CHAPTER I
INTRODUCTION AND RESEARCH DESIGN
1.1 Introduction

Agriculture is one of the most prominent sectors in the Indian economy as its share in employment generation and livelihood creation is incredibly high. Agriculture and its allied industry have a mainstay in India for more than 54.6% of the Indian population engaged in this sector (GoI, 2011). Agriculture is the chief source of livelihood and essence of growth of the Indian economy which accounts approximately for 14% of the Gross Domestic Product (GDP) of the nation (Nasurudeen, Kuruvilla, & Rajini, 2007). The agriculture and allied sector also contribute about 11% of the country’s export. Additionally, it is the principal source of income of the country and almost half of the population still depends on agriculture. The industry provides a source of raw material for a large number of industries also. To achieve an overall GDP target of 8% during the 12th Five Year plan and to meet the intensifying demand for food, the principal focus is to accelerate the growth of agricultural production (Kerala State Planning Board, 2017). For the overall growth of the economy, it is necessary to ensure an inclusive growth through restructuring the backward and rural population towards the track of the development and thereby increasing the incomes of those who are dependent on agriculture (Ministry of Agriculture & Cooperation & GoI, 2014). Despite the steady decline of this sector’s share in the GDP, still, agriculture is the critical economic sector that plays a significant role in the socio-economic development of India.

Constitutionally, agricultural maintenance and its development in India is a combined responsibility of both the States and Centre. Central Government’s role is to formulate essential policies and provide financial resources required to instigate the agricultural cultivation. The respective States and local bodies will collectively take up the responsibilities to execute strategies concerned with agriculture. Hence, both the sub-national and the federal governments together determine the prices of essential commodities to protect farmers’ interests. It also administers the other products such as petroleum, coal, nitrogenous fertilizers, etc. which are produced by the government-controlled companies. Other than these, all agricultural commodity markets operate under the regular forces of demand and supply. Additionally, the
monsoon plays a critical role in determining whether the agricultural harvest will be bountiful, average or weak in any given year in the Indian sub-continent. The entire rainfall in the sub-continent is concentrated for a few monsoon months.

Agriculture in India predominantly follows a mixed crop-livestock farming-system (Saleena, 2017). The livestock sub-sector supplements farm income by increasing the employment opportunities in farms and allied agro-based industry and service sectors; it also offers draught animals, supplies manure and so on. Recently, India has been observed to be one of the largest nations in the milk production, accounting for 17% of production thus turning to be an important secondary source of income for 70 million of rural households engaged in dairying (Ministry of Agriculture & Farmers Welfare, Department of Agriculture Cooperation & Farmers Welfare, & Directorate of Economics & Statistics, 2016). Agro-based food processing industry is the fastest growing agribusiness in India. As an effort to link up the relevance of this perception-based study with the farmers and their current socio-economic plight, it is imperative to know what agriculture is and how does it mean to India at large. Swaminathan (2016) goes on to elaborate agriculture as:

“Agriculture is not a commodity machine but the backbone of the livelihood security system in India, where 70% of the population is in the villages. So, agriculture is not just a question of economics and trade but of dignity and survival. We need to develop a long-term stake in agriculture. This will pay enormous dividends.”

Rationally, to substantiate this investigation into the ever-changing farming habits across the nation, the researcher is in the view that a comprehensive study must have been conducted on massive scale. Because, agriculture and the food sector in India need enormous investment in research & development, agricultural education, agricultural extension programs, irrigation, fertilisers, laboratories to test soil, water and commodities, and warehousing and cold storage system (Ministry of Agriculture & Farmers Welfare et al., 2016). The existing primary challenges in Indian agriculture system have been the non-sustainability of the present cropping pattern, insufficient management of water and soil resources, poor disaster management, and the usage of
obsolete technology. Furthermore, the majority of the unskilled farmers are unable to handle innovative and updated farming technology.

Practically, there is a wide gap in the yields of several agricultural commodities among the different Indian States. The yield gap between India and the rest of the world concerning agro-based production and distribution also needs to be bridged to ensure swift economic growth and development of the nation. The new economic reforms devised in India since 1991 had brought about the divide in the life of Indian farmers. The establishment of WTO in 1995 and its ministerial negotiations till the date has an ultimate role to play in the changing scenario. However, as things stand today, India need not be unduly perturbed about WTO conditional bonds. Yet, agriculture and allied investment since liberalisation in India have been reflecting on unique diversity.

1.1.1 Indian Agriculture in Recent Years

India possesses the second largest workforce in the world and has been striving to find novel ways and means to keep its escalating population adequately fed. India, mainly being an agrarian economy, is having deterrence in the form of declining productivity and also encounters challenges created by liberalisation (Nasurudeen et al., 2007).

The significant factors affecting agricultural productivity consist of agricultural land holdings, dependence on the monsoon, access to irrigation, the fertility of soil, access to modern technology in different parts of the country, formal agricultural credit, procurement of food grains by government agencies, and reasonable and remunerative prices to farmers (Deshpande, 2017). Major crops cultivated in the country are sugarcane, rice, wheat, oilseeds, ragi, cotton, jowar, bajra, sapota, coffee, coconut, pulses, rubber, spices, cashew, cauliflower, onion, cabbage, banana, mango, etc. Small and minimal operational holding is the main characteristic of the agricultural system in India; which is of household farmers in nature. It is reported that almost 85% of cultivated land has been fragmented into less than 10 hectares of land and about 60% of farmland is less than 4 hectares in size. In the present agricultural scenario, appropriate leveraging of accessible natural resources and harmonising it with the existing infrastructure to build an agro-based system which is suitable to the current situation is the need of the hour.
Awareness of the agricultural infrastructure, natural resources, utilising them effectively and sustainably through apt strategies and agrarian engineering can empower it to meet the growing demands and run into the challenges posed by several human and environmental factors (Alemu, Ayele, & Assefa, 2017). Perhaps, vigorous efforts to employ technologies to enhance productivity and to reduce the cost of cultivation can result in spectacular advancement in the production, the richness of major crops, and other agro-based activities in the country. For strengthening the agriculture sector, there needs to improve various elements like proper water management and irrigation, reclaiming the degraded land, bridging the knowledge gap about the new varieties of crop, and adequate use of fertilizers, agriculture diversification, promotion of dairy & fishery, providing affordable credit to the farmers, improving the market mechanism and focusing on land reforms (Sathe, 2009).

1.1.2 Agriculture Gross Value Added (GVA)
Central Statistics Office (CSO), Ministry of Statistics & Programme Implementation had released the New Series of National Accounts, based upon revising the base year from 2004-05 to 2011-12. As per the Provisional estimates published by CSO on 31.05.2016, the Agriculture and Allied sector contributed approximately 17.0% of India’s Gross Value Added (GVA) at current prices during 2015-16. Gross Value Added (GVA) of Agriculture and Allied sector and its share in total GVA of the country during the last three years including the current year, at current prices of 2011-12 series is as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>GVA of Agriculture and Allied Sectors</td>
<td>2012-13</td>
</tr>
<tr>
<td></td>
<td>1680797</td>
</tr>
<tr>
<td></td>
<td>2013-14</td>
</tr>
<tr>
<td></td>
<td>1902452</td>
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<tr>
<td></td>
<td>2014-15</td>
</tr>
<tr>
<td></td>
<td>1995251</td>
</tr>
<tr>
<td></td>
<td>2015-16</td>
</tr>
<tr>
<td></td>
<td>2093081</td>
</tr>
<tr>
<td>Percentage to total GVA</td>
<td>18.2</td>
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<tr>
<td></td>
<td>18.3</td>
</tr>
<tr>
<td></td>
<td>17.4</td>
</tr>
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<td></td>
<td>17.0</td>
</tr>
</tbody>
</table>

Source: Central Statistics Office, Ministry of Statistics and Programme Implementation, Govt. of India.
The sector showed a continuous decline in the share of the GVA in agriculture and its allied Sector. In the financial year 20012-13, it was 18.2, but it decreased to 17.0 percent in 2015-16. The expected outcome in a fast growing and structurally changing economy of this sector is in a falling nature (CSO, 2016).

Over the years, the growth in the Total GVA of the Economy and that in the GVA of Agriculture and Allied sector at 2011-12 basic prices is given below:

<table>
<thead>
<tr>
<th>Period</th>
<th>Total GVA</th>
<th>Agriculture &amp; Allied Sector GVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
<td>5.4</td>
<td>1.5</td>
</tr>
<tr>
<td>2013-14</td>
<td>6.3</td>
<td>4.2</td>
</tr>
<tr>
<td>2014-15</td>
<td>7.1</td>
<td>-0.2</td>
</tr>
<tr>
<td>2015-16</td>
<td>7.2</td>
<td>1.2</td>
</tr>
</tbody>
</table>

*Source: Central Statistics Office (Indiastats.com)*

While digging in the above Table:1.2, it is understood that the Agriculture and Allied sector witnessed a growth of 1.5 % in the financial year 2012-13, however, in 2013-14 it was 4.2%, it showed a negative -0.2% in 2014-15, and 2015-16 showed a positive growth of 1.2 percentage in at 2011-12 basic prices.

