Ind. Jn. of Agri. Econ.
Vol.71, No.1, Jan.-March 2016

Dairying as an Instrument for Ensuring Socio-Economic and Nutritional Security in Rural India

Ayush Kumar and Jignesh Shah*

ABSTRACT

It is often said that dairying is one of the best poverty alleviation tool but this claim is seldom backed by appropriate nationwide large scale data. The unit-level data from the Consumer Expenditure Survey, conducted by National Sample Survey Organisation, shows that the households which are engaged in dairying are comparatively better-off both in terms of financial and nutritional security when compared to the households which are not engaged in dairying in the rural areas. After categorising the households into five groups of poor, lower middle, middle middle, upper middle and rich, based on their monthly per capita expenditure (MPCE), the percentage of households in the bottom two categories is substantially lower in case of households engaged in dairying than those which are not. Also, the producer households consume more milk than the non-producer households especially in the bottom categories thus ensuring nutritional security. Dairying may prove to be one of the best tools for poverty alleviation, nutritional security and changing the socio-economic milieu of rural India.

Keywords: Dairying, Lorenz Curve, Poverty alleviation, Nutritional Security.

JEL: I112, Q13

I

INTRODUCTION

India has made considerable progress in almost all fronts since Independence and more so in the last two decades after the economy was opened up post-liberalisation. We may not shy away from highlighting these achievements with a sense of pride but it does come with a pinch of salt. There are some systemic maladies gripping our nation which even after several decades of efforts refuse to be ameliorated.

One such iniquity is poverty which in turn leads to nutritional insecurity. Latest reports suggests that still about one-third of our population, which will roughly translate into a colossal 40 crore people, is below the poverty line and they survive barely on less than Rs. 28 per day in rural India.

This has proved a constant vexation for the successive governments and policy makers since decades. Several ways and means have been adopted and are still being adopted to tackle this challenge. There is progress without an iota of doubt but it has been sluggish and not at a pace to the liking especially in the rural areas.

*Deputy Manager and Senior Manager, respectively, National Dairy Development Board, Anand-388 001 (Gujarat).

The views expressed in the paper are personal views of the authors and in no way connected with views of the organisation in which they are working.

Dairying has always been quoted as one of the means for poverty alleviation and improvement of nutritional security. Dairying is not a tool but viewed as synonym with rural development by creating both employment and income opportunities for the disadvantaged groups (Bhanja and Tripathi, 2004). It has been witnessed over the years that the stability in dairy income is far stronger than the income deduced from agricultural activities. Besides augmenting per capita availability, the Indian dairy sector has accentuated sustained and stable availability through assured production of milk as compared to food grains. Agricultural growth has been fluctuating over the years while the growth in value of milk remained steady (Dadhich, 2013).

This argument is not often backed with hard-baked empirical evidence to suggest dairying as one of the solutions to the problem or even if it is there it is mostly based on small samples or case studies.

The paper attempts to drive home the point that dairying indeed has a positive impact on lives of the poor and helps to provide both financial and nutritional security.

II

SOURCE OF DATA

The National Sample Survey (NSS) regularly conducts pan India surveys entailing various parameters and issues which are of national interest. These surveys can be broadly categorised into two, viz., thin and quinquennial rounds. Thin rounds are generally conducted on annual basis involving smaller sample size whereas the quinquennial rounds have much larger sample size and conducted at an interval of five years. The importance of this goldmine of data cannot be ignored as it is the sole source of such robust and comprehensive information in the country and every government and policy makers are heavily dependent on it for taking critical decisions. There are data pertaining to several parameters which helps in estimating consumers' expenditure on various items both in the rural and urban sectors, state-wise which are then aggregated to the national level.

This paper is based on the analyses carried out on the unit level data of 68th Round on consumer expenditure survey which was conducted in the year 2011-12 (Government of India, 2011-12). The consumer expenditure schedule captures inter-alia the sources of consumption of items also which can be extracted from the unit level data. The households which have indicated their milk consumption source as home have been considered as the households that rear milch animals, who may be called as 'producers' and the other households as the 'non-producers'. The comparisons in this paper are then drawn between the 'non-producers' and 'producers' of milk. Our hypothesis is that the households which are engaged in dairying are relatively better-off both in terms of financial and nutritional security indicators. Here, the focus of analysis is rural India as only 5 per cent of the production of milk takes place in urban areas.

