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## **Consumption Pattern of Liquid Milk by Home Production and Purchase Households, Potential Markets and Demand Estimation - Some Insights**

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### ABSTRACT

More than 75 per cent of the households in the country are consuming milk. The share of households consuming milk out of home produce in rural India remains below 30 per cent. The per capita milk consumption<sup>1</sup> is found to be much higher for the home grown households than those which purchased in most of the States. There exists huge potential for increasing liquid milk marketing by the organised sector- all States in the southern region, all major states in the Northern and Western regions and Bihar and West Bengal in the Eastern Region. The demand for fresh liquid milk is expected at 107 million tonnes for the households' consumption and the total demand of milk including product processing is expected at 218 million tonnes in 2020.

**Keywords:** Demand for milk, Demand projection, Consumption

**JEL:** O18, Q11, Q13

### CONTEXT

Dairying in India plays an important role in the socio-economic development of the farmers. It is practiced along with agricultural activities to generate additional income in addition to meet its own household requirement of milk and milk products. Dairy sector contributes more than one-fifth to the agricultural value of output and provides employment to about 21 million people, the majority of whom are resource-poor (Kumar *et al.*, 2010). India's milk production growth is much higher than that of the world. It became the largest milk producer globally since 1998 accounting for about 18 per cent of the global production. The per capita availability of milk has increased from 176 grams in 1990-91 to 299 grams in 2012-13 (BAHS, 2014). This has also improved the consumption of milk among the households.

Generally dairy farmers retained some proportion of liquid milk for household consumption and the rest is sold to the available marketing channels. The retention of milk for meeting its own household demand varies from one State to another. Generally, it is believed that cow and buffalo ownership improves milk consumption in the households particularly among children (Bhagowalia *et al.*, 2012). India is a vast country with significant interstate variations in the consumption of liquid milk. There are limited research findings that have assessed the extent of consumption of milk in the households which own milch animals, i.e, producing households and

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\*National Dairy Development Board, Anand-388 001 (Gujarat).

those which does not own animals, i.e., consuming milk through outright purchase across all the States of the country. Further, total volume of liquid milk being purchased by the households also has significance regarding milk marketing aspect. So far, State wise milk production data is available; however, there is dearth of research on the estimation of State wise consumption through various sources. An attempt has therefore been made in this paper to estimate the consumption of milk both by the milk-producing households and non-producing households for all States and volume of liquid milk being purchased.

The demand for milk is expected to increase with the increase in income of the people. Several empirical studies have revealed (Huang and Bouis 1996; Kumar 1996) that a structural shift is taking place in food consumption towards livestock products including milk. This is likely to intensify with the growth in per capita income and urbanisation. The food preferences also have an important role to play to the consumption of milk and there are some research work has been published related to animal products consumption in India. These include Sinha and Giri (1989), examining the consumption of livestock products for the States of Gujarat, Punjab and Tripura; Gandhi and Mani (1995), discussing the importance of livestock product demand in India till the late 1980s. Dastagiri (2004) addressed livestock products the issue of demand for using data only up to 1993. The value of parameters like base year milk demand, economic growth rate, projected population and growth in per capita income has changed over a period of time and hence it is required to revise the estimates based on the new value of those parameters. With the availability of latest consumption data of 2011-12, an attempt has been made to estimate the demand for fresh liquid milk consumed at the household level and also demand for total milk during the next decade.

#### DATA AND METHODOLOGY

The 68th Round of NSSO unit level data (Type 1 dataset) for the year 2011-12 was analysed for this exercise. The schedules of enquiry used by NSSO were of two types which differed in the reference periods used for collection of consumption data.

Schedule Type 1, as far as reference periods were concerned, was a repeat of the schedule used in most quinquennial rounds. For certain categories of relatively infrequently purchased items, including clothing and consumer durables, it collected information on consumption during the last 30 days and the last 365 days. For other categories, including all food and fuel and consumer services, it used a 30-day reference period. Schedule Type 2 used last 365 days for the infrequently purchased categories, 'last 7 days' for some categories of food items, as well as pan, tobacco and intoxicants, and 'the last 30 days' for other food items.