<table>
<thead>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Food Grains</td>
<td>244.5</td>
<td>259.3</td>
<td>257.1</td>
<td>265.4</td>
<td>252.02</td>
<td>251.57</td>
</tr>
<tr>
<td>2</td>
<td>Cereals</td>
<td>226.3</td>
<td>240.8</td>
<td>238.8</td>
<td>245.8</td>
<td>234.9</td>
<td>235.2</td>
</tr>
<tr>
<td>3</td>
<td>Pulses</td>
<td>18.2</td>
<td>17.1</td>
<td>18.3</td>
<td>19.3</td>
<td>17.15</td>
<td>16.35</td>
</tr>
<tr>
<td>4</td>
<td>Rice</td>
<td>96.0</td>
<td>105.3</td>
<td>105.2</td>
<td>105.4</td>
<td>104.4</td>
<td>109.7</td>
</tr>
<tr>
<td>5</td>
<td>Wheat</td>
<td>86.9</td>
<td>93.5</td>
<td>93.5</td>
<td>95.9</td>
<td>86.5</td>
<td>92.29</td>
</tr>
<tr>
<td>6</td>
<td>Oil Seeds</td>
<td>32.5</td>
<td>29.8</td>
<td>30.9</td>
<td>32.7</td>
<td>27.5</td>
<td>25.3</td>
</tr>
<tr>
<td>7</td>
<td>Sugarcane</td>
<td>342.4</td>
<td>361.0</td>
<td>341.2</td>
<td>352.1</td>
<td>362.3</td>
<td>348.4</td>
</tr>
<tr>
<td>8</td>
<td>Cotton</td>
<td>33.0</td>
<td>35.2</td>
<td>34.2</td>
<td>35.9</td>
<td>34.8</td>
<td>30.0</td>
</tr>
</tbody>
</table>

*Source: Directorate of Economics & Statistics, Department of Agriculture and Cooperation.*
Table: 1.3 reveals that the production of major crops in India during the period from 2010-11 to 2015-16. It also shows an increasing trend of production of rice and fluctuating trend reflected in the production of food grains, cereals, pulses, wheat, oilseeds, sugarcane, and cotton over the last six years. In the previous year 2014-15, it witnessed a decreasing trend of food grains, pulses, oilseeds, sugarcane and cotton while an increasing trend showed on crops such as cereals, rice and wheat.

1.1.3 Agricultural Background of Kerala

By virtue, Kerala is the southernmost state in India and is famous for its abundant resources like fertile soil, rainfall, pleasant sunshine, and humidity. The state has diverse climatic conditions ranging from tropic, sub-tropic to moderate climate and has been divided into 26 different agro-ecological zones. The topography of the land spreads over the Western Ghats, is well patented for its flora and fauna diversity and is famous as the ‘Biodiversity Paradise’. Despite these dynamic features, agriculture in Kerala is suffering from hurdles due to the declining of the number of cultivable areas, low productivity per unit of labour and prevalence of small and fragmented holdings. Being a state with nearly hundred percent literacy and a more significant percentage of highly educated youth, the agriculture sector in Kerala has been experiencing the hitches from young generation who prefer white collar jobs, which resulted in an aversion to the agriculture sector. Young farmers and agricultural workers pay little attention to the farming sector in the state due to the uncertainty in income, insecurity in farm production and the poor marketing networks.

Agriculture and its allied sectors stand as one of the critical areas of Kerala economy as they offer a source of livelihood for around two-thirds of the population and also contribute a fourth of the State Domestic Product (SDP). According to the studies conducted by Kerala Government, it is found that the emergence of export-oriented cash crops over food crops resulted in the reduction of the food crop to non-food crop area ratio from 64:36 during 1960-61 to 16:67 in 2009-10 (Saleena, 2017). The impact of climate change has severely affected the agricultural production and productivity to a great extent in the form of flood and drought (Habitat Advocate, 2011).
The studies also point out that many of the agricultural produces like rubber, coffee, tea, and spices produced from Kerala continue to hold its market outside the state. The presence of lush greenery in the State provides a better space for feed availability to the livestock and therefore forms an essential part of the agro production system. Homestead farming system by way of courtyard poultry, inland fishery and integrated farming by harmonising livestock, etc. are unique in Kerala (Department of Agriculture, 2013). It has been assessed that due to the rapid economic growth and shift of emphasis to the service sectors the overall role of agriculture in the economy has been diminished. Like the other Indian states, there is no exception as Kerala has also seen a drop in the contribution of agriculture and its allied services to overall Gross State Domestic Product (GSDP). It was about 30% in 1990-91, that reduced to 10.6 % in the year 2010-11 (Kerala State Planning Board, 2017). The agricultural sector in Kerala has undergone – changing scenarios over the years; thus, the transformation had begun since the late 1970s (Department of Economics & Statistics, 2015). There was a decline in rice production and investment in rice; consequently, the significant portion of the land was shifted to the cultivation of perennial tree crops and also seasonal crops. Profitability of crops is decreasing because of the demand for higher wages by the farm workers, rising price of land and uneconomic size of the operational holding areas (IBEF, 2013). A High density of population and also the growing pressure on the land is rapidly making farming activity in the State a non-profitable occupation. Kerala being a consumer state depends upon its neighbour States like Tamil Nadu, Karnataka, Andra Pradesh, and Telangana for food grains.

The state is yet to achieve self-reliance in food production - that resulted to a high level of food insecurity in the State. Besides that, increasing urbanisation, declining agricultural growth together with declining profitability in the agriculture sector, and the shrinking of agrarian land also pose a severe challenge to the food security of the State. Many of the grain producing areas of Kerala has declared ‘Rice Holidays’ that further deteriorates the present condition. Technological backwardness, ignoring agriculture due to the focus on the tourism sector, labour conflict, improper disaster management services and absence of proper support from the government for protecting farmer’s interest are the significant obstacles encountered by the agricultural producers and distributors in the state (Department of Agriculture, 2013). However, the agro-based system has been re-defined on account of new global
spectacles like globalisation, the materialisation of assimilated value chains, rapid technological and the institutional innovations, the emergence of livelihood, food security concerns and environmental constraints. A paradigm shift is must to transform the traditional system of agriculture into a modern sector by adopting the scientific technology, thereby enhancing quality and quantity of agricultural commodities and services with the social enhancements. To ensure inclusiveness, sustainable and overall growth and development of the Indian agrarian system, the main prerequisite is, therefore, a major shift from the conventional agriculture structure to a modern and hi-tech farming and non-farming activities that would boost the performances and productivity of agriculture sector.

1.1.4 Performance of Kerala Agricultural Sector

Over the years, the performance of agriculture sector showed a steady declining trend in the area of cultivation, production and productivity emphasising on the post-economic reform period (Geetha, 2006). The expansion of agricultural production rate in Kerala was remarkably higher during the eighties (Sakeer, 2011). More spectacular was the rising trend in the output of non-food grains, particularly during the second half of the decade. However, during the nineties, the growth rate of agricultural production slowed down considerably. Food grains output failed to keep pace with the population growth and consequently, the per capita availability of food grains has declined. These broad trends in the growth rates of agricultural production were directly or indirectly associated with a series of related issues like input supply, markets, price policy, trade policy, etc. A quick look at the growth patterns in the area under various crops reveals that the share of gross cropped area under rice has consistently come down. Such a decrease is primarily because of the growing dominance of cash crops like coconut and rubber. As a result, the state has 50 percent short in rice production compared to consumption requirements.

The growth of the agricultural sector continues to witness volatility. Food grain production in the state has been declining year after year. In recent years, the prices of many of the food and non-food crops have been dropping or fluctuating due to the removal of quantitative restrictions on imports. The state has been losing its prominent role in the export of traditional agricultural commodities such as pepper, cardamom, cashew kernels, and tea (Kerala State Planning Board, 2017). The other
major problems facing the agriculture sector include the high cost of cultivation, too much attention paid to commercial crops, low productivity, high land cost, and the decrease in the size of the farm holdings. Given the pathetic condition of the economy, the state initiated many reforms starting in early 2001. Since then Kerala has announced reform measures in the sectors like agriculture, industry, government finances, infrastructure, Information Technology (IT), labour, tourism, etc. In the agriculture sector, many incentives were offered to the biotechnology sector. The government has established an Agri-Export Zone for the export of vegetables and fruits.

1.1.5 Investment and Agricultural Investment
Technically, investment means using the money for purchasing assets with the hope of generating income in the future or for increasing its value over a period. Investment, in other words, is forgoing consumption in the present to pursue a higher level of income in the future. It includes the purchase of stocks, shares, bonds and securities, the acquisition of real property like residential, agricultural or other commercial lands, real estates, machinery, equipment, and transport for commercial purposes. Accordingly, investment can be understood as activities that result in the accumulation of capital that is capable of yielding a stream of returns over a period. In economic growth theory, initiated seventy years ago by Harrod & Domar, investment is merely a change in capital stock or fixed inputs used in a production process (Harrod, 1939; Domar, 1946). From the 1940s to the present, the Harrold and Domar growth formula has been extensively adopted and used for calculating target rates of investment in economic planning and development. Robinson (1956) stated that investment is an addition to capital, which occurs when a new house or a new factory is built. Investment means making an addition to the stock of goods in existence and it is the part of production not merely replacing past sales but is directed to increasing the rate of output in the future.

