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Farmers Income through Livestock Rearing and Cash Crop Cultivation in Dry Land Agriculture

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ABSTRACT

The mean annual rainfall of western arid Rajasthan is 339 mm with a standard deviation of 158 mm as compared to 593 mm ± 217 mm. Due to erratic rainfall, the crop cultivation is at big risk. Livestock rearing is used as supplementary activity and a support system in lean periods of farming. The study was primarly based on the primary data for the year 2015-16 and conducted in dryland region of Rajasthan comprising of arid and semi-arid agro climate zones. The average income of farmers in these three districts from cultivation of cumin was ₹ 276962 per household while average income per household from livestock was ₹ 102030. Thus, 73 percent of the household income was contributed by crop production (cumin) and 27 percent by livestock rearing. The study revealed that an average household in Barmer, Bikaner and Churu district, 57.9 percent of total income of household was from moth crop production while 30.2 percent income was contributed by livestock rearing. In Jhunjhunu district the income farm crop production (40.90 per cent) and income from livestock (40.54 per cent) was almost equal, while 18.54 per cent of the total household income was from service or business.

Keywords: Farmers' Income, Livestock Rearing and Cash Crop Cultivation

Risk is an integral part of agriculture as farmers confront various types of risks in farming. These risks may be from ever changing climatic cycle, disease and pest infestation and demand – supply fluctuations resulting in price fluctuations. In the dryland regions of Rajasthan, farmers are more prone to climate and rainfall hazards. The mean annual rainfall of western arid Rajasthan is 339 mm with a standard deviation of 158 mm as compared to 593 mm ± 217 mm for the state (Agroclimatic Atlas of Rajasthan). The rainfall is untimely and erratic and thus poses big risk for crop cultivation. In the arid and semi-arid dryland region of Rajasthan livestock is the backbone of rural economy. Livestock rearing is used as supplementary activity and a support system in lean periods of farming. It is a highly potential sector of Rajasthan. It is not only subsidiary occupation to agriculture but a major economic activity especially in the dryland region of Rajasthan. It provides source of livelihood as well as food security and insurance against poverty.

Average herd size of animals per household in arid and sem-arid region of Rajasthan have been presented in Table 1. In this region the maximum number of adult animal was that of *desi* buffalo (4.27 per HH). Murrah buffaloes, cross bred cows and *desi* cows were also present as 2.65, 2.98 and 3.48 per household, respectively. Sheep herds were also an integral part of economy of these regions due to sale of wool. These are mainly reared through migration to other region of the state during summer season and herding on common property resources.

Table 1: Average Herd Size of Animals in Arid and Semi Arid Regions of Rajasthan (No./HH)

Animal	Desi Buffalo	Murrah Buffalo	CB Cow	ND Cow	Sheep	Goat	Camel
Adult	4.27	2.65	2.98	3.48	39.00	5.66	1.33
Milch	2.06	1.65	1.35	1.61	23.00	2.29	0.00
Dry	2.21	1.00	1.63	1.87	16.00	3.37	1.33
Heifers	2.26	1.76	1.47	1.59	12.00	2.83	0.00
Young stock	1.90	2.50	1.00	1.95	0.00	2.83	0.00

The average annual milk production per household from all animals was 5330.2 litres out of which 1546.95 litres retained and 3783.26 litres was sold per year as shown in Table 2.

Table 2: Average Annual production, Consumption and Sale in Arid and Semi-Arid Regions of Rajasthan (Litre/HH)

Animal	Total Production	Retained to Home Consuption	Sold	Price (₹)
Buffalo	3445.00	803.44	2641.57	45.00
Cow	1691.44	549.75	1141.69	35.38
Goat	193.76	193.76	0.00	19.79
Total	**5330.2**	**1546.95**	**3783.26**	**—**

Methodology

The study was primarly based on the primary data for the year 2015-16 and conducted in dryland region of Rajasthan comprising of arid and semi-arid agro climate zones. Ten districts of the were selected among total 21 district fall under dryland region. One tehsil from each district and one village from each tehsil were selected purposively having highest area under particular cash crop. 10 farmers were selected from each village and a comparative analysis of income generated through different cash crops vis-à-vis livestock activity was done for each selected crop i.e cumin, moth, clusterbean, cowpea and Isbgol. Number of districts covering 75 percent of area under crops were taken for study. The estimates were generated on per house-hold basis.

RESULTS AND DISCUSSION

The results for five Principal cash crops of dryland region vis-à-vis livestock activity on the sample farms were worked out and are presented in the following discussion.

Cumin

Cumin is an important cash crop of arid agroclimatic zone of Rajasthan. Cumin crop requires cool and dry climate for better growth and production. It's cultivation concentrated in Barmer, Jalore and Jodhpur districts. The details of sample farmers growing cumin and rearing milch animals in shown in Table 3. On an average 5.13 hactare land was used for cultivation and 2 milch animals were reared by them.

