

Full Length Research Paper

Characterization of farming systems in Jammu region of J&K State and its policy implications

Dileep Kachroo¹, Jyoti Kachroo², Anil Bhat^{2*}, N. P. Thakur¹, A. K. Gupta¹, Vijay Khajuria¹ and Mudasir Iqbal²

¹Farming System Research, SKUAST-Jammu, Chatha (J&K), India.

²Division of Agricultural Economics and Statistics, FoA, SKUAST-Jammu, Chatha (J&K), India.

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Farming systems of households in the Jammu region of Jammu and Kashmir State have been analyzed based on the primary data collected through a total sample of 450 farmers in 2010-2011. The cereal based farming system and livestock based farming system has been found mostly in the study area except in Rajouri district where only cereal based farming system was predominant. Livestock and cereals only have been found to be the main sources of farm income in all the districts, whereas maximum contribution to their income was from non-farm. The study has indicated that credit has no impact on farm income as none of the sample farmers has taken credit from any sources, whether it is institutional or non-institutional sources. It was also observed that cross-bred breeding programme has not marked headway in the sample area. As far as resource use efficiency was concerned, Cobb-Douglas production was used and it was observed that the elasticity coefficient was highly significant for area under cereals (AUC) in Reasi and Doda districts whereas for area under other crops (AOTH) it was found to be highly significant in Kathua and Doda districts. Doda district was found highly significant for both DA and EI also.

Key words: Farming system, livestock, cereal.

INTRODUCTION

India accounts for some 2.4% of the world's landmass but is home to about 17.52% of the global population (Anonymous, 2011). The Indian economy is predominantly agrarian and agriculture is a primary source of livelihood providing employment directly or indirectly to 58% of its population. Due to the rapid increase in the population and the decrease of agricultural land, no single farm enterprise is likely to be able to sustain the small and marginal farmers without resorting to integrated farming systems for the generation

of adequate income and gainful employment year round (Mahapatra, 1994). The declining trend in size of average area operational holding from 2.28 ha in 1970-1971 to 1.33 ha during 2000-2001 and 1.23 ha in 2005-2006 poses a serious challenge to the sustainability and profitability of farming (Anonymous, 2012). In view of the decline in per capita availability of land from 0.5 ha in 1950-1951 to 0.15 ha by the turn of the century and a projected further decline to less than 0.1 ha by 2020, it is imperative to develop strategies and agricultural

*Corresponding author. E-mail: anilxb@rediffmail.com.

technologies that enable adequate employment and income generation, especially for small and marginal farmers who constitute more than 80% of the farming community (Jha, 2003). To meet the multiple objectives of poverty reduction, food security with improved productivity, reduced income imbalance between agricultural labourer and urban factory worker, competitiveness and sustainability, several researchers have recommended the farming system approach to research and development. According to National Commission on Farmers (2005), introduction of appropriate farming systems have been proposed as one of the approaches to achieve better growth in agriculture and livelihood.

In Jammu and Kashmir State, the share of agriculture and allied sectors in the Gross State Domestic Product stands at 25.81%. While as nearly 70% of the population in the state derives its livelihood directly or indirectly from this sector (Anonymous, 2009). The predominant cropping systems in Jammu region of J&K State are rice-wheat (59.92%) and maize-wheat (73.09%) in irrigated and rain fed areas, respectively. Other farming activities may comprise any one or combination of mono or multiple cropping, horticultural crops, agro-forestry, livestock, poultry, fishery, goat/sheep rearing etc. So far studies conducted on farming systems in the Jammu division of Jammu and Kashmir State are negligible. As farming system approach is gaining lot of importance in recent years, a need was felt to work out the predominant farming systems, their economics and resource productivity of crop and non-crop enterprises in this region so that, it enables the academicians and policy makers to make policies instead of blanket recommendations, a region specific, appropriate and tailor-made recommendations.