The status of consumption of liquid milk was taken up only with two sources, i.e., home produce and purchase. It may be noted that liquid milk consumption includes milk as directly obtained from cow, buffalo, goat or any other livestock. Milk sold in

bottle or polypack, as well as readily drinkable flavoured and bottled milk, was included. Milk converted at home into curd, casein, ghee, butter, etc. for the purpose of household consumption and milk used in home preparation of sweetmeats, etc., was also accounted here.

### *Expenditure Elasticity*

The impact of income change on consumption was analysed through the estimation of income elasticity of demand. Expenditure elasticity explains the likely responsiveness of income on the consumption of food commodities and is used to project their future demand. It is ratio between the percentage change in demand and the percentage change in income. There are many methods through which income elasticity of demand are estimated, however, for the present study as followed by Gandhi and Zhang (2010), double-log functional form was used to estimate the elasticity as:

$$\log y = a + b \log x + \mu$$

where,  $y$  = quantity consumed,

$x$  = income level,

$\mu$  = error term,

$b$  = estimated income elasticity of demand.

This approach is used to estimate the income elasticity of demand for liquid milk in this study. The elasticity is estimated for consumption data with respect to quantity and value.

### *Demand Projection*

The estimation of probable future demand for milk is essential for the planners. It has been tried to project the probable demand for liquid milk in the households on the basis of projected population, future per capita income growth and expenditure elasticity. The projected probable demand formajor food items has been calculated by using the demand projection model given by International Agricultural Commodities and Trade (IMPACT). This demand projection model was also used by Surbhi Mittal (2008) and Dastagiri (2004). The demand projection model is as follows:

$$\text{Demand at time } t: Dt = do * Nt * (1 + Ye)^t$$

where,  $dt$  = household demand of milk at time 't',

$do$  = Per captia demand of milk in base year,

$Nt$  =Projected population in the year 't',

$e$  = expenditure elasticity of demand,

$Y$  =Growth in per capita income.

A sustained economic growth and steady increase in per capita income are expected to boost the demand for milk in the country.

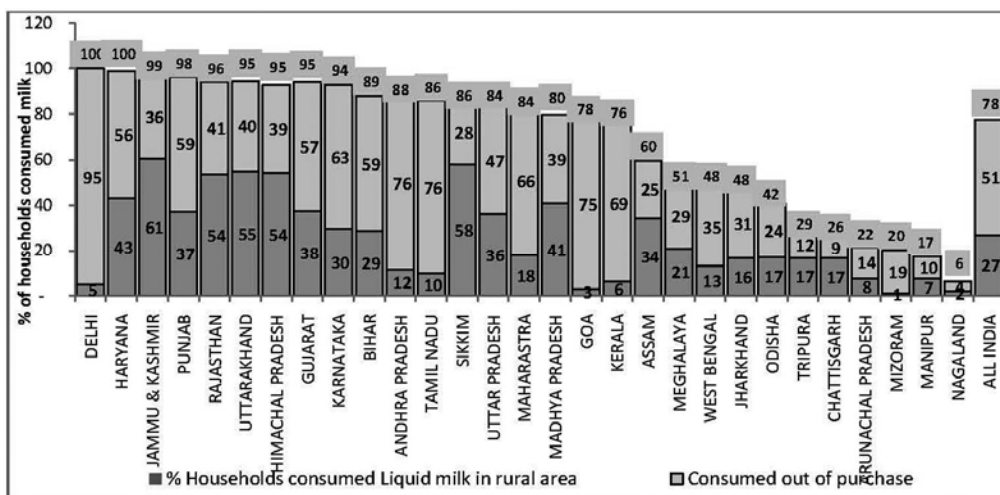
#### RESULTS AND DISCUSSION

Broadly, the results have been classified as State wise consumption of liquid milk, per capita consumption and market size for liquid milk sale separately for rural and urban households.

