

Sajeesh P. V. “ Economic impact of organic farming in Kerala: a micro level analysis”. Thesis. Research and Post Graduate Department of Economics, St. Thomas College (Autonomous), Thrissur, University of Calicut, 2021.

Chapter 6

An Assessment of Organic Farming in Selected Districts in Kerala: A Survey Based Analysis

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6.1. Introduction

Kerala Located in southwest India, it is a narrow coastal strip bounded by on the northeast Tamil Nadu on the east and Arabian Sea on the west. The state is about 580 km long and 130 km broad at the widest point. Temperature ranges from a minimum of 19-26oC to a maximum of 27-37 C and rainfall ranges from 1943mm-3667mm. Though one of the smallest states in India with a geographical area of 38863 km (1.18% of the Indian Union), Kerala has a diverse physiography a range of altitude from sea level to about 2690m. Kerala is divided into three distinct natural zones such as lowlands, midlands and the highlands, forming parallel belts running across the length of the state from North to South. Lowlands are the low-lying coastal belt on the west, densely populated (1385 p/. km²), where rice and coconut are the main crops. The highlands consist of the Western Ghats mountain range forming the eastern part of the State. Rubber, Spices, Coffee and Tea are the major crops in the highlands. The midlands, a varied terrain of small valleys and hills in between, have a wide variety of crops including rice, tapioca, banana, plantain, coca, clove, nutmeg, ginger, pepper, areca nut, cashew, coconut and rubber (Economic Review, Various Years).

Kerala accounts for several important agricultural commodities such as Pepper (95% of India's production), Rubber (92%), Cashew (85%), Cardamom (70%), Ginger (60%) and Coconut (43%). Other than plantations and paddy fields, rural Kerala is abounding with homestead farms that have an astonishing variety of crops. Predominance of perennial tree crops, very small operational holdings (average size 0.36 ha.), and mainly rain-fed farming are the singular features of Kerala's agriculture.

6.2. Geographical Features of Kerala

Kerala is bordered by land on three sides and the Arabian Sea at the west. It shares its border with the state of Karnataka at the north and the rest of Kerala shares its border with Tamil Nadu. In fact, almost the whole of the western and southern frontiers of Kerala is surrounded by Tamil Nadu. On the basis of physiography of Kerala is divided into three geographical regions.

Though small in size, Kerala is a land affluent in water resources. 44 rivers , of which 41 are west flowing and 3 flow east. Apart from these 44 main rivers, their tributaries and distributaries and a countless number of streams and rivulets crisscross the land making it green and fertile and also serves as inland waterways. Aside from these rivers, Kerala is bestowed with a number of lakes and backwater lagoon which add to the beauty of the land. ‘Vembanadu’ Lake with area of 260 sq km is the largest in the state. ‘Shastamkotta’ Lake is the largest natural fresh water lake. So the water source of farming is adequate

6.3. Demographic Profile of Kerala

The total population size as per 2011 Census in India is 1,21,08,54,977 as against 1,02,86,18,821 as per 2001 Census.

Table 6.1
Comparison of Demographic Profile of India Vs Kerala (2019)

Indicators	India	Kerala
Total population	1,21,08,54,977	3,34,06,061
Male	62,32,70,258	1,60,27,412
Female	58,75,84,719	1,73,78,649
Sex-Ratio (urban)	929/1000	1084/1000
Sex Ratio- Rural	943/1000	1062/1000
Density of Population	382/Sq.km	860/Sq.km
Literacy		93.91
Literacy Male	82.14	96.02
Literacy –Female	65.46	91.08

Source: Kerala Economic survey, 2019-2020

Kerala has the highest effective literacy rate of 93.91 per cent among Indian states. It was 90 per cent in 2001 Census. In Kerala, 96.02 per cent of men and 91.98 per cent of women are literate as against 82.14 per cent of men and 65.46 per cent of women at the all India level. Sex ratio means number of female population per thousand of male population. The sex ratio of Kerala according to Census 2011 is 1,084 and has improved by 26 points since 2001. It increased from 1,032 to 1,036 from 1981 to 1991. Kerala is the only State where the sex ratio has historically been above unity. The sex ratio of Tamil Nadu is 996, of Karnataka are 973, of Andhra

Pradesh are 993 and at all India level are 943. Another significant feature of the State is that all Districts in Kerala show a positive sex ratio.

The State has 63.9 per cent of its population in the working age group of 15-59, 23.4 per cent and 12.7 per cent in 0-14 age and 60 and above age groups respectively. Among Districts, Idukki has the highest per cent of the working population (66 per cent) while Malappuram has the lowest (61.4 per cent). In the age group of 60 and above Pathanamthitta has the highest per cent (17.9 per cent), while Malappuram has the lowest per cent (8.4 per cent). At the same time, Malappuram has the highest proportion of the population, in the 0-14 group at 30.2 per cent, while Pathanamthitta has a proportion of 19.4 per cent. If the actual number is taken, Malappuram has the highest number both in 0-14 and 15-59 groups (12.4 lakh and 25 lakh). While Ernakulam District has the highest number of people in the elderly group of 60 and above. Wayanad has the lowest number in all age groups, as the district has the least number of total populations (Kerala Economic survey, 2020)

6.4. Economic Indicators of Kerala

Table 6.2

GSDP of Kerala at Constant Prices from 2017-2018 to 2019-2020

Indicators	2017-2018	2018-19	2019-2020
GSDP (in crore)	516189.76	549672.93	568635.52
Primary Sector	47619.23	46004.41	42373.83
Secondary Sector	129866.26	138033.99	141805.63
Territory Sector	283268.51	305303.78	317781.22
Per capita Income	149650.00	158564.00	163216.00

Source: Economic Review, Various Years

The GSDP of Kerala is presented in table 6.2. From the table 6.2, it is clear that the GSDP has been increasing during the period from 2017-18 to 2019-20. Further, primary sector has a crucial contribution towards the GSDP. But, territory sector is a front-runner in GSDP. Therefore, it is essential to give an equal importance to agriculture especially agriculture.

6.5. Land-Use Pattern of Kerala

Land use pattern in Kerala has witnessed major changes in its land use pattern over the years. The major change was the shift from cultivation of food crops to

nonfood crops and increase in area under land put to non-agricultural use. Changes in land use and cropping pattern in Kerala pose a challenge not only to food security but also to the ecological sustainability of the State. An analysis of changes in land use pattern over a period which helps to comprehend the present scenario of agricultural land utilization. As per the land use data of 2019-20, out of a total geographical area of 38.86 lakh ha, total cultivated area is 25.89 lakh ha (66.64 per cent) and the net area sown is 20.26 lakh ha (52.13 per cent). Land put to non-agricultural use is approximately 11.73 per cent and forest area is 27.83 per cent. The cultivable waste and current fallow constituted 2.57 per cent and 1.48 per cent respectively.

The present study focused on the organic farmers' status and their impact in Kerala. It is executed through a primary survey in selected districts in Kerala. The survey results are presented in the following sections. The study was based on the primary data were collected through personal interview of the sample organic farmers by using semi structured interview schedule. This included selected organic farming methods.

6.6. Socio-Economic Status of the Organic Farmers in Kerala

Primary survey shows that the socio-economic background of the farmers is examined by using the variables such as age, income, education and economic status and other from two points. The rest is devoted to the description of organic farming practiced by the farmers. The table 6.3 shows the age-wise distribution of the organic farmers where age is the one of the major indicators to assess the socio economic status of the respondents. It is evident that the 10.5 % of the organic farmers are belong to the age group varies 20-35. It clearly shows that educated youth are not self-encouraging in organic farming. 36% percentage of the organic farmers are belong to the age group of 35-50 i.e. productive age group, under this age group farmers are experienced and they are more capable to understand the various methods of organic farming. Out of the respondents, 38 % of the organic farmers are belonging to the age group of 50-65 in the selected districts in Kerala. Income of the individual and family are the prime indicator of the socio-economic status of the individuals, the table 6.4 clearly shows the income wise classification of the organic farmers among the selected sample districts of Kerala.