Table 3: Details of sample farmers cultivating Cumin as major cash crop

Sl. No.	Particular	Details of Selected Farms			
		Barmer	Jalore	Jodhpur	Combined
1	Farm size (ha/farm)	4.89	4.78	6.07	5.25
2	Land used for farming(ha/farm)	4.89	4.73	5.77	5.13
3	Irrigated area (ha/farm)	4.89	4.73	5.25	4.96
4	Unirrigated area (ha/farm)	—	—	0.52	0.17
5	Land not used for farming (ha/farm)	—	0.05	0.30	0.12
6	Livestock composition (No./farm)				
	(a) Milch	1	2	2	2
	(b) Draught	—	2	2	1
	(c) Undetermined	—	1	3	1

Income composition of households of Barmer, Jalore and Jodhpur districts from cultivation of cumin and livestock rearing presented in Table 4. The average income of farmers in these three districts from cultivation of cumin was ₹ 276962 per household while average income per household from livestock was ₹ 102030. Thus, 73 percent of the household income was contributed by crop production (cumin) and 27 percent by livestock rearing. Among the districts the highest per cent contribution of livestock in household income was in Jalore district where livestock contributed approximately forty percent of the average household income. In Barmer and

Jodhpur districts about one fifth (20 percent) of the household income was from livestock enterprise.

Table 4: Income composition of sample farmers cultivating Cumin as major cash crop (₹/HH)

Sl. No.	Particular	Details of Selected Households			
		Barmer	Jalore	Jodhpur	Combined
1	Income composition (HH)	262620 (100)	400585 (100)	473770 (100)	378992 (100)
	(a) Crop production	211470 (80.52)	241435 (60.27)	377980 (79.78)	276962 (73.07)
	(b) Livestock	51150 (19.4)	159150 (39.7)	95790 (20.2)	102030 (26.9)
	(c) Service/ Business	—	—	—	—
	(d) Others	—	—	—	—

(Figures in paraenthesis show percent to total income).

Moth

Moth is an important pulse crop of arid dryland region of Rajasthan. Three districts having maximum area under moth cultivation in Rajasthan were Barmer, Bikaner and Churu. The average farm size on the sample farm was 6.20 hectare, 5.94 hectare and 4.12 hectare per farm in Barmer, Bikaner and Churu districts respectively (Table 5).

Table 5: Details of sample farmers cultivating Moth as major cash crop

Sl. No.	Particular	Details of Selected Farms			
		Barmer	Jalore	Jodhpur	Combined
1	Farm size (ha/ farm)	6.20	5.94	4.12	5.42
2	Land used for farming(ha/farm)	4.76	4.43	3.73	4.31
3	Irrigated area (ha/farm)	1.46	2.25	2.23	1.98
4	Unirrigated area (ha/farm)	3.30	2.18	1.50	2.33
5	Land not used for farming (ha/farm)	1.44	1.50	0.39	1.11
6	Livestock composition (No./farm)				
	(a) Milch	10	3	3	5
	(b) Draught	2	—	—	1
	(c) Undetermined	8	2	2	4

The average livestock per farm was highest in Barmer district where average sample farm had 10 milch cattle, 2 draught cattle and 8 undermined cattle.

The data showed in Table 6 revealed that income composition of sample households in Barmer, Bikaner and Churu districts. On an average household in these three districts, 57.9 percent of total income of household was from crop production while 30.2 percent income was contributed by livestock rearing. 8.5 percent of income was contributed by service or business and other sources like hiring out of labour or machinery contributed only 3.4 percent of the total income of household. The highest income from livestock enterprice was in Barmer district (63.4 percent of total household income) and the lowest was in Bikaner district (3.9 percent of total household income). In Churu district the income from service or business was the highest as it contributed 29.4 percent of total income of sample household as joining Indian Army is a prevalent and popular source of service in Churu district.

Table 6: Income Composition of sample farmers cultivating Moth as major cash crop (₹/HH)

Sl. No.	Particular	Details of Selected Households			
		Barmer	Jalore	Churu	Combined
1.	Income composition (HH)	417702 (100)	468133 (100)	302579 (100)	396138 (100)
	(a) Crop production	152720 (36.6)	397214 (84.9)	138492 (45.8)	229475 (57.9)
	(b) Livestock	264982 (63.4)	18162 (3.9)	75254 (24.8)	119468 (30.2)
	(c) Service/ Business	—	12500 (2.7)	88833 (29.4)	33778 (8.5)
	(d) Others	—	402050 (8.5)	—	13417 (3.4)

Figures in parenthesis show percent to total income.