III

RESULTS AND DISCUSSION

Producers and Non-Producers

The profile of producers has not changed much in the past few decades. India is still a country where milk is produced by masses and it is not mass produced by few very large dairy farms. Unlike the advanced dairy nations, milk in India is produced by millions of resource poor families (about 85 per cent of rural households either do not own any operational land or own less than two hectares of land), who maintain one or two heads of cattle or buffaloes with a daily average of 2 to 4 litres of milk per family to supplement the family income. Indian milk producers generally follow mixed farming systems, where agriculture and dairying are highly inter-dependent.

According to Consumer Expenditure Survey (CES) data of 2011-12, there are about 17.2 crore rural households in the country out of which 27.1 per cent i.e. about 4.7 crore households are engaged in dairying and can be categorised into the producers category.[1] The rest about 12.6 crore households or 72.9 per cent can be categorised as the non-producer households and are consumers of milk and milk products. At aggregate level, about 3.7 crore households which translates into 21.5 per cent of the total rural households have reported no consumption or production of liquid milk – probably due to various factors such as dietary preferences and habits, affordability etc. This might prove to be another interesting topic for investigation.

Among major dairying states, the states of Rajasthan and Haryana have 55 and 44 per cent rural households respectively involved in dairying whereas the three progressive South Indian states of Andhra Pradesh, Tamil Nadu and Kerala have respectively 12, 10 and 6 per cent of households involved in dairying. Now, there are several hilly states (J&K- 62 per cent, Uttaranchal and Himachal Pradesh-55 per cent each) where the proportion of households engaged in dairying is considerably higher than the national average. This may be due to the fact that dairying could serve possibly one of the major sources of revenue for these households in difficult hilly terrain. These states have very little milk production as compared to the major milk producing states and therefore may not have much impact at a national level (for select individual states please refer Annexure 1).

India being such a diverse country it is important to analyse any statistic regions wise as each region is distinctly different from another on any parameter. For region-wise comparison we have made six regions namely North, East, West, South, North East and Union Territories considering their geographical contiguity, similarity in weather patterns, similarity in socio-economic conditions, culture, dietary habits etc. Table 1 presents the states in each region.

Now, if we consider only the producer households and look at it region wise then the North accounts for the largest chunk of the producers with Uttar Pradesh alone

having about 20 per cent of all producer households in the country (Annexure 2 presents the share in selected states).

TABLE 1. THE STATES IN EACH REGION

Region (1)	States (2)
North	Haryana, Punjab, Rajasthan, Uttar Pradesh, Himachal Pradesh, Jammu &Kashmir, Uttarakhand
East	Bihar, Odisha, West Bengal, Chhattisgarh, Jharkhand
West	Gujarat, Madhya Pradesh, Maharashtra, Goa
South	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu
North East	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura
Union Territories (UT)	A & N Islands, Chandigarh, D & N Haveli, Daman & Diu, Delhi, Lakshadweep, Puducherry