Table 6.3
Age wise Distribution of Selected Organic Farmers in Kerala

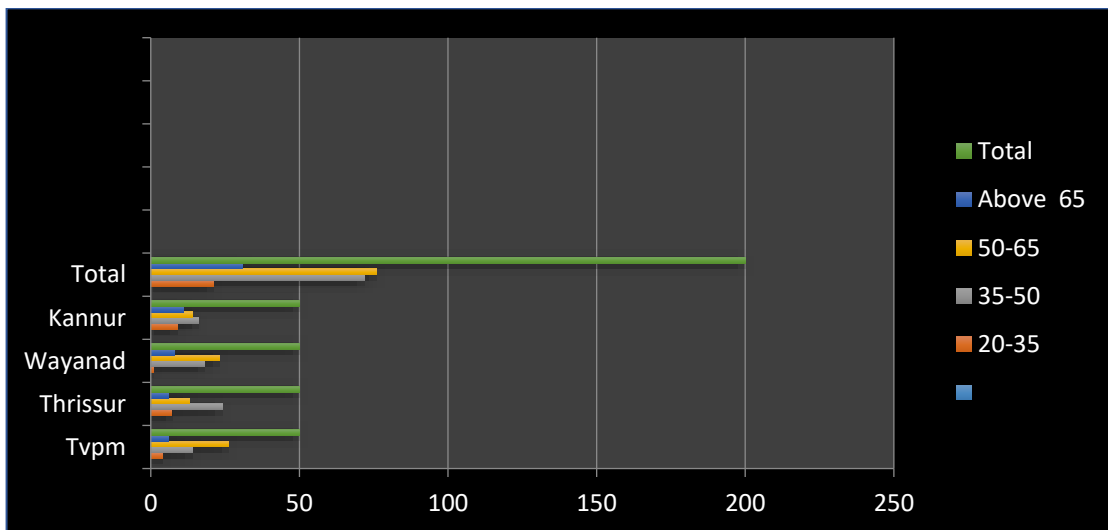
Age Group/Districts	Tvp.m.		Thrissur		Wayanad		Alapuzha	
	N	%	N	%	N	%	N	%
20-35	4	8	7	14	1	2	9	18
35-50	14	28	24	48	18	36	16	32
50-65	26	52	13	26	23	46	14	28
Above 65	6	12	6	12	8	16	11	22
Total	50	100	50	100	50	100	50	100

Source: Primary Survey

They are very prominent supporters to organic farming, 15.5 % of the organic farmers are belong to the age group of above 65 years, they are the nominal farmers because their unhealthy situations may not be contribute much.

Figure 6.1

Age wise Distribution of the Organic Farmers in Kerala



Source: Primary survey

The purpose of analysis annual income of the organic farmers are class divided into five category i.e. lower income group belongs to those annual income lies below the Rs.30000/- PA and middle lower income groups belongs to annual income between Rs.30000-Rs.60000. The average income group belongs to 60000-90000 and upper average income group belongs to Rs.90000- Rs.1, 20,000 and finally higher income group they are belongs to income level above Rs.1, 20,000 rupees annually (figure 6.2). Out of 200 sample organic farmers 24% of the organic farmers are belongs to the lower income group. 25.5 % of organic farmers are belongs to the

average income group and 8.5% of the organic farmers are belonging to the higher income group.

Table 6.4
Income wise Distribution of Organic Farmers in Kerala

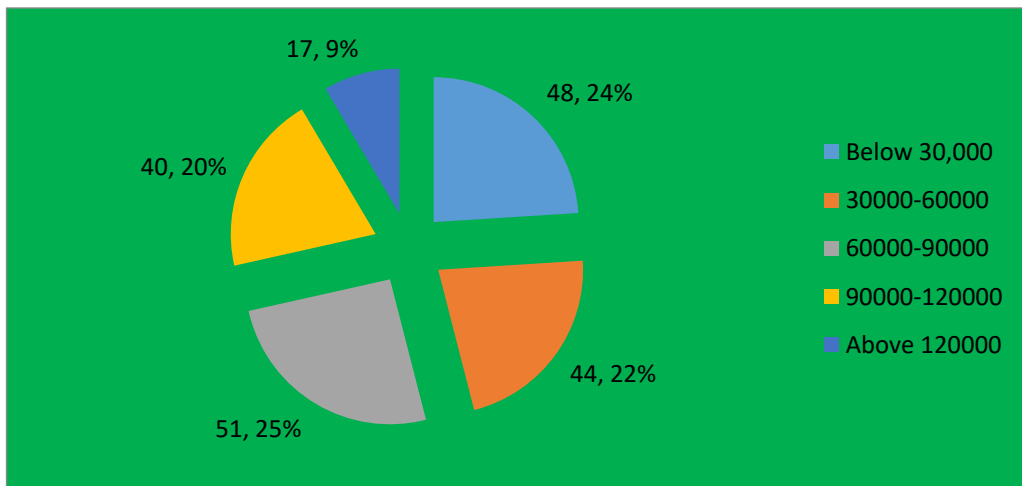
Income level	Below 30,000	30000-60000	60000-90000	90000-120000	Above 120000
No. of Farmers	48	44	51	40	17
Percentage	24	22	25.5	20	8.5

Source: Primary Survey

Male female proportion among the organic farmers are another factor to access the socio economic status of the organic farmers , a proportionate proportion of the male female participation means that the women has a equality in employment.

Figure 6.2

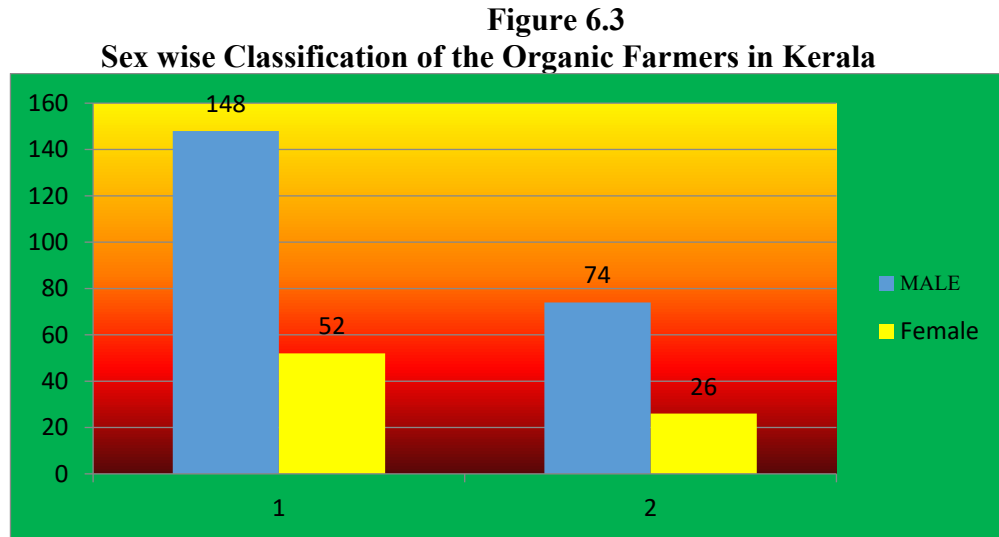
Income Wise Classification of the Organic Farmer in Kerala



