Asian Journal of Agricultural Extension, Economics & Sociology

39(8): 48-57, 2021; Article no.AJAEES.70909
ISSN: 2320-7027

Factors Influencing Economic Viability of Small and Marginal Farms in Rayalaseema Region of Andhra Pradesh, India

M. Ramakrishna[1*], I. Bhavani Devi[1], S. Rajeswari[1], P. V. Satyagopal[2] and G. Mohan Naidu[3]

[1]Department of Agricultural Economics, S V Agricultural College, Tirupati. Andhra Pradesh, India.
[2]Department of Agricultural Extension, Agricultural College, Bapatla, Andhra Pradesh, India.
[3]Department of Statistics and Mathematics, S V Agricultural College, Tirupati, Andhra Pradesh, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2021/v39i830624
Editor(s):
(1) Dr. Sailendra Narayan Goswami, Natural Resource Management Government of Assam, India.
Reviewers:
(1) Kingsley Ike Okeke-Agulu, Nigeria.
(2) S. K. Mahidur Rahaman, Bihar Agricultural University, India.
Complete Peer review History: https://www.sdiarticle4.com/review-history/70909

Original Research Article

Received 20 May 2021
Accepted 23 July 2021
Published 31 July 2021

ABSTRACT

This study was conducted to estimate the factors influencing the viability of small and marginal farms in Rayalaseema region of Andhra Pradesh. Multistage sampling technique was employed for selection of samples at different levels (districts, mandals and villages) in the present study. A sample of 120 farmers was selected from two districts, six mandals and six villages. The farmers were categorized according to their land holding size into marginal (<1 ha) and small (1-2 ha) category. On the basis of economic surplus left, the sample farmers were grouped as viable and nonviable farmers. The farmers having positive economic surplus are viable farmers and the farmers with negative economic surplus are non-viable farmers. Out of 120 sample farmer's only 37 farmers were viable and 83 remained non-viable. It is found that net income from live stock and dairy and net income from crops were the major significant discriminating factors that discriminate viable and non-viable farmers. Other significant factors were off farm income, farm size and family expenditure.

**Corresponding author: E-mail: mandlaramakrishna@gmail.com;*

Keywords: Economic surplus; economic viability; non-viable farmers; farm income.

1. INTRODUCTION

India had been a predominantly agrarian economy and agriculture continues to be the main stay of the economy even today. Majority of the farmers in India are small and marginal farmers. Nearly 57.8 percent of India's rural households are engaged in agriculture. Of them, over 69 per cent possess or work on marginal landholdings, and 17.1 percent, on small landholdings. About 72.3 percent of India's rural households work as either cultivators or agricultural labourers in the agriculture sector as per the latest Census of 2011. Therefore, the future of sustainable agriculture growth and food security in India depends on the performance of small and marginal farmers [1-3]

The sustainability of these farmers is vital for livelihoods in rural areas and for the entire country. It is true that the productivity of small holdings is higher than large farms. But, that it is not enough to compensate the disadvantage of having small holdings. As NCEUS (2008) says "consumption expenditure of marginal and small farmers exceeds their estimated income by a substantial margin and presumably the deficits have to be plugged by borrowing or other means". It also indicates that the poverty for small holding farmers is much higher than other farmers. The need for increase in productivity and incomes of small holdings and promotion of non-farm activities for these farmers are obvious.

In Andhra Pradesh there were 7621.12 thousand land holdings, out of which 6574.63 thousand holdings were owned by small and marginal farmers accounting for nearly 86 per cent of the total farm households (2011). Fragmentation of land has serious consequences in almost every aspect of agricultural growth and development *i.e.*, in production, storage, transportation and marketing. Fragmentation means higher transaction cost of reaching out to them. Continuous decline in average size of land has implications for agriculture credit outreach too. Banks find it increasingly difficult to finance asset generating investments, as they are not viable on marginal and small farms, unless they are also leased out to neighbouring farms. There are multiple factors responsible for this viability. Broadly, the likely factors are family size, farm size, education level of farmers, income from crops, income from livestock and dairy, off-farm income and family expenditure. This paper has examined the contribution of these factors towards the viability of marginal and small farmers for the two agro- climatic zones in Rayalaseema region of Andhra Pradesh.