1.1.6 Agricultural Investment Portfolio
An investment portfolio means that collection or combination of assets owned by the individual or by an institution. It is the grouping of financial assets like stocks, bonds, commodities, currencies and cash equivalents, etc. in addition to their fund equivalents including mutual, exchange-traded and closed funds. A portfolio can
also implicate non-publicly tradable securities, like the real estate, art, and private investments. Investing in agricultural portfolios in the study signifies various combinations of the factors or variables, which are directly or indirectly influencing the agricultural growth. Here it brings in the importance of agricultural portfolio mix which would be used to minimise risk and maximise return in the farming activities. Investors should construct a favourable investment portfolio per their investment objectives, cost, risk tolerance and the yield. The selection of the variables very much depends upon the factors affected to the investments like land, labour, equipment, money, climatic variations, fluctuating demands of the agricultural commodities, etc. The selection of portfolio is substantially subject to the region or area where an investor/farmer is ready to invest in their money in the form of farm investment or any other agricultural activities. Hence, selection of portfolio or the combination of the variables different from one area to another, some investment type to another. Investors can also have multiple portfolios for various purposes. In this study, it’s the building of agriculture investment portfolio considering the variables such as Size of the agriculture investment, Preference in investment period and technology used, Risks involved in the investment, Decision taken by the investor in the proper time related to the investment, and also which methods suitable for the area of investment. These all are significantly affected to the agricultural growth that depends on various physical, economic and governmental factors. (Williams, 1938) observed in his study that the future dividends of a stock or an interest, and principal of a bond may be uncertain. He also said that, in this case, probabilities or chances should be assigned to several possible values of that security and the mean of these values can be used as the valuation of the security.

Adding to it, Markowitz (1952) explained the portfolio selection proposed, expected (mean) return = E, and the variance of return = V, of the portfolio as a whole, as criteria for portfolio selection, together as a possible hypothesis around actual behaviour and as the maxim for how investors ought to act. (a) The expected return on the weighted average of expected returns on individual securities and (b) The variance of return on portfolio is a particular function of the variances of, and also the covariance’s between, securities and their weights in the portfolio.
1.1.7 Modern Portfolio Theory: Mean-Variance Optimization

For determining the role of agribusiness assets in a mixed-assets portfolio, consider signing on the modern portfolio theory (MPT), mean-variance optimisation is done. Applying the fundamental principle that most investors desire to earn bigger rather than lower returns, and prefer lower risk rather than huger risk, Markowitz, (1952) noted in his developed theory. An efficient portfolio showed that different assets could be combined to produce an 'efficient' portfolio that will provide the highest level of portfolio return for any given level of the portfolio risk, with risk measured by the variance or the standard deviation. Alternatively, an efficient portfolio gives the lowest level of portfolio risk for a given level of portfolio return. These portfolios can be related to what is known as an 'efficient frontier' (Markowitz, 1952; Johnson, 2006). An efficient frontier that represents the boundary of the risk/return set of the asset combinations. The frontier is a plot of all the efficient portfolios along with the range of risk levels (Standard Deviation = SD), and the return levels between the minimum risk portfolio (A) and the maximum return portfolio (B). Inefficient portfolios are those below the efficient frontier line that could improve their return without increasing risk or decrease risk for the same level of return.

Figure: 1.1

1.1.8 Building an Agricultural Portfolio

Despite the recent poor financial performance of agriculture and overall sectorial negative growth, farming sector urgently needs to set up or build a portfolio suitable to the system or method for the farmers or investors to attain a favourable return
through the best performing agricultural operations to overcome the dangerous situation faced by the farmers or the sector as whole. The sectoral growth relatively moves or drives to the growth of other industries and also leads to the economic development of the region through the state further. With the help of variables or factors, this sector should form part of a well-diversified portfolio.

Building an agricultural investment portfolio based on the region or the level of investment with the combination of factors like Investment Size, Investment Preferences, Investment Decision, and Investment Risk consideration of the physical, economic and various governmental factors which is inevitable towards agricultural growth. It will undoubtedly give exact route to reach the destination point of riskless return or the risk-return adjustment area through suitable crop portfolio diversification strategies.

1.2 Statement of Problem

Today, Indian agriculture especially needs more public investment and policy support in several areas to overcome the current structural weaknesses such as the low scale of operations, the poor state of rural infrastructure, lack of product diversification, low R&D spending, low productivity, the absence of marketing infrastructure, and inadequate financial support, primarily because of the big decline in public investment in the sector, post-reform. According to GOI report (2016) the share of agriculture and allied activities in the country’s GDP has steadily declined from 32.2 percent in 1990-91 to 24.3 percent in 2001-02 and 15.4 percent in 2015-16. However, more than two-thirds of the country’s population continues to depend on this sector even now, and it employs 60 percent of the productive workforce. Clearly, this tendency means that the overwhelming majority of the population, which depends on agriculture for its livelihood, is getting increasingly impoverished.

The agriculture in India has been witnessing a fast-changing investment strategy which has a real influence on India's total international and domestic trade. Indeed, globalisation has had its ultimate impact on the agriculture, and the concept of free trade and investment has been visualising a diminishing trend in prices of agricultural commodities, which results in decreasing investment in agriculture and diverting to some other sectors. To exploit the opportunities of globalization, the developing
economies are thinking of diversification of their investment not only for profit-making but also to compensate losses rather than meaningless resistance. The diminishing trend in agriculture investment could merely visualise the rapid growth in other sectors.

Being in the very same line, Kerala has also been undergoing through radical investment pattern changes; with no exceptions to agriculture. Being a consumer State, Kerala should certainly pay more attention to its agricultural output to help achieve self-reliance, though it is nearly impossible. Nonetheless, a meagre number of farmers are only still choosing to farm because of the alternative employment availability in the Gulf countries. Earlier, such farmers were used to relying on or cultivate hardly a single crop all through the year which could not necessarily yield the best. Here, there is an interesting side-line situation as the farming strategies have been changed to cultivate multiple crops in the same land to align with the suitable climate fluctuations. For a researcher, it is the duty to contextualise the dynamic investment practices in farming and dwell on to see how farmers are adapting to such situations is as extremely important as analysing the past agriculture yield.

1.3 Need and Scope of the Study

From the relevant studies which are conducted according to the situations of Indian or Kerala agriculture are mainly based on the problems and prospects of agriculture and its priority after liberalisation but there was considerably less number of studies telling various strategies to be followed while investing in agriculture. The investigation on “Changing scenario in investing portfolio of agrarian societies” is focusing on the diversification strategy of Kerala, especially in Malabar region. Globalization has, in fact, its ultimate impact on agriculture, which results in decreasing investment in agriculture and diverting to some different sectors. This study describes the current status of the selected crops and their various trends in cultivation, such as entire paddy culture is decreased by 1/4th, and 1/3rd, of them, diverted to area coconut cultivation, showing a diminishing trend. In rubber the new plant and replant trend shows high variations since 1991 as the total of the both were 20800 ha in 96-97 which was decreased by 9600 hr in both 2001 and 02 and 10600 hr in 2004-05 and the profound reduction noted from the later years also (Government of
Kerala, 2016). The cases of other crops are facing the similar threat will also be under the study. Typically, on a macro scale, Kerala's agricultural numbers have been observed to be an outlier because of its nature of being consumer state. In such a situation, the research is rigorously aiming to shed the lights on the overall agricultural profile of Kerala in its broad theme.

**Scope of the Study**

The study on “Changing scenario in investing portfolio of Agrarian Societies” would cover a span of almost two decades, i.e. from 1991 through the 2016-17 as per the availability of the apt statistical figures which are fundamentally created for a compact base of this perception-oriented research. This time span would be more than sufficient to find out the past trends in the performance-related aspect of economic liberalisation vis-à-vis and its impact on agricultural investment strategies. The researcher is fully aware of the fact that the wholesale reforms have been affected across the agriculture sector. This study is a sample survey of selected districts of Kerala, i.e. Malappuram, Kozhikode, Palghat and Wayanad, which are dominating in separate and diversified crops. In this study, an earnest attempt has been made to analyse the diversified investment strategy of agrarians in India with particular reference to Kerala; which has unique importance in the national map. The instability in the price-level of agricultural commodities like coconut, areca nut, pepper and paddies led to a lower Returns on Investments (ROI) from agriculture which is even lower than the bank rates.

In a nutshell, hypothetically, the reasons of such quick changing pattern are not only of the economic factors but also the influence of many other social factors like gulf migration, complete literacy, to name a few. Considering the globalisation in the broad horizon and its impact has also caused a sudden change in the investment pattern of the agriculture post-economic reforms in the early 1990s. In the bottom line, household farmers are the ones who can experience and react to the changes in the sector in particular. Therefore, the study has considered taking household farmers' direct perception about such changes experienced over time. To delimit the study on to a specific area, the scope of this study is particularly paying attention to crop diversification practices. To reiterate, the researcher is of a strong opinion that these four districts would be able to represent the total districts of Kerala. To delimit the
study, the investing portfolio of farmers is strictly focused down on to the crop portfolio diversification while leaving other investment made by the same household farmers remained untouched or disregarded. The following objectives justify the scope of the study as well.

1.4 Objectives of the Study

The broad aim of this study is to identify and understand the level of awareness about farming investment portfolio among the farmers. In numerous situations, such a farming portfolio construction has been a challenging task because of many reasons. However, the study earnestly attempts to investigate how farmers are reacting to such challenges and opportunities around the agricultural investment. To dig in deep, the present study explores five specific objectives. They are as follows:

- To analyse the factors influencing the changing pattern of agriculture investment strategies among agrarians of the Malabar region.
- To study the effect of various demographic factors on the Agriculture Growth Perception of agrarians in the Malabar region of Kerala.
- To examine the impact of crop portfolio diversification and its underlying factors in the wake of changing scenario in agriculture investment strategies.
- To analyse the growth trend of different cropping systems in the State.
- To suggest strategies for strengthening agriculture and allied sectors in Kerala.