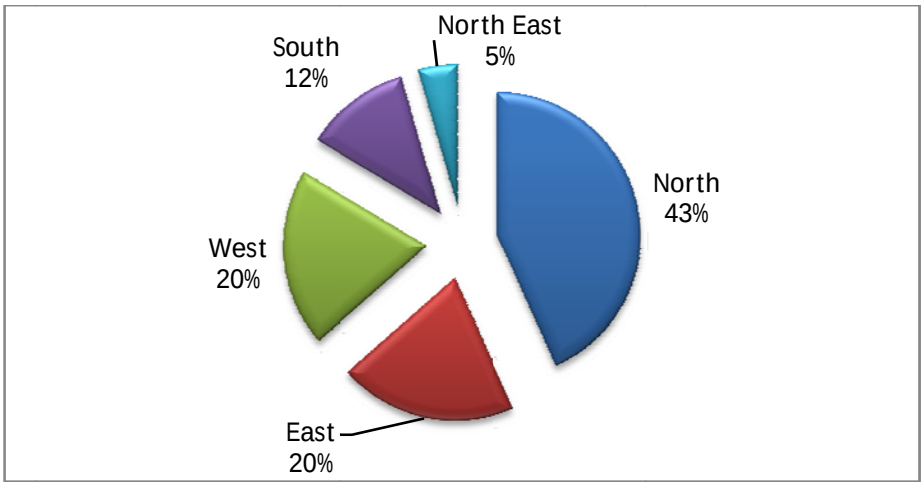


Figure 1. Distribution of Producer Households: Region-Wise

Producers and Non-Producers: Comparison of Economic Well Being

The monthly per capita expenditure (MPCE) is a proxy indicator to the income of a household. It is generally conjectured that greater the income higher the expenditure. The NSS in its 68th Round categorised the households into 12 classes of household based on their level of MPCE. For simplification and better presentation we have categorised the households in 5 classes based on their level of expenditure, viz., poor (bottom 20 per cent of the households), lower middle (20-40 per cent of the households), middle middle (40-60 per cent of the households), upper middle (60-80 per cent of the households) and the rich (top 20 per cent of the households).

A comparison was made between the distribution of producer and non-producer households vis-à-vis their MPCE category. Interestingly there is a sharp difference between the bottom two category households, i.e., the bottom 20 per cent or the poor

and 20-40 per cent or the lower middle category (Table 2). The student's t-test was also carried out to check whether the difference is statistically significant or not. The t-test results indicate that difference in average MPCE between the producer and non-producer households is significant across all the categories but it is prominently significant in the bottom 40 per cent of the population, i.e., the poor and the lower middle category.

TABLE 2. ESTIMATES OF HOUSEHOLDS AND AVERAGE MPCE FOR THE PRODUCERS AND THE NON-PRODUCERS BY MPCE CATEGORY: ALL INDIA (RURAL)

		Households (per cent)		Average MPCE (Rs./ month)		
MPCE category		Producer	Non-producer	Producer	Non-producer	t-value
(1)		(2)	(3)	(4)	(5)	(6)
Poor	(0-20 per cent)	9.9	19.2	610	578	-10.10**
Lower middle	(20-40 per cent)	16.5	18.8	831	823	-3.247**
Middle middle	(40-60 per cent)	22.4	18.3	1039	1037	-1.685*
Upper middle	(60-80 per cent)	24.3	20.1	1345	1353	1.757*
Rich	(80-100 per cent)	26.9	23.7	2439	2690	2.981**
Overall		100	100	1339	1250	-

** and * indicate significance at 5 and 10 per cent levels.

There are almost 10 per cent lesser households in the bottom category of the producers than the non-producers and also, on an average, they spend Rs. 32 per capita per month more than the non-producers. It brings out the significant impact of dairying on the financial well-being of the household especially at the bottom of the pyramid where it is needed the most. Same is true for the lower middle class although the difference is not that high in magnitude. As you go to richer classes percentage of households increases in producer category which is again desired. Producers across the categories have greater expenditure than the non-producers, specially in lower rung of MPCE classes. Even overall, producers beat the non-producers in their monthly per capita expenditure with a significant difference of Rs. 89.

It would also be interesting to analyse this difference region-wise which will help us develop some interesting insights.

As seen from the Tables 3 and 4 there is a marked difference between the percentage of households in the poor or the bottom 20 per cent of households across the regions. This difference is most pronounced in the Eastern Region where extra 16 percentage households fall into the poor category in case of non-producers. Even the difference in per capita expenditure between the poor households of the producer and non-producers is the highest in the Eastern Region. (Tables 5 and Table 6) The eastern region comprising states of Bihar, Chhattisgarh, Jharkhand, Odisha and West Bengal is generally considered economically less privileged than the rest of the country. It can be deduced from the above argument that the impact of dairying is greater in magnitude where there is more poverty and therefore it can serve as one of the important poverty alleviation tools in the most under-privileged regions of the country.

TABLE 3. DISTRIBUTION OF HOUSEHOLDS FOR THE PRODUCERS BY MPCE CATEGORY: REGION-WISE (RURAL)

	Producers: Household (per cent)					
MPCE category	North	East	West	South	North-east	UT
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Poor	9.4	14.9	8.9	4.6	10.7	**
Lower middle	14.3	19.9	15.8	17.2	25.2	21.1
Middle middle	19.8	27.1	22.4	22.2	26.8	10.6
Upper middle	23.1	24.9	26.6	23.3	24.8	9.1
Rich	33.4	13.2	26.3	32.7	12.5	59.2
Overall	100	100	100	100	100	100

** No producer household reported in the poor category in rural UT.

TABLE 4. DISTRIBUTION OF HOUSEHOLDS FOR THE NON-PRODUCERS BY MPCE CATEGORY: REGION-WISE (RURAL)