2. MATERIALS AND METHODS

For the present study, two agro climatic zones in Rayalaseema region of Andhra Pradesh viz., Southern zone and Scarce Rainfall zones were selected purposively. From each of the selected agro-climatic zones, one district was selected based on the maximum area operated by the small and marginal farmers. All the mandals in each of the selected district along with their operated area of small and marginal farmers were listed out in descending order and top three mandals were selected. Similarly, all the villages in each of the selected mandals were listed out and arranged in descending order and top one village was chosen. At village level, the farmers were categorized according to their land holding size into marginal (<1 ha) and small (1-2 ha) category (RBI, 2008). From these two categories, a total of 120 farmers were selected at random, representing 60 farmers from each category. So, the final sample consisted of two districts, 6 mandals, 6 villages and 120 farmers (60 farmers each in marginal and small categories) from which the researcher collected the requisite data. A well-structured pre-tested schedule was employed to collect the required information from the sample farmers for the agricultural year 2016-17 [4-7].

2.1 Discriminant Function Analysis

To analyze the viability of small and marginal farmers, discriminant function analysis was employed. It is a statistical technique used to differentiate between two or more classes, based on the common variables, was used for analysis of data. The discriminant function helps in measuring the net effect of a variable by holding the other variables constant. The sample farmers were categorized into two groups on the basis of economic surplus left with a farm household after deducting the domestic expenditure from the sum of net returns from agriculture, livestock and dairy plus off-farm income of the respective farm household. The farmers having positive economic surplus were grouped as viable farmers and the farmers with negative economic surplus were categorized as non-viable farmers. The linear discriminant function of the form of

equation (1) was applied to find the relative importance of different variables in discriminating between these two groups of farms, *viz.,* viable farms and non-viable farms.

$$Z = \sum_{i=1}^{n} L_i X \qquad \ldots(1)$$

where,
Z = Total discriminant score for viable and nonviable farms of marginal and small farmers, respectively,
L_i = Linear discriminant coefficients of the variables estimated from the data,
(i=1, 2,……,7)
X_i = Variables selected to discriminate the two groups (i = 1, 2,...., 7), like
X_1 = Family size in numbers
X_2 = Farm size in acres
X_3 = Education in years
X_4 = Net income from crops in ` ha^{-1}
X5 = Net income from livestock and dairy in `
X6 = Off-farm income in `
X7 = Domestic expenditure in `

The method seeks to obtain coefficients (Li's) such that squared differences between the mean Z score for one group and mean Z score for other group is as large as possible in relation to the variation of the Z scores within the groups.
Mahalanobis D^2 (Radha and Chowdry, 2005) statistics was used to measure the discriminating distance between the two groups,

$$D^2 = \sum_{i=1}^{n} L_i d_i \qquad \ldots(2)$$

where,
L_i is the linear discriminant coefficient and d_i is the mean difference of the two categories for the i^{th} variable (x_i).

The significance of D^2 was tested by applying the following variance ratio (F) test:

$$\frac{(n-1-p)(n_1 n_2)}{p(n-2)(n)} D^2 \sim F(p, n-p-1) \qquad \ldots(3)$$

where,
n_1 = Number of farms in the viable farm group,
n_2 = Number of farms in the non-viable farm group,
$n = n_1 + n_2$, and
p = Number of variables considered in the function.
The critical mean discriminant score was obtained for each group by Equation (4):

$$Z = [\bar{Z}_1 + \bar{Z}_2]/2 \qquad \ldots(4)$$

where,

$$\bar{Z}_1 = \sum_{i=1}^{p} L_i X_{1i} \quad \text{for viable farms}$$

$$\bar{Z}_2 = \sum_{i=1}^{p} L_i X_{2i} \quad \text{for non-viable farms}$$

For each individual, Z_i value was calculated by Equation (5):

$$Z_i = \sum_{i=1}^{p} L_i X_i \qquad \ldots(5)$$

If the individual Z_i value was more than Z, the individual belonged to the viable farm of the marginal and small farmers, otherwise to the non-viable category. L_i = Linear discriminant coefficients of the variables estimated from the data, (i=1, 2..., n)

