

DAIRYING AS VEHICLE TO RAISE INCOMES OF SMALL FARMERS IN HARYANA

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ABSTRACT

Dairying is an indispensable part of rural livelihoods in the country, especially for the small and marginal farmers. The Situation Assessment Survey (SAS), 2013 reports that in 2012-13 in Haryana, 93% of agricultural households (highest as compared to other states in the country) were engaged in livestock enterprise. Agricultural households in the state also earned the maximum nominal income (Rs. 2000 per month) from farming of animals, of which 95 per cent came from milk alone (SAS, 2013). This paper examines the contribution of dairy alongside that of cultivation to farmers' real income in Haryana in 2003 and 2013. Distribution of income from these two sources is also examined across landholding categories, social groups and National Sample Survey (NSS) state-regions. Real growth in expenses in dairy production is then ascertained for the same time points. It is found that real income from both dairy and cultivation has more than doubled in the state between 2003 and 2013. The distribution of income is found to be highly skewed across land classes, social groups and NSS state-regions. Real expenses per liter in dairy have decreased by 4.8% and receipts per liter have increased by 3.3% during the period under consideration.

Keywords: Dairying, Doubling farmers' income, Haryana, Small farmers

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In India, dairying has always been an indispensable part of rural livelihoods, especially for the small and marginal farmers. According to BIRTHAL *et al.* (2017), 14 per cent of total income of marginal farmers and 12 per cent of total income of small farmers came from livestock in 2013, and income share of livestock declined with increase in landholding size. Livestock was also the second most important source of income followed by wages & salaries for farmers with less than 0.01 hectare of land - 26 per cent of their income came from this source (Ranganathan, 2015). In the 70th Round (2012-13) of the 'Situation Assessment Survey (SAS) of Agricultural Households', conducted by the National Sample Survey Office (NSSO), more than 9 per cent of agricultural households of Tamil Nadu, Gujarat, Punjab and Haryana reported livestock as their principal source of income. Both Gujarat and Haryana had the maximum share of receipts from milk (95%) in the total monthly receipts coming from farming of animals per agricultural household. Agricultural households in Haryana also earned the maximum (Rs. 2000) nominal monthly income from livestock farming in 2012-13 (SAS, 2013). Therefore, the role of dairy as a way to augment farmers' incomes in the state cannot be ignored.

With this background, from the average agricultural households' perspective in the state of Haryana, it is argued that dairy is an important source of livelihood for farmers, and that income earned from dairy must be analyzed alongside that of cultivation to assess the growth in both the sectors over time. No comprehensive study has been carried out so far to gauge the contribution of dairy to farmers'

income in the state. We not only present a comparative analysis of real incomes from dairy and cultivation in Haryana, but also estimate the real growth in expenses in dairy production between 2002-03 and 2012-13. The paper further investigates variations in incomes across different land classes of farmers, and across different social groups and state-regions. An independent samples t-test is then applied to compare incomes from dairy in the two time points to test the null hypothesis that dairy can not be the vehicle to raise incomes of small farmers in Haryana (or there is no significant difference in the incomes from dairy in the two years under consideration).

MATERIALS AND METHODS

The Situation Assessment Surveys (SAS) carried out by the National Sample Survey Office (NSSO) are the only source in the country that provides information on farmers' income and its components. Till date two such surveys have been conducted: one in 2002-03 (NSS 59th Round) and another in 2012-13 (NSS 70th Round). The surveys consider four main sources of farm household's income, namely, wages & salaries, cultivation, farming of animals, and non-farm business. The Compound Annual Growth Rate (CAGR) of real income (at national level) from these four sources was reported as 1.4%, 3.7%, 14.3%, and -0.1%, respectively by Ranganathan (2015). The growth of income from livestock was highest compared to other incomes, and its share in total income of a farm household had also increased from 4% in 2003 to 13% in 2013 (Ranganathan, 2015). But there is bound to be a lot of inter-state and intra-state variations in this regard,

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as dairy is not same everywhere in the country.