	Non-Producers: Household (per cent)					
MPCE category	North	East	West	South	North-east	UT
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Poor	21.2	30.9	17.0	6.2	18.5	5.7
Lower middle	18.9	24.0	17.7	12.7	24.5	5.1
Middle middle	17.3	18.2	18.1	18.9	20.7	6.9
Upper middle	18.6	14.9	22.6	25.5	19.9	11.6
Rich	23.9	12.0	24.6	36.8	16.5	70.7
Overall	100	100	100	100	100	100

TABLE 5. AVERAGE MPCE OF HOUSEHOLDS FOR THE PRODUCERS BY MPCE CATEGORY: REGION-WISE (RURAL)

	Producers households average (per cent)					
MPCE category	North	East	West	South	North-east	UT
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Poor	606	608	594	663	647	**
Lower middle	837	823	834	822	839	741
Middle middle	1049	1026	1032	1045	1033	1070
Upper middle	1349	1320	1364	1343	1323	1368
Rich	2401	2188	2380	2963	2078	3015
Overall	1421	1093	1336	1559	1101	2152

** No producer household reported in the poor category in rural UT.

TABLE 6. AVERAGE MPCE OF HOUSEHOLDS FOR THE NON-PRODUCERS BY MPCE CATEGORY: REGION-WISE (RURAL)

	Non-Producers household average MPCE (per cent)					
MPCE category	North	East	West	South	North-east	UT
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Poor	573	578	555	622	611	548
Lower middle	817	819	831	832	818	812
Middle middle	1034	1033	1037	1044	1040	1044
Upper middle	1349	1344	1356	1360	1363	1378
Rich	2613	2270	2687	2939	2271	2778
Overall	1196	979	1294	1662	1116	2108

As seen in Table 7, the difference is statistically significant in the bottom poor category across the regions. It is to be noted that this is more significant in the

Northern and Eastern Regions of the country, a plausible explanation of this could be lack of other employment opportunities, socio-cultural practices, food habits, life style, etc. which may be taken up as a separate topic of research.

TABLE 7. STATISTICAL SIGNIFICANCE OF DIFFERENCE IN MPCE OF PRODUCERS AND NON-PRODUCERS BY MPCE CATEGORY: REGION-WISE (RURAL)

MPCE category	t-values					
(1)	North (2)	East (3)	West (4)	South (5)	North-east (6)	UT (7)
Poor	-6.585**	-6.314**	-3.941**	-2.975**	-2.429**	Not
Lower middle	-2.645**	-1.967**	0.185	1.163	-1.794**	computed
Middle middle	-3.059**	-0.538	-0.930	0.334	0.765	due to
Upper middle	1.045	0.029	0.937	1.699*	2.691**	paucity of
Rich	3.297**	2.874**	1.771*	-0.148	2.804**	adequate
Overall	-1.814*	-8.244**	-0.385	-0.060	6.223**	observations

** and * indicate significance at 5 and 10 per cent levels

Equity in Per Capita Expenditure

It would be interesting to know the equitability in per capita expenditure of producer and non-producer categories of households. From the above analysis, it is conjectured that the disparity in per capita expenditure among producer households is relatively less than non-producer households. An equitable distribution of asset has much wider welfare implication, especially relating to distribution and redistribution of rural economic assets. The Lorenz Curve[2] substantiates the assumption that per capita expenditure in producers' category is more equitable than non-producers' category. The results of Gini coefficients of monthly household expenditure for producer and non-producer households have been estimated at 0.275 and 0.322 respectively, implying that household expenditure, which may be considered as proxy to household income in India is more equitably distributed in case of producer households.

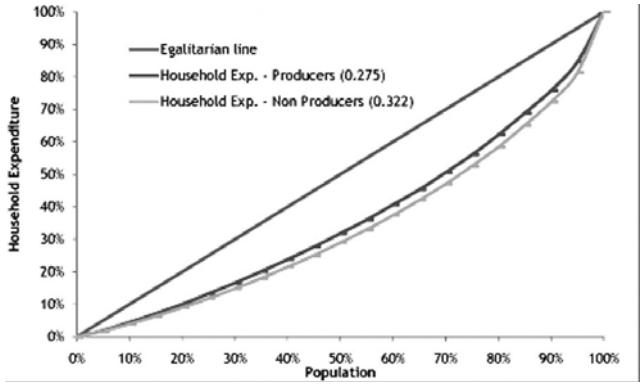


Figure 2. Lorenz Curve for Distribution of Monthly Household Expenditure of Producer and Non-Producer Households

