



# Role of Dairy Farming as a Stimulant to Enhance Livelihood of Rural Farm Households in Gujarat

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## Abstract

*In connection to the Prime Minister's call to double farmers' income by 2022, a fair share of the onus falls on dairy sector. Around 81% rural households in Gujarat were engaged in livestock enterprise in 2012-13. The present study leveraging efforts to assess the contribution of dairy alongside that of cultivation to farmers' real income in Gujarat in 2003 and 2013. Real growth in expenses in dairy production is also ascertained for the same time points. Real income from dairy in Gujarat has more than doubled during the period. The distribution of income is found to be highly skewed across land classes, social groups and NSS state-regions in the state. Both real dairy expenses and receipts per liter increased by 3.5% and 3.3% respectively during the period. Dairy farming can act as stimulant to enhance farmers' income with targeted approach encompassing research for technological breakthroughs, infrastructure development, dairy development institutions and human resources crucial for growth in any sector.*

**Keywords:** Cultivation, Dairy Farming, Land Classes, Real Income, Social Groups

## Introduction

In light of evidence of agrarian distress in the country, Union Budget 2016-17 presented with the objective of doubling farmer's income by 2022. It raises an obvious question that which income is to be doubled? Is it the real income or nominal income of farmers? As growth in efficiency of production is the key factor to enhance farmers' income, it should be real income that need to be analysed over the period of time. In India dairy is always a part and parcel of rural livelihood, especially for marginal and small farmers. With country's large livestock resource asset, dairy as a subsidiary business has tremendous potential to partially fulfil the objective of enhancing farmers' income. Among the various states of India, Gujarat is one of the largest milk producing states with the contribution of 8% in total milk production in the country. The state has string network of 17 cooperative dairy milk unions and 25 private dairy plants. Moreover, AMUL is the only successful cooperative movement in India situated in Anand, Gujarat. In this article we look at evidences on real income of farm households in Gujarat using data from National Sample Survey Office's (NSSO) *Situation Assessment Survey of Farmers* conducted in year 2003 (now onwards *SAS 2003*) and *Situation Assessment Survey of Agricultural Households* in year 2013 (now onwards *SAS 2013*). Efforts have been made to present comparative analysis of real incomes of farm households from dairy and cultivation in Gujarat as well as estimates of real growth in expenses in dairy production between 2002-03 and 2012-13.

## Material and Methods

The study used secondary data available from NSSO's *Situation Assessment Survey of Farmers 2003* and *Situation Assessment Survey of Agricultural Households 2013*. These surveys have rural farm households as the unit of observation. Information collected were on socio-economic conditions, crop husbandry, animal husbandry etc. with the help of stratified multistage random sampling with district as strata, village as first stage unit and rural farm household as second stage unit. In Gujarat total number of farm households surveyed in *SAS 2003* were 1330 and that of in *SAS 2013* were 1317.

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 carried out by obtaining real income and expenses estimates across land class (landholding categories), across social groups, and across NSS state-regions. Real growth in expenses in dairy production was also analysed for the two time points across different land classes and regions. Compound Annual Growth Rate (CAGR) was calculated with following formula:

$$CAGR = \left( \frac{EV}{BV} \right)^{\frac{1}{n}} - 1$$

Where, *EV* = Ending value, *BV* = Beginning value, *n* = number of years

## Results and Discussion

### Changes in Income from Dairy Farming vis-à-vis Cultivation

Change in real income of farm households in two time periods was analysed for among various land holding size categories, different social groups and between different NSS state-regions in Gujarat.

### Changes Among Various Land Holding Size Categories

Dairy is far more established in the state of Gujarat, and it is evident from Table 1, that real income from dairy had more than doubled for both small and marginal farming households in the state between 2003 and 2013. Earlier farmers were earning 3 percent less than the state average of Rs. 1223 per month from dairy in 2003, they earned 36 percent more than the state average of Rs. 2666 in 2013. The large farming households seemed to have taken a backseat with regard to dairy (their real monthly income from dairy decreased from Rs. 1824 to Rs. 1647 from 2003 to 2013) and stressed more on cultivation, where their income had almost doubled between the two time points. The

real monthly income from cultivation for small farmers too decreased from Rs. 2651 to Rs. 2441 in the state during the same period, increasing the deviation from state average of 5 percent less in 2003 to 29 percent less in 2013.

