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Analysis of Factors Determining Yield of Various Crops in Salem District

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Abstract: Farmers are exposed two risks, that is, production risk and price risk (Mandal, 2013). As per risk theories, diversification helped to minimize the risk involved in an enterprise or activity. In this regard, it can be said that both determine of the amount of revenue of any crop. Suppose, a change in any one takes place, it reflects in the amount of return as well as profit. So, factors determining yield is analysed by employing factor analysis in the present study. The value of inputs and others costs taken in terms of monetary value. Cost on seed, manure, fertilizer, weedicide, pesticide, and micro food, labour costs are taken as independent variables. Through the analysis, the level of variance, which can be caused by a particular variable or a set of variables, is found. This variance would explain the variance in the yield.

Introduction

Food grains area had decreased drastically from 11.81 million hectares in 1958-59 to 3.67 million hectares in 1999-00 in Tamil Nadu. Despite the declining of area of food grains, the production had increased from 5.73 million tonnes in 1969-70 to 8.84 million tonnes in 1990-00 because of Green Revolution. A tremendous increase in the output of pulses was mainly due to sharp increase in the yield and area (Govindarajan, 2002 and Season and Crop Report, Tamil Nadu). Hence, yield gets a crucial role in determining the quantity of agricultural production. By studying the coastal region, Sharma et.al. (1995) gave s set of suggestions in order to maintain the desired level of acreage and yield of rice. The farmers would have to be assured of not only remunerative and stable prices, but also of good and stable yields. In this connection, Narayanamoorthy (2013) emphasised that government should focus on non-price incentive to increase the yield of crops and also to reduce the cost of cultivation.According to Majumdar and Basu(2005), institutional and policy support to farmers was crucial for ensuring agricultural input supplies, credit, price incentives and adequate marketing systems in a holistic manner for increased crop productivity. But, it was not permanent. Hence, if sustainable and steady growth continued, further technological breakthrough should take place (Majumdar and Basu, 2005). Singh (2000) also emphasized that the agricultural productivity was strongly determined by the level of technology adoption.

According to Karthick et.al. (2013), the yield of turmeric could be increased by increasing the use of planting material, nitrogen, potash, harvesting and curing and irrigation. Kumar (2005) noted that the land and labour were the important factors of production in agriculture.Sharma (1966)

observed that the machinery usage may be better than the labour usage in terms of productivity. In this connection, Reddy et.al. (1995) revealed that the land, farm yard manure and seeds were significant in groundnut yield. Bhattacharya (2011) noted that several location specific factors causes for minimizing crop yields such as, unbalanced usage of fertilizers, lack of use of High Yielding Varity Seeds, inadequate use of manures and micronutrients, inefficient and poor water management, lack of proper marketing arrangements in the neighborhood, lower access to electrified irrigation sources, inefficient extension services and lesser interest in agriculture. All these resulted in improper crop management and farming practices, which have to be addressed. In this regarding, Meenakshi and Indhumathi (2009) noted that 53 per cent of the cultivated area was being used for growing unsuitable crops in Tamil Nadu.

Farmers are exposed two risks, that is, production risk and price risk (Mandal, 2013). As per risk theories, diversification helped to minimize the risk involved in an enterprise or activity. In this regard, it can be said that both determine of the amount of revenue of any crop. Suppose, a change in any one takes place, it reflects in the amount of return as well as profit. So, factors determining yield is analysed by employing factor analysis in the present study. The value of inputs and others costs taken in terms of monetary value. Cost on seed, manure, fertilizer, weedicide, pesticide, and micro food, labour costs are taken as independent variables. The yield of paddy and gingelly from Alampalayam, sugarcane from Pappampalayam and Thumbal are analysed. Paddy, tapioca, cotton, maize, turmeric are analysed by consolidating Thumbal and Kalleripatti. Factor analysis is employed to find the significance of the influencing variables in determining yield. Through the analysis, the level of variance, which can be caused by a particular variable or a set of variables, is found. This variance would explain the variance in the yield.

Research Question

What are the factors that have more impact on yield?

Objective

To analyse the factors determining the yield of selected crops in the study villages.

Hypothesis

There are some factors that are more influential than others in determining the yield of the selected crops in the study villages.