1.5 Definition of Key Terms

The researcher has predefined specific terms which form the fundamental conceptual ground for the research going forward; which will help the researcher and reader to delineate the study and to decode and will prompt further thinking on the research done. Following are the essential technical glossaries broken down to define the study – this portion will provide succinct and precise definitions of the variables and the core technical words used all through the study. Particularly after covering this part, the study will be able to convey the idea and benchmark the work fairly. This portion can be used as the glossaries that are available for quick references to clarify any conceptually related matters.
Investment: The word "investment" maybe be defined in many ways by different theories and principles (Sahan & Mikhail, 2012; Syed & Miyazako, 2013a; Williams, 1938). To be more specific, investment is the application of money for making more money in the future. From an economic perspective, investment is the utilisation of available resources to augment income or production output down the line (Johnson, 2006). Putting it into finance perspective, the practice of investment refers to the buying of a financial product or any valued item with anticipation that positive returns will be received in the future. Future is always uncertain, and one must determine the quantum of risk that he/she can bear since the higher return is associated with accepting more risk (Dasgupta, n.d.).

In farmer's point of view, they invest their hard-earned money in land in which they cultivate, farming and yield processing equipment, building, etc. Investing in all such activities is done by their expectation of better return in the future. So, they forgo the present value of money to recoup better returns.

Agriculture Investment: Agricultural investment is mainly involved with investing funds in agricultural and allied activities by government, public or private investors to generate incomes leading to capital formation in the sector. At a global scale, there is growing evidence that tells the productive investments in the agricultural sector especially in the developing countries can substantially reduce poverty and hunger. Many factors like availability of land, finance, quality labour and other agro-infrastructure; the legal and institutional framework prevailing in the country; the terms and conditions of the investment and the socio-economic conditions in the investment area determines the growth of this sector (Kahn & LeZaks, 2014). Agricultural development to a great extent depends on the synchronised growth of farm-level production and productivity and the value chains linked to it (Syed & Miyazako, 2013b).

Agricultural Investment Portfolio: As the name "portfolio" indicates, putting each egg in as many available baskets as possible rather than making a single bucket for all. It merely implies that diversification and a probable security for the investment. Same can be applied to an initial and subsequent agriculture investment scenario by indulging into merely one crop with full investment that can push the farmer into an
edge of massive investment risk (Karunakaran, 2014). A well-diversified and thoughtful agriculture investment in yields by considering the cost, return, marketability, etc. can make the farmer relieved from huge potential loss of investment (Abro, 2012).

**Agrarian Society:** An agrarian society (or agricultural society) is a group of people whose economy is based on producing and maintaining crops and farmland. In other words, is a society whose wealth and prosperity are primarily based on agriculture (Cervantes-Godoy & Dewbre, 2010). More than half of the people living in that society make their living by farming (Crossman, 2017).

An agrarian society focuses its economy primarily on agriculture and the cultivation of large fields. This inherent feature distinguishes it from the hunter-gatherer society, which produces none of its food, and the horticultural society, which produces food in small gardens rather than fields. In this study, the word "agrarian society" may be replaced by "farmers", "cultivators", "house hold farmers" or "agrarians".

**Investment Size:** Size also has several implications on the performance related to transactions and investments (Thomas, 2009). The size of investment should also become an issue (eventually) for strong and growing assets which the funds are pooled in. Likewise, agriculture and its scale of investment is also a highly important factor to be considered to understand the overall changes over the years (Jagongo & Mutswenje, 2014).

Being one of the essential predictor variables under study, the respondents are asked to give their opinion about the investment size which constitutes the overall perception of the agricultural growth. To elaborate the study, there are many proxy measures to understand the investment such as amount invested in agrarian activities to spend on land, money needed to pay off workers, the amount invested in agricultural equipment, cost of pesticides used in farming and cost of modernisation of farms
**Investment Preferences (IP):** Plenty of studies have been carried out to study the investment preferences and practices of the individual or retail investors. Generally, preferences and thereby practices vary from person to person. Lewellen, Lease, & Schlarbaum (1977) added that age, sex, income, and education affect investor's preferences. Another study by Rajarajan (2000) revealed an association between lifestyle clusters and investments. Gandhi (2015) viewed that designing a portfolio is much more than merely picking up for investments. A portfolio builder needs to bear the psyche of his client in mind while building a balanced portfolio, he also noted.

For the study, IP is the second crucial independent variable on which the respondents are asked to give their opinion. The perception towards the return on the investment period over the period, crop diversification, labour intensive technology, risk preferences, Hi-tech farming, are treated as the proxy measures to understand the variability (Gandhi, 2015).

**Investment Decisions (ID):** The investment decision-making process of individuals has been explored through experiments by group of researchers over the years. The research unanimously concluded that the skewness of the return distribution significantly influences the risk perception of individuals (Weston, 1973). It implies that while taking investment decisions, investors are concerned about the possibility of maximum losses in addition to the variability of returns (Barua & Srinivasan, 1988). Investors may range from confident to anxious (Harikanth, D. & Pragathi, 2012; Jagongo & Mutswenje, 2014). Method of action is reflected in how methodical investors are, as well as how analytical and intuitive they are.

Being the fourth critical independent variables of the research, investment decisions with regard to income generation, growth & expansion need, wealth creation, high yield variety, safety of investment, periodic return, securing future, ease of getting fund, liquidity requirements, profitability, use of new technology, risk factors, subsidies and grants, & unique benefit for farmers are treated as the proxy measures to understand the agrarian perception on investment decision.

**Investment Risk (IR):** The term 'risk' in the context of investment refers to the inconsistency of the expected return. It is an earnest effort to quantify the profitability
of the actual performance being different from the anticipated return. Broadly, a risk is said to be made up of three components: business risk, financial risk and liquidity risk (Seethapathi, Suryanarayana, & Subbulakshmi, 2003). Another related research understands that financial wealth had a significant and positive impact on the average level of risk chosen in a portfolio. As it was an additional measure of financial sophistication, they again confirmed the conclusion that more sophisticated investors entertain a higher average level of portfolio risk (Shukla, 2016).

Linking the investment risks and returns up with agriculture, researcher observed independent variables such as environmental, financial & marketing, and political risks and are analysed for their impact on the agriculture growth perception. Putting all of them together as the proxy measures of the study, environmental risks include change in weather, crop loss due to the landslide, flood, drought, wind, etc. are taken into consideration. Secondly, Financial and marketing risks comprise of rate and variation of loan interest, repayment period, lease rent agricultural land, cost of farming inputs, input processing costs, fluctuation in commodity prices, etc. Finally, Political risk includes ever-changing taxation policies, legal barriers like import and export, government loans, grants and subsidies.

*Crop Diversification Portfolio:* A well-diversified wise agriculture investment in crops by considering the return, cost, marketability, etc. can make the farmer relieved from substantial anticipated losses of the investment (Abro, 2012; Karunakaran, 2014). Besides, a global portfolio provides exposure to a diverse variety of markets, crops, growing seasons, weather, economies, currencies, and governments — reducing the impact of changes in any single area for different types of farming commodities (Coleman, 2007; Johnson, 2006). A portfolio can be further diversified among different classes of agricultural investments, each with distinctive risk and return characteristics. These include raw crops and Permanent crops.

- **Raw crops:** Such crops are planted and reaped annually and include grains and oilseeds such as corn, soybeans and wheat (Chand, Jha, & Mittal, 2007). Naturally, raw crop investments produce more stable income returns over time since planting decisions can be made yearly. Some raw crops, such as corn, soybeans, and sugarcane, are also used in the production of alternative fuels.
Due to the lower risk profile compared to permanent crops, raw crops often serve as the core of a diversified portfolio.

**Permanent crops:** Perpetual crops, such as wine grapes, nuts, citrus, apples, and cranberries, have a long lifecycle, typically 25 years or more. They mature three to seven years after planting, so there is usually a lag between investment and realisation of returns (Exim Bank, 2007). Roughly 70% to 80% of the value of the investment is above the ground in the form of a tree or vine that makes replanting annually cost-prohibitive. These crops historically have delivered higher average income returns than raw yields, but they also have experienced higher volatility on a year-to-year basis.

As the last independent variable which is distinguished and its understanding among the farmers are also asked. Proxy measures such as risk diversification and cultivation, solid return, human hours and timing investment, investment pattern, climatic influence, labour investment including training and development, etc. are covered in this part, thereby, farmers are instructed to give their perception on them.

**Agriculture Growth Perception:** The perception of investors or agrarians differs from different diverse factors like age, income, the experience of investing, investment objectives and individual social needs (Haritha & Uchil, 2016). The perception of individual elements concerning different macroeconomic variables seems to be disturbing the market behaviour (Dasgupta, n.d.).

Sindhu & Kumar (2014) added that in all types of financial investments there is variability in the actual and expected returns due to risk and hence risk perception of investors is an essential factor that influences the investment decisions. In the same paper, the factors affecting the risk perception of investors are identified viz, the unpredictability of returns, knowledge about the financial assets, the chance for incurring the loss, diversification of portfolios, etc. Usually, where comparisons have been attempted, public spending on agricultural R&D outperforms other federal expenditures in agriculture, such as extension, irrigation, and fertiliser subsidies, in terms of raising agricultural productivity (UNCTAD, 2015).
The research design has identified the agriculture growth perception as the only the dependent or outcome variable. The farmers were provided with 20 statements relating to physical, economic and governmental factors to measure their understanding towards agricultural growth view. The researcher also studied the relations between such sub-scale linked judgement of the farmers in the Kerala State and their investment decisions in agriculture. However, physical factors like land, climate, & favourable topography, economic factors like level and availability of finance, costs, capital formation, cheap labour availability, and farming infrastructure & Govt. factors such as R&D activities, training and development, subsidies, import-export etc. are also to be seen as the underlying factors and itemized for the agriculture growth perception

1.6 Hypotheses of the Study
According to Kerlinger (1986), 'A hypothesis is a conjectural statement of the relationship between two or more variables'. Further (Cooper & Schindler, 2014; Danghi & Dewen, 2016; Zikmund, 2012; Zikmund, Babin, Carr, & Griffin, 2013) views that a hypothesis is written in such a way that it would be proven or disproven with valid and reliable data.