3. RESULTS AND DISCUSSION

3.1 Economic Surplus Generated on Different Categories of Farms

To test the viability of the farms, economic surplus was calculated by deducting the domestic expenditure from the total net income from crops, livestock and dairy and off farm income of a selected farm household. Table 1 indicated that, both marginal and small farmers could not meet their household expenditure on the basis of their total disposable income from crops, livestock and dairy farming. Marginal farmers were in a deficit of ` 37,576.72 and ` 50,080.94 in Chittoor and Anantapur districts respectively. It is the adversity of the situation that even the small farmers were living under a deficit economic surplus from agriculture to the tune of ` 21,508.97 and ` 33,958.75 in Chittoor and Anantapur districts respectively.

After adding the off-farm income, small farmers in both the districts became viable as the overall economic surplus after meeting the domestic expenditure remained positive, whereas marginal farmers remained non-viable due to negative economic surplus. Therefore income from dairy

and off-farm activities can help them to become viable farmers Thus, it could be concluded that both marginal and small farmers both districts are not economically viable by depending upon crops, livestock and dairying. Income from off-farm activities helped them to become viable farmers in the case of small farmers.

3.2 Viability of Farms

The distribution of marginal and small farmers into viable and non-viable classes has been presented in Table 2. Out of the total 120 sample farmers, the number of viable farmers was 37 (30.83%) and of non-viable farmers were 83 (69.17%). Out of 60 marginal farmers, only 25 per cent were viable, while remaining 75 per cent were non-viable. In the case of small farmers, 36.67 per cent were viable and 63.33 per cent were non- viable.

The district-wise comparison of this aspect depicted that the marginal farmers were viable only to the tune of 30 per cent in Chittoor and 20 per cent in Anantapur. This kind of divergence exists because of difference in the farm size as well as crop and livestock and dairy productivity on marginal farms across two districts. The position of viable small farmers was better with 40 and 33.33 per cent in Chittoor and Anantapur districts respectively.

3.3 Factors Influencing Viability of Small and Marginal Farmers

Discriminant function analysis was used for analysis of data which differentiates between two or more classes based on the common variables. It helps in measuring the net effect of a variable by holding the other variables constant. Mahalanobis D^2 (Radha and Chowdhry, 2005) statistics was used to measure the discriminating distance between the two groups and the results are presented below.

3.3.1 Contribution of selected factors in discrimination among marginal farmers (Chittoor district)

From the discriminant functional analysis between viable and non-viable farms in Chittoor district as given in Table 3. It could be observed that, D^2 value (67627.60) was found to be significant at 1 per cent level of probability. This shows that there is significant difference between viable and non-viable farms. It is observed that, among marginal farms the net income from livestock and dairy, off farm income and education were the significant discriminant factors that contributed to the viability and non-viability of farms in the district. Income from livestock and dairy was the major significant discriminant factor between viable and non-viable farms with 69.42 percent followed by off farm income with 16.14 per cent.

3.3.2 Contribution of selected factors in discrimination among small farmers (Chittoor district)

On small farms it is observed that, net income from livestock and dairy, farm size and education were the significant discriminant factors that contributed to the viability and non viability of marginal farms in the district. Income from livestock and dairy was the major significant discriminant factor between viable and non-viable farms with 86.34 percent (Table 4).