Methodology

The present study aims at analysing the agricultural production and cropping pattern in Salem District. Salem district was selected for the study as the area under agricultural activities had the largest declining trend among the various districts in Tamil Nadu during the past decade. Multi-stage random sampling was adopted to select the blocks and villages, and ultimately the sample respondents. With the help of the District level and Block level Offices, Department of Economics and Statistics, Government of Tamil Nadu, irrigation sources and predominant crops were identified. Totally, there are 35 blocks in the district and among them, eight blocks are located on the Cauvery river bank (left side). Water is supplied to these eight blocks through the canal system from the Stanley Reservoir, Mettur in Salem district. Thus, villages which are located on the river bank get canal irrigation. The remaining 27 blocks are located beyond the Cauvery river bank. In these 27 blocks canal irrigation system might be available, but, it is not sufficient for crop cultivation, i.e., water cannot be supplied regularly. In order to make a comparative analysis of the cropping pattern under canal irrigation and well irrigation, and also the increased area in the case of non-agricultural purpose, two blocks were selected; one, near the riverbank and the other away from the riverbank. In these two blocks, four villages were selected, that is, two from each block on the basis of the type of irrigation. The details of the selected blocks and villages are given below.

Table 3.1: Details of Area Selection

Block	Pallipalayam		Pethanaickenpalayam	
Village	Alampalayam	Pappampalayam	Thumbal	Kalleripatti
Type of Irrigation	Canal	Well	Well	Well

Out of the eight blocks in Salem district, which are located near the riverbank, Pallipalayam block was selected at random. In Pallipalayam block, one village, namely, Alampalayam was selected as it had canal irrigation and another village, namely, Pappampalayam was selected as it had well irrigation. Out of the remaining 27 blocks, Pethanaickenpalayam block was selected at random. In Pethanaickenpalayam block, two villages, namely, Thumbal and Kalleripatti were selected because they had well irrigation (major parts of Salem district have well irrigation). Out of the four selected villages, three villages were selected for well irrigation. There were 400 farmers in Alampalayam, 550 farmers in Pappampalayam, 640 farmers in Thumbal and 350 farmers in Kalleripatti. Either 10 per cent or a quota of 60 in number whichever is maximum was taken as the sample size in each village. Among the four villages, 60 farmers were chosen as respondents from each village, namely, Alampalayam, Pappampalayam and Kalleripatti. In Thumbal, 10 per cent of the farmers, which accounts to 64 in number were chosen at random, as respondents. The grand total of the selected respondents was 244, which accounted to 12.58 per cent of the total farmers in all the four villages. A structured interview schedule was prepared and the data was collected through personal interview. Before collecting the primary data, interactions and group discussions were made in each village.

The major crops in Salem district were identified through Secondary data taken from Season and Crop Report for Various Years, published by the Directorate of Economics and Statistics, Tamil Nadu on area, production and yield. The list of major crops is as follows, paddy, jower, bajra, ragi, maize, sugarcane, turmeric, gingelly, groundnut, coconut, cotton, and fruits and vegetables.

Results and Discussion

Paddy (Alampalayam)

In the initial stage of the analysis, all the variables are considered at the 100 per cent level, so the values are assigned as one andare presented in column two of Table 1 (a). In the next stage, the variances of the variables are extracted and presented in column three of Table 1 (a). The level of extraction depends on the strength of the variables, i.e., the variance of the variables. Among the taken variables, seed is extracted at .713 points, manure at .709 points, fertilizer at .595 points, pesticide at .674 points, weedicide at.357 points, and micro food at .753 points and labour costs at .738 points.

Table 1 (a): Communalities of the Analysis of Paddy in Alampalayam

Variables	Initial	Extraction
Seed	1	0.713
Manure	1	0.709
Weedicide	1	0.357
Pesticide	1	0.674
Micro Food	1	0.753
Labour Cost	1	0.735
Fertiliser	1	0.595

Source: Computed from Primary Data.

Table 1 (b): Variances of Paddy in Alampalayam

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage
1	2.047	29.249	29.249	2.047	29.249	29.249
2	1.384	19.775	49.024	1.384	19.775	49.024
3	1.106	15.793	64.817	1.106	15.793	64.817
4	.895	12.792	77.610	~	~	~
5	.742	10.594	88.203	~	~	~
6	.548	7.833	96.036	~	~	~
7	.278	3.964	100.000	~	~	~

Source: Computed from Primary Data .Note: ~ denotes Not Applicable.

