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Research Article

Economic Viability of the Integrated Farming in Kerala

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Abstract

The article unwraps the findings of the specifications of the viability of Integrated Farming Systems (hereafter, IFS) in Kerala, done during the pressing period of the Pandemic Covid-19.The data source was the survey of 390 farmers from the randomly selected sample of six agro-ecological zones of Kerala, namely Onattukara, Southern Midlands, Northern Midlands, Malayoram, Riverbank Alluvium and High Ranges. The study stipulates the following findings. The extensive homestead farming had the highest economic viability in riverbank alluviumand Onattukara.The south Midland region reported the lowest rate of viability. The Monoculture/ plantation model was the most successful combination of integrated farming in Kerala which was followed by rice/fish model.The coconut/ tree based combination was the model which had least viability.The coconut/fish model brought out best performance in southern midlands. The farmers who belonged to the category of those who had small-size of land, had comparatively high viability rate as per the models used in the study. However, all the three types of farmers had economic viability in general.

Key words : Economic viability,integrated farming,average annual income,total cost of farming,working cost,size of land under cultivation and combinations of integrated farming.

Introduction

Economic viability involves aspects related to the economic condition of a farm. Viability, in literary sense, means the measure of the likely success of a particular action or set of actions.

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Economic viability states that the assessment of the evaluation of the economic activities is caused due to particular actions. Farming is an economic activity and viability of any farming activity can be measured by analysing certain economic variables like income, working cost and initial cost or capital investment. Income was measured based on their average annual income from the farm that the farmers gained. The cost variables explained in the study were labour cost, non-labour cost and initial cost or the capital cost.

Integrated Farming System is generally defined as a system of agriculture in which different elements like soil, plants, animals, off-farm components interact each other to reduce the cost of the activities of farming and to increase efficiency of the agriculture activity undertaken by the framers and increase the revenue generated from it. Studies are carried out around the world with regard to the practices of integrated farming, their viability in terms of economic and environmental aspects. For deeper understanding of the concept, studies, articles, theories on Integrated Framing System (hereafter IFS) were reviewed. Mostly the authors or researchers were having a positive opinion about integrated farming system and its adoption, but the important factor was the selection of correct elements which was suitable to the environmental condition and availability of resources. The experiences of Integrated farming system around the world and in India was referred while making the present study. This had helped to understand the concept of Integrated Farming and concepts related to it.

Integrated Farming System (IFS)

Integrated Farming System camouflages the idea of integrated agriculture where the elements interact each other in order to make farming more productive and environmentally sustainable by cutting down the chemicals or unhealthy artificial content. The studies in this field identified Integrated Farming System as a natural way of farming, which suited the constrained conditions of agriculture. The complex and compatible integration helped farmers, especially those with small land holdings to use their off-farm resources to upsurge the farm output at a reduced cost. Research works around the world support this argument of integrated farming and space for trial and error experiments with different crops and farm practices are high in this system of farming. Various works had mentioned about the significance of integrated farming in controlling the environmental losses incurred due to bad agricultural practices. In defining the basic concept of integrated farming system many researchers had made their contribution. Integrated Farming System (IFS) was defined as a complex interrelated matrix of soil, plants, animals, implements, power, labour, capital and other inputs controlled in part by farming families and influenced, to varying degree, by political, economic, institutional and rest factors that operated at the level of the farm (Mahapatra, 1992). The definition disclosed the interrelation of the factors in a more effective way within the level of the farm. Unlike the traditional farming system, integrated farming system had more correlation among the inputs of the farm, both internal and external. The natural interrelations framed in a systematic way helped to maintain the viable conditions of the IFS.

Location and Land Size

The survey was conducted in six different agro-ecological zones, i.e., high ranges, Southern midlands, Northern midlands, Onattukara, Malayoram, Riverbank alluvium. These zones are having different characteristic features in terms of their economic,

geographical, environmental conditions and as a result of which, farming related decisions also gets impacted causing a change in their dimensions of farming.