IV

NUTRITIONAL SECURITY: PRODUCERS AND THE PRODUCERS

Food Basket: Producers and Non-Producers

Milk is widely regarded as a complete food as it contains many vital nutrients such as calcium, potassium, Vitamin D, Vitamin B12, phosphorous, magnesium, zinc, proteins etc. In addition to better economic situation as discussed above. It plays a vital role in cognitive and physical development especially in children. Producers have better intake of milk than the non-producers across the MPCE categories. As one goes higher in the MPCE hierarchy the difference becomes more pronounced. Richer categories have better financial resources and therefore they may be having access to many alternative source of nutrition, but it is the difference between the bottom two categories which is rather more important as they have limited resources and they cannot afford better quality food. In these categories therefore milk proves to be a very significant source of nutritional security.

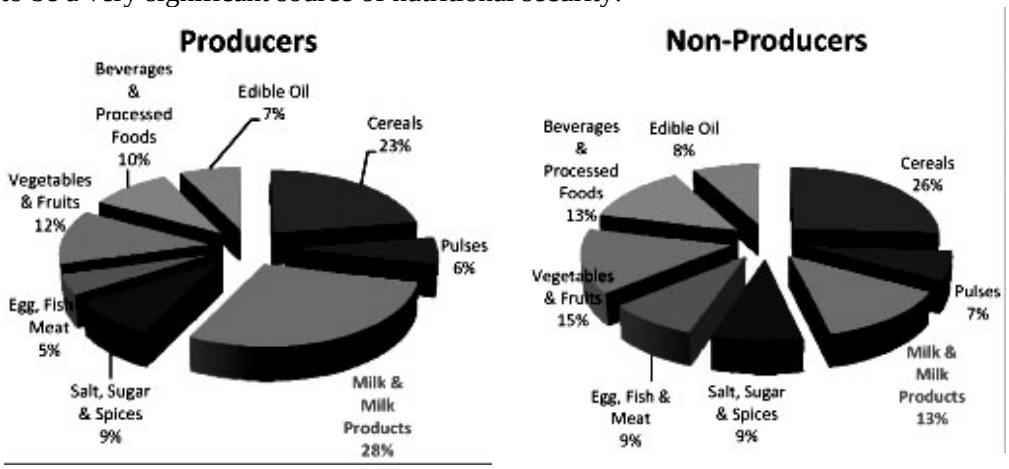


Figure 3. Distribution of expenses on various items of the food basket for The Producers and Non-Producers: All India (Rural)

One of the indicators for access to better nutrition is to look at expenditure on various food items in the food basket of the households. The comparison between the producers and the non-producers clearly shows about 15 per cent higher allocation by the producers towards milk and milk products than the non-producers. This is true for absolute values also because even the absolute per capita expenditure is higher in case of producers as discussed above.

Also, it is interesting to look at the magnitude of the difference across the categories. A person in a producers households in the poor section consumes almost four times the milk consumed by the non-producer households. This is quite

significant especially when one considers the lesser availability of resources of a poor household.

While it is known that the NSS captures only within the home consumption, one may argue that the poorer section of population have limited scope for out of home consumption of milk and milk based products – unlike the richer section of the society (Table 8). While the above point is appreciated, one also has to keep in mind that avenues for out of home consumption in rural India are still limited. Nonetheless, there would be some element of out of home consumption in addition to consumption expenditure derived over here, which is not within the scope of present analysis.

TABLE 8. AVERAGE MILK CONSUMPTION PER PERSON FOR THE PRODUCERS AND NON-PRODUCERS BY MPCE CATEGORY: ALL INDIA (RURAL)

	Milk Consumption per captia (grams/day			
MPCE Category	Producer	Non-producer	Difference	Magnitude of the difference
(1)	(2)	(3)	(4)	(5)
Poor	123	31	92	4.0
Lower middle	172	62	111	2.8
Middle middle	217	89	128	2.4
Upper middle	286	128	158	2.2
Rich	466	183	282	2.5
Overall	270	94	176	2.9

When this magnitude is analysed region-wise, one thing which comes out clearly is that the difference is greater in the regions where there is lesser economic prosperity. The poor category of producer households in the Eastern and North Eastern Region has reported 6 and 9 times more consumption of milk than that of the producer households (Table 9). Even overall difference of these two regions is highest amongst all the regions, with the exception of rural UTs which have very small sample size and few samples may have a large impact on the estimation.