With these extracted values, factors or components are formed and are given in Table 1 (b). They are composed into seven components and eigenvalues are assigned for each component. Here, the first three components are selected as their eigenvalues are greater than 1.0 as per the Kaiser Criterion. Here, component one with eigenvalue 2.047 explains 29 per cent of the variance, component two with eigenvalue 1.384 explains 20 per cent of the variance and component three with eigenvalue 1.106 explains 16 per cent of the variance and the remaining four components explain 35 per cent of the variance. The cumulative variance is given in column four, that is, component one explains 29 per cent of the variance, component one and two together explain 49 per cent of the variance and component one, two and three together explain 65 per cent of the variance cumulatively. So, the first three components explain 65 per cent of the variance in the dependent variable, i.e., yield. These selected components are presented in the right hand side of the Table 1 (b) with their eigenvalues in column five, percentage of variance in column six and cumulative variance in column seven.

Table 1 (c): Component Matrix of the Analysis of Paddy in Alampalayam

Variables	Components		
	1	2	3
Seed	0.155	0.728	-0.399
Manure	0.823	-0.179	0.024
Weedicide	-0.595	-0.032	-0.051
Pesticide	-0.661	0.344	0.345
Micro Food	0.029	0.107	0.861
Labour Cost	0.215	0.827	0.070
Fertiliser	0.714	0.087	0.279

Source: Computed from Primary Data.

These components are taken for further analysis, which are given in Table 1 (c). The variable that is loaded at the top or with high value in that particular component is considered to influence the variance in that factor and the dependent variable. According to this, manure is the top variable in the

first component with a score of 0.823 points followed by labour cost with a score of 0.827 points in the second component, finally by micro food with a score of 0.861 points in the third component. Hence, as per the analysis, manure, labour cost and micro food are the main determining factors of yield per acre of paddy in Alampalayam and explain about 72 per cent of the variance in it. In this connection, it can be noted that for paddy cultivation in Alampalayam the measures to control manure, labour costs and micro food may result in better outcome and it may lead to increase the level of yield.

2. Paddy (Thumbal and Kalleripatti)

In the initial stage of the analysis, all the variables are considered at the 100 per cent level, so the values are assigned as one and are presented in column two of Table 2 (a). In the next stage, the variances of the variables are extracted and presented in column three of Table 2 (a). The level of extraction depends on the strength of the variables, i.e., the variance of the variables. Among the taken variables, ploughing is extracted at .792 points, seed at .883 points, manure at .770 points, fertilizer at .771 points, weedicide at .711 points, pesticide at .768 points and micro food at .487 points and labour costs at .718 points.

Table 2 (a):Communalities of Paddy in Thumbal and Kalleripatti

Variables	Initial	Extraction
Ploughing	1.000	.792
Seed	1.000	.883
Manure	1.000	.770
Fertiliser	1.000	.771
Weedicide	1.000	.711
Pesticide	1.000	.768
Micro Food	1.000	.487
Labour Cost	1.000	.718

Source: Computed from Primary Data.

Table 2 (b): Variances of Paddy in Thumbal and Kalleripatti

Components	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage
1	2.326	29.070	29.070	2.326	29.070	29.070
2	1.349	16.861	45.931	1.349	16.861	45.931
3	1.224	15.303	61.234	1.224	15.303	61.234
4	1.001	12.507	73.740	1.001	12.507	73.740
5	.863	10.791	84.531	~	~	~
6	.592	7.402	91.933	~	~	~
7	.397	4.959	96.892	~	~	~
8	.249	3.108	100.000	~	~	~

Source: Computed from Primary Data. Note: ~ denotes Not Applicable.

With these extracted values, factors or components are formed and are given in Table 2 (b). They are composed into eight components and eigen values are assigned for each component. Here, the first four components are selected as their eigen values are greater than 1.0. Here, component one with eigen value 2.326 explains 29 per cent of the variance, component two with eigen value 1.349 explains 17 per cent of the variance, component three with eigen value 1.224 explains 15 per cent of the variance and component four with eigen value 1.001 explains 13 per cent of the variance and the remaining four components explain 26 per cent of the variance. The cumulative variance is given in column four, that is, component one explains 29 per cent of the variance, component one and two together explain 46 per cent of the variance, component one, two and three together explain 61 per cent of the variance and component one, two, three and four together explain 74 per cent of the variance cumulatively. So, the first four components explain 74 per cent of the variance in the dependent variable, i.e., profit. These selected components are as earlier.