The NSSO's SAS 59th Round (2002-03) covered 928 rural households in Haryana and the NSSO's SAS 70th Round (2012-13) covered 591 rural households in the state. First, the relevant unit level secondary data (pertaining to farming of animals and cultivation) was extracted for Haryana from both the rounds. Net income from dairy was calculated by subtracting total expenses incurred from the total value of output of dairy farming. Similarly, net income from cultivation of crops was calculated by subtracting the cost of production from value of main output of crops and their by-products. The income estimates thus obtained from both the rounds were brought to the common base of 2011-12 prices using respective GDP deflators. The analysis was thus carried out by obtaining real income and expenses estimates across land class (landholding categories), across social groups, and across NSS state-regions (Eastern Haryana and Western Haryana). Real growth in expenses in dairy production was also analyzed for the two time points across different land classes and regions. Independent samples t-test was carried out to test if there was a significant difference in income from dairy in the years 2003 and 2013.

RESULTS AND DISCUSSION

Changes in income from dairy farming vis-à-vis cultivation: Table 1 shows the changes in real monthly income from dairy and cultivation across land classes in Haryana. Dairy farming reaped negative returns in Haryana in 2003, as the expenses incurred on dairy far exceeded the receipts from the enterprise. In ten years (2002-03 to 2012-13), dairy farming not only became a profitable enterprise in the state, but returns from dairy more than doubled across farming households of all land classes. On the other hand, income from cultivation for marginal farmers decreased from 2003 to 2013, and more than doubled for all other land classes. Consequently, marginal farmers in the state were earning up to 86 per cent less real monthly income from cultivation than the state average of Rs. 7272 in 2013. Small farmers were earning an average monthly income of Rs. 2877 from cultivation in 2003, which increased to Rs. 7233 in 2013. Dairy augmented their monthly income to the tune of Rs. 3660 in the same year.

Another way to look at variation in the contribution of income from dairy and income from cultivation is by social group of farmers. The differences uncovered at the social group level have important implications for income level per se and poverty incidence in particular. As observed by Gang *et al.* (2008), there is little difference in the incidence of poverty between scheduled caste and

scheduled tribe households, and the observed poverty rates of scheduled households are 17.2 per cent higher than non-scheduled households in the country. Table 2 presents the changes in real monthly income from the two sources (dairy and cultivation) across social groups in the state of Haryana.

The scheduled tribe farming households are miniscule in Haryana. Although dairy had turned profitable from 2003 to 2013 for the scheduled households in the state, they still earned up to 62 per cent less real monthly income from dairy farming than the state average of Rs. 2442. Even OBC farming households earned up to 27 per cent less than the state average income from dairy. Cultivation seemed to be a profitable enterprise only for the non-scheduled and non-OBC category of farming households. The extent of skewness in the distribution of income from cultivation among social groups aggravated in the state between 2003 and 2013. In rural India, caste is an important indicator of social status, which can cause disparities in access to technology and credit and ownership of resources. As Batte and Arnholt (2003) and Ali (2012) have reported, new technologies and innovations only reach the upper strata of society who have a higher endowment of resources and access to extension services.

Although the results so far clearly bring out the variations arising out of land size and social group in farmers' income from cultivation and dairy, it is important to look at the distribution of income across NSS state-regions as well. Table 3 presents the region-wise changes in real monthly income from dairy and cultivation between 2003 and 2013 in Haryana. NSSO divides Haryana into two state regions: Eastern Haryana and Western Haryana. Farming households in Western Haryana, comprising of Sirsa, Fatehabad, Jind, Hisar, Bhiwani, Mahendragarh, and Rewari districts, reaped positive returns from dairy even in 2003. By 2013, their income from dairy increased more than ten times and from cultivation increased more than three times. During the same period, skewness in the distribution of income from both dairy and cultivation worsened across the two regions in the state as average monthly income decreased for Eastern Haryana and increased many fold for Western Haryana. One possible reason for this could be that the districts of Eastern Haryana (Panchkula, Ambala, Kurukshetra, Yamunanagar, Kaithal, Karnal, Panipat, Sonapat, Rohtak, Jhajjar, Gurugram, Faridabad, Mewat, and Palwal) are relatively well connected to the National Capital Region via NH1, and present more job opportunities compared to the districts of Western Haryana. Consequently, the farming households in Eastern Haryana rely more on wages and salaries as their income

