

Characterization and Economics of Farming Systems in Southern Rajasthan

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Received: December 2012

Abstract: A characterization survey of 144 farmers was conducted during 2010-11 in Chittorgarh and Rajsamand districts of southern Rajasthan. Crop-livestock and crop-livestock-horticulture farming systems were adopted by 66 and 34% of the farmers. Among different enterprises, crop production contributed 71 to 74% to total income of crop-livestock farming system and 23-29% in crop-horticulture-livestock farming system. The contribution of livestock in total income of farming system ranged from 23 to 29%. Horticulture contributed 11 to 35% to the total income of farming system. Large farmers received Rs. 49,852 and Rs. 37,385 ha⁻¹ more net income than small and medium category of farmers, respectively, from crop-animal husbandry farming system and Rs. 87,710 and Rs. 51,161 ha⁻¹ more from crop-animal husbandry-horticulture farming system, respectively. Study revealed that 91% of the farmers in Chittorgarh and Rajsamand districts face non-availability of quality seed as a major constraint. Lack of cross-bred and exotic breed animals resulted in low productivity of animals for 87.5% of the farmers. About 87.5% farmers suggested the need for making available good quality planting material for horticultural crops.

Key words: Farming system, economics, constraints, characterization.

Rajasthan is the largest state in the country and is at 6th position with respect to agricultural production. Mixed farming system occupies more than 60% of total area under different farming systems in the state. Mainly cereal-based farming systems dominate in the state. The average income from different farming systems depends upon the agroclimatic zones of the state. In southern Rajasthan, maize-based farming system is dominant. Productivity and income of the maize-based farming systems is low due to poor resource use efficiency and lack of optimization of need-based resources and technologies.

The basic aim of integrated farming system is to derive a set of resource development, management and utilization practices that lead to a substantial and sustained increase in agriculture production. Since farming systems differ in different situations such studies should be location specific (Singh, 1998). Several studies conducted on farming systems showed that farming system approach is better than conventional farming (Ravishankar *et al.*, 2007; Singh *et al.*, 2007).

As there is no scope for horizontal expansion of our agricultural land, only alternative

approach is for vertical expansion through various farm enterprises requiring less space and time, but given high productivity and ensuring periodic income especially for small and marginal farmers. Therefore, a study was undertaken to assess the economics of farming systems in Chittorgarh and Rajsamand districts situated in the Agroclimatic Zone-IV A in Rajasthan with the objectives to identify and characterize the major farming systems of the study area and major constraints limiting the efficiency of different farming sub-systems.

Materials and Methods

Multistage random sampling method was followed to select 144 households from 24 villages in different districts of Zone-IV A of southern Rajasthan during 2010-11. The standard cost and income methodology was adopted (Raju and Rao, 1999). Personal interview of farmers practicing integrated farming systems in selected villages was the main source of information on the subject. The needed information was collected by filling in the proforma developed for the purpose. Some important information like number of small, medium and large farmers have also been collected from the published documents of the district administration on the basis of sample data collected (District Statistics, 2010-11).

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Results and Discussion

Farming systems in the region

Results indicated that crop-livestock farming system is followed by 66% farmers, while crop-animal husbandry-horticulture farming system is practiced by 34% farmers in Chittorgarh and Rajsamand districts situated in sub-humid southern plains and Aravalli hills of Rajasthan (Table 1).

Table 1. Major farming systems prevailing in the Zone-IV A

Major farming systems	Category of the farmers			Total
	Small (0-2 ha)	Medium (2-4 ha)	Large (>4 ha)	
Crop-livestock	34	32	29	95 (66%)
Crop-livestock-horticulture	14	16	19	49 (34%)
Total	48	48	48	144

After crops and animals, horticulture is another enterprise, which is practiced more by large and medium farmers in comparison to small and marginal farmers.

Table 2. Number of livestock in different categories of farmers

Category of farmers	Average holding size (ha)	No. of livestock		Total
		Cow	Buffalo	
Small	1.47	2.0	-	2.0
Medium	2.78	2.0	1.0	3.0
Large	5.00	3.0	1.0	4.0

Date on livestock presented in Table 2 revealed that number of livestock is more with the large farmers in comparison to small and medium farmers. Further it is important to note that most of the large farmers rear buffalo, while small and medium farmers prefer cattle.

Table 3. Income and expenditure of crop-livestock farming system

Category of farmers	Av. size of holding (ha)	Gross income (Rs ha ⁻¹)			Total expenditure (Rs. ha ⁻¹)		Net income (Rs. ha ⁻¹)	Per cent contribution to total income	
		Crop	Livestock	Total	Crop	Livestock		I	II
Small	1.03	45870 (26405)*	15807 (10985)*	61677	18952	9340	37390	74.37	25.63
Medium	2.71	65380 (33407)*	20805 (12080)*	86185	27132	13566	45487	75.86	24.13
Large	6.82	68650 (37287)*	23807 (12565)*	92457	28403	14202	49852	74.30	25.70

*Figures in parentheses indicate the net income by different enterprises; I: Crop production; II: Animal husbandry.