Table 1. Economic surplus from crops, livestock, dairy and overall after including off-farm income of marginal and small farmers in Rayalaseema region of Andhra Pradesh (`/farm/annum)

S.No	Particulars	Chittoor		Anantapur	
		Marginal	Small	Marginal	Small
1.	Net income over operational costs	23163.35	47482.90	18169.78	42042.16
2.	Net income from livestock and dairy	12652.36	14595.63	8654.25	10658.18
3.	Total net income from crops, livestock and dairy	35815.71	62078.53	26824.03	52700.34
4.	Domestic expenditure	73392.43	83587.50	76904.97	86659.09
5.	Economic surplus from crops, livestock and dairy	-37576.72	-21508.97	-50080.94	-33958.75
6.	Off-farm income	34717.18	40180.50	39435.05	45031.99
7.	Overall economic surplus	- 2859.54	18671.53	-10645.89	11073.24

Table 2. Distribution of marginal and small farmers into viable and non-viable classes on the basis of overall economic surplus in Rayalaseema region of Andhra Pradesh

Farm size categories	Chittoor		Anantapur		Rayalaseema	
	Viable	Non-viable	Viable	Non-viable	Viable	Non-viable
Marginal	9 (30.00)	21 (70.00)	6 (20.00)	24 (80.00)	15(25.00)	45(75.00)
Small	12 (40.00)	18 (60.00)	10 (33.33)	20 (66.67)	22(36.67)	38(63.33)
Pooled	21 (35.00)	39 (65.00)	16 (26.67)	44 (73.33)	37(30.83)	83(69.17)

Note: Figures in parentheses indicate percentages to total

Table 3. Particulars of discriminant function for marginal farmers in Chittoor district

S.No	Particulars	Mean difference (di)	Discriminant coefficient (bi)	Discriminating distance (di*bi)	Percent contribution to total distance
1.	X1-Family size (No.)	0.52	-0.035	- 0.018	- 0.001
2.	X3-Farm size (acres)	- 0.01	0.014	- 0.0002	- 0.001
3.	X3-Education (years)	- 2.85**	-0.421	1.197	0.00
4.	X4-Net income from crops (` ha^{-1})	762.49	0.726	553.417	0.82
5.	X5- Net income from livestock and dairy(`)	38554.30***	1.218	46944.935	69.42
6.	X6-Off- farm income (`)	8162.90*	1.337	10917.552	16.14
7.	X7-Family expenditure (`)	- 8364.42	- 1.101	9210.519	13.62
8.	D^2 value			67627.60***	100.00

Note: ****, **, * indicate significance at 1 per cent, 5 per cent, 10 per cent*

Table 4. Particulars of discriminant function for small farmers in Chittoor district

S.No	Particulars	Mean difference (di)	Discriminant coefficient (bi)	Discriminating distance (di*bi)	Percent contribution to total distance
1.	X1-Family size (No.)	0.64	- 0.106	- 0.068	0.000
2.	X3-Farm size (acres)	0.42**	0.848	0.356	0.001
3.	X3-Education (years)	2.24*	0.093	0.207	0.001
4.	X4-Net income from crops (` ha^{-1})	2334.77	- 0.234	- 546.589	- 1.49
5.	X5- Net income from livestock and dairy(`)	21284.09***	1.489	31686.874	86.34
6.	X6-Off- farm income (`)	1721.59	1.002	1724.328	4.70
7.	X7-Family expenditure (`)	- 6229.55	- 0.615	3833.222	10.44
8.	D^2 value			36698.330***	100.00

Note: ****, **, * indicate significance at 1 per cent, 5 per cent, 10 per cent*

3.3.3 Contribution of selected factors in discrimination among pooled farmers (Chittoor district)

While identifying the discriminating factors on marginal and small farms taken together, the D^2 value (44847.842) was found to be significant at 1 per cent level of probability. The major discriminating factor was found to be income from livestock and dairy which was significantly lower on non-viable farms than viable farms. Its contribution towards total distance was 84 per cent. Thus, the farmers can sustain their livelihood only if they get adequate income from livestock and dairy. The second major discriminant factor was off farm income contributing a total distance of 10.91 but remained non-significant.