Table 1
Changes in real monthly income from dairy and cultivation by land class in Haryana

Base: 2011-12

2002-03				
Land class	Income from dairy (Rs.)	Deviation from average state income from dairy (%)	Income from Cultivation (Rs.)	Deviation from average state income from cultivation (%)
Marginal (<1.0 ha)	-130	-	1467	-59.5
Small (1.0-2.0 ha)	-538	-	2877	-20.6
Medium (2.0-4.0 ha)	-386	-	5198	43.4
Large (>4.0 ha)	-1235	-	9112	151.4
Total	-335		3624	
2012-13				
Land class	Income from dairy (Rs.)	Deviation from average state income from dairy (%)	Income from Cultivation (Rs.)	Deviation from average state income from cultivation (%)
Marginal (<1.0 ha)	1866	-23.6	1046	-85.6
Small (1.0-2.0 ha)	3660	49.9	7233	-0.5
Medium (2.0-4.0 ha)	2395	-1.9	11608	59.6
Large (>4.0 ha)	3941	61.4	37882	420.9
Total	2442		7272	

Note: negative income from dairy shows negative returns from the enterprise in the year 2002-03; deviation from average state income measures the percentage difference of income of that particular category of land class compared to the state income from an income source

Table 2
Changes in real monthly income from dairy and cultivation by Social groups in Haryana

Base: 2011-12

2002-03				
Social group	Income from dairy (Rs.)	Deviation from average state income from dairy (%)	Income from Cultivation (Rs.)	Deviation from average state income from cultivation (%)
SC/ST	-1781	-	2918	-19.5
OBC	-121	-	2832	-21.9
Others	-241	-	4072	12.4
Total	-335		3624	
2012-13				
Social group	Income from dairy (Rs.)	Deviation from average state income from dairy (%)	Income from Cultivation (Rs.)	Deviation from average state income from cultivation (%)
SC/ST	919	-62.4	2700	-62.9
OBC	1793	-26.6	3267	-55.1
Others	3001	22.9	10285	41.4
Total	2442		7272	

source. Nonetheless, the possible reasons for the uneven income distribution need further investigation.

An important aspect to look into while analyzing changes in returns from dairy is the proportion of increase in sheer milk value. Table 4 compares the average quantity of milk sold (in liters) in a month and the corresponding

milk value (in Rs.) across land-size categories of farming households in both the states in 2003 and 2013. The maximum percentage increase in milk value between 2003 and 2013 is seen in the large and small farming households, with a 92 per cent and an 83 per cent increase, respectively. In terms of sheer milk quantity, the small farmers produced 22 per

Table 3
Changes in real monthly income from dairy and cultivation by NSS regions in Haryana

Base: 2011-12

2002-03				
NSS regions	Income from dairy (Rs.)	Deviation from average state income from dairy (%)	Income from Cultivation (Rs.)	Deviation from average state income from cultivation (%)
Eastern Haryana	-766	-	3419	-5.7
Western Haryana	220	-	3929	8.4
Total	-335		3624	
2012-13				
NSS regions	Income from dairy (Rs.)	Deviation from average state income from dairy (%)	Income from Cultivation (Rs.)	Deviation from average state income from cultivation (%)
Eastern Haryana	1735	-29.0	3335	-54.1
Western Haryana	3461	41.7	12944	78.0
Total	2442		7272	