METHODOLOGY

A multi stage random sampling was adopted for the selection of samples, with districts, blocks, villages and farmers as the first, second, third and fourth stage sampling units. Out of 10 districts of Jammu region, five districts namely Doda, Rajouri, Jammu, Kathua and Reasi (50% of total number of districts) were randomly selected. Then three blocks from each district were selected and from each block three villages were selected. The ultimate units, that is, farmers were selected randomly from each village so as to constitute a total sample of 450 (10 from each village) farmers from the whole area under study. The required information was collected through personal interview method, using well-designed and pre-tested schedules. The farmers were divided into four groups: marginal (0.01-2.50 acres), small (2.51-5.00 acres), medium (5.01-7.50 acres) and large (above 7.50 acres). The data was collected and farming systems were identified based on the major contribution to income of farm enterprises.

Education index

Education of the households was measured by education index using the formula given below (Singh, 2009):

$$\text{Education Index} = \sum_{i=1}^n w_i f_i / \sum f_i, i=0,1,2,\dots, 4$$

Education attained, that is, illiterate = 0, below high school = 1, high school = 2, intermediate = 3, graduation and above = 4.

Gross Income was computed by adding the income from all the sources including livestock, cereal, service and business.

Resource use efficiency

To analyze the resource productivities of different farming systems for improving the economic conditions of the farmers and to measure the contribution of specific factor in combination with other factors which are responsible for the change in the level of output, multiple regression analysis was used. The Cobb-Douglas production function in below form was fitted to the data:

$$Y_i = b_0 X_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} X_5^{b_5} X_6^{b_6} u_i$$

Where Y = Gross farm income in Rupee; X_1 = Area under cereals in hectare (AUC); X_2 = Area under other crops in hectare (AOTH); X_3 = No. of dairy animals per farm (DA); X_4 = Expenditure on seeds in `; X_5 = Expenditure on fertilizer and chemicals in ` (TFC); X_6 = Education index (EI); $i = 1, 2, 3, 4, \dots, n$ farms; b_0 = Constant; b_i = Regression coefficient, and u_i = Random variable.

RESULTS AND DISCUSSION

Socio-economic characteristics of households

The study of the socio-economic status of sample households in different farming systems of different districts of Jammu region indicated in Table 1 revealed that 52 (57.78%), 62 (68.89%), 76 (84.44%), 37 (41.11%) and 90 (100%) sample farmers (X_1) were following cereal based farming system in Jammu, Doda, Kathua, Reasi and Rajouri district, respectively whereas 38 farmers (42.22%), 28 farmers (31.11%), 14 farmers (15.56%) and 53 farmers (58.89%) were following livestock based farming system, respectively except in Rajouri district wherein all the 90 farmers were following cereal based farming system. Farmers were earning about 79% of their gross income (X_2) from livestock in the livestock based farming system in Kathua district followed by Doda (75%), Reasi (69%) and Jammu (62%). In cereal-based farming system farmers were earning about 95% income from cereals in Rajouri district followed by 93% in Kathua district, 89% in Jammu district and 81% in Reasi district. The data further revealed that except for Doda district, the rest of districts Jammu (7.80), Kathua (10.20) and Reasi (8.00) had higher family size in livestock based farming system. The education index has been found 1.30 in livestock based farming system as compared to 1.38 in cereal based farming system. The size of farm was more in livestock based farming system in all the districts except for Doda district. It was 1.83, 1.32, 4.40 and 2.01 ha in livestock based farming system and 1.72, 1.51, 2.40 and 1.23 ha in cereal based farming system for Jammu, Doda, Kathua and Reasi districts, respectively. The cereal based farming system had more

Table 1. Socio economic characteristics of sample households of different districts of Jammu region.