Source: Primary Survey

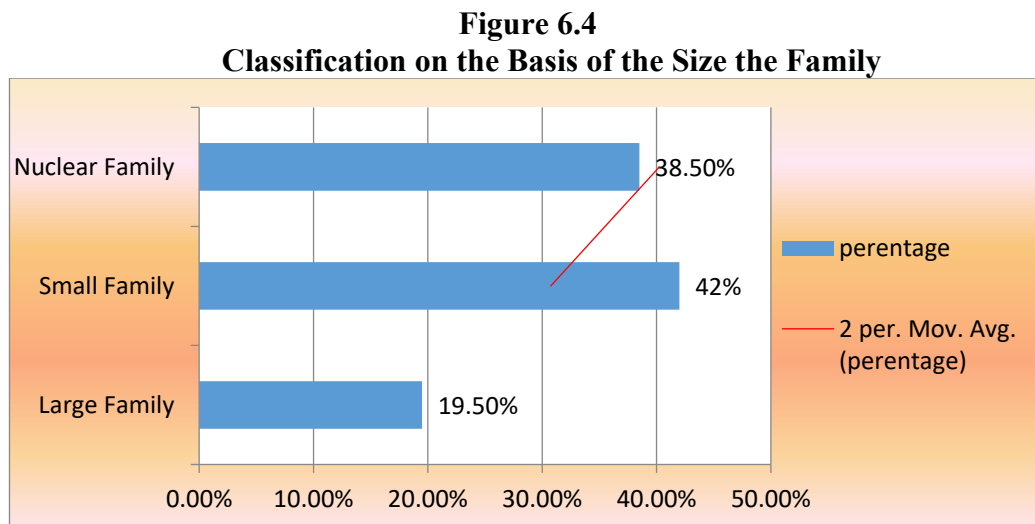
In Kerala, agriculture women played a crucial role as like men. The figure 6.3 clearly shows the sex wise classification of the organic farmers in selected districts in Kerala. It is evident that 74% of the organic farmers are male farmers and only 26% percentage of the organic farmers is females. It clearly indicates that participation of females in the organic farming is low among the selected sample districts. Size of the family is an another important factor to access the socio-economic status of the respondents, on the basis of the number of family members family is divided in to three i.e. Nuclear family, small family and large family. Nuclear family is consist of father and mother and two surviving children, small family consists of familywith

grand parents and large family consists of more than more than six members. The figure 6.4 shows the classification of the organic farmerson the basis of the nature of the family. Out of two hundred organic farmers from the Thirivanthapuram, Thrissur, Alapuzha, and wayanad.



Source: Primary Data

The consolidated figure 6.4 clearly indicate that 77 (38.5%) of farmers having nuclear family, it is understood that earners of the family is either one or two. Majority of the family having single earner.



Source: Primary Data

The 42% of the farmers having small family the number of dependence in the samll family is comaparitively low to comapare with nuclear and large family. The 20% of the organic farmers having large family consists of more than 8 members. It is clearly understood that family income of the large families is comaparitively high in

large families. Number of earners are also good. Economic status of the farmers is another factor to access the socio economic status of the organic farmers poverty line. One serious issue identified by the researcher during the survey process, that is real position regarding their economic status was entirely different from the actual position. Many of the organic farmers are belongs to the category of APL even if they are not much economically sound and their living condition was very erratic and poor. Some body have no own house and they have only income from agriculture they also belongs to above poverty line.

Table 6.5
Income-Slab Distribution of Organic Farmers in Kerala

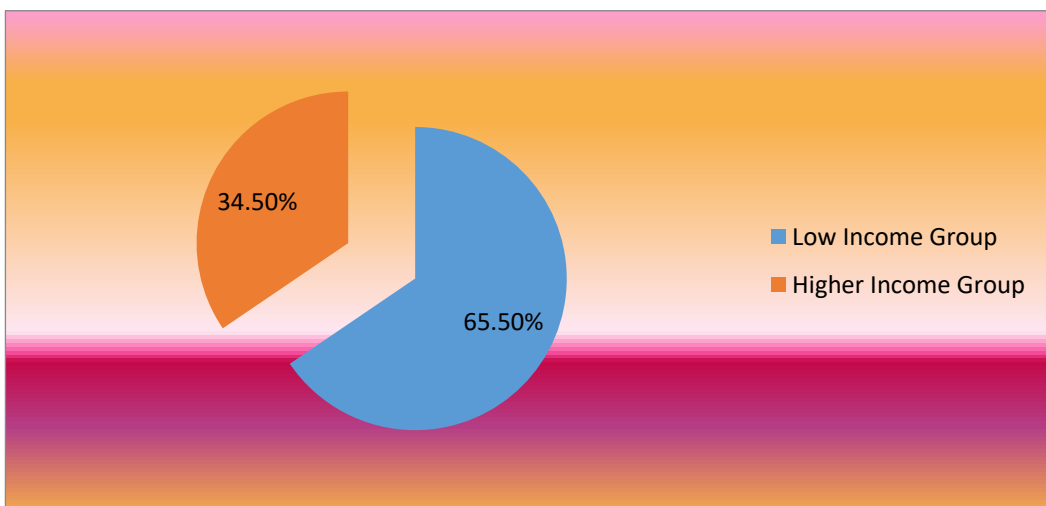
Category	No. of Farmers	Percentage
Low income Group	131	65.5
Higher Income Group	69	34.5

Source : Primary Survey

The term ‘economic status’ means that better living condition without burden. There are two categories i.e. APL and BPL, out of 200 organic farmers 112 respondents are belong to Above poverty line and 88 organic farmers are belongs to below poverty line on the basis of their actual status of their ration card.

Figure 6.5

Classification of the Organic Farmers on the Basis of the Nature of Family



Source: Primary Survey

The economic status of the respondents not nearly accessed through the basis of their ration card. On the other side many of the organic farmers having better living conditions like, own house, own well, ownership of vehicles and consumer durables

but unfortunately, due to the administrative default they are belongs to the below On the basis of the observation made by the present study the economic status of the organic farmers are divided into category low income group and higher income group. It is clearly depicted in the figure.6.5. The table 6.6 shows the educational background of the organic farmers in Kerala. Out of 200 samples, 22% of the organic farmers are illiterates and 27.5% of the organic farmers are completed primary education. The number of people having education at matriculation and Pre-degree level is 13% and 6% respectively. Education is an another important criteria for evaluating the socio economic status of the organic farmers in Kerala. Education enrich the quality of work and understandability of the human being to be an certain extent.

Table 6.6
District wise Educational Status of the Organic Farmers in Kerala

Education/Districts	Tvpm	Thrissur	Alapuzha	wayanad	Total	Percentage
Illiterates	7	13	16	8	44	22
primary level	13	6	20	16	55	27.5
High school level	19	24	7	8	58	29
Matriculation	6	3	6	11	26	13
Plus Two/Pre degree	3	3	1	5	12	6
Degree and above	2	1	0	2	5	2.5
Total	50	50	50	50	200	100

Source: Primary Survey

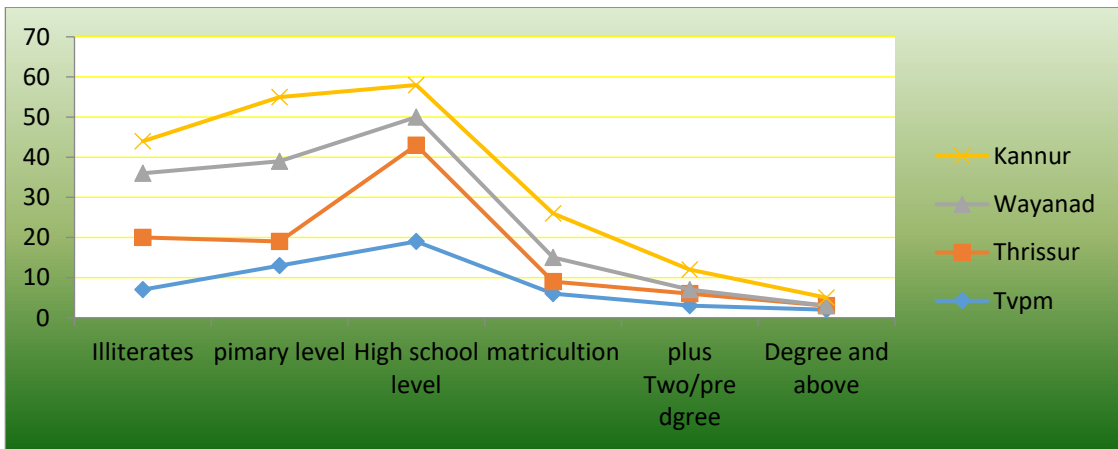
The criteria behind that the ammiities enjoyed by the organic farmers. Out of two hundred organic farmers 131 (65.5%) of the organic farmers are belongs to the lower income group an only 69 (34.5%) of the organic farmers are belongs to the higher income group.