Table 2 (c):Component Matrix of the Analysis of Paddy in Thumbal and Kalleripatti

Variables	Components			
	1	2	3	4
Ploughing	.856	.189	.133	.077
Seed	.005	.052	.772	.534
Manure	.545	-.576	.353	-.127
Fertiliser	-.087	.846	.093	-.198
Weedicide	-.700	.147	.263	.361
Pesticide	-.096	.210	.550	-.642
Micro Food	.385	.358	-.318	.329
Labour Cost	.801	.262	.072	.059

Source: Computed from Primary Data.

These components are taken for further analysis, which are given in Table 2 (c). The variable that is loaded at the top or with high value in that particular component is considered to influence the variance in that factor and the dependent variable. According to this, ploughing is the top variable in the first component with a score of 0.856 points followed by fertiliser with a score of 0.846 points in the second component, seed with a score of 0.772 points in the third component and finally by pesticide with a score of -0.642 points in the fourth component. Hence, as per the analysis, ploughing, fertiliser, seed and pesticide are the main determining factors of yield per acre of paddy in Thumbal and Kalleripatti and explain about 74 per cent of the variance in it. In this connection, it can be noted that out of these four variables the measures to control seed and ploughing may result in better outcome and it may lead to increase the level of yield.

3. Gingelly (Alampalayam)

In the initial stage of the analysis, all the variables are considered at 100 per cent level, so the values are assigned as one, which is presented in column two of Table 3 (a). In the next stage, the variances of the variables are extracted and presented in column three of Table 3 (a). The level of extraction depends on the strength of the variables, i.e., the variance of the variables. Among the taken variables, ploughing is extracted at .839 points, seed at .923 points, manure at .924 points, fertilizer at

.702 points, weedicide at .699 points, pesticide at .576 points and micro food at .785 points and labour costs at .878 points.

Table 3 (a): Communalities of the Analysis of Gingelly in Alampalayam

Variables	Initial	Extraction
Ploughing	1.000	.839
Seed	1.000	.923
Manure	1.000	.924
Fertiliser	1.000	.702
Weedicide	1.000	.699
Pesticide	1.000	.576
Micro Food	1.000	.785
Labor Cost	1.000	.878

Source: Computed from Primary Data.

Table 3 (b): Variances of Gingelly in Alampalayam

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage
1	3.154	39.421	39.421	3.154	39.421	39.421
2	1.850	23.121	62.542	1.850	23.121	62.542
3	1.322	16.527	79.069	1.322	16.527	79.069
4	.989	12.359	91.428	~	~	~
5	.258	3.226	94.655	~	~	~
6	.186	2.323	96.978	~	~	~
7	.143	1.788	98.765	~	~	~
8	.099	1.235	100.000	~	~	~

Source: Computed from Primary Data.Note: ~ denotes Not Applicable.

With these extracted values, factors or components are formed and are given in Table 3 (b). They composed into eight components and eigenvalues are assigned for each component. Here, the first four components are selected as their eigenvalues are greater than 1.0. Here, component one with eigenvalue 3.154 explains 39 per cent of the variance, component two with eigenvalue 1.850 explains 23 per cent of the variance and component three with eigenvalue 1.322 explains 17 per cent of the variance and the remaining five components explain 21 per cent of the variance. The cumulative variance is given in column four, that is, component one explains 39 per cent of the variance, component one and two explain 63 per cent of the variance and component one, two and three explain 79 per cent of the variance cumulatively. So, the first three components explain 79 per cent of the variance in the dependent variable. These selected components presented in the column six and seven along with their eigenvalues in column five.

Table 3 (c): Component Matrix of the Analysis of Gingelly in Alampalayam

Variables	Components		
	1	2	3
Ploughing	.783	-.059	-.471
Seed	-.203	.909	.235
Manure	.712	.141	-.630
Fertiliser	.789	-.134	.249
Weedicide	.615	.551	.134
Pesticide	.628	.423	.055
Micro Food	.565	.010	.682
Labor Cost	.529	-.707	.315

Source: Computed from Primary Data.

These components are taken for further analysis, which is given in Table 3 (c). The variable that is loaded at the top or with high value in that particular component considered to influence the variance in that factor and the dependent variable. According to this, fertilizer is the top variable in the first component with a score of 0.789 points followed by seed with a score of .909 points in the second component, finally by micro food with a score of 0.682 points in the third component. Hence, as per the analysis, fertiliser, seed and micro food are the main determining factors of yield per acre of gigelly in Alampalayam and explain about 79 per cent of the variance in it. In this connection, it can be noted that the measures to control fertiliser, seed and micro food may result in better outcome and it may lead to increase the level of yield.