Particulars	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂	X ₁₃	X ₁₄	X ₁₅	X ₁₆	X ₁₇
Jammu																	
Livestock based farming system	38.00(42.22)	61.72	7.80	1.30	2.26	189.00	1.83	0.00	0.00	0.00	0.00	0.05	0.48	0.65	37.21	38.41	187079.35
Cereal based farming system	52.00(57.78)	88.67	6.07	1.38	2.11	232.00	1.72	0.00	0.00	0.00	0.00	0.18	0.28	0.59	46.90	47.93	218367.86
All farming system	90.00(100.00)	100.00	6.85	1.34	2.24	220.00	1.77	0.00	0.00	0.00	0.00	0.12	0.37	1.61	42.38	43.49	204257.35
Doda																	
Livestock based farming system	28.00(31.11)	74.92	6.68	1.16	3.80	196.00	1.32	0.00	0.00	0.00	0.00	0.76	0.04	0.00	4.15	4.94	156105.26
Cereal based farming system	62.00(68.89)	93.16	6.83	1.15	1.83	199.00	1.51	0.00	0.00	0.00	0.00	0.67	0.10	0.02	4.27	5.07	210264.15
All farming system	90.00(100.00)	100.00	6.79	1.16	2.64	201.00	1.46	0.00	0.00	0.00	0.00	0.69	0.09	0.02	4.24	5.04	195972.22
Kathua																	
Livestock based farming system	14.00(15.56)	79.45	10.20	1.00	1.75	170.00	4.40	0.00	0.00	0.00	0.00	0.05	0.25	1.10	1.05	2.45	147200.00
Cereal based farming system	76.00(84.44)	92.92	7.32	1.72	1.62	200.00	2.40	0.00	0.00	0.00	0.00	0.13	0.24	0.16	0.34	0.83	257738.24
All farming system	90.00(100.00)	100.00	7.64	1.67	1.82	215.00	2.51	0.00	0.00	0.00	0.00	0.12	0.24	0.73	0.39	0.99	250167.12
Reasi																	
Livestock based farming system	53.00(58.89)	69.49	8.00	0.90	2.42	191.00	2.01	0.00	0.00	0.00	0.00	0.20	0.24	0.75	2.47	3.66	146044.88
Cereal based farming system	37.00(41.11)	80.69	6.69	0.76	2.17	207.00	1.23	0.00	0.00	0.00	0.00	0.34	0.11	0.50	0.45	1.41	74222.25
All farming system	90.00(100.00)	100.00	7.49	0.84	2.56	226.00	1.97	0.00	0.00	0.00	0.00	0.25	0.19	0.66	1.70	2.81	133946.22
Rajouri																	
Cereal based farming system	90.00(100.00)	95.00	8.85	1.44	3.09	291.00	2.22	0.00	0.00	0.00	0.00	0.95	0.24	0.05	7.55	8.80	240565.50
All farming system	90.00(100.00)	95.00	8.85	1.44	3.09	291.00	2.22	0.00	0.00	0.00	0.00	0.95	0.24	0.05	7.55	8.80	240565.50
Overall districts																	
Livestock based farming system	133(29.56)	65.25	5.72	1.05	1.85	189	1.91	0.00	0.00	0.00	0.00	0.27	0.35	0.64	12.25	15.75	159107.40
Cereal based farming system	317(70.44)	91.47	7.45	0.92	1.48	207	1.82	0.00	0.00	0.00	0.00	0.23	0.29	0.31	9.87	11.80	198231.60
All farming system	450(100.00)	100.00	7.15	1.02	1.80	209	1.87	0.00	0.00	0.00	0.00	0.24	0.33	0.50	10.35	12.75	175742.75

X₁ = Sample Size (No.), X₂ = Gross Income (%), X₃ = Family Size (No.), X₄ = Educational Index of head of the family, X₅ = Family labour engaged in agriculture/farm (No.), X₆ = Employment mandays/ year, X₇ = Farm size (ha), X₈ = Total farm credit (₹/ha), X₉ = Institutional credit, X₁₀ = Non Institutional credit, X₁₁ = Kisan Credit Card (No.), X₁₂ = Desi Cows (No./ha), X₁₃ = Cross bred cows (No./ha), X₁₄ = Dairy buffaloes (No./ha), X₁₅ = Other animals (No./ha)-Poultry, goat etc., X₁₆ = Total animals (No./ha), X₁₇ = Off-farm ncome (₹). Figures within the parentheses are percentages to total.

employment generation potential as compared to livestock based farming system with 232.00, 199.00, 200.00 and 207.00 man days for Jammu, Doda, Kathua and Reasi districts, respectively with 291.00 man days in Rajouri district where not

a single farmer had livestock based farming system. The livestock population varied from 1.14/ha in livestock based farming system to 0.83/ha in cereal based farming system with an overall average of 1.04/ha. Farming system wise

combination of dairy buffaloes varied from 0.63/ha in livestock based farming system to 0.26/ha in cereal based farming system with an overall average of 0.76/ha. The data further revealed that neither of the farming systems had either borrowed

credit for agricultural purposes or had Kissan Credit Card which is a matter of concern to bankers. The findings are in conformity with those of Singh et al. (2009) who had also reported that only 19% farmers were holders of KCC.