In orgaic farming practices the education of the farmers are playing a crucial role because the farming practices like preparation of vermi-compost, green mannures and other techinques which imprves the fertility of soil are very determining factors of the organic output. The table 6.6 shows that the education wise classifiacion of the organic farmers. The level of education is one of the important indicator of socio-economic progress. In the prsent context, education plays fundmental role to improve the living codition of the society to organic farmers in Kerala. Only 2.5% of the organic farmers having the education level above the graduation in Kerala. Educational wise classifiation of the organic farmers are explain with the help of trend lines. Number of farmers engaged in organic farming in all selected districts education

is high school. Out of 50 organic farmers in Wayanad 16 (32%) are illiterates. Thruvannathapuram and Alapuzha districts majority of the farmers are completed their matriculation i.e. 30% and 31% respectively. These are seven General factor to access the socio-economic condition of the organic farmers in Kerala. The present study is try to identify the socio-economic status of the sample orgnic farmers in the seleted districts so the size of the land holding and dependence on agriculture as a source of income. The rest is devoted to the description of organic farming practiced by the farmers are also treated as the indicators for measuring socio economic status.

Figure 6.6

District wise Educational Status of the Organic Farmers in Kerala



Source: Primary Data

Socio-Economic Development Indicators for Agriculture and related activities considered in this study:-

1. Status of Farmland
2. Area under Cultivation
3. Allied agricultural activities of farmers
4. Water source
5. Method of Irrigation
6. Use of Agricultural Machinery

6.7. Status of Farm Land

According to Alfred Marshal, rent is the reward for the land for its use. Status of farmland is an indicator of ownership of the farmland, if the farmer is the real owner of the farmland the profitability of farming may increase beyond doubt. Many

of the farmers want to pay rent for the cultivated land either the production was profit or loss.

Rent contributes the major share of the cost of production of the farmers the table 6.7 shows the actual status of the farmland of the organic farmers in the selected districts. Out of 200 organic farmers, 144 (72%) farmers having Own land and 5% of the organic farmers are farming at lease land.

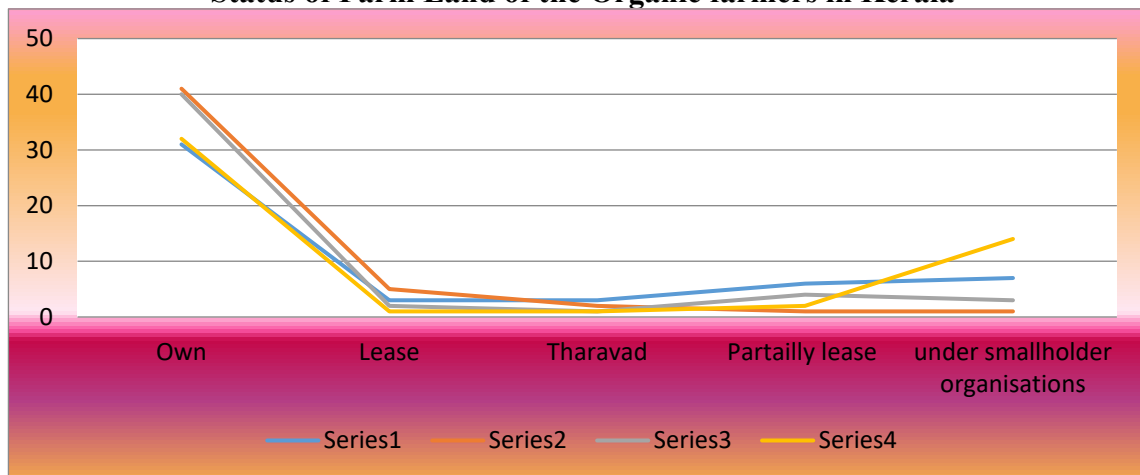
Table 6.7
Status of Farm Land the Organic farmers In Kerala

Status of Farmland /Districts	Typm	Thrissur	Alapuzha	Wayanad	Total	Percentage
Own	31	41	40	32	144	72
Lease	3	5	2	1	11	5.5
Tharavad	3	2	1	1	7	3.5
Partailly lease	6	1	4	2	13	6.5
Undersmallholder organisations	7	1	3	14	25	12.5
Total	50	50	50	50	200	100

Source: Primary Survey

The 6.5% of the organic farmers are use land for partially lease and 12.5% of the organic farmers are arming under small holder organizations. Area under cultivation is a factor to access the socio economic status of the organic farmers. Output is an outcome related to various inputs used by the farmers. Cost of production of various organic inputs are incurred certain fixed cost, either the quantity of inputs may higher or lower.

Figure 6.7
Status of Farm Land of the Organic farmers in Kerala



Source: Primary survey

If the area under cultivation of the organic famers increased it reduces the average cost of production. In wayanad district nearly 26% of the organic farmersare

cultivating more than two hectares. The table 6.7 shows the total cultivated area under organic cultivation by the organic farmers, according to the size of the farm land area under cultivation divided into three category farmers with cultivating area one hectare, in between one hectare to two hectare and finally above three hectare. The 55.5% of the sample are cultivating below one hectare. In district wise analysis it is clear that in Thiruvananthapuram district out of 50 farmers 27 farmers (54%) are cultivating below one hectare. The number of farmers cultivating below one hectare in three sample districts are higher than 50% except wayanad district. 31.5% of the sample respondents are cultivating the area in between one hectare to two hectare. only 13% of the organic farmers are cultivating the farm land above two hectares.

Table 6.8
Area under Organic Cultivation of the Organic Farmers of Kerala

Area under cultivation	Tvpm	Thrissur	Alapuzha	Wayanad	Total	Percentage
Below 1 hectare	27(54%)	31(62%)	21(42%)	32(64%)	111	55.5
1-2	18(36%)	17(34%)	16(32%)	12(24%)	63	31.5
Above 2 hectare	5(10%)	2(4%)	13(26%)	6(12%)	26	13
Total	50(100%)	50(100%)	50(100%)	50(100%)	200	100

Source : Primary Survey

6.8. Agricultural Allied Activities of the Organic Farmers

Allied agricultural activities refers to different agricultural related activities that the respondent was producing along with the cultivation of different crops. Farmers are engaged many other allied activities to stabilise their income through different activities.