The primary motive of the study is to investigate the impact of investment and related variables on agricultural growth in the region under study. As per the detailed literature review, the researcher identified one single dependent variable which is an agrarian growth perception (Ramakumar, 2006). Thus, firstly, to make sure that the researcher has carried out the work adhering to the research ethics with no bias - the assumptions are laid down as there are no differences in the agriculture growth perception across the demographical aspects such as age, gender, locations, etc. of the respondents. Secondly, different independent variables identified are related to the dependent variable: agriculture growth perception. To put it clearly, the study will look through the impact of such independent or predictor variables on the dependent variables or outcome variables. Finally, the critical focus of agricultural portfolio mixes and its effects on the agriculture growth perception of agrarian society will also be examined. As in the statistical testing, the first step is to define the Null
Hypotheses ($H_0$) of the study. Therefore, predefined Null Hypotheses are provided below:

$H_01$: There is no significant difference in Agriculture Growth Perception across various demographic variables of agrarian society in the Malabar region of Kerala.

**Sub-Null Hypotheses**

- $H_{01.1}$: There is no significant difference in Agriculture Growth Perception across various Age categories of agrarian society in the Malabar region of Kerala
- $H_{01.2}$: There is no significant difference in Agriculture Growth Perception across gender category of agrarian society in the Malabar region of Kerala
- $H_{01.3}$: There is no significant difference in Agriculture Growth Perception across different educational groups of agrarian society in the Malabar region of Kerala
- $H_{01.4}$: There is no significant difference in Agriculture Growth Perception across various localities of Agrarian society in the Malabar region of Kerala
- $H_{01.5}$: There is no significant difference in Agriculture Growth Perception across various farming experience level of agrarian society in the Malabar region of Kerala
- $H_{01.6}$: There is no significant difference in Agriculture Growth Perception across various Farm Income groups of agrarian society in the Malabar region of Kerala
- $H_{01.7}$: There is no significant difference in agriculture growth perception across various Crop Investment levels of agrarian society in the Malabar region of Kerala

$H_02$: There is no significant impact of Crop Portfolio Investment on Agriculture Growth Perception of agrarian society in Malabar region of Kerala

**Sub-Null Hypotheses**

- $H_{02.1}$: There is no significant impact of Crop Diversification Portfolio on Agriculture Growth Perception of agrarian society in the Malabar region of Kerala
**H_02.2**: There is no significant impact of investment decisions on Agriculture Growth Perception of agrarian society in the Malabar region of Kerala  
**H_02.3**: There is no significant impact of investment size on Agriculture Growth Perception of agrarian society in the Malabar region of Kerala  
**H_02.4**: There is no significant impact of investment risk on Agriculture Growth Perception of agrarian society in the Malabar region of Kerala  
**H_02.5**: There is no significant impact of investment preferences on Agriculture Growth Perception of agrarian society in the Malabar region of Kerala

1.1.15 Variables of the Study

Through the initial observations into the problem, the investigator is mainly looking at the attitude or awareness of farmers about the crop portfolio and its impact on their agricultural income growth. To justify this study, first and foremost, the study has to pre-decide what all aspects are covered in the questions. Hence, a details variable analysis has been conducted. More specifically, variables are just things that can change (or vary); they might differ between people (e.g., IQ, behaviour) or locations (e.g., unemployment) or even time (e.g., mood, profit, number of cancerous cells) (Field, 2013).

A variable which is normally a "cause" is known as an independent variable (because its value does not depend on any other variables). Through the study, the researcher has found out six independent variables as given in the figure 1.4 given below. According to the same author in another edition of book, A variable that we think is an "effect" of something is called a dependent variable because the value of this variable depends on the cause (predictor variable) (Field, 2009). In this study, the researcher has only one dependent variable: Agriculture Growth Perception as promptly depicted in figure 1.4 below:
### Table No: 1.4
Dependent and Independent Variables of the Study

<table>
<thead>
<tr>
<th>Dependent Variable (DV)</th>
<th>Independent Variable (IVs)</th>
<th>Type of Data</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agriculture Growth Perception</strong></td>
<td><strong>Demographic Variables:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Locality</td>
<td>DV: Continuous (Interval Scale)</td>
<td>One Way-ANOVA</td>
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<td></td>
<td>2. Gender</td>
<td>IVs: Categorical (Ordinal: Age, Education, Years of Experiences, Earnings) (Nominal: All Others)</td>
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<td></td>
<td>3. Educational Qualification</td>
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<td></td>
<td>4. Years of Farming Experience</td>
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<td></td>
<td>5. Farm Earnings</td>
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<td></td>
<td>6. Age</td>
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<td></td>
<td>7. Crop Investment</td>
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<td></td>
<td><strong>Crop Portfolio Investment Variables</strong></td>
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<td></td>
<td>8. Investment Preference</td>
<td>DV: Continuous (Interval Scale)</td>
<td>Multiple Regression</td>
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<tr>
<td></td>
<td>9. Investment Size</td>
<td>IVs: Continuous (Interval Scale)</td>
<td></td>
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<td></td>
<td>10. Investment Decisions</td>
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<td>11. Investment Risks</td>
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<td></td>
<td>12. Crop diversification Portfolio</td>
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</tbody>
</table>
Figure No:1.2
Variable Relationship Model

- Agriculture Growth Perception
- Crop Investment
- Demographic Variables
  - Educational Qualification
  - Years of Farming Experience
  - Years of Farming Experience

- Variable Relationships:
  - DV (Dependent Variable)
  - IV (Independent Variable)

- Note: IV=Independent Variable, DV=Dependent Variable
1.7 Research Methodology and Design

Research methodology is a broad process consisting of systematic, disciplined, and scientific procedure adopted by the investigator to investigate into an unknown phenomenon and give a valid solution for the problem under study. In a broader perspective, Singh (2006) explains research as it comprises of a mapping strategy of research covering different steps such as identifying problems, literature review, formulating hypotheses, the procedure for testing hypotheses, determining the sample design, measurement, collection and analysis of data, interpreting results and drawing conclusions. To put it in micro or a firm's view, research is a process of planning, acquiring, analysing, and disseminating relevant data, information, and insights to decision makers in ways that mobilize the organization to take quick and agile action that, in turn, maximize performance (Cooper & Schindler, 2014).

The forthcoming section of the chapter brought out the nature of the research methodology and the subsequent suitable design built up and devised to further research into the problems identified in the initial observations. During the initial stage of the study, the investigator adopted an exploratory design to throw conceptual clarity on the investigation. While doing an extensive literature review, the researcher found the nature to be empirical and theoretical in general. Towards the end, based on the data collected and subsequent data analysis & interpretations, the same research turned out to be both descriptive as well as inferential in nature as it used descriptive as well as inferential statistics, i.e., regression analysis.

1.7.1 Primary Data

Based on the research questions generated out of the initial observations, a set of investigative questions are formulated that are to be filled out by the respondents (household farmers) during data collection. So, the primary data here, in this case, consisted of data collected through structured questionnaires which are administered to the target respondents. Data has been obtained from 10 out of 20 Taluks belonging to 4 districts which cover the major of the Malabar region. After the pilot study, some of the irrelevant variables from the demographic variables are dropped and went ahead with the rest of the variables defined.
1.7.2 Secondary Data
Towards evidently finding the solutions for the research problem under study, the researcher always has to relate his/her refined data to its objective and hypotheses drawn in the earlier stage of the research. Therefore, the same researcher may need the help of a compilation of both the primary and secondary to justify the conclusions arrived in the end. In the present study, many secondary data are sourced to back up the study. The secondary data include the information collected from the database of Central Statistical Organization (CSO), Directorate of Economics & Statistics – Kerala, Dept. of Agriculture and Cooperation – Kerala. Past published and unpublished resources available at ministerial databases such as Public Information Bureau, Ministry of Commerce & Ministry of Agriculture – Govt. of India, Dept. of Agriculture & statistics of Kerala are collated in. In addition, much lower information database from Kerala State and District Level Planning Boards; Districts Census Handbooks are cascaded in. Offline Journals and reports especially Economic & Political Review, Previous year Economic Reviews are considerably used all through the study. Many online resources are also considered to key in numbers into the study. Websites such as Indiastats.com, agristats.com, keralastats.com, mapsofindia.com, etc., are being used to articulate the current situation of agriculture growth in India as well as in Kerala. Besides all, the investigator also used unpublished theses, offline journals, books, etc. that are openly available.

Additionally, agricultural engineers and experts, Kissan Bhavan\(^1\), go-betweens, wholesalers, and agri-product manufacturers, etc. had also given their constructive inputs towards the research, though they were not formed part of the observation.

1.7.3 Data Collection Tool
To collect primary data, a structured questionnaire has been constructed to know the attitude of farmers about the investment portfolio and its change over the time. The questionnaire is mainly divided into three parts per data analysis plans. Firstly, it consists of 9 demographical variables which help the researcher to apply the descriptive statistics. However, the researcher did not choose all such variables to go

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\(^1\) Kissan Bhavan – Government owned institution to help and promote farmers at local body, municipality, district and corporation level.
ahead with the analysis. In similar way, Part two has been spared to understand the level of perception of the respondents about the investing portfolio and their impact on the agriculture growth perception; have been analysed in the data analysis section. In order to assess the awareness level, 67 questions in the *Five-Point Likert Scale* have been used to collect and collate for the analysis. All these are taken up to study the relationships and impact between variables. More precisely, the respondents are asked to provide their opinion on different factors which constitute towards their agriculture growth perception. However, some of the responses out of the total items are not relevant to the overall theme of the study, but it was asked to keep the questions logically arranged. Thus, all such questions in the questionnaire would not be analysed one by one.