**Table 1:** Changes in real monthly income from dairy and cultivation by size of land holding in Gujarat

2002-03				
Land class	Income from dairy	Deviation from average state income from dairy (%)	Income from Cultivation	Deviation from average state income from cultivation (%)
Marginal	1058	-13.5	972	-65.2
Small	1181	-3.4	2651	-5.1
Medium	1485	21.4	4305	54.2
Large	1824	49.1	8418	201.5
Total	<b>1223</b>		<b>2792</b>	
2012-13				
Land class	Income from dairy	Deviation from average state income from dairy (%)	Income from Cultivation	Deviation from average state income from cultivation (%)
Marginal	2567	-3.7	1164	-66.2
Small	3620	35.8	2441	-29
Medium	2417	-9.3	5245	52.5
Large	1647	-38.2	15219	342.4
Total	<b>2666</b>		<b>3440</b>	

(Land Class: Marginal - < 1 ha., Small - 1-2 ha., Medium - 2-4 ha. Large - > 4 ha.)

### Changes Among Different Social Groups

Another way to look at the variation in the contribution of income from dairy and cultivation is by the social group of farmers. An agricultural household's social standing based on caste, religion and ethnicity can also cause variations in its income from different sources. Table 2 presents the changes in real monthly income from the two sources (dairy and cultivation) across social groups in the state of Gujarat. In Gujarat (Table 2), it was the scheduled tribe farming households that seemed to have gained more from dairy than the scheduled caste farming households. In 2003, the scheduled tribe farming households earned up to 32 percent less real monthly income from dairy than the state average of Rs. 1223, whereas in 2013, their income from dairy more than doubled so that they earned up to 7 percent more than the state average income of Rs. 2666. Real income from dairy for the scheduled caste farming households improved only slightly (from Rs. 1053 per month to Rs. 1627 per month).

**Table 2:** Changes in real monthly income from dairy and cultivation by Social groups in Gujarat

2002-03			Base year: 2011-12	
Social group	Income from dairy	Deviation from average state income from dairy (%)	Income from Cultivation	Deviation from average state income from cultivation (%)
ST	833	-31.9	1318	-52.8
SC	1053	-13.9	1309	-53.1
OBC	1376	12.5	2974	6.5
Others	1444	18.1	3940	41.1
Total	<b>1223</b>		<b>2792</b>	
2012-13				
Social group	Income from dairy	Deviation from average state income from dairy (%)	Income from Cultivation	Deviation from average state income from cultivation (%)
ST	2848	6.8	1340	-61
SC	1627	-39	3655	6.3
OBC	2877	7.9	2312	-32.8
Others	2070	-22.4	8061	134.3
Total	<b>2666</b>		<b>3440</b>	

(Social groups: ST – Scheduled Tribe, SC – Scheduled Caste, OBC – Other Backward Caste)

The real monthly income from cultivation more than doubled for the scheduled caste farming households in the

state; where they earned 53 percent less income from the state average of Rs. 2792 in 2003, they earned about 6 percent more income from cultivation compared to the state average of Rs. 3440 in 2013. The changes in the earnings of OBC farming households in the state command special mention. Although their earnings from dairy improved between the two time points, they were the only social group whose share of real income from cultivation shrank in the state from Rs. 2974 per month in 2003 to Rs. 2312 per month in 2013.

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.

### Changes Between Different NSS State-Regions

The changes in real monthly income from dairy and cultivation across different NSS state-regions of Gujarat is presented in table 3.

**Table 3:** Changes in real monthly income from dairy and cultivation by NSS regions in Gujarat

2002-03			Base year: 2011-12	
NSS Regions	Income from dairy	Deviation from average state income from dairy (%)	Income from Cultivation	Deviation from average state income from cultivation (%)
South Eastern	740	-39.5	2431	-12.9
Plains Northern	1153	-5.7	1931	-30.8
Dry Areas	1539	25.8	2784	-0.3
Kachchh	553	-54.8	4857	74
Saurashtra	1897	55.1	3991	42.9
Total	<b>1223</b>		<b>2792</b>	
2012-13				
NSS Regions	Income from dairy	Deviation from average state income from dairy (%)	Income from Cultivation	Deviation from average state income from cultivation (%)
South Eastern	2945	10.5	1978	-42.5
Plains Northern	3417	28.2	2765	-19.6
Dry Areas	3792	42.2	2293	-33.3
Kachchh	996	-62.6	18508	438
Saurashtra	1559	-41.5	6650	93.3
Total	<b>2666</b>		<b>3440</b>	

(Districts in NSS regions: South Eastern- Panch Mahals, Dohad, Vadodara, Narmada, Bharuch, Surat, The Dangs, Navsari, Valsad, Tapi, Plains Northern - Mehsana, Sabar Kantha, Gandhinagar, Ahmedabad, Anand, Kheda, Dry Areas: Bans Kantha, Patan, Kachchh – Kachchh, Saurashtra - Surendranagar, Rajkot, Jamnagar, Porbandar, Junagarh, Amreli, Bhavnagar)