#### *State-Wise Consumption of Liquid Milk by the Household by Source*

##### *Rural India*

The analysis of NSS unit level data revealed that 78 per cent of the rural households were consuming milk (Figure 1). There were only 27 per cent households consuming milk out of home produce, while 51 per cent through outright purchase. There were very negligible households which were consuming other than these two sources. With majority of the households consuming milk through purchase in the rural areas, it has the potential to emerge as a huge market for the organised sector to augment its liquid milk sale. An analysis by segregating the data across various states revealed many critical findings. In Rural Northern India, more than 90 per cent of households were consuming milk in all the States, barring Uttar Pradesh where 84 per cent were consuming milk (Figure 1). In this region, the households which were consuming milk out of home produce varied from 36 per cent in Uttar Pradesh to



Source: Author's estimation from NSS unit level data (2011-12).

Figure 1. State wise Consumption of Milk by the Rural Households: 2011-12.

61 per cent in Jammu and Kashmir. Surprisingly, the less milk producing States like Jammu and Kashmir, Himachal Pradesh and Uttarakhand appeared as milk consuming States as far as coverage of the milk consuming households were concerned (for State-wise milk production data refer Annexure I). However, in these three States, more than 50 per cent of the households were consuming milk out of home produce. It can be inferred that in the hilly States of Northern India, dairying is practiced by majority of the rural households.

The milk consuming households varied from 76 per cent (Kerala) to 94 per cent (Karnataka) in rural Southern India. The households consuming milk out of home produce are surprisingly lower and varied from 6 per cent in Kerala to 30 per cent in Karnataka. For Andhra Pradesh and Tamil Nadu, these also remained much lower at 12 per cent and 10 per cent respectively.

In Western Rural India, more than 75 per cent of the households were consuming milk, with the highest was in Gujarat at 95 per cent (Figure 1). There are a large number of households in Gujarat (38 per cent) and Madhya Pradesh (41 per cent) who consumed out of home produce. In Maharashtra and Goa, it was only 18 per cent and 3 per cent respectively.

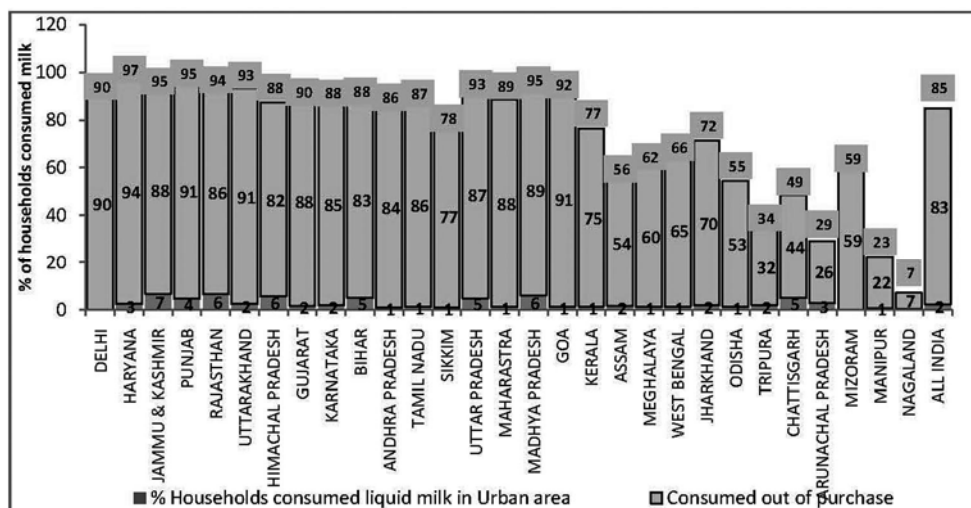
In the Eastern and North-Eastern parts of the country, except Bihar (89 per cent), Sikkim (86 per cent) surprisingly though, Assam (60 per cent) and Meghalaya (51 per cent); in all other States, less than 50 per cent of the rural households were consuming milk. In Sikkim, 58 per cent of the households were consuming out of home produce, while in Bihar, it was only 29 per cent. In the States of West Bengal, Odisha, Jharkhand and Chhattisgarh, 13 to 17 per cent of the households were consuming milk out of home produce.