Economics of crop-livestock farming system

Small, medium and large farmers have on an average land holding of 1.03, 2.71 and 6.82 ha. Maize, soybean and cotton in kharif and wheat, barley and mustard are important crops of rabi season in the region. Crop production contributed 74.3 to 75.86% and animal husbandry contributed 24.13 to 25.7% to total income of farmers from crop-livestock farming system (Table 3).

In crop-livestock farming system, a maximum expenditure of Rs. 42,605 ha⁻¹ was incurred by the large farmers, which was 33.2 and 4.4% higher in comparison to expenditure incurred by the small (Rs. 28292 ha⁻¹) and medium farmers (Rs. 40,698 ha⁻¹).

Among small, medium and large farmers, large farmers got the maximum income of Rs. 68,650 ha⁻¹, which was 33.1% and 4.7% higher in comparison to small and medium farmers. Livestock contributed to the tune of Rs. 12,565, Rs. 12,080 and Rs. 10,985 to total net income of a crop-livestock farming system of large, medium and small farmers, respectively, which indicates that there is a lot of scope of improvement in total income of farmers through adoption of improved livestock technologies.

Economics of crop-livestock-horticulture farming system

Small, medium and large farmers have on an average land holding of 1.47, 2.78 and 5.00 ha. Crop production contributed 42.0 to 60.70%, livestock contributed 23 to 29.2% and horticulture contributed 11 to 35% to total income of farmers from crop-livestock-horticulture farming system (Table 4).

In crop-livestock-horticulture farming system, a maximum expenditure of Rs. 44,405 ha⁻¹ was incurred by the large farmers, which

Table 4. Economics of crop-livestock-horticulture farming system

Category of farmers	Average holding size (ha)	Gross income (Rs. ha ⁻¹)				Total expenditure (Rs. ha ⁻¹)			Net income (Rs. ha ⁻¹)	Per cent contribution to total income		
		Crops	Livestock	Horticulture	Total income	Crop	Live-stock	Horti-culture		I	II	III
Small	1.47	33958 (29292)*	18558 (12577)*	28292 (10292)*	80808	12534	8506	7607	52161	42.0	23.0	35.0
Medium	2.78	51680 (31200)*	35560 (24100)*	34160 (22200)*	121400	16200	14300	13400	77500	42.6	29.2	28.0
Large	5.00	80150 (53300)*	37400 (26300)*	14565 (8110)*	132115	23045	16060	5300	87710	60.7	28.3	11.0

*Figures in parentheses indicate the net income by different enterprise; I: Crop production; II: Animal husbandry and III: Horticulture.

was 35.4% higher in comparison to expenditure incurred by the small farmers (Rs. 28,647 ha⁻¹).

Data presented in Table 4 revealed the net income of farmers from crop-livestock-horticulture farming system. Maximum net income (Rs. 87,710 ha⁻¹) was obtained by large category of farmers, of which Rs. 53,300, Rs. 26,300 and Rs. 8,110 ha⁻¹ was from crop production, livestock and horticulture, respectively. The lowest net income was obtained by small farmers (Rs. 51,161 ha⁻¹). As the size of land holding increased, the per cent contribution of crop production decreased and contribution of horticulture and livestock

increased. It indicates that farmers should diversify for getting higher income from present farming system.

Constraints in farming systems

Non-availability of seed of newly developed high yielding varieties followed by imbalanced use of fertilizer are major constraints in enhancing the crop productivity under crop production component (Table 5). About 91% farmers could not get seeds of newly developed high yielding varieties. About 84% farmers faced imbalanced use of fertilizers as constraint and about 51% farmers felt lack of knowledge

Table 5. Constraints conceiving low productivity of farm enterprises

Enterprises	Constraints	Category of farmers			Total
		Small	Medium	Large	
Crop					
I	Non-availability of newly developed high yielding variety seeds	35	32	15	82 (91.1%)
II	Imbalanced use of fertilizers	34	30	12	76 (84.4%)
III	Lack of knowledge of improved package of practices	22	14	10	46 (51.1%)
Animal husbandry					
I	Lack of crossbred and exotic breed animals	35	30	14	79 (87.7%)
II	Lack of artificial insemination and medical facilities for cattle	30	22	16	68 (75.5%)
III	Improper maintenance balance feeding and lack of organized co-operative societies.	28	20	12	60 (66.6%)
Horticulture					
I	Lack of availability of improved good planting material suitable for local conditions	33	29	15	77 (87.5%)
II	Imbalanced use of fertilizers	30	21	15	66 (78.1%)
III	Lack of knowledge of improved package of practices	27	20	10	57 (68.7%)

* Figures in parenthesis indicate per cent value.

of improved package of practices as constraint. Kadam *et al.* (2003), Singh and Singh (2005) and Choudhary *et al.* (2007) also reported similar findings.

About 87.7% farmers reported lack of crossbred and exotic breed animals, followed by lack of artificial insemination and medical facilities for cattle as major constraints in livestock enterprise.

The lack of availability of improved good planting materials suitable for local conditions was reported by 87.5% of framers as the important constraint in the horticulture component. Imbalanced use of fertilizers lack of knowledge of improved package of practices was the reason of low productivity of horticultural crops for 78.1 and 68.7% farmers.

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