The state is divided into a total of five NSS regions by the NSSO on the basis of geographic similarities. It is curious to find that the Dry Areas (Bans Kantha district) had been consistently earning positive returns from dairy farming in Gujarat. The returns from dairy in the state showed improvement in all regions except Saurashtra (Surendranagar, Rajkot, Jamnagar, and Porbandar), where in 2003 agricultural households earned up to 55 percent more income from dairy compared to the state monthly average of Rs. 1223, their income from dairy decreased so that they now earned up to 42 percent less income compared to the state monthly average of Rs. 2666 in 2013. Real monthly income from cultivation for agricultural households in Kachchh increased more than three times during the same period, from Rs. 4857 to Rs. 18508. Farming households in South Eastern (Panch Mahals, Dohad, Vadodara, Narmada, and Bharuch), Plains Northern (Mahesana, Sabar Kantha, and Gandhinagar), and Dry Areas (Bans Kantha), all reaped less returns from cultivation than the state average of Rs. 3440 per month.

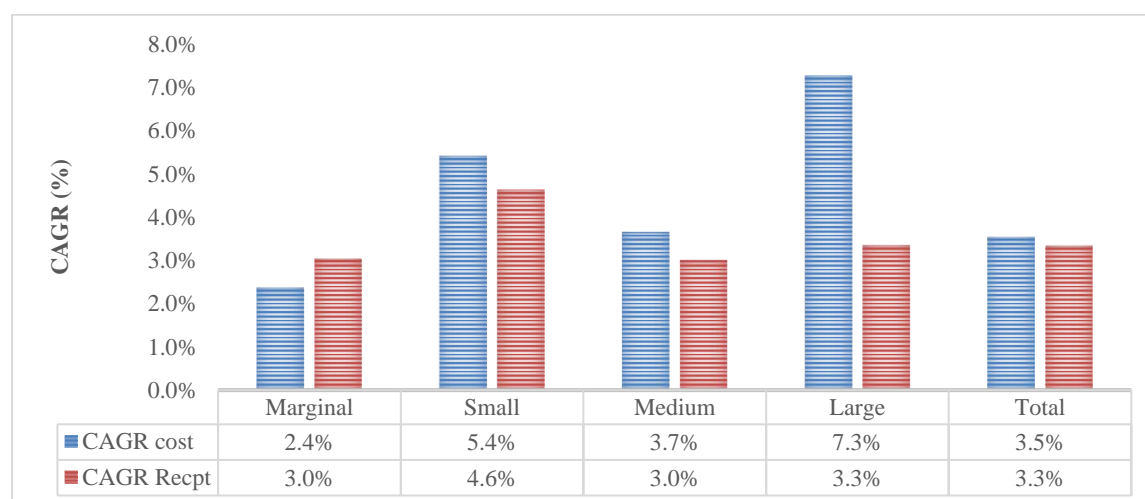
## Real Growth in Expenses in Dairy Production

Analysing deeper into the changes in income from dairy, we break down the expenses incurred in dairy into feed per liter and cost per liter. The average monthly expenses incurred overall and on feed increased between 2003 and 2013 (Table 4) and although receipts per liter had increased too, the income per liter from dairy increased only by Rs. 4.

**Table 4:** Real growth in average monthly expenses (Rs) in dairy production in Gujarat

2002-03			Base year: 2011-12		
Land class	Feed/Lt	Cost/Lt	Receipts/Lt	Profit/Lt	Price/Lt
Marginal	10.4	10.6	21.2	10.6	18.7
Small	10.1	10.2	20	9.8	17.4
Medium	12.4	12.7	22.4	9.6	19.3
Large	11.3	12.2	22.2	9.9	19.2
Total	10.7	11	21.2	10.2	18.5
2012-13 (Rs.)					
Land class	Feed/Lt	Cost/Lt	Receipts/Lt	Profit/Lt	Price/Lt
Marginal	12.4	13.4	28.6	15.1	28.6
Small	16	17.3	31.5	14.2	31.5
Medium	16.1	18.2	30.1	11.8	30.1
Large	20.5	24.7	30.8	6.1	30.8
Total	14.1	15.5	29.4	13.9	29.4

The changes in average monthly costs and receipts pertaining to dairy across land classes are brought out more clearly in Figure 1, where CAGR for both are presented. Costs per liter increased the most for large farmers (7.3%) and small farmers (5.4%), while receipts per liter increased relatively more for the small farmers (4.6%) only. Overall, the costs per liter and receipts per liter both increased by 3.5 percent and 3.3 percent respectively in the state, resulting in a less-than-expected increase in income per liter.