In rural areas, a very prominent variation in consumption of milk was noticed and more importantly, significant variation in households consuming milk out of home produce was observed.

#### *Urban India*

In the urban areas of the country, 85 per cent of the households were consuming milk and as expected, almost all was sourced through purchase (Figure 2). In Northern and Western States, more than 87 per cent of households were consuming milk. In Southern States, it was 77 to 88 per cent, while in the Eastern States, it was in the range of 49 to 88 per cent. In North-Eastern States, in the urban areas, substantial number of households was consuming milk in Sikkim (78 per cent), Meghalaya (62 per cent), Mizoram (59 per cent) and Assam (56 per cent) (Figure 2).

Therefore, it can be inferred that majority of the households both in the rural and urban areas of the country consumed milk, except in some of the States in the Eastern and North-Eastern parts of the country.



Source: Author's estimation from NSS unit level data (2011-12).

Figure 2. State-wise Consumption of Milk by the Urban Households: 2011-12.

#### *Per Capita Consumption of Milk in Home Grown and Purchase Households*

Along with incidence of consumption of milk by the households, it is also pertinent to look at the per capita consumption of milk. A greater ambiguity is observed on the extent of consumption of milk for the milk producing households and non-milk producing households that is through purchase in both the rural and urban areas.

#### *Status of Milk Consumption in Rural India*

In rural areas of the country, consumption of milk out of home produce was 270 grams/day/consumer, almost double compared to outright purchase (131 grams/day) (Table 1). This indicates that a person of a producing household in the rural areas consumed about 140 grams of additional milk than a person of a purchasing household. This additional consumption of milk adds more to the nutritional security of the producing households.

Barring Jammu & Kashmir and Uttarakhand, the households across all the Northern States, which consumed milk out of home produce was almost 2-3 times higher than those consumed through purchase. The major milk producing States of the Northern India are Uttar Pradesh, Rajasthan, Punjab and Haryana and the per capita consumption of milk out of home produce was 298, 415, 559 and 697 grams per day respectively. On the contrary, it was 115, 193, 295 and 277 grams respectively for purchased households (Table 1). The less milk producing States like Jammu and Kashmir, Himachal Pradesh and Uttarakhand, the per capita consumption of milk out of home produce was 310, 401, 301 grams against 254, 239 and 216

grams respectively when it was purchased. It may be noted that in rural Northern India, the consumption of milk across the home producing households surpass the minimum recommendation of 280 grams of milk and milk products per day.

TABLE 1. STATE-WISE PER CAPITA HOUSEHOLD CONSUMPTION OF MILK AND ESTIMATED MARKET SIZE: 2011-12

		Rural			Urban			
Region	State	Home produce	Purchase	Estimated market size (HHs purchase) (LLPD)	Home produce	Purchase	Estimated market size (HHs purchase) (LLPD)	Per cent of purchase to total milk production
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
East	Bihar	208	115	55.4	248	160	12.0	37
East	Chattisgarh	103	66	1.2	111	157	3.8	16
East	Jharkhand	197	112	7.8	247	191	7.6	32
East	Odisha	124	74	5.5	127	137	4.6	21
East	West Bengal	129	84	18.4	162	120	18.3	29
North	Delhi	466	265	2.4		285	31.4	246
North	Haryana	697	277	22.8	564	357	24.8	26
North	Himachal Pradesh	401	239	4.6	360	311	1.8	21
North	Jammu & Kashmir	310	254	6.3	311	308	5.9	28
North	Punjab	559	295	26.1	608	368	30.6	22
North	Rajasthan	415	193	32.6	415	288	35.5	18
North	Uttar Pradesh	298	115	71.8	348	197	66.6	22
North	Uttarakhand	301	216	5.6	296	241	5.4	28
North-East	Arunachal Pradesh	188	135	0.2	235	173	0.1	50
North-East	Assam	85	65	4.0	103	102	1.7	26
North-East	Manipur	68	62	0.1	81	72	0.1	9
North-East	Meghalaya	68	70	0.4	92	93	0.3	32
North-East	Mizoram	155	82	0.1	196	117	0.3	104
North-East	Nagaland	109	107	Neg	139	110	Neg	3650
North-East	Sikkim	245	217	0.2	185	211	0.2	32
North-East	Tripura	122	109	0.3	133	139	0.2	16
South	Andhra Pradesh	186	131	52.9	197	172	40.7	28
South	Karnataka	160	113	23.7	239	170	31.4	37
South	Kerala	219	118	18.8	189	155	10.0	39
South	Tamil Nadu	180	143	40.7	236	189	51.0	48
West	Goa	143	176	0.8	273	211	1.3	128
West	Gujarat	250	156	26.4	427	242	50.2	28
West	Madhya Pradesh	204	119	20.0	197	178	25.5	20
West	Maharashtra	185	110	39.9	181	173	75.8	50
All-India		270	131	490	305	201	542	29