Size of Land Holding

The size of the landholdings categorized were hooked on to three categories based on stratified random sampling as small, medium and large, the stratum being the size of landholdings. Here, the small landholdings constitute, landholdings which were less than 2 acres, landholdings more than 2 acres and less than 4 acres and above 4 acres were respectively termed as medium and large. These categorization of the landholdings were distributed among the six different agro-ecological zones. The cross tabulation of zones and category of landholding are given in table 1.1

Table 1.1 Size of land holdings.

Type of land area	Place						Total
	High ranges	Malayoram	Northern midlands	Onattukara	Riverbank alluvium	Southern Midlands	
Large	**12**	**3**	**20**	**7**	**31**	**16**	**89**
Medium	**35**	**45**	**32**	**48**	**26**	**30**	**216**
Small	**18**	**17**	**13**	**10**	**8**	**19**	**85**
Total	**65**	**65**	**65**	**65**	**65**	**65**	**390**

Source: primary Survey

The size of the landholdings selected for the study were distributed in such a way that 22 per cent were large farmers, 55 per cent of the farmers were medium and rest of the farmers hold small landholdings (i.e. Less than 2 acres) . In the High ranges, 53 per cent of the respondents had medium landholdings, 27 per cent with small landholdings and 20 per cent with large landholdings. At this juncture it could be observed that the general trend of the size of landholdings of the state of Kerala was reflected here. In Kerala the size of large landholding is less compared to other states. At the outset it should also be inferred that the farmers engaged in integrated farming cluster more around the medium size of landholdings. In Malayoram, 69 per cent of the respondents possessed medium landholdings, 26 per cent had small landholdings and the rest were large landholdings. In Northern midlands, 49 per cent of the respondents had medium landholdings and 30 per cent were large landholdings and rest had small landholdings. In Onattukara, 74 per cent of the respondents had medium landholdings, 15 per cent of the respondents had small landholdings and 11 per cent of them had large holdings. Among riverbank alluvium, 48 per cent of the landholdings were large, 40 per cent of the landholdings were medium and the rest belonged to small farmers. In southern midlands, 46 per cent of the landholdings belonged to medium farmers, 29 per cent of the landholdings were small and 25 per cent of the holdings wee large. At this juncture it is to be approved that majority of farmers engaged in integrated farming in essence belonged to the category of medium farmers. That is why 74 per cent belonged to the category of medium farmers. In Kerala, the average size of the

cultivable land was only 0.22 whereas it was 1.67at all India level (Monitoring and Evaluation Division, Directorate of Agriculture, (Agricultural statistics, Govt.of Kerala 2020).

However, the overall average land area was 4.53 acres. In the case of large farmers the average landholdings was 10.25 acres and for the medium farmers the average land area was 3.41 acres and for the small farmers the average land area was 1.64 acres. For the High ranges, the average land area was 4.45 acres and the average land area of the larger farmers was 12.75 acres, for medium farmers, it was 3.39 and for the small farmers the average land area was 1.72. It is observed here that the density of population in high ranges was less as compared to other areas under the consideration of the study. In the northern midlands, the average land area was highest with 5.88 acres and among them, the large farmers were having an average land area of 12.83 acres. The average land area was lowest in Malayoram (low land of the high ranges) with 3.02 acres. In the case of average size of land in Kerala, the small category of farmers (i.e. below 2 hectares of land) constituted the highest.

Average Annual Income

In an integrated farming system the income is generated from different components on an irregular basis. Farmers employ crops that generate income on long term, short term and mid-term basis. Farmers plant crops and look after animals in accordance with their income generation ability so that they can have a steady income to meet their farm expenses. So in order to measure the income, annual scale is used. The annual average income from different components of the farmers is represented in table 1.2

Table 1.2 Average income in '000 ₹

Place	Small	Medium	Large	Total
High ranges	1160.7	1740	2475	1693.5
Onattukara	921	2033.3	1450	1808.1
Southern midlands	815	2672.2	4200	2497
Northern midlands	825	1720	4366.7	3538.8
Malayoram	991.7	1714.2	2800	1559.5
Riverbank alluvium	1600	2446.1	2371.5	2330
Overall	1008.1	2005.5	3732.6	2163.1

