

Milk Production and Disposal Pattern by Dairy Farmers in Gujarat

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ABSTRACT

Gujarat is considered to have a well-organized dairy sector with cooperative model leading in the state. The study was undertaken to estimate the pattern of milk production at household level and its disposal pattern. Multi-stage stratified sampling design was followed to collect data from 300 dairy farmers in two districts viz. Anand and Mahesana. It was found that majority of the dairy farmers in the study area own less than one hectare of land. Number of buffalo owners is more than the cow owner farmers. The average milk production per day from cow (11.94 lts and 10.24 lts in Anand and Mahesana respectively) is more than buffalo (8.39 lts and 7.57 lts in Anand and Mahesana respectively). Additionally, per household sale of milk of cow is more than that of buffalo. 100 % farmers are selling milk through the dairy cooperative societies.

Keywords: Dairy, Milk production, Milk disposal, Sales pattern

INTRODUCTION

Livestock farming is an integral part of Indian agriculture, which provides livelihood to more than 2/3 of rural population. Rural households keep livestock because of the wide spectrum of benefits such as income, food, manure, draft power and social status. As per livestock census 2012 there are 190.04 million cattle and 108.70 million buffaloes (DADF, 2010). During 2003-2007, there was an increase in livestock population with positive growth in all types of animals, especially small ruminants. However, 2007-12 has shown a marginal decline in livestock population; the declining trend being discernible for cattle, sheep and goat; only buffalo population has increased at compound rate of less than 1 percent per annum. Dairy sector is the most important sub-sector of livestock and it accounts for 67% of the value of output from livestock sector (MoF, 2012). In the span of past 60 years, the dairy sector has come a long way registering more than 8-fold increase in milk production, from 17 million tonnes in 1950-51 to anticipated 140 million tons at present. The decadal growth rates, ranging from of 3.5-4.5 per cent during the past six decades, have been higher than the world average growth rate of about one per cent.

In Gujarat, dairy is considered as backbone for small and marginal farmers. It acts as a source of regular income for them. Amul's cooperative model is quoted globally for its success and in uplifting the farmers in the state. The study was undertaken to estimate the pattern of milk production at household level and its disposal pattern.

MATERIALS AND METHODS

The sample design adopted for the study was multi-stage stratified design. Two districts *viz.* Anand and Mahesana were selected randomly. From each selected District, two blocks were selected randomly. From each block, five clusters of villages were selected randomly. A cluster consisted of 3-5 adjacent villages. Three clusters of villages were selected from rural areas (*viz.* distance of the village is more than 15 km from Town/District Centre) and two clusters from peri-urban area (*viz.* distance of the village is less than 15 km from Town/District Centre). This ensured proper representation of rural as well as peri-urban areas. The list of villages is based on Livestock Census 2007. The ultimate stage unit is the dairy farmers. Ten households were selected randomly from each selected village. Thus in all 300 dairy farmers were surveyed.

Techniques/Methodology:

Estimation of milk yield: Estimation of milk yield was done on recall basis (on the previous day of visit) or actual weighment. The lactation yield has been estimated based on yield on day of visit and peak yield.

Lactation yield = Peak yield * 200

RESULTS AND DISCUSSION

I) Socio-economic status of sample households:

Table 1: Family composition of sample household

Category		Anand	Mahesana
Adult	Male	231	204
	Female	234	204
Children	Male	156	120
	Female	76	62
Average family size		4.65	3.93

Family size is an important demographic parameter. Large family size ensures timely and more availability of family human labour for carrying out the dairy farming and associated activities. Average family size of the sample household in the Anand district is 4.65 whereas for Mahesana it is 3.93.

Table 2: Education status of head of household

Education	Anand	Mahesana
Illiterate	1.33	0.67
Literate but below primary	12.00	1.33
Primary	50.00	11.33
Middle	25.33	40.67
Secondary	8.00	26.67
Higher secondary	2.67	11.33
Diploma/Certificate course	0.00	2.00
Graduate	0.00	5.33
Post graduate and above	0.67	1.33

Educational status helps in better and judicious use of available farm resources. In terms of educational qualification, 50% of the head of household has primary schooling in Anand district, whereas in Mahesana 40% has middle schooling. Illiteracy is very less in both the districts and there is a good literacy level of the head of the sample households.

Table 3: Occupational pattern of sample households

Occupational pattern	Anand	Mahesana
	% of HH	% of HH
Principal occupation		
<i>Agriculture</i>	85.33	95.33
<i>Dairy</i>	14.67	4.67
Subsidiary occupation		
<i>Agriculture</i>	2	1.33
<i>Dairy</i>	90	98.66
<i>No subsidiary occupation</i>	8	--

Occupational pattern helps in understanding the various sources of income. It is quite evident from the above table that majority of the sample households in both the districts have agriculture as primary occupation. Dairy is a subsidiary occupation in most cases. Few of the sample households in Anand district have only dairy activity with no other occupation.