Table 4
Average monthly milk sales in the two periods in Haryana

Land class	2002-03		2012-13		Percentage increase in milk value
	Milk quantity (Lts)	Milk Value (Rs.)	Milk quantity (Lts)	Milk Value (Rs.)	
Marginal	126	2643	138	3948	49.4
Small	168	3395	205	6210	82.9
Medium	177	3595	180	5398	50.2
Large	217	4352	294	8362	92.1
Total	149	3064	171	4978	62.5

Table 5
Real growth in average monthly expenses in dairy production in Haryana

Base: 2011-12

2002-03						(Rs.)
Land class	Feed/Lt	Cost/Lt	Receipts/Lt	Income/Lt	Price/Lt	
Marginal	27.2	27.8	17.0	-10.8	14.8	
Small	32.1	32.7	20.9	-11.8	18.0	
Medium	28.2	28.6	21.4	-7.3	18.6	
Large	34.8	35.4	20.9	-14.5	18.5	
Total	28.8	29.4	18.6	-10.7	16.2	
2012-13						(Rs.)
Land class	Feed/Lt	Cost/Lt	Receipts/Lt	Income/Lt	Price/Lt	
Marginal	16.8	17.4	25.3	7.8	24.2	
Small	13.8	14.7	24.1	9.4	23.7	
Medium	20.6	22.0	27.5	5.5	26.8	
Large	16.0	18.2	28.5	10.3	27.6	
Total	16.9	17.9	25.8	7.9	24.9	

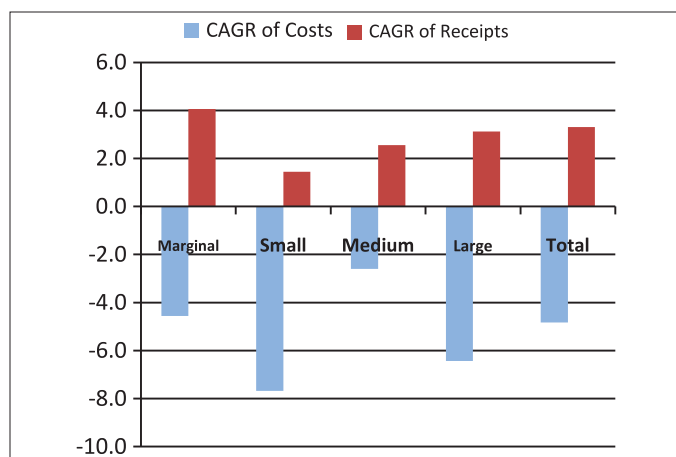


Fig. 1. CAGR (%) of real monthly costs and receipts in dairy between 2003 and 2013 - Haryana

cent more milk in a month in 2013 as compared to the total milk produced by them in a month in 2003.

Real growth in expenses in dairy production: Digging deeper into the analysis of changes in income from dairy, we break down the expenses incurred in dairy into feed per liter and cost per liter in the state. Table 5 shows the real growth in average monthly expenses in dairy production by land class in Haryana. Both feed per liter and cost per liter decreased during the ten year period while receipts per liter increased (as price per liter improved) in real terms. Consequently, returns from dairy improved substantially for all land classes. Although it can be observed that for medium farmers, the feed cost and total cost per liter were higher than that of other land class farmers.

The changes in costs and receipts in dairy are brought out more clearly in Fig. 1, where the CAGR of costs and receipts for dairy farming in Haryana are presented across land classes. Costs per liter reduced in the ten years period more for small and large farmers (7.7% and 6.4%, respectively) and least (2.6%) for medium farmers. Receipts per liter, on the other hand, increased more for marginal farmers (4.1%) and large farmers (3.1%) and least for small farmers (1.4%). On an average, the costs decreased more (4.8%) than the receipts increased (3.3%) in the state. Cost of production of milk is related to the net returns from milk. Between 2003 and 2013, the price of milk had increased by Rs. 10/liter. Also, receipts per liter depend upon Solids Not Fat (SNF, which includes total solids content left after complete evaporation of water from milk) and fat content in the milk being sold. A difference in these values (i.e., milk quality) can result in a difference in receipts from milk.