Table 6.9
Allied Agricultural Activities of the Organic Farmers in Kerala

Activities	No. of Farmers
Cattle	72
Poultry	44
Piggery	14
Bee	2
Fish	9
Duck	11
Goat	29
Rabbit	4
Others	8
None	7
Total	200

Source:Primary Survey

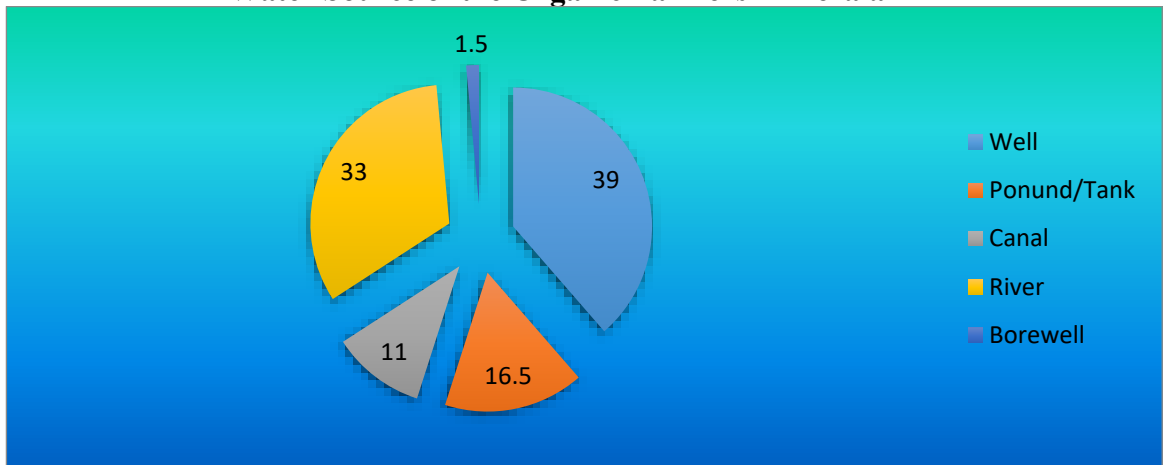
It is an important measure to access the socio economic situation of the farmers, other allied agricultural activities directly or indirectly effect the farming,by providing manures and its also improve the financial position of the farmers.The main agricultural allied activities are performed by the sample farmers are cattle, poultry, piggery, bee, fish, duck, goat, rabbit, others etc. The table 6.9 shows the various agricultural related activities engaged by the organic farmers. Out of sample farmers, 72 (36%) of the organic farmers are engaged in cattle rearing. Most of the farmers who have cattle also keep poultry and goat for alternative Income. Only seven farmers are not entered in other agricultural activities.

6.9. Water Source of Organic Farming

Water is the essential thing for farming, as like air for living things availability of water and method of irrigation adopted by the farmers are the prime determinant of agricultural outcome. Excess availability and shortage of water is adversely effect the farm practices. Flood and drought are the two phenomenon inversly effect the farming.

Figure 6.8

Water Source of the Organic Farmers in Kerala



Source: Primary Survey

Organic farmers depends mainly on the seasonal rains as their primary water source for the farmland. In addition the farmers depends on well in water scared areas. The 39% of the sample repondents are used well as other source of water. Farmers used other natural resources for water like well, pond, canal, river etc. In addition borewell are also used by the farmers. The source of water is an important

determinant of organic farming in Kerala. It is evident that the well is the major source of water to the organic farmers in Kerala. Further, river is the second major source of water to the cultivation in Kerala.

6.10. Farmers Perception towards Farming Methods

Perception refers to the attitude of the organic farmers about the farming method he/ she has adopted in his/her farm. The perception of the organic farmers towards farming method is presented in table 6.10. Out of the 200 hundred organic farmers, (66%) of the respondents are fully encouraged with organic farming. The perception towards the other form of farming is traditional 41 farmers (20%), and partially organic 16 farmers (8%). The farmers do not encourage partially organic methods because partially organic methods may not fulfil ethics of farming.

Table 6.10
Perception towards Farming Methods of the Organic Farmers in Kerala

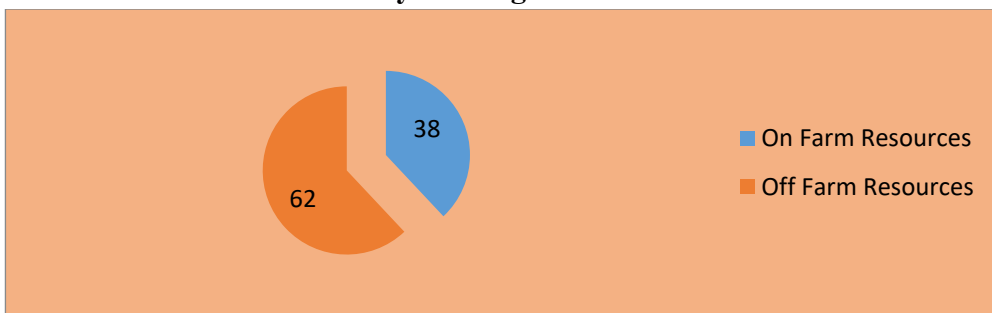
Category	No of farmers	Rank
Traditional	41	2
Modern	11	3
Partially Organic	16	4
Fully Organic	132	1

Primary Survey

6.11. Resources for Organic Farming

This refers to the source of various inputs that have been used for organic cultivation

Figure 6.9
Resources used by the Organic Farmers in Kerala



Source: Primary Survey

The figure 6.8 shows that 38% of the organic farmers use their own farm resources as various inputs for farming and 62 % of the organic farmers depend on the resources outside the farm as farm resources.

6.12. Farming Group Membership

Farming Group Membership refers to the involvement of the respondent in any farmer group either as a member or involvement of the respondent in any organization other than the farmer group.

Table 6.11
Socio-Economic Status of the Organic Farmers in Kerala

Sl.No	Variables	Mean	SD
1	Age	46.03	10.82
2	Education	4.46	1.5
3	Employment	1.61	0.49
4	Family type	1.06	0.24
5	land size	1.48	0.15
6	Area under organic farming	2.86	0.2
7	Year of Experience	18.42	11.74
8	experience in Organic farming	12.74	8.84
9	Crops grown	5.43	3.74
10	Type of farming	3.92	1.48

Source: Computed from primary Data

If the respondent is a member of any farming group the group will direct all agricultural activities by time. It will ensure the minimum productivity of the organic output. The intervention of any group or organisation helps the organic farmers to make awareness about various plans and subsidies provided by the government. All the respondents are the members of the various groups and organizations.

6.13. Technological Innovations in Organic Farming

Among the various organic farming practices being followed by organic farmer respondents of the study, only six major organic farming technologies were considered in this study for assessing their adoption.

- (i) Bio-pesticides
- (ii) Bio-fertilizers and manures
- (iii) Use of traditional seeds,
- (iv) Selective weeding
- (v) Intercropping and crop rotation
- (vi) Minimum tillage and mulching

Table 6.12
Adoption of Technologies by the Organic Farmers in Kerala

Sl.No	Organic Farming Technologies	Mean Rank
1	Bio-Pesticides	408.10
2	Bio-Fertilisers and Mannures	376.90
3	Use of Traditional seeds	228.28
4	Selective Weeding	225.84
5	Inter Cropping and Crop Rotation	122.85
6	Minimum Tillage and Mulching	245.50

Source: Computed from primary Data

To identify the environment friendly farming methods were categorised as six groups of technologies. The details of these groups of farmers and the details of preparations of bio pesticides are given in Appendix IV and V. The obtained data are analysed using statistical tools like percentage analysis, correlation and Kruskal -Wallis (KW) test (Table 6.12).

Table 6.13
Correlation between Adoption of Technologies and Socio-Economic Variables

Sl.No	Socio-Economic Variables	Correlation Co-efficient
1	Age	.380**
2	Total land Size	0.725**
3	land under organic Farming	0.721**
4	Farming Experiance	0.825**
5	Experience in Organic Farming	0.865*

Level of Significance 0.001

Source: Computed from primary data

The table 6.12 shows that there is a statistically significant difference in the extent of adoption among different organic farming technologies and difference in the mean rank for the selected technologies. The bio-pesticides with the mean rank of 408.10 was identified as the most significant technology adopted by the organic farmers and followed by bio fertilisers and manures (mean rank 376.90) the intercropping and crop rotation advised as important practices for organic farming but that was least preferred in the adoption level with mean rank 122.85. The relationship exists between the extent of adoption of various organic farming technologies and different socio-economic variables. The spearman rank correlation non-parametric static method is used. The table 6.13 shows the direction of association as well as the strength of correlation of different socio-economic variables with the adoption of technologies. Out of five socio economic variables four variables shows the positive correlation between with the extent of adoption of technologies.