TABLE 9. MAGNITUDE OF DIFFERENCE IN MILK CONSUMPTION OF HOUSEHOLDS FOR THE PRODUCERS AND NON-PRODUCERS BY MPCE CATEGORY: REGION-WISE (RURAL)

MPCE	Magnitude of difference in consumption of milk between producers and non producers					
category	North	East	West	South	North-East	UT
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Poor	4.4	6.0	4.3	3.3	9.8	**
Lower middle	3.1	4.6	2.6	2.0	6.9	11.4
Middle middle	2.8	3.9	2.5	1.9	6.3	4.6
Upper middle	2.5	2.7	2.5	1.9	3.0	4.2
Rich	3.0	2.2	2.4	2.0	2.5	6.3
Overall	3.3	3.9	2.7	2.0	4.4	5.2

The critical point worth mentioning over here is that dairying not only provides economic stability to the family, but also provides nutritional security to them, which is need of the hour in India – especially among the poor section of the rural society.

V

CONCLUSION

The experiences from Indian dairying development have been widely accepted across the globe as a model for the developing countries. Particularly, dairy as an instrument of silent socio-economic revolution among the resource poor rural people has many lessons to be learnt for implementation in other sectors of development also (Bhanja and Tripathi, 2004).

Dairying not only helps families earn better, eat better it also acts as an insurance in times of distress like drought, floods and erratic rains leading to crop failures. Effects of climate change has begun to take its toll on monsoon pattern in the country with more and more unseasonal rains, flash floods and less and less of seasonal rains. Dairying comes to rescue during such stresses with its risk covering potential. Several studies have indicated that failure of crop production due to vagaries of monsoon has not affected milk production. Milk sale contribute over 50 per cent of a small family income in arid agriculture that increases to 74-75 per cent in case of drought or crop failures (Rangnekar, 1995).

With changing lifestyle, increased urbanisation and disposable income in the country, the demand for milk and milk derivatives has been increasing by leaps and bounds. Successive rounds of Consumer Expenditure Survey of NSS indicate that the expenditure towards animal protein has been steadily rising, where milk is not an exception. In addition, more and more people have started consuming milk and it is the increasing incidence of milk consuming population that is fuelling demand for milk (Shah and Datta, 2009). Therefore, dairying as an occupation may be considered to remain promising, attractive and economically viable in years to come.

Also, studies carried out on the relative profitability of specialised dairy farming, mixed farming and arable farming involving 2ha of irrigated cultivated land and with productive cows and buffaloes showed a return of 124, 155 and 177 per cent, respectively, indicating that animal welfare programmes would be more profitable to small farmers having irrigated land than crop farming programmes (Mugdal, 1999).

Dairying also helps immensely in gaining social recognition and building self-confidence and helps families stand on their feet. It is most critical occupation to millions resource starved families in India. Thus, it seems dairying is a panacea for all ills especially among the bottom rung of the society.

Thus, one can surely conclude from the present analysis that dairying has significant impact on economical and nutritional security of the producer households. A person in a producer household is consuming almost 2 to 4 times more milk than a person in the non-producer household. More importantly, this difference is greater among the lower rung of the society who are the most vulnerable and resource stressed in terms of nutrition and finance. What clearly comes out is that these households would not have been consuming this much milk if they were not into milk production and had to purchase it. Also, its significance increases manifold as milk

becomes the sole source of animal proteins as large swathes of our country belongs to the class of lacto-vegetarians and even in case of non-vegetarians to some extent, they hardly have access to other sources of animal proteins like egg, fish or meat, which are relatively expensive, due to financial resource crunch. The difference in milk consumption even goes up to 6 times in case of poorest of the poor group in the eastern region, which is generally less prosperous than other regions of the country, underling the fact that dairying has greater impact when there are greater limitations on the financial resources.