As regards the combination of cross-bred cows in the farming system, it was found that cross-bred breeding programme has not marked headway in the area and were 0.25 and 0.19/ha in livestock and cereal based farming systems, respectively with an overall average of 0.40/ha. As far as desi cows were concerned, they were merely 0.27/ha in livestock based farming system and was more in cereal based farming system (0.45/ha) as compared to livestock based farming system. The off-farm income in livestock based farming system was less (₹159107.37/annum) as compared to cereal based farming system (₹198231.60) with an overall average of (₹175742.75).

Area under different crops across farming systems

The distribution of cropped area under different crops in Jammu region has been presented in Table 2. The cropping intensity was found to be more in cereal based farming system in all the districts like Jammu (178.97%), Doda (113.72%), Reasi 9183.95%) except Kathua district wherein it was 119.41% in cereal based farming system and 139.00% in livestock based farming system.

Cost on crop production and livestock maintenance

Table 3 represented the annual cost on crop production and livestock maintenance. In general, the overall average cost of production was found to be ₹21845.65 in livestock based farming system and ₹23253.61 in cereal based farming system. In livestock based farming system, it was found to be highest (₹24566.67/ha) in Reasi district whereas in cereal based farming system (₹18914.53) in Kathua district. The overall human labour was found highest (₹8542.75) in cereal based farming system and bullock labour (₹36565.35) in livestock based farming system. Overall expenditure on seed was highest in cereal based farming system (₹1475.19) followed by livestock based farming system (1095.76). Kathua district with an expenditure of ₹2350.86 on seed in cereal based farming system is at top of the list whereas in livestock based farming system Jammu district tops with an expenditure of 1119.16. Expenditure on machinery was also found the highest in livestock based farming system (₹8195.29) followed by cereal based farming system (₹7850.65).

The per hectare cost of livestock maintenance was found to be maximum on the livestock based farming system (₹21988.55/ha) followed by cereal based farming system ₹14408.05. Except in Doda district the per hectare

cost of livestock maintenance was found to be highest in livestock based farming system whereas in Doda district it was found to be highest in cereal based farming system (₹17576.97).

Resource productivities of major farming systems of various districts

The Cobb-Douglas production was used to find out resource use efficiency of major farming systems of various districts of Jammu region and have been represented in Table 4. The elasticity of production indicated that one per cent increase in area under other crops (AOTH) in overall districts increase gross income ranging from 0.098%, in the case of livestock based farming systems, to 0.360% for the cereal based farming systems. As far as Jammu, Doda and Reasi district is concerned, it was found positively significant in all the farming systems whereas in Kathua and Rajouri it was found to be non-significant. The elasticity coefficients for cereal based farming system in overall districts were found positive and non-significant (0.201) indicating that there is no contribution of dairy animals in increased gross income whereas in livestock based farming system it was found to be negative and non-significant (-0.03).

The contribution of different sources towards farm-family income for livestock based and cereal based farming systems has been shown in Table 5. On an average household in the region received ₹74492/farm as farm-family income out of which 41238.27 was from non-farm income followed by livestock (₹20201.45) and crops (₹13055.20). District wise analysis indicated that non-farm income contributed a major share to farm-family income except in Doda and Kathua where major contribution is from crops. The share of livestock was recorded highest (₹18765.50) in livestock based farming system and ₹12055.10 in cereal based farming system in Reasi district.

DISCUSSION

The study revealed that livestock based farming system was rarely followed by the sample farmers of Kathua district but was major farming system followed by the sample farmers of Reasi district. Farmers from Kathua district were earning major portion of their gross income from livestock in the livestock based farming system whereas in cereal-based farming system farmers of Rajouri district were earning major portion of their gross income from cereals. The size of farm was more in livestock based farming system in all the districts except for Doda district. From the data, it was further observed that livestock was the major component of the existing farming system and neither of the farming systems had either borrowed credit for agricultural purposes or had

Table 2. Farm size-wise percentage area under different crops and cropping intensity under different farming systems.