6.14. Factors behind to Shift to Organic Farming

Agriculture scenario across the country was rapidly changing from bad to worse. There has been a deceleration in agricultural growth leading to stagnation in productivity, declining factor productivity and distress among the farming community in the recent periods. Kerala state too witnessed similar changes in its agriculture sector. As these developments are gradually led the state to a stagnant situation in the production of most of the agricultural commodities. The percentage share of agriculture in economy and the percentage of farmers among the population have started to decrease in the state. This phenomenon has become most evident in the case of major food crops of the state. The area and production of rice, the part and parcel of the culture of the state is also in the declining stage and in this way Kerala has reached a stage of shortage of all agricultural produce (John, 2007). Organic farming is a holistic production management system for promoting and enhancing health of agro-ecosystem, has gained wide recognition as a valid alternative to conventional food production system to ensure safe food for human consumption

There is no question about the increasing demand for chemical free food, but seems to be confined among the population of the industrialized world. So, as third world countries enter into the world organic market, production may be mostly for the export and thus contributing very little to the food security of the poor nation (Altieri and Nicholls, 2004). However, the promise of a better and improved health conditions of the farm family ingrained in the concept of organic farming can act as an added incentive for practicing farmers to continue with it as well as for motivating more farmers to adopt organic farming.

A number of factors are associated with the adoption of organic farming among the farming community. The willingness to change and operate in diverse ways, the ability to face challenges, love of land and region, and the ability to overcome obstacles related to markets and to search for traditions and new information, etc., all these attributes make organic farmers different from others (Duram, 1999). Organic farmers had better environmental orientation than inorganic farmers. The organic farmers were treating their farms as a living organism and they were mostly using locally available inputs in their farming which did not harm the environment (Jaganathan, 2009). In a state like Kerala where cash crops are being

exported to other states and abroad and food crops are being imported, there 'organic by default' is a big market for organic food. The homestead farming model which popularly known as in the state has the potential to emerge out as the main source of organic food to a certain extent if farmers can take the advantage of the existing homestead models (John, 2007).

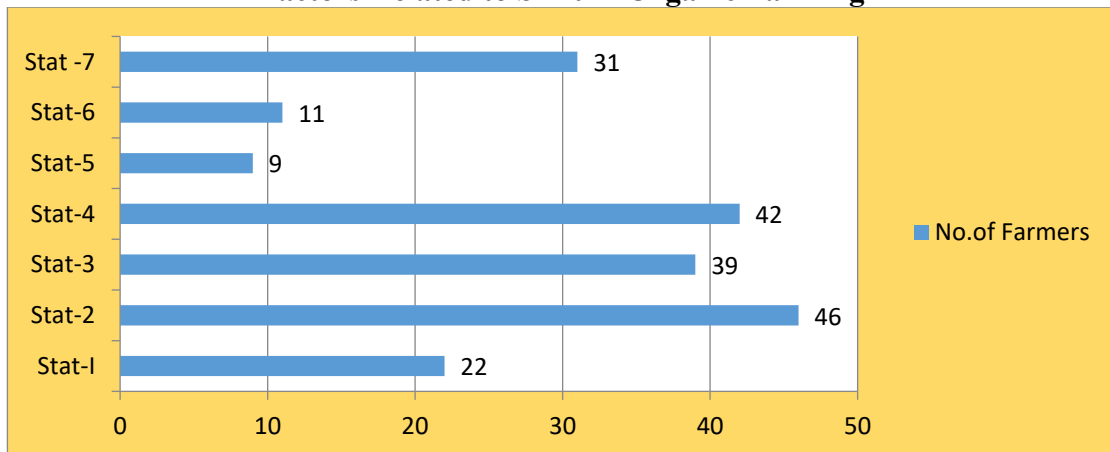
Knowing the importance of these issues, the Government of Kerala has started to work on an organic farming policy with the aim of localization of chemical free food to the whole population of the state as well as to create a chemical free environment for the future generations. Many ecologically sensitive farmers have come forward forgoing organic, with considerable success. Considering all these facts, this study was planned to analyse the factors behind the need for a shift from conventional farming to complete organic farming in Kerala. The figure 6.9 shows the various factor behind to shift to organic farming by sample respondents. There are so many factors to shift to organic agriculture i.e.as detailed below.

1. Environment sustainability through producing chemical food.
2. High price of Organic products
3. Organic farming reduces the environment pollution
4. Domestic market for organic products
5. Export Demand for organic products
6. Financial support from the government
7. Group farming.

The figure 6.10 clearly explains that 46 (23%) of the sample respondents are shifted to organic farming due to high price of the organic products in the domestic and foreign market. It is found that 39 organic farmers are converted to organic farming because of these farming practices will reduce the environmental pollution. The 21% of the organic farmers are shifted to organic farming due to the demand for organic products in domestic market. It is revealed that there is only 9% of the organic farmers are moved to organic farming through the export promotion of organic farming. At present, many of the people are the victims of serious diseases like cancer are because of change in food habits and chemical composition of the food

items either cooked or food ingredients may results high medical dilema. There has been an increasing concern for the conservation of the ecosystem for the future generation, restoration of pesticide-polluted water bodies, reclaiming soil health and soil fertility through organic manures. Ecological and environmentally-friendly solutions were sought for practicing farming. Hence organic farming is preferred and practiced by most of these respondent farmers. However, the increasing awareness about the chemical free and safe food for a better living, and the willingness of consumers to spend more for the organic food has raised the demand of organic food even in the domestic markets and lured farmers to shift to organic farmers as the organic produce was fetching high price in the market.

Figure 6 .10
Factors Related to Shift in Organic Farming



Source: Primary Survey

In addition, high demand for organic produce in international market was also another major factor that lured them to shift to organic farming through group efforts of farming and marketing and exporting abroad. Kerala, being the major organic exporter of the nation, had enjoyed an assured high price for organic produce in the export market. This was another major factor for the present organic movement of the state. The group farming method adopted by different small farmers' groups and promoted by non-government organizations of the state could also spread the concept of organic farming rapidly. The group marketing of the produce through these groups promoted a number of farmers to join hands in the organic movement of the state. The lack of awareness about the financial support from government for organic farming might be the reason behind the poor preference of the factor by the respondents.

6.15. Productivity and Profitability of Organic Farming Units

In spreading the concept of organic farming NGOs had made a visible impact as compared to government agencies as they were more close to the rural farming community. The approach, of working at the grassroots level, had enhanced their accessibility to the farmers. Influenced by the worst agricultural situation of the state especially in the food crops, all most all NGOs started working in the farm sector too, along with the livelihood enhancement and natural resource management projects. ‘One Life One Earth’, an NGO was identified as the pioneer in this farm sector and registered in 1988, which initiated projects to protect nature and natural resources and promote adoption of nature-friendly agricultural practices among farmers for ensuring the development of a safe environment (see tables, 6.14, 6.15, 6.16 and 6.17).

Table 6.14
Crop Diversity of Selected Organic Farm in Thiruvananthapuram District

Major Crops	Medium	Minor Crops	Others
Paddy	Papaya	Vegetables	Chilli
Rubber	Jack		Star Apple
coconut	Teak		Passion fruit
Pepper	Arana		Mango
Medium Plants	Nutmeg		Wild Jack
	Jamba		
	Guava		

Source: Primary Data

The one and only organic farmers’ association, the Kerala ‘JaivaKarshakaSamithi’ with organic farmers from the whole state as its members, was managed by this NGO.