**Figure 1:** CAGR (%) of real monthly costs and receipts in dairy between 2003 and 2013 – Gujarat

Keeping in mind the regional distribution of income from dairy farming in both the states, it is important to look at the relative increase or decrease in costs and receipts in different NSS state-regions in the given time period. Table 5 presents CAGR of per liter costs and receipts across different regions in the state.

**Table 5:** CAGR (%) of real monthly costs and receipts in dairy across NSS regions in Gujarat

NSS Region	CAGR of Costs	CAGR of Receipts
South Eastern	-0.8	3.2
Plains Northern	2.5	3.4
Dry Areas	2.9	4.3
Kachchh	9.5	4.3
Saurashtra	6.5	3
Total	3.5	3.3

It is only in the South Eastern region (Panch Mahals, Dohad, Vadodara, Narmada, and Bharuch) where real costs per liter in dairy decreased between 2003 and 2013. Costs increased the most in Kachchh and Saurashtra, by 9.5 percent and 6.5 percent, respectively. The percentage increase in costs per liter (3.5%) was more than the percentage increase in receipts (3.3%). This gives clear instinct that policy implications are very crucial in order to control input prices to make dairy business economically more feasible. Regions like Kachchh and Saurashtra need special attention in this matter to frame dairy farmer friendly policies.

## Conclusion

It is imperative to know the target group – the farmers, their location and their characteristics, when formulating a policy for a specific purpose. It is only with targeted interventions and planned strategies that any real change can ever be brought about. There is no doubt that dairy provides a cushion to fall back on for small and marginal farmers in dire times. The findings of this study also highlight the huge potential of dairy farming that needs to be tapped to enhance farmers' income. The implications of this study cater to location-specific, social-group specific, and land-holding category specific requirements of Gujarat.

Although the marginal and small dairy farming households in the state were doing fairly well with respect to the state's real average income from dairy, dairying for marginal farmers needs to be targeted for further improvement. Small farmers earned up to 36 percent more income from dairy compared to the state average of Rs. 2666 in 2013, the marginal farmers lagged behind by earning 4 percent less than the state average. The scheduled caste farming households that earned up to 39 percent less income from dairy compared to the state average in 2013 also need to be targeted. Both Saurashtra and Kachchh, the regions that lagged behind in dairy require specific dairy development policies.

Policy focus also needs to be centered on the small farmers as cultivation is concerned in the state, as their real monthly income from cultivation decreased from Rs. 2651 in 2003 to Rs. 2441 in 2013, so that they now earned up to 29 percent less income from this source compared to the state average of Rs. 3440. The OBC farming households whose share of income from cultivation shrank between the two time points also require targeted policy interventions. Income from cultivation was found to be very unevenly distributed among different regions in the state as well. The regions of South Eastern, Plains Northern and Dry Areas should be kept in mind while planning for cultivation income enhancement, as agricultural households in these regions earned 43 percent, 20 percent, and 33 percent less income from cultivation compared to the state average of Rs. 3440 in 2013. Strategies like improving farmers' access to reliable irrigation facilities and seeds of short-duration high-yielding crops, and mechanization of agricultural operations can help boost their cultivation incomes (Agarwal, 1984; Dhawan, 1991; Jin *et al.*, 2012; Sekhar and Bhatt, 2014).

A highly potent finding from this study is that real expenses incurred on feed and in general in the dairy sector had actually increased in the state between 2003 and 2013 across all land classes. Although costs per liter had increased the most for large farmers and least for marginal and small farmers, the overall effect of increased expenses reflected on the per liter income from dairy for all land classes. An exception to the trend of increasing costs was seen in the South Eastern region of the state, where costs reduced, but only by 0.8 percent. Since the average increase in costs was 3.5% and the average increase in receipts was 3.3 percent, the net effect was that income from dairy could not reach up to its full potential despite the co-operative backbone.

In nutshell, dairy farming can be the vehicle to enhance farmers' income with targeted approach encompassing

research for technological breakthroughs, infrastructure development, dairy development institutions and human resources crucial for growth in any sector. Specific policy interventions in both dairy and cultivation sectors especially in states like Gujarat where there is a huge untapped resource potential in terms of livestock population and farmers owning integrated farming systems can go a long way in providing the much-needed boost to farmer's incomes in near future.

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## Conflict of Interests

There is no conflict of interest.

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