4. Sugarcane (Pappampalayam)

In the initial stage of the analysis, all the variables are considered at 100 per cent level, so the values are assigned as one, which is presented in column two of Table 4 (a). In the next stage, the variances of the variables are extracted and presented in column three of Table 4 (a). The level of extraction depends on the strength of the variables, i.e., the variance of the variables. Among the taken variables, ploughing is extracted at .787 points, manure at .645 points, fertilizer at .751 points, pesticide at .663 points, weedicide at .692 points, and micro food at .421 points and labour costs at .698 points.

Table 4 (a): Communalities of the Analysis of Sugarcane in Pappampalayam

Variables	Initial	Extraction
Ploughing	1.000	.787
Manure	1.000	.645
Fertiliser	1.000	.751
Weedicide	1.000	.692
Pesticide	1.000	.663
Micro Food	1.000	.421
Labor Cost	1.000	.698

Source: Computed from Primary Data.

Table 4 (b): Variances of Sugarcane in Pappampalayam

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage
1	1.862	26.593	26.593	1.862	26.593	26.593
2	1.555	22.220	48.814	1.555	22.220	48.814
3	1.239	17.699	66.513	1.239	17.699	66.513
4	.952	13.594	80.107	~	~	~
5	.629	8.987	89.094	~	~	~
6	.522	7.450	96.544	~	~	~
7	.242	3.456	100.000	~	~	~

Source: Computed from Primary Data. Note: ~ denotes Not Applicable.

With these extracted values, factors or components are formed and are given in Table 4 (b). They composed into seven components and eigenvalues are assigned for each component. Here, the first three components are selected as their eigenvalues are greater than 1.0 as per the. Here, component one with eigenvalue 1.862 explains 27 per cent of the variance, component two with eigenvalue 1555 explains 22 per cent of the variance and component three with eigenvalue 1.239 explains 18 per cent of the variance and the remaining four components explain 33 per cent of the variance. The cumulative variance is given in column four, that is, component one explains 27 per cent of the variance, component one and two explain 49 per cent of the variance and component one, two and three explain 67 per cent of the variance cumulatively. So, the first three components explain 67 per cent of the variance in the dependent variable (yield). These selected components presented in the column six and seven along with their eigenvalues in column five.

Table 4 (c): Component Matrix of the Analysis of Sugarcane in Pappampalayam

Variables	Components		
	1	2	3
Ploughing	.457	.752	.112
Manure	-.565	.480	.308
Fertiliser	.277	-.116	.813
Weedicide	.740	.067	-.373
Pesticide	.256	.772	.040
Micro Food	.586	-.172	-.217
Labor Cost	-.546	.341	-.532

Source: Computed from Primary Data.

These components are taken for further analysis, which is given in Table 4(c). The variable that is loaded at the top or with high value in that particular component considered to influence the variance in that factor and the dependent variable. According to this, weedicide is the top variable in the first component with a score of 0.740 points followed by pesticide with a score of 0.772 points in

the second component, finally by fertiliser with a score of 0.813 points in the third component. Hence, as per the analysis, weedicide, pesticide andfertiliser are the main determining factors of yield per acre of sugarcane in Pappampalayam and explain about 67 per cent of the variance in it. In this connection, it can be noted that the measures to control weedicide, pesticide andfertiliser may result in better outcome and it may lead to increase the level of yield.

5. Sugarcane (Thumbal)

In the initial stage of the analysis, all the variables are considered at 100 per cent level, so the values are assigned as one, which is presented in column two of Table 5 (a). In the next stage, the variances of the variables are extracted and presented in column three of Table 5 (a). The level of extraction depends on the strength of the variables, i.e., the variance of the variables. Among the taken variables, plouging is extracted at .764 points, manure at .774 points, fertilizer at .862 points, pesticide at .691 points, weedicide at .321 points, and micro food at .893 points and labour costs at .515 points.