3.3.4 Contribution of selected factors in discrimination among marginal farmers (Anantapur district)

The results of the discriminant functional analysis of viable and non-viable marginal farms in

Anantapur district are presented in Table 6. The D^2 value (43752.156) was significant at 1 per cent level of probability showing that there is significant difference between the farms. Net income from crops, net income from livestock and dairy, farm size and family expenditure were the significant factors between viable and non-viable farms in the district. The highest contribution towards total distance between the viable and non-viable marginal farms was from net income from livestock and dairy with 72.38 per cent, followed by, family expenditure (23.48%) and net income from crops (15.99%).

3.3.5 Contribution of selected factors in discrimination among small farmers (Anantapur district)

Among small farms it is observed that, the net returns from livestock and dairy, off farm income, family expenditure and net income from crops were the significant discriminating factors between viable and non-viable farms in this district (Table 7). The relative importance of the discriminators was calculated through their per cent contribution to total distance. The results showed that, net income from livestock and dairy was the major significant discriminant factor (60.21%) followed by off farm income (26.83%) family expenditure (24.62 %) and net income from crops (4.99 %) between viable and non-viable farms. The D^2 value (63470.53) was significant at 1 per cent level of probability representing significant difference between viable and non-viable farms.

3.3.6 Contribution of selected factors in discrimination among pooled farmers (Anantapur district)

The discriminant function analysis was carried out taking both marginal farms and small farms. The results of the analysis from Table 8 revealed that, at overall level net income from crops, net income from livestock and dairy and family expenditure were the major significant factors that discriminate the viable and non-viable farms in the district. Family size, farm size and off farm income also contributed for the discrimination of both the farms. The highest contribution towards total distance between the viable and non-viable farms was from net income from livestock and dairy with 49.87 per cent, followed by, family expenditure (19.35%), net income from crops (17.89%) and off farm income (12.90%).

3.3.7 Contribution of selected factors in discrimination among marginal farmers (Rayalaseema)

Table 9 presents results of the discriminant function analysis on marginal farms in Rayalaseema region as a whole. In the case of marginal farms, net income from livestock and dairy, family expenditure and net income from crops were calculated to be the significant discriminating factors, accounting for 77.54 per cent, 11.93 per cent and 7.17 per cent contributions, respectively towards total distance between viable and non-viable marginal farms.

3.3.8 Contribution of selected factors in discrimination among small farmers (Rayalaseema)

It is observed from Table 10 that net income from livestock and dairy came to be the most significant factor which contributed 59.29 per cent towards total distance. Family expenditure, off farm income and net income from crops were the other significant factors that discriminate the viable and non-viable farms in the region contributing 20.16, 16.66 and 3.95 per cent respectively to the total distance.

Table 5. Particulars of discriminant function for pooled farmers in Chittoor district

S.No	Particulars	Mean difference (di)	Discriminant coefficient (bi)	Discriminating distance (di*bi)	Percent contribution to total distance
1.	X1-Family size (No.)	0.69*	- 0.009	- 0.006	0.00
2.	X 2-Farm size (acres)	0.68***	1.021	0.694	0.002
3.	X3-Education (years)	- 0.23	- 0.119	0.027	0.00
4.	X4-Net income from crops (` ha^{-1})	5097.83*	0.072	364.846	0.81
5.	X5- Net income from livestock and dairy(`)	29842.86***	1.262	37674.359	84.00
6.	X6-Off- farm income (`)	4780.00	1.024	4894.702	10.91
7.	X7-Family expenditure (`)	- 2039.96	- 0.938	1913.220	4.26
8.	D^2 value			44847.842***	100.000

Note: ****, **, * indicate significance at 1 per cent, 5 per cent, 10 per cent*

Table 6. Particulars of discriminant function for marginal farmers in Anantapur district

S.No	Particulars	Mean difference (di)	Discriminant coefficient (bi)	Discriminating distance (di*bi)	Percent contribution to total distance
1.	X1-Family size (No.)	0.72	- 0.245	-0.18	0.000
2.	X3-Farm size (acres)	0.39**	- 0.764	-0.30	- 0.001
3.	X3-Education (years)	2.04	- 0.024	-0.05	0.000
4.	X4-Net income from crops (` ha^{-1})	6613.39***	1.058	6995.85	15.99
5.	X5- Net income from livestock and dairy(`)	18562.50***	1.706	31669.37	72.38
6.	X6-Off- farm income (`)	- 3335.71	1.555	-5185.50	-11.85
7.	X7-Family expenditure (`)	- 6913.39*	- 1.486	10272.94	23.48
8.	D^2 value			43752.15***	100.00