Source: Author's estimation from NSS unit level data (2011-12). LLPD: Lakh litres per day.

The consumption of milk out of home produce was 1.3-1.9 times higher than the purchased in Southern India. Kerala reported highest consumption of 219 grams/day/consumer for the home grown households followed by Andhra Pradesh (186 grams), Tamil Nadu (180 grams) and Karnataka (160 grams). However, the consumption of milk when purchased was 143 grams in Tamil Nadu followed by Andhra Pradesh (131 grams), Kerala (118 grams) and Karnataka (113 grams) (Table 1).

In western India also, barring Goa, the consumption of milk out of home produce was higher by 1.6-1.7 times than when it was purchased. In Gujarat and Madhya Pradesh, 250 and 204 grams were consumed out of home produce as against 156 and 119 grams respectively when it was purchased. In Maharashtra, 185 grams was consumed by a consumer when it was home grown as compared to 110 grams for purchased (Table 1).

In Eastern India, home grown households consumed 1.5-1.8 times higher milk than the purchased households. Among the Eastern States, the extent of consumption was higher for Bihar and Jharkhand as 208 and 197 grams of milk was consumed by a person of home grown households. The rest of the States consumed in the range of 103-124 grams per consumer per day (Table 1).

The consumption of milk of the home grown households was marginally higher as compared to the purchased households for most of the North-Eastern States. In Sikkim, the consumption was 245 grams for home grown households and 217 grams for the purchased households (Table 1).

#### *Status of Milk Consumption in Urban India*

In urban India, since generally the number of households consumed milk out of home produce was negligible, their comparative consumption to that of purchased households was not elaborated.

In urban India, consumption of liquid milk was 201 grams/day/consumer through outright purchase. In Northern India, it was in the range of 197 grams for Uttar Pradesh to 368 grams for Punjab (Table 1). It may be noted that in all states of urban Northern India, the consumption of milk across the purchase households surpass the minimum recommendation of 280 grams of milk and milk products per day barring Uttar Pradesh and Uttarakhand.

As regards Western India, consumption of milk was the highest in Gujarat (242 grams/day/consumer), while it was the lowest in Maharashtra (173 grams) for the purchased urban households. In Southern India, it was highest in Tamil Nadu (189 grams) and the lowest was in Kerala (155 grams). Jharkhand's per capita consumption was highest at 191 grams and lowest was in West Bengal (120 grams) in the Eastern India. In North-East India, it was highest in Sikkim (211 grams) and lowest was in Manipur (72 grams) (Table 1).

#### *Market Size for Liquid Milk Sale (Household Segment Only)*

The number of households purchasing milk along with family size and the per capita consumption together determines the potential liquid milk market size of any area. With the analysis of NSS unit level data, it has been arrived at the estimated quantity of liquid milk being purchased by the households.