Source: Survey data (2020)

The overall average annual income was₹21.63 lakh and it varied among small, medium and large farmers and also based on their regions. Small farmers in river alluvium had the highest

income among the small farmers with an average income of ₹16 lakhs per year, whereas the small farmers of southern midlands had the lowestaverage income in this category. The overall average of the small farmers was around ₹10.08 lakhs per year. For the medium farmers, the overall average was income₹ 20.05 lakh per year. The medium farmers of the southern midlands had highest average income with₹26.72 lakhs per year and medium farmers of the Malayoram the lowest with₹17.14 lakh per year. And for the large farmers, the overall average income was ₹37.32 lakh per year. The average income was high in Northern midlands with₹43.66 lakh and low in Onattukara with₹14.5 lakh per year. The correlation coefficient of the average income and landholding was 0.684, making the landholding a significant factor in determining the income, whereas the region or the place was just 0.18 and for the type of farming it was 0.25.

Total Initial Cost of Farming

The total initial cost was the sum of cost of setting up the farm land for farming and cost of seeds and total required to start the farming activity. Initial cost occurred every time when the crop replanted. Every year the short term and mid-term crops had to be replanted for which the land had to be prepared. The initial cost based on place and size of landholding is given in table 5.24.

Table 1.3 Average Initial cost in '000 ₹

Place	Small	Medium	Large	Total
High ranges	185	267.5	537.5	257.8
Onattukara	107.3	249.6	355	238.8
Southern midlands	151.6	447.2	381	341.8
Northern midlands	160	226.8	495.8	414
Malayoram	178.8	278.2	450	272.2
Riverbank alluvium	222.5	393.3	606	525.9
Overall	167.2	299.3	593.3	335.7

Source: Primary data

The overall average total initial cost was₹ 3.33 lakh and it was highest in riverbank alluvium with₹5.25 lakh and lowest in Onattukara with₹ 2.38 lakh. The average cost of the small farmers was₹1.67 lakh and among the large farmers it was around₹5.93 lakh. The small farmers of Onattukara had the least initial cost with₹1.07 lakh and the large farmers of riverbank alluvium had the highest with₹6.06 lakh. The correlation coefficients of the total

initial income with the place, type of farming and landholding size were 0.251, 0.326 and 0.575 respectively. The total land area had a major impact in determining the initial cost incurred in a particular field.

Total Working Cost

The working cost was comprised of the purchase of fertilizer for the crops, feed cost of the livestock, transportation and other market accessing cost. This cost was consistent and most vital in farming, as they were considered as regular inputs and a part of the income was saved for this operational cost. All farmers tried to keep their operational cost, especially feed and fertilizer cost, at minimum level by finding innovative way of interaction among the farm components.

Table 1.4 Average Annual Working Cost in '000 ₹

Place	Small	Medium	Large	Total
High ranges	455.8	622.6	923.7	624.1
Onattukara	240	641.8	653	610.2
Southern midlands	209	2178.8	2118	1572.7
northern midlands	273.5	692	2621	1282.5
Malayoram	395.8	731.1	665	632.1
Riverbank alluvium	669.5	1031.3	1121.1	1039.6
Overall	356.1	921.7	1535.4	933.8

Source: Primary data

The overall average of the working cost was₹9.33 lakh per year. The highest working cost average was for the southern midlands region with₹15.72 lakh and lowest among Onattukara with₹6.10 lakh per year. The correlation coefficient was high with respect to the land area which was 0.84. Among the small farmers in the riverbank alluvium had the highest working capital cost with₹6.69 lakhs and Southern midlands had₹ 2.09 lakh per year. Among the medium farmers, Southern midlands had the highest working cost with ₹21.78 lakh and High ranges with minimum of ₹ 6.22 lakh per year. Finally among the large farmers, Southern midlands had the highest working cost of ₹ 21.18 lakh and Onattukara had the lowest working cost with₹ 6.53 lakh per year.