**1.7.4 Measurement of the Data**

As clearly stated above, the data are itemised as per the five-point Likert Scale. It tells the way how the researcher decoded the perception of the respondents into a quantitative form. Such measurement of data helps illustrate the type of variables, scalability of data, i.e., whether they are nominal, ordinal, interval or ratio, and appropriate statistical tests to be applied. Here, each question would be a statement carrying 5-point Likert scale; 'Highly Increasing', 'Increasing', 'Neutral', 'Decreasing', and finally 'Highly Decreasing' (HI, I, N, D, and HD, respectively) and 'Strongly Agree', 'Agree', 'Neutral', 'Disagree', and 'Strongly Disagree' (SA, A, N, DA, and SDA, respectively). Putting it numerically, the researcher assigned scores as $HI = 5$, $I = 4$, $N = 3$, $D = 2$, and $HD = 1$. Likewise, $SA = 5$, $A = 4$, $N = 3$, $DA = 2$, and $SDA = 1$ also followed for such items under such indicators. In contrast to the statistician's opinion, these scales are strictly considered to be interval scales to apply parametric tests and further analysis.

**1.7.5 Type of Universe**

The researcher has not clearly defined the total population or universe for the study due to the out-dated database. Though the whole samples drawn cannot offer an exactitude of the population number, researcher considered each District Census Handbook - 2011 to get the total cultivator's number residing in the area under study. Thus, it has been estimated to be around 40,000 (approximate) cultivators are there in the region under study.
1.7.6 Sampling Size
Sampling Size for the study is 508 farmers distributed across four districts in the Malabar region. For the primary data research, the total population constitutes the entire registered and unregistered farmers living in four districts of Malabar region. As aforementioned, complete population coverage is impossible, the researcher followed Cochran (1977) model to decide the sample size. Cochran had developed a formula for calculating the minimum sample size when the population size is found to be infinite. The below is the formula used to find standardised Cronbach's Alpha:

\[ n_0 = \frac{Z^2pq}{e^2} \]

\[ n_0 = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} \]

\[ \therefore n_0 = 384 \text{ Farmers} \]

Where, \( n_0 \) is the sample size; \( Z \) is the selected critical value of the desired confidence level; \( p \) is the probable proportion of an attribute existed in the universe; \( q \) is equal to \( 1-p \); \( e \) is the level of precision. The degree of precision is the margin of permissible error (Tyagi, 2015).

However, the study still used the sample size of around 600 Questionnaires circulated to the farmers, out of these 540 farmers marked their responses and returned. But, out of which, 32 responses were found to be incomplete and not suitable for proper analysis. Hence, the researcher opted such responses out. Finally, the researcher ended up with 508 questionnaires which were found to be usable for further analysis.

1.7.7 Sampling Frame
The sample frame comprises of the farmers from the select districts of the Malabar\(^2\) region of Kerala (Palakkad, Malappuram, Kozhikode, and Wayanad) who are engaged primarily in agricultural activities for livelihood. First, the Judgemental sampling method is used to select the district based on the agriculture performance. Secondly, a convenience sampling technique is used to select the Taluk of each

\(^2\) Malabar region is the compilation of whole or part of six districts in Northern Kerala. They are Northern Palakkad, Malappuram, Kozhikode, Wayanad, Kannur, and Kasaragod
district. For the administrative set, each district has been divided into certain taluks and it incorporated the various corporation, municipality, and panchayat aligned under the area of study. One of the important non-probability sampling techniques, convenience sampling was adopted for this study for the selection of farmers in each District. It is the sampling process possibly used to reach the respondent who is included in the sampling frame which is the most convenient using (Zikmund, 2012). The advantages of the convenient sampling method are easy to access and conduct compared to other techniques. Generally, it is cheaper and less time-consuming. In this technique, the large number of responses are possible to obtain quickly and conveniently at a lower cost (Malhotra & Perterson, 2006).

**Figure: 1.3**
Selected Districts from Malabar Region – Map

![Map of Malabar Region](image)

*Source: Combined from MapsofIndia.com and collated by the researcher*
Table: 1.5
Region Under the Study

<table>
<thead>
<tr>
<th>State</th>
<th>Malabar³</th>
<th>Taluk⁴</th>
</tr>
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<tbody>
<tr>
<td>Kozhikode</td>
<td>Vadakara</td>
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<td>Koyilandi</td>
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<tr>
<td></td>
<td>Kozhikode</td>
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<td>Thamarassery</td>
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<td>Malappuram</td>
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<td>Eranad</td>
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<td>Kondotty</td>
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<td>Ponnani</td>
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<td>Tirur</td>
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<td></td>
<td>Thirurangadi</td>
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<tr>
<td>Palakkad⁵</td>
<td>Alathur</td>
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<td>Chittur</td>
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<td>Mannarkad</td>
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<td>Ottapalam</td>
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<td>Palakkad</td>
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<td>Pattambi</td>
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<td>Wayanad</td>
<td>Vythiri</td>
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<td></td>
<td>Mananthavadi</td>
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<tr>
<td></td>
<td>Sulthan Batheri</td>
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</tbody>
</table>

Source: Keralastats.com

³ Excluded Kannur and Kasaragod districts as the researcher chose convenience sampling technique to select districts from the whole Malabar region (North Kerala).
⁴ A Taluk is also known as Tehsil or Mandal, is an administrative division of India which is sub-grouped within each State of the country. It's an area of land with a city or town that serves as its administrative centre. Taluk as an entity of local
⁵ Malabar region includes only Northern Palakkad districts
1.7.8 Pilot Study
The pilot study involves collecting data from a small sub-sample. It is done to make sure that the data plans for the primary study are appropriate (Danghi & Dewen, 2016). According to the pre-testing plans, the researcher had administered around 25 questionnaires to the targeted respondents and subsequently found that it is quite challenging to manage the same survey written in the English language. To overcome the limitations, the tool developed was transcribed into the Malayalam\(^6\) language in which the respondents were comfortable. It was basically observed as most of the farmers responded were just elementary schooled – literate though. However, the researcher still decided to keep an English copy of the tool for the official reporting of the research.

Additionally, the investigator had taken down some of the items that contained irrelevant elements. Such items were found to be having high statistical means and variances; besides these, researcher dropped three others due to less correlation with other items. These pre-testing stages could make sure that the research is precise, unambiguous, and more importantly, address the research questions to the point.

1.7.9 Reliability Testing
The confidence of the researcher on the work done has been expressed by applying the statistical reliability testing on the data so collected and collated with the help of the developed tool. Primarily, this study contains a 72-item questionnaire with various statements as items in each variable identified to which responses are recorded on a 5-point scale. More importantly, the research is purely a perception-based one and measured in scale. Interestingly, the question arises as to how it would rely on the perceptive responses to draw an overall conclusion. Cronbach (1951) had solidly suggested a model to test the reliability of the scale measurement called Cronbach's Alpha (\(\alpha\)). To note, the model mentioned that the Cronbach's \(\alpha\) might differ according to the internal consistency of the scales. However, the research model assures a strong internal item consistency of 0.885 throughout, which is brilliant (Nunnally, 1978). Following is the statistical formulae used:

\[^6\] Malayalam is the mother tongue language of Kerala State
The measure of reliability that ranges between 0-1 and results comes ≥ 0.7 is considered to be the lower limit of acceptability. Interestingly, the research model assures a high internal item consistency of 0.885 throughout, which is excellent and respectable (Robinson, Stimpson, Huefner, & Hunt, 1991; Nunnally, 1978). This study uses the cut off mark of 0.70 for analysis. Besides, an inter-item correlation matrix has been built up to understand relationship among the items. According to the rule of thumb, > 0.50 for item to total correlation which represent the correlation of item to the summated scale score and > 0.30 for inter-item correlation (Robinson, Shaver, Wrightsman, & Andrews, 1991; Hair, Tatham, Anderson, & Black, 1998)

The result of a pilot survey and subsequently in the core data analysis suggested that the investment size, investment preferences, investment decision, investment risk, and crop diversification, could be meaningfully used for getting a clear picture of the growth perception of household farmer.
1.7.10 Statistical Data Analysis

After a series of literature review, the study came up with the following process of data analysis. They are briefly described with the step by step process down below:

**Step 1: Data Screening**

As a first step, a strict missing data analysis was carried out to check if there has been any missing or outlier present by mistake. Firstly, 32 responses were imputed since the overall responses recorded was less than 90% of the total questions given. This complete imputation is adopted why because total responses recorded were much higher than the minimum sample size of 382 after thoroughly going through the *missing value analysis* (Gaskin, 2018a). By visually inspecting the result, two responses were unengaged; those were transformed as per median. Secondly, such finalised individual variable inputs are further transformed by adding the total items under one variable and divided by the number of items under each variable under study. This transformation helps to apply regression analysis on the averaged response.

**Step 2: Data Normality Test**

The study is purely based on the Likert-scale; thus, detailed scrutiny for the normal distribution has not been required as there is no need of checking outliers in Likert-Scale data (Gaskin, 2018a). Even though, the researcher has performed Skewness and Kurtosis to make sure that the distribution is absolutely normal. As a result, the distribution is found to be staying within lenient cut-off of ±3 (Gaskin, 2018a).