Guar (Cluster Bean)

Guar (Cluster Bean) is one of the most important commercial crop of arid and semi-arid region of Rajasthan state. Rajasthan state stands first in area and production of cluster bean in India followed by Gujrat, Haryana and Uttar Pradesh. In Rajasthan it is mainly grown for guar gum, which is a major export

Table 7: Details of sample farmers cultivating Gaur as major cash crop

Sl. No.	Particular	Details of Selected Farms					
		Barmer	Bikaner	Churu	Hanumangarh	Jaisalmer	Combined
1	Farm size (ha/farm)	7.78	3.67	4.97	3.52	9.39	5.87
2	Land used for farming (ha/farm)	5.39	3.58	4.53	2.64	6.60	4.55
3	Irrigated area (ha/farm)	—	2.33	2.72	0.88	0.43	1.27
4	Unirrigated area (ha/farm)	5.39	1.25	1.82	1.76	6.17	3.28
5	Land not used for farming (ha/farm)	2.39	0.08	0.44	0.88	2.79	1.32
6	Livestock composition (No./farm)	19	4	5	4	23	11
	(a) Milch	9	2	3	2	8	5
	(b) Draught	3	1	—	1	7	2
	(c) Undetermined	7	1	2	1	8	4

Table 8: Income Composition of sample farmers cultivating Gaur (Cluster Bean) as major cash crop (₹/HH)

Sl. No.	Particular	Details of Selected Farms					
		Barmer	Bikaner	Churu	Hanumangarh	Jaisalmer	Combined
1	Income Composition	132936 (100)	383091 (100)	345549 (100)	210780 (100)	337430 (100)	281955 (100)
	(a) Crop Production	109864 (82.6)	286995 (74.9)	177727 (51.4)	166250 (78.9)	112180 (33.2)	170603 (60.5)
	(b) Livestock	23071 (17.4)	70762 (18.5)	73500 (21.3)	44530 (21.1)	209000 (61.9)	84173 (29.9)
	(c) Service/Business	—	—	94313 (27.3)	—	—	18863 (6.7)
	(d) Others	—	25333 (6.6)	—	—	16250 (4.8)	8317 (2.9)

(Figures in parentheses show percent to total income.).

item, and livestock feed. It is also raised as a green manure and cover crop in the rainfall condition of Rajasthan.

Main districts under gaur cultivation were Barmer, Bikaner, Churu, Hanumangarh and Jaisalmer. The average farm size on the sample farms ranged from 3.52 hectare in Hanumangarh district to 9.39 hectare in Jaisalmer as shown in Table 7. Average farm size on sample farm was 5.87 hectare out of which only 1.27 hectare was irrigated. Number of livestocks per household were highest in Jaisalmer (23) followed by Barmer (19) which are entreme dry regions. Income composition of sample households (Table 8) shows that the average income per household for sample farmer growing gaur in five districts combined was 60.5 per cent from gaur cultivation and 29.9 per cent from livestock rearing. 6.7 per cent income of total household income was from service or business while 2.9 per cent was from other sources. Among the five districts the share of income from gaur cultivation was highest in Barmer district (82.6 percent) and lowest in Jaisalmer district (33.2 per cent). The income share of livestock ranged from 61.9 per cent in Jaisalmer district to 17.4 per cent in Barmer district. Livestock activity was comparatively profitable activity in Jaisalmer district and as a supplementary activity to agriculture it contributed approximately one fifth (20 percent) of the total household income in all the five districts. Thus livestock rearing acts as shock absorborin the arid region of Rajasthan.

Cowpea

Cowpea is an important legume crop of Rajasthan where it is cultivated mainly as rainfed crop. Two district having highest area under cowpea was Jhunjhunu and Sikare districts. The details of sample farmers cultivations cowpea as major cash crop in these two districts are presented in Table 9. In Jhunjhunu district average farm size of sample farmer was 3.51 hectare with on an average five milch ahnimals and four undetermined animals. In Sikar district average farm size was 4.29 hectare with seven milch animals and four undetermined animals.

The per household total income was ₹ 6,00,336 in Jhunjhunu district and ₹ 9,06,763 in Sikar. In Jhunjhunu district the income farm crop production (40.90 per cent) and income from livestock (40.54 per cent) was almost equal, while 18.54 per cent of the total household income was from service or business. In Jhunjhunu district majority of young population is working in household income from crop production was 58.74 per cent and share of livestock was 30.55 per cent. The livestock is a major economic activity in both the districts.