Particular		Vegetables	Cereals	Fodder	Others	Fruit crops	Gross cropped area (ha)	Cropping intensity (%)
Jammu								
Livestock based farming system	Marginal	0.00	97.77	2.23	0.00	0.00	1.12	182.67
	Small	0.00	88.09	11.19	0.72	0.00	2.31	179.87
	Medium	0.00	85.39	14.61	0.00	0.00	3.65	151.79
	Large	0.00	88.34	9.52	2.14	0.00	5.19	160.38
	All farms	0.00	88.97	9.83	0.92	0.00	2.72	164.76
Cereal based farming system	Marginal	0.00	98.25	0.17	1.58	0.00	1.27	192.21
	Small	0.00	95.90	3.52	0.59	0.00	2.27	164.43
	Medium	0.00	97.93	2.07	0.00	0.00	2.62	140.48
	Large	0.00	98.18	1.82	0.00	0.00	3.11	166.67
	All farms	0.00	97.34	2.23	0.43	0.00	2.75	178.97
Doda								
Livestock based farming system	Marginal	0.00	100.00	0.00	0.00	0.00	1.00	126.76
	Small	0.00	100.00	0.00	0.00	0.00	1.71	118.10
	Medium	0.00	100.00	0.00	0.00	0.00	2.10	84.00
	Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	All farms	0.00	100.00	0.00	0.00	0.00	1.49	112.55
Cereal based farming system	Marginal	0.00	98.48	0.00	1.52	0.00	1.28	146.50
	Small	0.00	100.00	0.00	0.00	0.00	1.72	115.08
	Medium	0.00	100.00	0.00	0.00	0.00	3.14	120.77
	Large	2.54	97.46	0.00	0.00	0.00	1.97	53.64
	All farms	0.16	99.45	0.00	0.38	0.00	1.72	113.72
Kathua								
Livestock based farming system	Marginal	0.00	63.64	36.36	0.00	0.00	2.20	314.29
	Small	0.00	100.00	0.00	0.00	0.00	2.80	186.67
	Medium	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Large	0.00	57.02	23.25	19.74	0.00	7.60	128.09
	All farms	0.00	61.87	21.94	16.19	0.00	5.56	139.00
Cereal based farming system	Marginal	0.00	99.21	0.59	0.20	0.00	1.21	177.27
	Small	0.00	92.26	5.35	2.39	0.00	3.29	195.75
	Medium	0.10	61.54	3.96	34.41	0.00	4.59	189.29
	Large	0.00	90.85	6.71	2.20	0.23	8.94	190.97
	All farms	0.02	88.02	4.58	7.30	0.09	4.32	119.41
Reasi								
Livestock based farming system	Marginal	0.00	97.02	2.98	0.00	0.00	1.32	208.12
	Small	0.00	96.70	3.30	0.00	0.00	2.90	188.89
	Medium	0.00	92.78	7.22	0.00	0.00	3.74	153.88
	Large	0.00	83.39	1.71	1.20	13.70	6.49	173.29
	All farms	0.00	90.49	3.72	0.53	5.27	3.38	168.24
Cereal based farming system	Marginal	0.00	93.78	6.22	0.00	0.00	1.13	187.53
	Small	0.00	96.59	3.41	0.00	0.00	2.03	167.09
	Medium	0.00	100.00	0.00	0.00	0.00	3.75	163.04
	Large	0.00	97.87	2.13	0.00	0.00	5.88	106.82
	All farms	0.00	97.94	2.06	0.00	0.00	3.52	183.95

Table 2. Contd.