**Step 3: Linearity, Homoscedasticity & Multicollinearity**

Linearity refers to the consistent slope of change that characterises the relationship between an IV and a DV. The genuine way to recognize linearity is the "deviation from linearity test" available in the ANOVA test in IBM-SPSS. The deviation from the linearity should always be significant (≥ 0.05). Homoscedasticity means that the variable's residual (error) shows consistent variance across diverse levels of the variable (Hair et al., 2010). However, this study shall not be in need of the homoscedasticity as it does not contain a moderated models (Hair et al., 1998). Finally, the check for multicollinearity is crucial going forward. Multicollinearity normally happens when there is a high correlation between two or more predictor
variables. The easier way to spot is to calculate the correlation coefficient for all pairs of predictor variables. The way to check this is to calculate Variable Inflation Factor (VIF) for each independent variable after running the multivariate regression. $VIF \leq 3$ is not a problem. Additionally, the tolerance value $< 0.10$ are strong indications of multicollinearity issues (Gaskin, 2017).

**Step 4: Factor Validity & Model Fit**

According to Alleydog.com (2018) factor Validity is the degree to which the covariance of measured items ties the true covariance or behaviours in real life. It is a type of validity which is the degree to which a test is measuring what is envisioned to. The following are the critical sub-phases to be followed to ensure that the study has considered essential factors, often called factor validation:

1) **Sampling Adequacy**: As an initial check, it is mandatory to ensure that there are enough samples collected to perform the factor analysis. For that purpose, Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) can be used. The KMO statistic typically varies between 0-1. A value of 0 indicates that the sum of partial correlation is large relative to the sum of correlations, indicating dispersion in the pattern of correlations; hence can be concluded that the samples are inappropriate (Kaiser, 1970). A value close to 1 depicts that patterns of correlations are relatively compact and so factor analysis should yield sharp and reliable factors. Kaiser (1974) recommends accepting values greater than 0.5 as barely acceptable (values below this should lead you to either collect more data or rethink which variables to include).

Bartlett’s Test of Sphericity tells the correlation between items under study, this test is primarily conducted to identify those items which are not at all correlated ($r < 0.3$) to other items present and highlight those items which are highly correlated ($r > 0.80$) which might measure the same concept in the sub-scales. The opposite problem is when variables correlate too highly. Although slight multicollinearity is not a problem for factor analysis, it is important to avoid extreme *multicollinearity*. Sometimes, may it be the *singularity* problem (variables that are perfectly correlated).
The study gives a robust KMO value of 0.958, which is Marvellous (Hutcheson, 1999). Bartlett's Test of Sphericity examined the strength of the relationship between the variables, and the test is highly significant with a \( p\)-value (0.000) of less than 0.05.

2) **Scale Validity:** The researcher must assess the scale validity after ensuring that scale conforms to its conceptual definition. It is unidimensional and meeting the required level of reliability (Hair et al., 2010). Validity is defined as the extent to which any measuring instrument measures what it intends to measure. "One validates, not a test, but an interpretation of data arising from a specified procedure" (Cronbach, 1971). Well accepted forms of validity are content validity, convergent validity and discriminant validity which are considered to be suitable to the present research (Campbell & Fiske, 1959; Peter, 1981).

a) **Content Validity:** It is the indication that the content of a test match to the content of the construct it was designed to cover. In other words, it’s to ensure that the research is measuring what he/she thinks measuring. There should be theoretical evidence supporting the relationship between variable identified through previous research or well-accepted principles concerned with the subject matter in order to assess the scale corresponding relationship (Hair et al., 2010). This is also known as face validity which refers to the degree that a construct is fully capturing or represented by items that cover the domain of meaning for the construct (Malhotra, 2007; Garver & Mentzer, 1999).

b) **Convergent Validity:** It assesses the "degree to which two measures of the same concepts are conducted" (Hair et al., 2010). According to Garver & Mentzer (1999), it is understood with a question that "do the items intended to measure a single latent construct statistically converge together". High correlation in convergent validity indicates that scale is its intended concepts (Hair et al., 2010).

c) **Discriminant Validity:** The discriminant validity evaluates how well the factors get distinguished from each other. In another word, it is the degree to which two conceptually similar concepts are distinct (Hair et al., 1998).

**Step 5: Factor Analysis**

Factorial analysis is performed where often it needs to measure things that cannot be measured directly (so-called latent variable). Hence, the factors which the researcher is considering for analysis has to be thoroughly examined to confirm all the minimum
requirements for further analysis. To put another way, "Factor analysis is a technique of statistically identifying a reduced number of factors from a larger number of measured variables" (Zikmund et al., 2013). Factor analysis is also deemed as a data decoupling set of variates or composite variables. There are two types of factor analysis done in this study. They both are briefly described below:

1.7.11 Exploratory Factor Analysis (EFA)
EFA is concerned with how many factors are necessary to explain the relations among a set of indicators and with estimation of factor loadings. It's primarily associated with theory development (Gaskin, 2018b). Thus, EFA ensures that the model developed is assuring the discriminant validity. Essentially, the purpose of factor analysis is to find a way to summarise the information into a smaller set of new dimensions (Gorsuch, 1983; Rummel, 1970). Ideally, it's always advised to perform a dimension reduction (EFA) when the researcher is using new indicators (Gaskin, 2018b). Technically, factor analysis is done through a bivariate correlation matrix which would be taken into a pattern matrix and makes a factored correlation. Nonetheless, the who EFA process is considered to be unguided (Henson & Roberts, 2006).

1.7.11.1 Deriving Overall Factor Fit
The broad purpose of factor analysis is to summarise data so that relationship and patterns can be easily interpreted and understood (Yong & Pearce, 2013). The following are the important process to be followed to ensure that the EFA has been properly done:
1. **Face validity** or construct meaning is assured in the first hand. It is assured through proper literature support and judges if they are common-sensical.
2. **Cronbach's Reliability (CR)** is 0.70 assured to go forward. The study assured a consistent Cronbach Alpha of 0.885.
3. While choosing the extraction method, **Maximum Likelihood Method (MLM) with Promax Rotations (for large datasets)** to be preferred to help back up confirmatory factor analysis further.
4. Make sure that the **Measure of Sampling Adequacy (MSA)** output is ideally greater than 0.80; which is meritorious (Kaiser, 1970, 1974). Moreover, for KMO, it should always be 0.60 or higher to proceed (however, the researcher can use 0.50 as a more lenient cut-off). The study assured a strong KMO value of 0.901.
made it easier to go forward. Adding to it, Bartlett’s Test of Sphericity has also been found significant.

5. Asses *Extracted commonality* of the variables; value should be $\geq 0.50$. If it is below 0.50, the result is not contributing to the convergent validity of the factor model (Gaskin, 2018b). Significant factor loading and its suppression are purely based on the sample size. In the present study, as the sample is size is more than 350, sufficient factor loading is accepted to be 0.30 (Hair et al., 2010).

6. The *cumulative percentage of Sum of squared loadings* must come out to be 50% or more. The present study gives a good cumulative loading of 59 %, which is better.

7. The pattern of factors loaded up in the matrix is ensuring high loading which would make sure the *convergent validity* of the factor model (Izquierdo, Olea, & Abad, 2014).

8. There are no cross-loadings of the same item under different factors. If it does, this will not ensure the *discriminant validity* of the model.

9. *Factor correlation matrix* is giving a decent inter-item correlation at around more than 0.70.

10. Finally, *Iterate until the model* reach into a clean pattern matrix

### 1.7.12 Confirmatory Factor Analysis (CFA)

Simply to put, CFA is performed for confirming the factor structure from EFA. It is also used to assess the validity of the measurement model & reliability of the factors. Most importantly, CFA helps determine the goodness of fit. Towards the end, this will help identify the extent of common method bias as well (Field, 2013). Essentially, the CFA considers every output what the study gave, and the researcher considers them as a latent factor with a reflective model to push it to IBM AMOS 20.0 to validate the model fit (Gaskin, 2018c). Validation of a model or model fit with CFA involves couple of stages which are briefly explained below:

1. **Check for Metrics**

   The first thing which the researcher has to do is to check for the goodness of fit. The goodness of fit is inversely related to sample size and the number of variables in the model. Hence, the cut-offs below are simple guidelines. The study has taken the cut-off value proposed by Hu & Bentler (1999)
Table No: 1.7
Goodness of Fit indices used in the research Model

<table>
<thead>
<tr>
<th>Goodness of Fit Measure</th>
<th>Abbreviations</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normed Chi-squared</td>
<td>$\chi^2/df$ (cmin/df)</td>
<td>$&lt; 3$ good; $&lt; 5$ sometimes permissible</td>
</tr>
<tr>
<td>Comparative Fit Indexes</td>
<td>CFI</td>
<td>$&gt; 0.95$ great; $&gt;0.90$ traditional; $&gt;0.80$ sometimes permissible</td>
</tr>
<tr>
<td>Goodness of Fit Index</td>
<td>GFI</td>
<td>$&gt; 0.95$</td>
</tr>
<tr>
<td>Adjusted Goodness of Fit Index</td>
<td>AGFI</td>
<td>$&gt; 0.80$</td>
</tr>
<tr>
<td>Standardised Root Mean-square Residual</td>
<td>SRMR</td>
<td>$&lt; 0.09$</td>
</tr>
<tr>
<td>Root Mean Square Error Approximation</td>
<td>RMSEA</td>
<td>$&lt; 0.05$ good; 0.05-0.10 moderate; $&gt; 0.10$ bad</td>
</tr>
<tr>
<td>$p$-value Close</td>
<td>PCLOSE</td>
<td>$&gt; 0.05$</td>
</tr>
</tbody>
</table>

Source: Statswiki.com and Hu & Bentler, 1999

2. Modification Indices
Modification indices offer suggested remedies to inconsistencies between the proposed and estimated model. Precisely, modification indices look for the error and fix by covarying the error terms between the variables under one indicator. Generally, the model should not covary error terms that between two latest variables (Gaskin, 2018c). Thus, the most appropriate modification available to us is to covary error terms that are part of the same factor.