Table 9: Details of sample farmers cultivating Cowpea as major cash crop

Sl. No.	Particular	Details of Selected Farms		
		Jhunjhunu	Sikar	Combined
1	Farm size (ha/farm)	3.51	4.29	3.90
2	Land used for farming (ha/farm)	3.51	4.29	3.90
3	Irrigated area (ha/farm)	2.34	3.97	3.16
4	Unirrigated area (ha/farm)	1.17	0.32	0.75
5	Land not used for farming (ha/farm)	—	—	—
6	Livestock composition (No./farm)			
	(a) Milch	5	7	6
	(b) Draught	-	-	-
	(c) Undetermined	4	4	4

Table 10: Income Composition of sample farmers cultivating Cowpea as major cash crop

Sl. No.	Particular	Details of Selected Farms (₹/HH)		
		Jhunjhunu	Sikar	Combined
1	Income Composition	600336 (100)	906763 (100)	753550 (100)
	(a) Crop Production	245579 (40.90)	532673 (58.74)	389126 (51.63)
	(b) Livestock	243423 (40.54)	277090 (30.55)	260257 (34.53)
	(c) Service/ Business	111333 (18.54)	97000 (10.69)	104167 (13.82)
	(d) Others	—	—	—

(Figures in parenthesis show percent to total income.)

Isabgol (Psyllium Husk)

Isabgol crop has great commercial and medicinal importance. India holds monopoly (98 per cent) in the world trade and production of Isabgol within India Rajasthan is the largest Isabgol growing state occupying an area of 214 thousand hectare producing 113 thousand toun of Isabgol (Vital Agriculture, Statistics 2011-12) It grows well in saline soils with poor quality water in western Rajasthan. The major Isabgol producing districts in Rajasthan were Barmer, Jaisalmer, jalore and Nagaur. The average farm size on the sample farms ranged from 3.29 hectare in Nagaur to 19.54 hectare in Jaisalmer with two to three milch animals, draught animals and undetermined

Table 11: Details of sample farmers cultivating Isabgolas major cash crop

Sl. No.	Particular	Details of Selected Farms				
		Barmer	Jaisalmer	Jhalor	Nagaur	Combined
1	Farm size (ha/farm)	4.89	19.54	6.10	3.29	8.46
2	Land used for farming (ha/farm)	4.89	15.63	6.00	2.64	7.29
3	Irrigated area (ha/farm)	4.89	12.00	6.00	0.93	5.96
4	Unirrigated area (ha/farm)	—	3.63	—	1.71	1.34
5	Land not used for farming (ha/farm)	—	3.91	0.10	0.65	1.17
6	Livestock composition (No./farm)					
	(a) Milch	1	3	2	2	2
	(b) Draught	—	3	2	4	2
	(c) Undetermined	—	3	1	—	1

Table 12: Income Composition of sample farmers cultivating Isabgol as major cash crop (₹/HH)

Sl. No.	Particular	Details of Selected Farms				
		Barmer	Jaisalmer	Jhalor	Nagaur	Combined
1	Income Composition	269240 (₹/HH)	272330 (₹/HH)	439380 (₹/HH)	142525 (₹/HH)	280869 (₹/HH)
2	Crop Production	211490 (78.55)	221530 (81.34)	280230 (63.77)	83125 (58.32)	199094 (70.88)
	(a) Livestock	57750 (21.44)	50800 (18.65)	159150 (36.22)	54400 (38.22)	80525 (28.66)
	(b) Service/Business	—	—	—	5000 (3.50)	1250 (0.44)
	(c) Others	—	—	—	—	—

Figures in parenthesis show percent to total income.

per household. The per household contribution of Isabgol cultivation as a share of total household income was highest in Jaisalmer where it contributed 81.34 per cent of total household income. In Barmer district Isabgol cultivation contributed 78.55 per cent and in Jalore 63.77 per cent of total household income.

The contribution of livestock activity in the household income in these districts ranged from 18.65 per cent in Jaisalmer to 38.16 per cent in Nagaur. Thus on an average, for these four district, for income of each rupee in household seven paisa came from isabgol cultivation and three paisa came from livestock.

CONCLUSION

In the dryland regions of Rajasthan, farmers are more prone to climate and rainfall hazards. In the arid and semi-arid dryland region of Rajasthan livestock is the backbone of rural economy. Livestock rearing is used as supplementary activity and a support system in lean periods of farming. In Jhunjhunu district the income farm crop production (40.90 per cent) and income from livestock (40.54 per cent) was almost equal, while 18.54 per cent of the total household income was from service or business. In Jhunjhunu district majority of young population is working in household income from crop production was 58.74 per cent and share of livestock was 30.55 per cent. The livestock is a major economic activity in both the districts. The study indicated that livestock rearing contributed 40-50 percent farmers' income in addition to cash crop i.e. cumin, moth, cluterbean,cowpea, isbagol in dryland regions of Rajasthan.

REFERENCES (MISSING)