Total cost (Working cost + Initial cost)

Total cost is the summation of total initial cost and working cost incurred during the farming process. Even though working cost and initial cost were the primary components there also existed miscellaneous costs that occurred in between the farming activity. Cost was the most important factor that determined the level of the profit of the farmer. Unlike the traditional farmer, the integrated farming practitioner had an advantage to reduce the cost by the interactions within the farm. The waste produced from one component of the farm could be an input to other component, which helped to maximize its efficiency.

Table 1.5 Average Total cost in '000 ₹

Place	Small	Medium	Large	Total
High ranges	640.8	890.1	1277.5	882
Onattukara	347.3	941.5	908	849.05
Southern midlands	360.2	1626.1	2408	1914.5
northern midlands	433.5	918.8	2416.8	1696.6
Malayoram	574.6	1009.3	1415	904.4
Riverbank alluvium	892	1424.6	1827.1	1565.5
Overall	523.4	1221.0	2128.8	1269.6

Source: Primary data

The overall average total cost was₹12.69 lakhs per year. It was the highest in the region of Northern midlands and lowest in the region of High ranges with ₹16.96 lakh and₹8.82 lakh respectively. For the small, medium and large farmers, it was ₹5.23 lakh,₹12.21 lakh and ₹21.28 lakh respectively and the correlation coefficientwas 0.86 between the land area and total cost incurred. Among the small farmers the riverbank alluvium had the highest average total cost of₹8.92 lakh per year and Onattukara had the lowest with₹3.47 lakh. For the medium farmers the highest average was in the southern midlands region with₹16.26 lakh per year and the lowest among the High Ranges with₹8.90 lakhs per year. Finally, for the larger farmers it was the highest in the northern midlands with₹24.16 lakh and lowest in the region of Onattukara with₹9.08 lakh per year.

Viability of Integrated Farming

Economic viability was calculated by dividing the gross capital (initial) cost plus working cost during the end of the financial year under consideration of the study, that is, the year 2020 by the gross revenue generated during that period. In the present study, for the

calculation of the total revenue or total cost, the revenue and cost produced and incurred by different components had to be measured. The **profitability and the viability** of IFS were found out by comparing the inputs and outputs of the farming activity. The inputs were measured in terms of cost and output in terms of the revenue. The results of the findings with respect to different regions are represented in table 1.6.

Table 1.6

Economic viability

Place	Small	Medium	Large	Total
High ranges	1.82	2.0	2.0	1.95
Onattukara	2.28	2.36	1.68	2.28
Southern midlands	2.10	1.28	1.805	1.65
northern midlands	2.08	1.94	2.26	2.175
Malayoram	1.73	1.70	1.978	1.72
Riverbank alluvium	2.10	1.91	1.32	1.65
Overall	1.96	1.91	1.76	1.88

Source: Primary data

The farmers who belong to the category of " small" had the more viability in comparison with other farmers namely "small" and "large".The rate of viability as estimated in the study is 1.96 which was comparatively more and the "medium" farmers were more successful in the region Onattukara where they had the highest rate of viability.The rate of viability of the large farmers in Onattukara was less in comparison with the other farmers.The overall performance of all the three types of farmers in Kerala were viable as per the estimations made in the study.The study high lights the findings that the IFS is a successful model of farming in Kerala and it should be popularized in the farming community of Kerala.

Conclusion

The IFS in Kerala gained a distinct gesticulation from 1968 onwards as it started to practise under the auspices of the Integrated Farming Systems Research Station (IFSRS) located at Nedumcaud in the district of Thiruvananthapuram, which was established in 1955.The IFS so far is practised in different parts of state. However, it has not become popular in the farming community of Kerala. Various combinations which has to be successful should be promoted by the policy makers and the officials in concerned especially the Krishibhavans in all the districts of the state. In IFS if one combination is not profitable, the other combinations can opted for.In near future the IFS can be the the best practised system of farming in Kerala.

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