II Land inventory, cropping pattern and herd composition:

Table 4: Average operational land holding and cropping pattern of sample households

Land inventory and cropping pattern	Anand	Mahesana
Average size of holding (ha)	0.65	1.71
Irrigated area (%)	100%	100%
Unirrigated area (%)		
Average Area under different crops		
<i>Rabi</i>		
Wheat	√	√
Tobacco	√	
Banana	√	
Chilli	√	
Sorghum	√	
Cauliflower	√	
Bengalgram	√	
Oat	√	
Tomato	√	
Mustard		√
<i>Kharif</i>		
Paddy/rice	√	
Maize	√	√
Banana	√	
Tomato	√	
Castor		√
Cotton		√
Fennel		√
Guar		√
<i>Summer</i>		
Bajra	√	
Banana	√	
Lady's finger	√	
Tomato	√	
Guar		√
Area under fodder crops (Principal fodder crop)		
Lucerne	√	√
Bajra	√	√
Maize	√	√
Sorghum	√	
Pioneer grass		√
Oat	√	

Crops are grown mainly in two distinct seasons viz. Kharif (July to October) and Rabi (October to February). With adequate irrigation facility, summer crops are also grown between March & June. Above table shows various crops as well as fodder crops being grown by the sample households. Average land holding in Mahesana is 1.71 hectares whereas it is 0.65 hectares in Anand with 100% irrigated land in both the districts. Principal fodder crops in the selected districts are: Lucerne, Bajra, Maize, Sorghum, Pioneer grass and oat.

Table 5: Composition of milch animals owned by sample households

Category of animal	% households reporting ownership of animals in Anand			% households reporting ownership of animals in Mahesana		
	Local	Crossbred	Buffalo	Local	Crossbred	Buffalo
In milk and not pregnant	28	53.33	62	38	3.67	68.67
In milk and pregnant	2	32.67	30.67	1.33	22	18
Dry and pregnant	2	26.67	31.33	0.67	18.67	9.33
Dry and not pregnant	0	2.67	4.67	0	0	0.67
Dry and unfit for breeding	0.67	0.67	0	0	0	0
Not calved even once	0	5.33	2	0	0	0
Pregnant heifer	0.67	24	29.33	3.33	16	24.67
Calves less than 1 year						
male	4	33.33	36	0	12	11.33
female	0	12.66	8	3.33	34.67	33.33
Calves more than 1 year						
male	0	2	1.33	0	4.67	2
female	0.67	5.33	2	0	9.33	3.33
Adult male	0	1	0	14.67	0.67	2.67

The proportion of households having in-milk buffalo is more in both the districts followed by cross-bred. Relatively higher proportion of households report local cow than cross bred cow in Mahesana. Adult Local bullocks as well as male buffalo are being used for pulling the cart in Mahesana.

Table 6: Average herd size for the selected households

Category of animal	Anand			Mahesana		
	Local	Crossbred	Buffalo	Local	Crossbred	Buffalo
In milk and not pregnant	0.07	0.96	1.21	0.8	0.12	0.84
In milk and pregnant	0.04	0.81	0.72	0.42	0.04	0.61
Dry and pregnant	0.04	0.56	0.62	0.98	0.02	0.37
Dry and not pregnant	0	0.4	0.7	0	0	1
Dry and unfit for breeding	0.5	0.5	0	0	0	0
Not calved even once	0	1.11	0.44	0	0	0
Pregnant heifer	0.01	0.56	0.68	0.54	0.08	0.60
Calves less than 1 year						
male	0.08	0.85	0.70	0.7	0	0.63
female	0	1.43	0.5	0.99	0.06	0.83
Calves more than 1 year						
male	0	0.8	0.8	0.3	0	0.4
female	0.09	1.36	0.36	0.44	0	0.28
Adult male	0	0	0	0.81	0.04	0.15

Above table shows the average herd size in the sample households. Milk is sold on the basis of fat percentage, and as buffalo milk accounts for higher fat percentage, buffalo has higher share in the herd. In some cases, animals which have never calved were also present. Adult male was not present in the sample households in Anand district, but were present in Mahesana, which were used for pulling the cart.