				Rajouri				
Livestock based farming system	Marginal	0.00	99.12	0.00	0.88	0.00	1.08	126.50
	Small	0.00	98.80	0.00	1.20	0.00	2.12	105.08
	Medium	0.75	99.25	0.00	0.00	0.00	2.95	112.77
	Large	0.00	98.55	0.00	1.45	0.00	2.80	96.46
	All farms	0.24	99.15	0.00	0.85	0.00	2.25	103.25
				Overall districts				
Livestock based farming system	Marginal	0.00	90.42	1.98	0.00	0.00	1.13	201.25
	Small	0.00	86.89	5.67	0.16	0.00	2.35	178.83
	Medium	0.00	92.54	9.81	0.00	0.00	2.21	123.37
	Large	0.00	85.24	4.25	4.23	2.78	4.31	154.56
	All farms	0.00	88.90	6.75	2.71	1.12	3.42	149.78
Cereal based farming system	Marginal	0.00	95.56	0.97	0.83	0.00	1.16	151.23
	Small	0.00	92.37	2.12	0.89	0.00	2.35	175.72
	Medium	0.21	94.57	1.72	5.17	0.00	3.72	139.78
	Large	0.45	95.02	4.25	1.89	0.05	5.02	141.76
	All farms	0.19	95.14	3.98	3.76	0.01	3.63	152.25

Kissan Credit Card.

Rice-Wheat and Maize-Wheat were found to be the major cropping systems in the Jammu region in both the farming systems. Also Kathua district had large percentage area under fodder crop under livestock based farming system whereas Doda and Rajouri districts has no area under this crop. In general, the overall average cost of production was found to be `21845.65 in livestock based farming system and `23253.61 in cereal based farming system.

The elasticity coefficient was found highly significant for area under cereals (AUC) in Reasi and Doda districts whereas for area under other crops (AOTH) it was found to be highly significant in Kathua and Doda districts. Doda district was found highly significant for both dairy animals and education Index also. The elasticity of production indicated that one per cent increase in area under other crops (AOTH) in overall districts increase gross income ranging from 0.098%, in the case of livestock based farming systems, to 0.360% for the cereal based farming systems. As far as Jammu, Doda and Reasi district is concerned, it was found positively significant in all the farming systems whereas in Kathua and Rajouri it was found to be non-significant. The elasticity coefficients for cereal based farming system in overall districts were found positive and non-significant indicating that there is no contribution of dairy animals in increased gross income whereas in livestock based farming system it was found to be negative and non-significant. The regression coefficient of fertilizer and chemicals was highly significant in cereal based farming system indicating that farmers were getting positive impact for the input whereas in livestock farming system it was negative and non-significant indicating no impact of

this input. The negative and non-significant coefficient for seed and education index in both cereal based and livestock based farming system indicated that these inputs did not contribute significantly to the output of these farming systems.

Conclusion

The educational index has been found highest (1.30) for livestock based farming system in Jammu district and for cereal based farming system it has been found highest (1.72) in Kathua district. The study has revealed that both the farming system, that is, livestock based farming system (189 man days per year) and cereal based farming system (207 man days per year) provides large employment but cereal based farming system provides the 56.71% employment. The per farm per year cost analysis of livestock maintenance has indicated that churi/concentrate, family labour and green fodder are the major components of livestock maintenance in all the districts. The regression analysis has indicated that one percent increase in area under other crops (AOTH) in overall districts increase gross income ranging from 0.098%, in the case of livestock based farming systems, to 0.360% for the cereal based farming systems.

Policy implications

1. Symphasis should be given in cereal based farming system which includes wheat, rice, jowar, maize etc.
2. Each zone of Jammu region being rich in location specific biodiversity needs to be explored, so that it may

Table 3. Annual input cost under different farming systems in various districts of Jammu region (₹/ha).