Note: ****, **, * indicate significance at 1 per cent, 5 per cent, 10 per cent*

Table 7. Particulars of discriminant function for small farmers in Anantapur district

S.No	Particulars	Mean difference (di)	Discriminant coefficient (bi)	Discriminating distance (di*bi)	Percent contribution to total distance
1.	X1-Family size (No.)	0.56	- 0.052	-0.030	0.00
2.	X3-Farm size (acres)	0.28	- 0.044	- 0.01	0.00
3.	X3-Education (years)	- 1.17	- 0.255	0.30	0.00
4.	X4-Net income from crops (` ha^{-1})	5206.67**	0.608	3164.28	4.99
5.	X5- Net income from livestock and dairy(`)	22191.94***	1.246	27652.20	43.57
6.	X6-Off- farm income (`)	14983.33***	1.136	17026.26	26.83
7.	X7-Family expenditure (`)	-10469.44**	-1.493	15627.53	24.62
8.	D^2 value			63470.53***	100.00

Note: ****, **, * indicate significance at 1 per cent, 5 per cent, 10 per cent*

Table 8. Particulars of discriminant function for pooled farmers in Anantapur district

S.No	Particulars	Mean difference (di)	Discriminant coefficient (bi)	Discriminating distance (di*bi)	Percent contribution to total distance
1.	X1-Family size (No.)	0.71**	0.013	0.009	0.00
2.	X3-Farm size (acres)	0.57**	-0.905	-0.517	-0.001
3.	X3-Education (years)	0.49	0.129	0.063	0.000
4.	X4-Net income from crops (` ha^{-1})	7412.23***	1.147	8501.037	17.89
5.	X5- Net income from livestock and dairy(`)	21208.97***	1.117	23699.501	49.87
6.	X6-Off- farm income (`)	6734.38*	.910	6129.420	12.90
7.	X7-Family expenditure (`)	- 7189.06**	-1.279	9194.405	19.35
8.	D^2 value			47523.92***	100

Note: ****, **, * indicate significance at 1 per cent, 5 per cent, 10 per cent*

Table 9. Particulars of discriminant function for marginal farmers in Rayalaseema region

S.No	Particulars	Mean difference (di)	Discriminant coefficient (bi)	Discriminating distance (di*bi)	Percent contribution to total distance
1.	X1-Family size (No.)	0.62*	- 0.01	- 0.01	0.00
2.	X3-Farm size (acres)	0.19	- 0.34	- 0.06	0.00
3.	X3-Education (years)	- 0.38*	0.10	- 0.04	0.00
4.	X4-Net income from crops (` ha^{-1})	3671.82	0.72	2638.71	7.17
5.	X5- Net income from livestock and dairy(`)	28297.98***	1.01	28541.91	77.54
6.	X6-Off- farm income (`)	2201.35	0.56	1238.56	3.36
7.	X7-Family expenditure (`)	-7439.36**	-0.59	4391.37	11.93
8.	D^2 value			36810.44***	

Note: ****, **, * indicate significance at 1 per cent, 5 per cent, 10 per cent*

Table 10. Particulars of discriminant function for small farmers in Rayalaseema region

S.No	Particulars	Mean difference (di)	Discriminant coefficient (bi)	Discriminating distance (di*bi)	Percent contribution to total distance
1.	X1-Family size (No.)	0.58	0.01	0.01	0.00
2.	X3-Farm size (acres)	0.31**	0.16	0.05	0.00
3.	X3-Education (years)	0.48	-0.05	-0.02	0.00
4.	X4-Net income from crops (` ha^{-1})	4027.75*	0.42	1695.62	3.95
5.	X5- Net income from livestock and dairy(`)	21568.25***	1.18	25429.93	59.29
6.	X6-Off- farm income (`)	8272.50**	0.86	7145.16	16.66
7.	X7-Family expenditure (`)	- 8416.25**	-1.02	8618.64	20.10
8.	D^2 value			42889.38***	