3. Standardized Residual Covariances (SRCs)
SRCs are much like modification indices; they bring out where do the underlying discrepancies occur between the proposed and estimated model. A significant standardized residual covariance is one with an absolute value greater than 2.58. Such significant residual covariances significantly decline the model fit.

4. Validity and Composite Reliability
In order to confirm the model fit, it is necessary to establish convergent and discriminant validity and of course reliability, when doing a CFA. Such an inadequate model cannot be tested for the causal model further. Therefore,
there are a few measures that are useful for establishing validity and reliability: Composite Reliability (CR), Maximum Shared Variances (MSV), Average Variance Extracted (AVE)

**Table No: 1.8**

**CFA Model Fit: Validity and Reliability**

<table>
<thead>
<tr>
<th>Master Validity</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite Reliability</td>
<td>CR &gt; 0.70</td>
</tr>
<tr>
<td>Convergent Validity</td>
<td>AVE &gt; 0.50</td>
</tr>
<tr>
<td>Discriminant Validity</td>
<td>MSV &lt; AVE&lt;br&gt;Square root of AVE greater than</td>
</tr>
<tr>
<td></td>
<td>Inter-construct correlation</td>
</tr>
</tbody>
</table>

1.7.13 Hypotheses Testing Methods

The primary data collected from farmers had been coded on Microsoft Excel and then transferred to SPSS (version 20.0). All the analysis has been done with the help of SPSS except validation with CFA (AMOS 22.0 version). One-way ANOVA and Multiple Regression (Enter Method) have been used for analysis of data and testing hypotheses for the present study.

1.7.13.1 One-way Analysis of Variance (ANOVA)

One-Way Analysis of Variance or One-Way ANOVA is a statistical method to determine if there is a difference in means between two or more independent groups, where the groups are defined by the outcomes for a single categorical variable (Murray, 2017). In this study, one-way ANOVA has been used to compare the mean value among the different age group of the farmers, educational qualification, years of farming experience, gender, farm earnings. It is understood to have a significant difference among the group if the value is less than 0.05 (5% significance level). Therefore, null hypotheses are rejected, and alternative hypotheses are accepted.

1.7.13.2 Multiple Regression

Regression explains the relationship between two variables, and it is used for predicting the values of one variable from that of the other. The variable(s) which
have to be predicted is called outcome/dependent variable(s), and the variables which all used to predict is called independent/predictor variable(s) (Field, 2013). The study developed and used a Multiple Regression model has been developed to predict the impact of 'Xs: independents' on 'Y: dependent'. The following is the crux model used to analyse and test the hypotheses on the impact of independent variables on dependent variable which are under study:

**Multiple Linear Regression Model**

\[
Y_1 = \alpha + \beta_1 (IS) + \beta_2 (IP) + \beta_3 (ID) + \beta_4 (IR) + \beta_5 (CPD) + \epsilon
\]

**Where,**

- \(Y\) = Agriculture Growth Perception
- \(IS\) = Investment Size
- \(IP\) = Investment Preference
- \(ID\) = Investment Decision
- \(IR\) = Investment Risk
- \(CPD\) = Crop Portfolio Diversification
- \(\alpha\) = Intercept
- \(\beta\) = Regression Coefficient
- \(X\) = Independent/Predictor Variable
Figure 1.4
Schematic Representation of the Study

Discovering the Changing Scenario in Agricultural Portfolio in Malabar & Kerala

Exploration
Initial observations, define, and refining Research Question

Exploration

Defining Objectives & Generate Hypotheses

Extensive Literature Review

Research Design (Tools & Data Collection)

Method:
Sample Survey

Tool:
Questionnaire (5 Point Likert Scale)

Sample Size:
508

Software Package:
SPSS & AMOS

Statistical Model Fit:
EFA & CFA

Statistical Analysis:
One-Way ANOVA, Multiple Regression

Method:
Lit Review, Database

Tenure:
10 Years

Statistical Tool:
Percentage Analysis, Pie Chart, & Trend Analysis

Primary Data
Household Farmers of Four Districts in Malabar Region

Secondary Data
Journals, Reports, Theses, Publications of Agriculture

Analysis & Interpretation

Findings & Suggestions

Research Gap & Variable Identifications

Defining Objectives & Generate Hypotheses

Initial observations, define, and refining Research Question
1.8 Limitations of the Study

There are some potential limitations that are likely to pose challenges to the reliability and validity of the data collected and analysed. They are briefed down below:

- The study is based on the sample of a few selected districts that is Malappuram, Kozhikode, Palakkad, and Wayanad which do not represent the overall characteristics of Kerala State.
- A sample of not more than 508 out of indefinite farming populations, therefore all non-sampling errors expected may occur in this research as well.
- The questionnaire has been rolled out only in the Malabar region; not covering all places in Malabar either. Preferably, a more extended sample might portray a different perception of investing farming.
- The survey is done on a perceptive angle of farmers, that too most of them are technically illiterate, which could be affecting the accuracy of the survey.
- The study is only looking at the crop diversification as a measure to mitigate the risks involved in the agriculture. Thus, the application of portfolio theory is quite limited as there are some different external factors which directly affect the risk-return trade-offs.
- For secondary data, the accuracy of the study is based on already published sources, the reliability of some of them are not cent percent authenticated.
- The perception cannot be generalised as the sample size was mostly biased to male farmers.

1.9 Structure of the Thesis

Keeping in view, the research questions and objectives, the entire thesis has been divided into seven chapters and organised as follows.

The first chapter is giving an outline or introductory background and research design of the study. It includes an introduction about Indian agriculture and agriculture background of Kerala, performance of Kerala agriculture sector, Investment and agriculture investments and agriculture investment portfolio. Besides, it extensively covers the need and significance of the study, the scope of the study, objectives of the study, definition of key terms, variables of the study, the hypotheses of the study. The chapter draws a research methodology and statistical data analysis, statistical tools,
validation of measurement scale and hypothesis testing method as well. The chapter ends with the schematic representation of the study, limitations of the study, and structure of the thesis.

The second chapter represents the review of the literature. It goes through the relevant published and unpublished work done by the academicians, scholars and agricultural experts. The review of literature has been presented in mainly two sections. The first section deals with the agriculture investments in India & world over; it covers the areas like global and Indian agriculture growth and developments, agriculture diversification and modernisation, crop diversification and agriculture trade and implications of liberalisation on agricultural investments. The second section deals with the Agriculture investment and developments in Kerala, it covers studies related to Agriculture investment and developments in Kerala and Cropping pattern and diversification. The last part of this chapter brings in the research gap.

Chapter three digs in deep about the conceptual framework: Agricultural Portfolio Diversification. It briefly discusses the definition of investment, agriculture investment, Agriculture investment portfolio, modern portfolio theory and building an agriculture investment portfolio. The chapter covers the meaning and concept of agricultural diversification, prospects of agriculture diversification, the reason for agriculture diversification, strategies for improving agriculture income such as crop diversification, crop rotation, mixed farming and integrated farming which constitutes on conceptual linkage to the overall problem under study. The chapter ends with the cropping pattern in Kerala and the suitable cropping system in the Malabar region of Kerala.

Chapter four has been historically linked up with the theoretical background of Kerala agriculture with a special reference to Malabar, historic background of agriculture in Malabar region, the details of study districts, growth performance of the agriculture and allied sectors in Kerala, agro-ecological environment, land use pattern and cropping pattern.

The chapter five deals with the evidence-based agricultural trend analysis of different crops predominantly cultivated in Kerala. It also discusses the areas of the cross-
cropped area, net cropped area and cropping intensity, area, production, and productivity trend of significant agricultural crops in Kerala during 2011-12 to 2016-17. The chapter also deals with the germination trend of the major crops separately on permanent crops. The chapter also shows the percentage changes in the area of crops from 2001-02 to 2016-17. This chapter is the fundamental base for the data analysis and interpretation as it shows the switching trend of agriculture in Kerala.

The sixth chapter deals with the data analysis and interpretation. For the convenience of the explanation, it has been divided into three sections. Section one describes demographic snapshot of the respondence with simple descriptive statistics on agriculture growth perception. It shows the demographic profile of the respondents. Section presents Model fit proof and finally third section ends with hypotheses testing for both difference in mean and impact of each indicator on agriculture growth perception as a whole.

Chapter seven is finally summed up with holistic conclusions about the research with suggestions emerging out of this study. The chapter summarises the major findings of the analysis, results and offers appropriate suggestions or proposals to the agrarian society, policy makers and both central and State governments. It also provides the direction for future research.

1.10 Summary
This chapter introduced the subject of agricultural portfolio and crop diversification practiced by the farmers and set the context to look back at the agricultural history of both India and Kerala agriculture over the years. A brief historical profile of area under study is touched upon by substantiating with relevant secondary sources. An interlinking of the agriculture investment practice and crop diversification had also introduced to. Through a comprehensive literature support, the chapter brought out some important variables and signified the relevance of farmers perception towards changing scenario of crop portfolio practices existed. And, the study also clearly clarified the meaning of perceptive agricultural growth of agrarians. Research design, objectives, significant hypotheses, and finally plan of work have also been presented in the resulting chapter.
Reference


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Chapter 1

Introduction and Research Design

Marketing Research, 18(2), 133–145.


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