Particular	Cost on crop production							Gross cost (Rs)
	Seed	Fertilizer	Plant protection	Irrigation charges	Human labour	Bullock labour	Machinery	
	Jammu							
Livestock based farming system	1119.16	1798.56	58.08	597.79	4352.87	4140.33	1032.78	13099.57
Cereal based farming system	866.00	1160.22	166.18	762.29	4894.73	1248.49	9231.75	18329.66
	Doda							
Livestock based farming system	334.41	721.29	86.49	511.71	11895.50	0.00	0.00	13549.40
Cereal based farming system	366.87	678.37	93.28	462.50	7991.51	0.00	3860.63	13453.16
	Kathua							
Livestock based farming system	1040.99	2092.63	158.43	877.28	5091.38	0.00	464.75	9725.46
Cereal based farming system	2350.86	2238.20	266.26	561.20	9521.40	970.12	3006.49	18914.53
	Reasi							
Livestock based farming system	861.81	749.16	15.37	210.31	2419.53	3933.34	16377.15	24566.67
Cereal based farming system	801.12	1076.18	36.06	143.25	2291.47	3485.68	8902.89	16736.65
	Rajouri							
Cereal based farming system	1138.67	1227.73	42.01	120.05	4296.72	4827.99	701.14	12354.31
	Overall							
Livestock based farming system	1095.76	1589.65	90.15	519.55	6789.90	3565.35	8195.29	21845.65
Cereal based farming system	1475.19	1675.50	145.98	526.67	8542.75	3036.87	7850.65	23253.61
Livestock maintenance								
Particular	Churi/ concentrate	Dry fodder	Green fodder	Mineral mixture	Labour	Miscellaneous	Gross cost (Rs)	
	Jammu							
Cereal based farming system	5199.07	3348.32	3882.90	822.12	4934.68	1140.55	19327.64	
Livestock based farming system	6749.70	6268.97	3949.20	695.93	3580.27	6704.98	27949.05	
	Doda							
Cereal based farming system	2190.09	5310.00	9524.96	551.92	0.00	0.00	17576.97	
Livestock based farming system	837.35	3119.46	3522.72	476.58	0.00	375.77	8331.88	
	Kathua							
Cereal based farming system	856.86	760.86	145.81	710.03	660.23	2000.21	5134.00	
Livestock based farming system	1589.79	1701.03	1039.97	636.64	3872.30	203.47	9043.20	

Table 3. Contd.

Reasi							
Cereal based farming system	2152.78	3693.16	1648.18	332.76	6766.11	1029.52	15622.52
Livestock based farming system	2830.49	2492.69	1152.61	473.30	13036.97	430.61	18560.61
Rajouri							
Cereal based farming system	2355.49	3495.87	3262.01	226.63	14456.02	313.42	24109.44
Overall							
Cereal based farming system	2485.39	3099.17	3159.69	841.43	2945.01	1854.32	14408.05
Livestock based farming system	3686.96	5862.61	4819.88	1031.73	10220.53	1889.68	21998.55

Table 4. Farming system-wise regression results for different farming systems in Jammu region of J&K state.

District	Farming system	Intercept	Regression coefficients						R ² Adj	F ratio	Returns to scale
			AUC	AOTH	DA	Seed	TFC	EI			
Kathua	Cereal based	-0.245	1.219	-0.076	0.084	0.299	0.951*	-0.167	0.390*	8.147	2.308
	Livestock based	3.040*	0.000*	-0.157*	0.000*	1.479*	-0.211*	-0.520	1.000*	5.127	0.591
Jammu	Cereal based	-0.159	6.293*	0.440***	0.249	-0.160	0.123	-5.938*	0.243*	3.950	1.006
	Livestock based	4.099*	-0.892	0.252**	-0.158	-0.147	0.675	0.867	0.007	1.054	0.598
Reasi	Cereal based	4.511**	0.454***	1.181*	-0.478	-0.177	0.263	3.355	0.169***	2.087	4.598
	Livestock based	4.818*	0.400***	0.003	0.096	-0.067	-0.096	0.024	0.036	1.250	0.361
Doda	Cereal based	4.318	4.941***	1.164***	0.363	0.217	-0.866	1.459***	0.038	1.419	7.277
	Livestock based	2.291	1.054***	0.000***	0.795***	-0.919**	1.004	0.051***	0.355	9.268	1.985
Rajouri	Cereal based	1.155	1.159	-0.388	1.674**	-0.190	0.350	-2.919	0.149***	2.021	-0.315
Overall	Cereal based	1.763*	1.367**	0.360*	0.201	-0.123	0.427***	-0.327	0.104*	5.934	1.912
	Livestock based	5.207*	0.027	0.098**	-0.03	-0.070	-0.026	0.072	0.057	0.944	0.073

AUC, Area under cereals; AOTH, area under other crops; DA, dairy Animals; TFC, total fertilizer and chemicals; EI, Educational index; *Significant at 0.01 los; **Significant at 0.05 los, ***Significant at 0.1 los.

be beneficial for the farmers to adopt the farming system related to that particular area.

3. There should be government strategy for marginal and small farmers.

Conflict of Interest

The authors have not declared any conflict of interest.

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