Table 6.15
Crop Diversity of Selected Organic Farm in Alappuzha District

Major Crops	Medium	Minor Crops	Others
Paddy	Ginger	Vegetables	Chilli
Areanut	Jack		Wild Jack
Coconut	Turmeric		Passion fruit
Pepper	Elephant Yarm		Mango
Medium Plants	Nutmeg		
	Jamba		
	Guava		

Source: Primary Data

The major NGOs working for the promotion of organic farming in different parts of the state were Thanal (Thiruvananthapuram), Kuttanad Vikasana Samity (Alappuzha), AVARD (Thrissur), Vanamoolika and Wayanad Social Service Society (Wayanad), Most of these NGOs were found to be working under the Association of Kerala Catholic Churches and getting sufficient funds from respective Dioceses, and working

through some externally funded projects to promote awareness on ecological restoration and organic farming. They were concentrating on agriculture and its development mainly to raise the standard of rural living and ensure food security.

Some NGOs were focusing on the preservation of scarce natural resources along with the localization of healthy food. One organic farming unit is selected from each district as directed by the NGOs. A detailed list of planted species crops and otherwise, was collected. There are bound to be some omissions; plants could have been naturally generated. However, it serves to show the biodiversity of organic farms. It is an idealistic organic farmer while for the latter; it is a matter of convenience.

Table 6.16
Crop Diversity of Selected Organic Farm in Thrissur District

Major Crops	Medium	Minor Crops	Others
Paddy	Pepper	Papaya	Elephant arm
Nutmeg	Areanut	Jack	Ginger
Coconut	Cashew nut	Mango	Passion fruit
	Nutmeg	Muringa	Turmeric
	Jamba		Chillies
			Vegetables

Source: Primary Data

Conventional homestead plots might not have the same feature, principally because home-stead farms are, by and large, few in the conventional system. The diversity of crops in these farms shows a direct relation to the agro-climatic zones in which they are situated. Farm1(South Zone) homestead has several species; however, we have not taken the homestead plot for study, since, due to family and peer pressure, the homestead plot has not been brought under organic methods.

Table 6.17
Crop Diversity of Selected Organic Farm in Wayanad District

Crop diversity of selected organic farm in Wayanad District			
Major Crops	Medium	Minor Crops	Others
Coconut	Plantain	Cardamam	Vegetables
Pepper	Areanut		Ginger
Coffee	Vanilla		Papaya
	Elephant Yarm		Malabar Turmeric
			Jack

Source: Primary Data

Moreover, due to the ecological uniqueness of these two areas, they cannot be considered along with the others. It is evident that the farm 4 (northern zone), which has a less fertile soil; differ in terms of number of crops (18 varieties). Most of the

farmers produce their own vegetables. Majority of the seed variety is indigenous. The cropping pattern differs from area to area. Those who have cattle, grow fodder grass.

6.16. Measurement of Productivity

The Table 6.18 shows the total factor productivity of selected farm in Thiruvananthapuram district, the farm output was increasing trend up to 2016-2017, but in the period of 2017-18 a rapid decline in the output, due to change in the climatic situation the productivity of the farm declined to 0.78.

Table 6.18
Total Factor Output comparison in Thiruvananthapuram District

Period	Total Output (Rs.)"O"	Total input (Rs)"I"	TFP=O/I
2015-16	124238	98125	1.27
2016-17	146389	101236	1.45
2017-18	187675	146982	1.28
2018-19	76432	98324	0.78
2019-20	121325	90821	1.34

Source: Primary Source (Note 'O' stands for output, "I" Stands for input)

The firm experience loss in agricultural production of Rs.21892/-, but the farmer expressed that the level of profitability of organic farming is increasing in diminishing rate in the beginning stage then it shows a steady growth in outputs from the period 2014-2019. The ago climatic condition of the south zone reflect the steady output of this region.

The farm 2 belongs to the Alapuzha district Which Covers 3 hectare, the major crops cultivated in the farm are Arecanut, Coconut, paddy and pepper measuring the productivity of the farm is in Adverse profit because the farmer is experiencing normal profit. Total input cost includes cost of own labour and own rent soothe farmers only obtaining the normal profit from the organic farming (see tables, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23 and 6.24).

Table 6.19
Total Factor Output Comparison of Selected Farm in Alaphuzha District

Period	Total Output (Rs.)"O"	Total input (Rs)"I"	TFP=O/I
2015-16	98865	92121	1.07
2016-17	124345	86432	1.44
2017-18	165433	112728	1.47
2018-19	101384	79434	1.28
2019-20	145949	98124	1.49

Source: primary Survey (Note 'O' stands for output, "I" Stands for input)

The Total factor productivity of the farm from the period 2014 to 2019 shows the positive trends. The socio- economic political and environmental conditions for organic farming is only improved through the proper intervention of the government. The influence of the organic farming organisations may improve the productivity of the farm.

The Table 6.20 shows the productivity analysis of farm No.3 in Thrissur district the Adatt farmers’ co-operative society, the society is a leading organic society in Thrissur district. The main crops under the cultivation are rice, coconut, banana and vegetables.

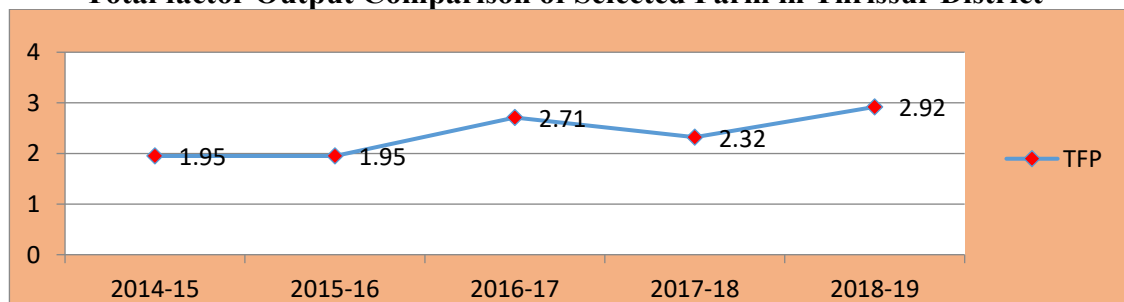
Table 6.20
Total Factor Output Comparison of Selected Farm in Thissur District

Period	Total Output (Rs.)"O"	Total input (Rs)"I"	TFP=O/I
2015-16	184432	94586	1.95
2016-17	199675	102343	1.95
2017-18	212345	78342	2.71
2018-19	234875	101345	2.32
2019-20	286439	98174	2.92

Source: primary Survey (Note ‘O’ stands for output, ‘I’ Stands for input)

200 farmers are engaged in the organic farming in Adatt gramapanchayath with the aim of promoting organic agriculture and environment sustainability. The annual factor productivity of the farm shows a study growth in 2016-17, 2017-18 and 2018-19 the farm experiencing profit recognition through the support from government agencies. Overall the firm is experiencing profit but the flood affected the crops in the 2018 and 2019 and decline the price of paddy is an adverse effect experienced by the farm.

Figure 6.11
Total factor Output Comparison of Selected Farm in Thrissur District



Source: Primary Data

Wayanad organic farming development society is a charitable society working with the motto of chemical free food for the society. The area under the cultivation was 6 hectare, the main crop under the cultivation is coconut, pepper, coffee etc. and the medium crops are cardamom, vegetables, Malabar tamarind etc. The total factor productivity of the farm shows overall normal profit from the year 2015-16 to 2018-2019.

It clearly exhibits the total factor output productivity of the selected farm in Wayanad District. But in the 2018-2019 the farm earns profit, the cost of input is comparatively low to compare with other districts, because the agro climatic zone is most favourable for organic farming. Minimum external labour is used and use own labour to agricultural activities. Efficient soil management, minimum labour input and no extra effort to enhance the yield these are the indicating factor of the selected farm in Wayanad district.