Table 7: Composition of milk produced (Quantity of milk drawn in pail (litres)) by the sample households

Location		Anand	Mahesana
Buffalo	Milk produced per day		
	-Average milk produced	8.39	7.57
	-Maximum milk produced	274	22
	-Minimum milk produced	0.5	2
	-Median of quantity produced	4	7
Milk disposed (% of milk produced)		47.66	88.03
Cow	Milk produced per day		
	-Average milk produced	11.94	10.24
	-Maximum milk produced	97	28
	-Minimum milk produced	3	3
	-Median of quantity produced	6	10
Milk disposed (% of milk produced)		94.9	94.27
Total	Milk produced per day		
	-Average milk produced	10.12	8.88
	-Maximum milk produced	274	28
	-Minimum milk produced	0.5	2
	-Median of quantity produced	5	8
Milk disposed (% of milk produced)		39.5	91.55

The above table shows the average milk produced per sample household separately for cow and buffalo. In case of buffalo, it is 8.39 litres in Anand and 7.57 litres per household in Mahesana. Households having big farms have reported as high as 274 litres per day production of milk from their dairy farm. 47.66% of the produced milk is sold by the sample households in Anand, whereas 88.03% of the produced milk is sold by the sample households in Mahesana. In case of cow, including both local and cross-bred, the average milk produced per household is 11.94 litres in Anand, whereas it is 10.24 litres in Mahesana. 94.9% of milk produced is sold by the sample households in Anand, which is nearly equal, 94.27 litres in Mahesana.

Table 8: Sales pattern of milk

Location	Anand		Mahesana	
	% of HH selling Milk	Average qty of milk sold	% of HH selling Milk	Average qty of milk sold
Buffalo	62.0	8.39	61.33	6.67
Cow	59.33	11.34	64	9.65
Total	100	10.13	100	8.13

Above table shows the sales pattern among the sample households in the two districts. Per household milk sold of cow is more (11.34 & 9.65 lt) than that of buffalo (8.39 & 6.67 lt) by the sample households in Anand and Mahesana. In all, it is 10.13 lt. in Anand and 8.13 lt. in Mahesana.

Table 9: Disposal pattern of milk (quantities in litres)

Milk Category	Agencies	Unit	Anand	Mahesana
Buffalo milk	<i>Average quantity sold</i>	Litre	8.39	6.67
	<i>Consumer</i>	%		
	<i>Vendor/middlemen -</i>	%		
	<i>Sweet shop/creameries</i>	%		
	<i>Cooperative society</i>	%	100	100
	<i>Private milk plant</i>	%		
	<i>Other</i>	%		
Cow milk	<i>Average quantity sold</i>	Litre	11.34	9.65
	<i>Consumer</i>	%		
	<i>Vendor/middlemen -</i>	%		
	<i>Sweet shop/creameries</i>	%		
	<i>Cooperative society</i>	%	100	100
	<i>Private milk plant</i>	%		
	<i>Other</i>	%		
Mixed Milk (Cow+Buffalo)	<i>Average quantity sold</i>	Litre		
	<i>Consumer</i>	%		
	<i>Vendor/middlemen -</i>	%		
	<i>Sweet shop/creameries</i>	%		
	<i>Cooperative society</i>	%		
	<i>Private milk plant</i>	%		
	<i>Other</i>	%		

In both the districts 100% of milk is sold in the village cooperative societies. None of the sample households sale milk to any agency other than the cooperative societies

Table 10: Average Unit price received (Rs per litre) from various agencies

Milk Category	Agencies	Anand			Mahesana		
		Summer	Rainy	Winter	Summer	Rainy	Winter
Buffalo milk	<i>Consumer</i>						
	<i>Vendor/middlemen -</i>						
	<i>Sweet shop/creameries</i>						
	<i>Cooperative society</i>	41.68	41.18	41.12	40.73	35.64	39.29
	<i>Private milk plant</i>						
	<i>Other</i>						
	Cow milk	<i>Consumer</i>					
<i>Vendor/middlemen -</i>							
<i>Sweet shop/creameries</i>							
<i>Cooperative society</i>		21.10	21.16	20.82	22.41	21.64	21.02
<i>Private milk plant</i>							
<i>Other</i>							
Mixed Milk (Cow+Buffalo)		<i>Consumer</i>					
	<i>Vendor/middlemen -</i>						
	<i>Sweet shop/creameries</i>						
	<i>Cooperative society</i>						
	<i>Private milk plant</i>						
	<i>Other</i>						

The above table shows the average unit price received by the sample households for cow and buffalo milk sold. As 100% milk is sold to the cooperative societies which considers the fat% for fixing the

price of milk. The per litre milk price has been arrived by the average of price received by the sample households for milk of one category of animal in a particular season.

CONCLUSION

The study found that majority of the dairy farmers in the study area fall under marginal category owning less than one hectare of land. More of the farmers own buffalo than indigenous or cross-bred cows. The average milk production per day from cow is more than buffalo. Additionally, per household sale of milk of cow is more than that of buffalo. The selling is 100% to the dairy cooperative societies.

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