Therefore, it will not be exaggerating to state that dairying is one of the best poverty alleviation tools available today and especially for the most downtrodden and destitute. The Lorenz curve distribution also shows that the household income is more equitably distributed among the producer households than the non-producer household thus ensuring greater parity among the people. Along with economic and nutrition security it also offers social security. Dairying must be made more popular among all anti-poverty and social programmes pursued by the government along with greater awareness among masses. However, at the same time, it may also be kept in mind that India has diverse socio-economic contours as well as varied natural resource endowment. Therefore, the policy for promoting dairying should be state-specific, which should take into account the state/ regional level factors like socio-cultural practices, agro-climatic conditions, dietary pattern, alternate occupational opportunities, etc. Policy makers must use dairying as an instrument for improving lives and helping those who require it most.

Received November 2015. *Revision accepted May 2016.*

NOTES

1. *Disclaimer:* The definition of producer households in the present context is the households that have reported "Home produce" as their source of liquid milk consumption. Here, the households that may be producing milk, but have not reported any consumption, will get excluded from the ambit of producing households.

2. The Lorenz curve and Lorenz ratio are indicators of inequality. Concentration curve and concentration ratio are generalisations of Lorenz curve and Lorenz ratio, respectively. Specific concentration curves plot cumulated share of each MPCE size group in aggregate consumer expenditure against the cumulated population shares of MPCE size group.

REFERENCES

Government of India (2011-12), *Unit Level Data of Level and Pattern of Consumer Expenditure*, 68th Round, National Sample Survey Organisation, Ministry of Statistics and Programme Implementation, New Delhi.

Dadhich, C.L. (2013), "Role of Dairy Animal Sector in Food Security", *Indian Dairyman*, Vol.65, No.11, pp.80-84.

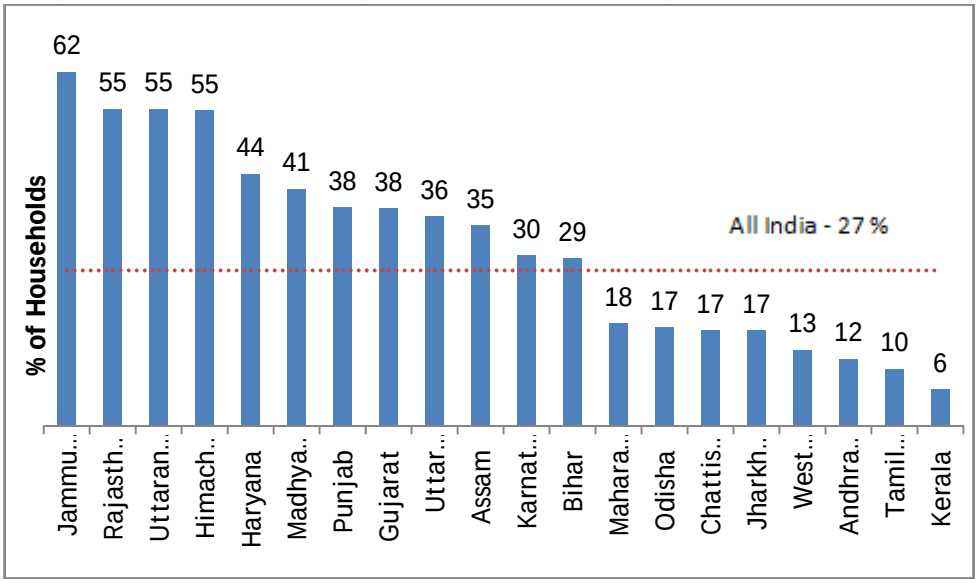
Bhanja, S.K. and H. Tripathi (2004), "Strategic Interventions through Dairying for Rural Development", *Journal of Rural Development*, Vol.23, No.1, pp.83-98.

Mugdal, V.D. (1999), "Role of Livestock in Indian Farming System Analysis", *Indian Dairyman*, Vol.51, No.5, pp.27-32.

Rangnekar, D.V. (1995), "XXIV Dairy Industry Conference Special Issue", *Indian Dairyman*, Vol.49, No.4, pp.71.

Shah, Jignesh and Datta, T.N. (2009), "Milk Consumption Pattern in India", *Sarvekshana* 96th Issue, Vol. 29, Nos. 3 and 4, December.

ANNEXURE 1. PERCENTAGE OF HOUSEHOLDS ENGAGED IN MILK PRODUCTION IN SELECTSTATE (RURAL)



ANNEXURE 2. PERCENTAGE DISTRIBUTION OF MILK PRODUCING HOUSEHOLDS IN SELECT STATES (RURAL)