Table 6.21

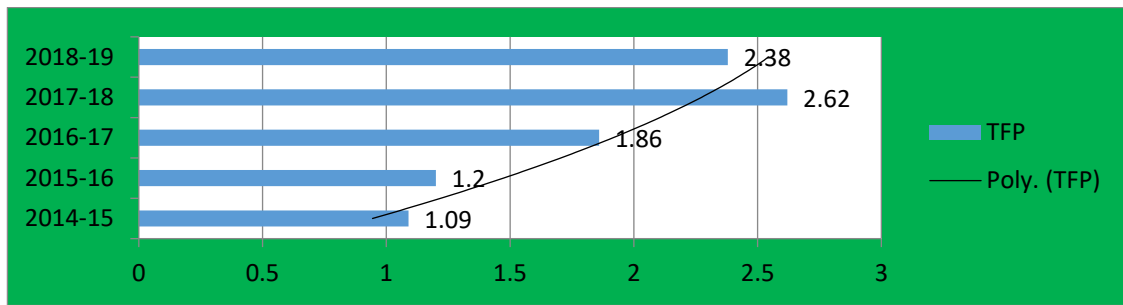
Total factor Output Comparison of Selected Farm in Wayanad District

Period	Total Output(Rs.)"O"	Total input(Rs)"I"	TFP=O/I
2015-16	98122	89735	1.09
2016-17	98643	82134	1.20
2017-18	184900	99635	1.86
2018-19	236489	90328	2.62
2019-20	272434	114675	2.38

Source: primary Survey (Note 'O' stands for output, "I" Stands for input)

But in the 2018-2019 the farm earns profit, the cost of input is comparatively low to compare with other districts, because the agro climatic zone is most favourable for organic farming. Minimum external labour is used and use own labour to agricultural activities. Efficient soil management, minimum labour input and no extra effort to enhance the yield these are the indicating factor of the selected farm in Wayanad district.

Figure 6.12
Total Factor Output Comparison of Selected Farm in Wayanad District



Source: Primary survey

This method could also be effective for a comparative sustainability study of organic plots. One of the major drawbacks of the TFP method is the diverse components whose relative value may be hard to assess. The value of the land has not been taken as an input since the study is restricted to cultivation costs and returns. External factors such as resource degradation, declining product prices (eg. the case of rubber), non-availability of separate market for organic produce, etc. influences the TFP. Moreover TFP focuses on individual farms and cannot be applied on regional level. Considering the complexity of the organic farms, the absence of account keeping among the farmers, lack of deliberate farming plan, inability to assess value of many capital investments and reluctance of the farmers in revealing their financial status are the major factors in Kerala. If the study is made for a longer duration of 5 years, the trend in TFP of every farm could be established.

Table 6.22
Total factor Output comparison of selected farms in Kerala

Period	Farm-1	Farm-2	Farm-3	Farm-4
2014-15	1.27	1.07	1.95	1.09
2015-16	1.45	1.44	1.95	1.2
2016-17	1.28	1.47	2.71	1.86
2017-18	0.78	1.28	2.32	2.62
2018-19	1.34	1.49	2.92	2.38

Source: Primary Survey

The general indifference to evaluating goods in terms of money, time constraint and financial limitations of the study-all put together, severely limited the scope for an exhaustive pool of quantitative data.

Table 6.23
Cost of Organic Manures used by Selected Farms in Kerala

Manures used	Farm 1	Farm 2	Farm 3	Farm 4
Cowdung	4325	3456	5430	7200
Bonemeal	3300	5450	4835	3850
Neemcake	5765	4875	3800	4100
Oil cake	1850	4300	3850	2350
Vermicompost	1350	2920	4320	2800
Total	16590	21001	22235	20300

Source: Primary survey

Yet the trends established by the analysis are indicative. The table 6.23 shows that various organic manures used by the organic farmers in the selected farm. As per the discussion with farmers it is understood that the organic manures and bio pesticides were given in the split doses at different stages of cultivation in the selected area. Farmyard manures are used more often monthly or bi-monthly. The various manures are used in the sample farms are Cowdung, Bonemeal, and Neemcake, Oil cake, Vermi-compost, and homemade slurry. The table 6.25 shows the input wise details of the selected crops of the selected farms in the sample districts. Only five crops selected for input output analysis pepper, Rice, Banana, Coconut and vegetables are the common crops cultivated in these farms commonly. The input cost of the farm for the period of one year taken for the consideration to calculate input cost. As compare with the conventional farming the cost of input material are low, for the calculation of input cost manure cost and labour cost taken for consideration. The total cost of these four farms is ranged from Rs.65000 to Rs.75000 annually. Labour cost plays major share to the total cost

Table 6.24
Input wise cost of Selected Farms in Kerala

Crops	Items	Farm 1	Farm 2	Farm 3	Farm 4
Pepper	Organic manure	4325	3456	5430	7200
	Labour	7000	5500	7000	13000
	Total	11325	8956	12430	20200
Rice	Organic manure	3300	5450	4835	3850
	Labour	18000	23000	29000	24000
	Total	21300	28450	33835	27850
Banana	Organic manure	5765	4875	3800	4100
	Labour	16000	19000	11500	9300
	Total	21765	23875	15300	13400
Coconut	Organic manure	1850	4300	3850	2350
	Labour	4500	7865	7500	4600
	Total	6350	12165	11350	6950
Vegetables	Organic manure	1350	2920	4320	2800
	Labour	3300	5400	11250	4300
	Total	4650	8320	15570	7100
	G.Total	65390	81766	88485	75500
	Total labour cost	48800	60765	66250	55200
	Total manure Cost	16590	21001	22235	20300

Source: Primary Survey

Descriptive Statistics of Output and Inputs

A multi linear regression model is done in order to understand the determinants of output .The regression equation is

$$\text{Output} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta$$

Where X_1 , X_2 , X_3 are denoted as vermi-compost, green manure and labour respectively.

The results of the regression are given in the table 6.26. The mean value of output earned by the sample farmers is rs.14963.33.Out of the major inputs labour cost is dominant with average amount of Rs. 4465 for the sample farmers followed by the vermin-compost is with an average cost of Rs.968.33 and green manure with an average cost of Rs.711.66. The regression result shows that green manure and labour inputs are the major determinants of output (t value is less than level of significance at .05).

When one rupee is spent on green manure, the value of output is increased by 7.566 rupees, and one rupee spent on labour the output is increased by 0.82 units. Vermicompost is positively related output but is not significant. The major determinants of the output in the sample regions are green manure and labour. Organic farming and adoption of technologies were focused on technological intervention in organic farming without compromising the in the sustainable resources in the eco system.

Table 6.25
Input-wise Cost of Selected Farms Quantitative Analysis

Valid	Sample size	Minimum value	maximum value	mean	SD
Output	200	5000	80400	14963.3	9626.12
Vermicompost	200	500	7600	968.33	934.44
Green manure	200	400	2600	711.66	482.572
labour	200	600	38000	4465	4125.7

*shows significant at the 5% level

Source: computed from primary Data

The organic farmers could take the advantages of these technologies by adopting relevant technology in farming. The scientist and policy makers should vigilant while advising the technology to the poor farmers, the organic farming practices need to

ensure the farm productivity and guarantee a minimum level of profitability to stick on organic farming

Table 6.26

Input-wise Cost of Selected Farms- Regression Analysis

Valid	Unstandardized Coefficient		Standardized Coefficient	t value	Significance level
Output	3506.41	2302.07	0.361	1.523	0.14
Vermicompost	2.241	1.461	0.218	1.534	0.137
Green manure	7.566*	3.099	0.379	2.441	0.022
labour	0.825*	0.355	0.353	2.321	0.028

*shows significant at the 5% level

Source: computed from primary Data