With these extracted values, factors or components are formed and are given in Table 5 (b). They composed into seven components and eigenvalues are assigned for each component. Here, the first three components are selected as their eigenvalues are greater than 1.0. Here, component one with eigenvalue 2.115 explains 30 per cent of the variance, component two with eigenvalue 1.587 explains 23 per cent of the variance and component three with eigenvalue 1.117 explains 16 per cent of the variance and the remaining four components explain 31 per cent of the variance. The cumulative variance is given in column four, that is, component one explains 30 per cent of the variance, component one and two explain 53 per cent of the variance and component one, two and three explain 69 per cent of the variance cumulatively. So, the first three components explain 69 per cent of the variance in the dependent variable (yield). These selected components presented in the column six and seven along with their eigenvalues in column five.

Table 5 (a): Communalities of the Analysis of Sugarcane in Thumbal

Variables	Initial	Extraction
Ploughing	1.000	.764
Manure	1.000	.774
Fertiliser	1.000	.862
Weedicide	1.000	.321
Pesticide	1.000	.691
Micro Food	1.000	.893
Labor Cost	1.000	.515

Source: Computed from Primary Data.

Table 5 (b): Variances of Sugarcane in Thumbal

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage
1	2.115	30.217	30.217	2.115	30.217	30.217
2	1.587	22.670	52.887	1.587	22.670	52.887

3	1.117	15.960	68.847	1.117	15.960	68.847
4	.833	11.895	80.742	~	~	~
5	.608	8.691	89.433	~	~	~
6	.514	7.345	96.778	~	~	~
7	.226	3.222	100.000	~	~	~

Source: Computed from Primary Data. Note: ~ denotes Not Applicable.

Table 5 (c): Component Matrix of the Analysis of Sugarcane in Thumbal

Variables	Components		
	1	2	3
Ploughing	.129	.703	.503
Manure	.602	.247	.592
Fertiliser	.678	.484	-.411
Weedicide	-.563	.047	-.041
Pesticide	-.747	.287	.224
Micro Food	-.147	.771	-.526
Labor Cost	.617	-.345	-.123

Source: Computed from Primary Data.

These components are taken for further analysis, which is given in Table 5(c). The variable that is loaded at the top or with high value in that particular component considered to influence the variance in that factor and the dependent variable. According to this, fertiliser is the top variable in the first component with a score of 0.678 points followed by micro food with a score of 0.771 points in the second component, finally by manure with a score of 0.592 points in the third component. Hence, as per the analysis, fertiliser, micro food, and manure are the main determining factors of yield per acre of sugarcane in Thumbal and explain about 69 per cent of the variance in it. In this connection, it can be noted that the measures to control fertiliser, micro food, and manure may result in better outcome and it may lead to increase the level of yield.

6. Tapioca (Thumbal and Kalleripatti)

In the initial stage of the analysis, all the variables are considered at 100 per cent level, so the values are assigned as one, which is presented in column two of Table 6 (a). In the next stage, the variances of the variables are extracted and presented in column three of Table 6 (a). The level of extraction depends on the strength of the variables, i.e., the variance of the variables. Among the taken variables, plouging is extracted at .793 points, manure at .648 points, fertilizer at .434 points, weedicide at .806 points, pesticide at .782 points and micro food at .865 points and labour cost at .558 points.

Table 6 (a): Communalities of the Analysis of Tapioca in Thumbal and Kalleripatti

Variables	Initial	Extraction
Ploughing	1.000	.793
Manure	1.000	.648
Fertiliser	1.000	.434
Weedicide	1.000	.806
Pesticide	1.000	.782
Micro Food	1.000	.865
Labor Cost	1.000	.558

Source: Computed from Primary Data.

Table 6 (b): Variances of Tapioca Thumbal and Kalleripatti

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage
1	2.006	28.653	28.653	2.006	28.653	28.653
2	1.533	21.900	50.552	1.533	21.900	50.552
3	1.348	19.250	69.803	1.348	19.250	69.803
4	.893	12.762	82.565	~	~	~
5	.704	10.053	92.618	~	~	~
6	.329	4.694	97.312	~	~	~
7	.188	2.688	100.000	~	~	~

Source: Computed from Primary Data. Note: ~ denotes Not Applicable.