Note: ****, **, * indicate significance at 1 per cent, 5 per cent, 10 per cent*

Table 11. Particulars of discriminant function for pooled farmers in Rayalaseema region

S.No	Particulars	Mean difference (di)	Discriminant coefficient (bi)	Discriminating distance (di*bi)	Percent contribution to total distance
1.	X1-Family size (No.)	0.70	0.03	0.02	0.00
2.	X3-Farm size (acres)	0.62 **	-0.03	- 0.02	0.00
3.	X3-Education (years)	0.15	0.03	0.00	0.00
4.	X4-Net income from crops (` ha^{-1})	6308.62***	0.67	4198.50	10.73
5.	X5- Net income from livestock and dairy(`)	25568.50***	1.03	26296.67	67.23
6.	X6-Off- farm income (`)	5785.41**	0.74	4296.83	10.99
7.	X7-Family expenditure (`)	- 4777.02*	-0.90	4321.59	11.05
8.	D^2 value			39113.60***	

Note: ****, **, * indicate significance at 1 per cent, 5 per cent, 10 per cent*

3.3.9 Contribution of selected factors in discrimination among pooled farmers (Rayalaseema)

Considering both marginal and small farms together in the state, it is noticed that D^2 value was (39113.60) found to be significant at 1 per cent level of probability (Table 11). It is observed that, income from livestock and dairy came to be the most significant factor in discriminating the viable and non-viable farms in the region contributing 67.23 per cent to the total distance. Other discriminating factors which significantly contributed to the viability were family expenditure with 11.05 per cent followed by off farm income (10.99%) net income from crops (10.73%).

4. CONCLUSIONS

It could be concluded that both marginal and small farmers in both the districts are not economically viable by depending upon crops, livestock and dairying. Income from off-farm activities helped them to become viable farmers in the case of small farmers while marginal farmers remained non-viable. Out of the total 120 sample farmers, the number of viable farmers was 37 (30.83%) and of non-viable farmers were 83 (69.17%). Out of 60 marginal farmers, only 25 per cent were viable, while remaining 75 per cent were non-viable. In the case of small farmers, 36.67 per cent were viable and 63.33 per cent were non-viable. It is found that net income from live stock and dairy and net income from crops were the major significant discriminating factors

that discriminate viable and non-viable farmers. Other significant factors were off farm income, farm size and family expenditure.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Bhullar AS, Singh M, Kaur I. Income and consumption pattern of marginal and small farmers in Punjab: An analysis from livelihood security perspective. Advance Research Journal of Social Science. 2010;1(2):77-82.
2. Birthal PS, Joshi PK, Narayanan AV. Agricultural diversification in India: Trends, contribution to growth and small farmer participation. ICRISAT, mimeo; 2011.
3. Kaur, S, Singh G. Analysis of income distribution among marginal and small farmers in rural Punjab. International Journal of Science and Research. 2014;3 (3):755-759.
4. Gururaj B, Hamsa KR, Ramesh, Mahadevaiah GS. Doubling of small and marginal farmers income through rural non-farm and farm sector in Karnataka. Economic Affairs. 2017;62 (4):581-587.
5. Parvin M, Akteruzzaman M. Factors affecting farm and non-farm income of haor inhabitants of Bangladesh. Progressive Agriculture. 2012;23 (1–2):143–150.
6. Singh M, Bhullar AS, Joshi AS. Factors influencing economic viability of marginal and small farmers in Punjab. Agricultural Economics Research Review. 2009;22(n2):269-279.
7. Singh AK. Income and livelihood issues of farmers: a field study in UttarPradesh. Agricultural Economics Research Review. . 2013;26:89 – 96.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle4.com/review-history/70909