Keeping in mind the skewness in the regional distribution of income from dairy farming that was presented earlier, it becomes imperative to look at the relative increase

Table 6
CAGR (%) of real monthly costs and receipts in dairy across NSS regions in Haryana

NSS Region	CAGR of Costs	CAGR of Receipts
Eastern Haryana	-6.00%	3.30%
Western Haryana	-3.00%	3.30%
Total	-4.80%	3.30%

or decrease in costs and receipts in different NSS state-regions in the given time period. Table 6 presents CAGR of per liter costs and receipts across different regions in Haryana. Although real costs in dairy production generally reduced in both the regions of the state, they reduced less (by a mere 3 per cent) in Western Haryana (Sirsa, Fatehabad, Jind, Hisar, Bhiwani, Mahendragarh, and Rewari districts). In Eastern Haryana (Panchkula, Ambala, Kurukshetra, Yamunanagar, Kaithal, Karnal, Panipat, Sonipat, Rohtak, Jhajjar, Gurugram, Faridabad, Mewat, and Palwal), where, as we saw earlier, farming households actually earned up to 29 per cent less income from dairy compared to the state average of Rs. 2442 in 2013, costs per liter reduced by 6 per cent. Despite this difference in reduction of costs, farming households in both Eastern and Western Haryana witnessed same percentage increase (3.3 per cent) in receipts from dairy.

Hypothesis testing: A pre (2002-03) and post (2012-13) period t-test analysis was carried out to examine the increase in dairy income levels of farmers with the null hypothesis that dairy cannot be the vehicle to raise incomes of small farmers in Haryana. There was a significant difference between income from dairy in 2003 ($M=-337.41$, $SD=2574.93$) and income from dairy in 2013 ($M=2420.13$, $SD=4459.01$); $t(785)=13.10$, $p=0.00$. This suggests that, dairy can indeed be the vehicle to raise incomes of small farmers in the state.

It is crucial to know the target group - the farmers, their location and their characteristics, while formulating policies for a specific purpose. The implications of this study cater to location-specific, social-group specific and landholding category-specific requirements of Haryana. The findings also highlight the huge potential of dairy farming that can be tapped to enhance the incomes of small and marginal farmers, who constitute 72 per cent of all farmers, in the state. Marginal farmers, scheduled farming households and OBC farming households should be at the forefront of the dairy development strategies in the state. Policy focus should be on the districts in Eastern Haryana (Panchkula, Ambala, Kurukshetra, Yamunanagar, Kaithal, Karnal, Panipat, Sonipat, Rohtak, Jhajjar, Gurugram, Faridabad, Mewat, and Palwal) that lag behind in both

dairy and cultivation. An important point that cannot be ignored in this regard is to consider the presence of dairy co-operatives in the state. Out of the total 3166 dairy cooperative societies functional in the state in 2002-03, 897 were reported to be in loss, and in 2012-13, out of the total 5969 societies, 98 were reported to be in loss (Registrar Cooperative Societies, Haryana & Statistical Abstract of Haryana, 2012-13). A strong co-operative presence, along with quality breeding, health and extension services and adequate supply of feed and fodder along with insurance and extension support must be at the center of dairy development policy.

The changes in expenses incurred on dairy farming had been most favorable to small farmers for whom the costs decreased by 7.7 percent. The costs for marginal farmers need further reduction, which would be possible only by improving the quality of milk produced by them, as better quality milk fetches better returns. As the average reduction in costs was to the tune of 4.8 percent and the average increase in receipts was 3.3 percent, measures to increase the remunerative prices per liter can be devised and implemented.

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