With these extracted values, factors or components are formed and are given in Table 6 (b). They composed into seven components and eigenvalues are assigned for each component. Here, the first three components are selected as their eigenvalues are greater than 1.0. Here, component one with eigenvalue 2.006 explains 29 per cent of the variance, component two with eigenvalue 1.533 explains 22 per cent of the variance and component three with eigenvalue 1.348 explains 19 per cent of the variance and the remaining four components explain 30 per cent of the variance. The cumulative variance is given in column four, that is, component one explains 29 per cent of the variance, component one and two explain 51 per cent of the variance and component one, two and three explain 70 per cent of the variance cumulatively. So, the first three components explain 70 per cent of the variance in the dependent variable (yield). These selected components presented in the column six and seven along with their eigenvalues in column five.

Table 6 (c): Component Matrix of the Analysis of Tapioca in Thumbal and Kalleripatti

Variables	Components		
	1	2	3
Ploughing	.349	.765	-.294
Manure	.496	.119	.622
Fertiliser	.305	.356	-.463
Weedicide	-.234	.532	.684
Pesticide	-.783	.160	-.379
Micro Food	-.702	.596	.132
Labor Cost	.620	.378	-.176

Source: Computed from Primary Data.

These components are taken for further analysis, which is given in Table 6 (c). The variable that is loaded at the top or with high value in that particular component considered to influence the variance in that factor and the dependent variable. According to this, labour costs is the top variable in the first component with a score of 0.620 points followed by ploughing with a score of 0.765 points in the second component, finally by weedicide with a score of 0.684 points in the third component. Hence, as per the analysis, labour cost,ploughing and weedicide are the main determining factors of yield per acre of Tapioca in Thumbal and Kalleripatti and explain about 70 per cent of the variance in it. In this connection, it can be noted that the measures to control labour cost, plouging and weedicide may result in better outcome and it may lead to increase the level of yield.

7. Turmeric (Thumbal and Kalleripatti)

In the initial stage of the analysis, all the variables are considered at 100 per cent level, so the values are assigned as one, which is presented in column two of Table 7 (a). In the next stage, the variances of the variables are extracted and presented in column three of Table 7 (a). The level of extraction depends on the strength of the variables, i.e., the variance of the variables. Among the taken variables, plouging is extracted at .713 points, manure at .306 points, fertilizer at .406 points, pesticide at .671points, micro food at .465 points and labour costs at .406 points.

Table 7 (a): Communalities of the Analysis of Turmeric in Thumbal and Kalleripatti

Variables	Initial	Extraction
Ploughing	1.000	.713
Manure	1.000	.306
Fertiliser	1.000	.406
Pesticide	1.000	.671
Micro Food	1.000	.465
Labour Cost	1.000	.406

Source: Computed from Primary Data.

Table 7 (b): Variances of Turmeric in Thumbal and Kalleripatti

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage
1	1.814	30.226	30.226	1.814	30.226	30.226
2	1.153	19.224	49.450	1.153	19.224	49.450
3	.939	15.646	65.096	~	~	~
4	.822	13.702	78.798	~	~	~
5	.746	12.426	91.224	~	~	~
6	.527	8.776	100.000	~	~	~

Source: Computed from Primary Data.Note: ~ denotes Not Applicable.

With these extracted values, factors or components are formed and are given in Table 7 (b). They composed into six components and eigenvalues are assigned for each component. Here, the first two components are selected as their eigenvalues are greater than 1.0. Here, component one with eigenvalue 1.814 explains 30 per cent of the variance, component two with eigenvalue 1.153 explains19 per cent of the variance. The cumulative variance is given in column four, that is, component one explains 30 per cent of the variance, component one and two explain 49 per cent of the variance cumulatively. So, the first two components explain 49 per cent of the variance in the dependent variable (yield). These selected components presented in the column six and seven along with their eigenvalues in column five.

Table 7 (c): Component Matrix of the Analysis of Turmeric in Thumbal and Kalleripatti

Variables	Components	
	1	2
Ploughing	.567	.626
Manure	.476	.281
Fertiliser	.535	.347
Pesticide	.559	-.599
Micro Food	.645	-.220
Labor Cost	.501	-.394

Source: Computed from Primary Data.

These components are taken for further analysis, which is given in Table 7 (c). The variable that is loaded at the top or with high value in that particular component considered to influence the variance in that factor and the dependent variable. According to this, micro food is the top variable in the first component with a score of 0.645 points, finally by ploughing cost with a score of 0.626points in the second component. Hence, as per the analysis, micro food and ploughing are the main determining factors of yield per acre of turmeric in Thumbal and Kalleripatti and explain about 49 per cent of the variance in it. In this connection, it can be noted that the measures to control micro food and ploughing may result in better outcome and it may lead to increase the level of yield.

8. Maize (Thumbal and Kalleripatti)

In the initial stage of the analysis, all the variables are considered at 100 per cent level, so the values are assigned as one, which is presented in column two of Table 8 (a). In the next stage, the variances of the variables are extracted and presented in column three of Table 8 (a). The level of extraction depends on the strength of the variables, i.e., the variance of the variables. Among the taken variables, plouging is extracted at .674 points, manure at .752 points, fertilizer at .736 points, weedicide at .794 points, pesticide at .717 points, and labour cost at .811 points.

Table 8 (a): Communalities of the Analysis of Maize in Thumbal and Kalleripatti

Variables	Initial	Extraction
Ploughing	1.000	.674
Manure	1.000	.752
Fertiliser	1.000	.736
Weedicide	1.000	.794
Pesticide	1.000	.717
Labor Cost	1.000	.811

Source: Computed from Primary Data.

Table 8 (b): Variances of Maize in Thumbal and Kalleripatti

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	Percentage of Variance	Cumulative Percentage	Total	Percentage of Variance	Cumulative Percentage
1	1.859	30.988	30.988	1.859	30.988	30.988
2	1.401	23.358	54.345	1.401	23.358	54.345
3	1.223	20.382	74.727	1.223	20.382	74.727
4	.802	13.359	88.086	~	~	~
5	.439	7.317	95.403	~	~	~
6	.276	4.597	100.000	~	~	~

Source: Computed from Primary Data. Note: ~ denotes Not Applicable.

With these extracted values, factors or components are formed and are given in Table 8 (b). They composed into six components and eigenvalues are assigned for each component. Here, the first three components are selected as their eigenvalues are greater than 1.0. Here, component one with eigenvalue 1.859 explains 31 per cent of the variance, component two with eigenvalue 1.401 explains 23 per cent of the variance and component three with eigenvalue 1.223 explains 20 per cent of the variance and the remaining three components explain 25 per cent of the variance. The cumulative variance is given in column four, that is, component one explains 31 per cent of the variance, component one and two explain 54 per cent of the variance and component one, two and three explain 75 per cent of the variance cumulatively. So, the first three components explain 75 per cent of the variance in the dependent variable (yield). These selected components presented in the column six and seven along with their eigenvalues in column five.

Table 8 (c): Component Matrix of the Analysis of Maize in Thumbal and Kalleripatti

Variables	Components		
	1	2	3
Ploughing	.547	.408	.457
Manure	.729	-.459	-.097
Fertiliser	.361	-.324	.708
Weedicide	.303	.807	.225
Pesticide	-.748	.301	.259
Labor Cost	-.497	-.421	.621

Source: Computed from Primary Data.

These components are taken for further analysis, which is given in Table 8 (c). The variable that is loaded at the top or with high value in that particular component considered to influence the variance in that factor and the dependent variable. According to this, manure is the top variable in the first component with a score of 0.729 points followed by weedicide with a score of 0.807 points in the second component, finally by fertiliser with a score of 0.708 points in the third component. Hence, as per the analysis, manure, weedicide and fertilizer are the main determining factors of yield per acre of maize in Thumbal and Kalleripatti and explain about 75 per cent of the variance in it. In this connection, it can be noted that the measures to control manure, weedicide and fertilizer may result in better outcome and it may lead to increase the level of yield.

Conclusion

The study reveals that manure, labourand micro food are the main determining factors of yieldper acre of paddy in Alampalayam. Similarly, ploughing, fertilizer and seed are the main determining factors of yield of paddy in Thumbal and Kalleripatti, fertiliser, seed and micro food are the main determining factors of yield of gingelly in Alampalayam, weedicide, pesticide and fertiliser are the main determining factors of yield of sugarcane in Pappampalayam, pesticide, micro food and manure are the main determining factors of yield of sugarcane in Thumbal,pesticide, plouging and weedicide are the main determining factors of yieldof tapioca in Thumbal and Kalleripatti, micro food and ploughing are the main determining factors of yield of turmeric in Thumbal and Kalleripatti, pesticide, weedicide and fertiliser are the main determining factors of yield of maize in Thumbal and Kalleripatti. Here, it has been found that a set of some factors have more influence on yield than other factors. Based on the results of present study, it is suggested that concentration on the above sets of factors crop wisewill improve the yield at village level.

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