The general belief is that low income and negligible consumption through out of pocket expenses hindering the rural areas to emerge as the potential markets. This however is not at all right as far as milk consumption is concerned as at the national level, rural households consumed 490 lakh litres per day (LLPD) milk through outright purchase. While in urban areas, it was marginally higher at 542 LLPD (Table 1).

The total consumption of liquid milk through purchase at the household level in the country estimated at about 1032 LLPD, which is about 29 per cent of the total milk production of the country. It is also relevant to mention that about 680 LLPD of liquid milk is consumed by the households through home produce. Hence total fresh milk consumption in the country estimated at 1712 LLPD which is about 48 per cent of the total milk production of the country.

As regards potential rural markets, Uttar Pradesh topped the list as about 72 LLPD milk was consumed through outright purchase (Table 1 and Figure 1). It was followed by Bihar (55 LLPD), Andhra Pradesh (53 LLPD), Tamil Nadu (41 LLPD), Maharashtra (40 LLPD) and Rajasthan (33 LLPD) (Table 1 and Figure 1). These States together accounted for about 60 per cent of the total rural market. Gujarat and Punjab was also not far behind as 26 LLPD milk was consumed each. Haryana though a small State but its total consumption out of purchase (23 LLPD) was almost equal to that of Karnataka (24 LLPD) and higher than another large State of Madhya Pradesh (20 LLPD). Kerala and West Bengal had a consumption of 18-19 LLPD (Table 1 and Figure 1). In the States of Jammu and Kashmir, Himachal Pradesh and Uttarakhand, though a larger number of households consumed milk and also per capita consumption was also higher, but these States were not emerged as a major potential market due to low population in these States in addition that most of the households consumed milk out of home produce. The rural market size however was 6 LLPD each in Jammu & Kashmir and Uttarakhand, while for Himachal Pradesh it was about 5 LLPD (Table 1 and Figure 1).

In case of urban markets, Maharashtra topped the list (76 LLPD) followed by Uttar Pradesh (66 LLPD), Tamil Nadu (51 LLPD), Gujarat (50 LLPD), Andhra Pradesh (41 LLPD) and Rajasthan (36 LLPD) collectively contributing 60 per cent to the total urban liquid milk market (Table 1 and Figure 2). Karnataka, Delhi and Punjab had a same market size of 31 LLPD each (Table 1 and Figure 2).

Most of the States in the country are the potential markets for the organised sector to augment their share of milk sale. In the Northern Region with the rural and urban sectors put together, Uttar Pradesh, Rajasthan, Punjab, Haryana and Delhi are the potential markets; in the Eastern Region, Bihar and West Bengal and all the States in the Southern Region and Western Region are the most prospective markets. The States of Delhi, Goa, Mizoram and Nagaland are deficit in milk and are meeting its requirements from neighbouring States.

### *Expenditure Elasticity of Liquid Milk*

The values of expenditure elasticities are estimated and presented in Table 2. The income elasticity of demand for milk has been estimated as 0.80 for rural households and 0.61 for urban households for quantity. It was however marginally higher at 0.90 and 0.68 for value for rural and urban areas respectively. The results clearly showed that demand for milk was more elastic in rural areas than in urban parts and this means that with the rise in income of the rural households, demand for liquid milk is likely to increase more in the rural parts of the country.

TABLE 2. ESTIMATED EXPENDITURE ELASTICITY OF LIQUID MILK

Quantity (1)	Rural (2)	Urban (3)	Aggregate (Rural + Urban) (4)
Expenditure elasticity of milk*	0.80	0.61	0.67
<i>t</i> - statistics	52.27	44.58	68.09
<i>p</i> - value	0.000	0.000	0.000
Value/Expenditure	Rural	Urban	Rural + Urban
Expenditure elasticity of milk*	0.90	0.68	0.80
<i>t</i> - statistics	56.42	46.44	76.25
<i>p</i> - value	0.000	0.000	0.000

*Source:* Authors estimate based on NSS data for the year 2011-12.

\*Significant at 99 per cent level

There is however a wide variation in the elasticities observed with the change in methodology and the base data. Expenditure elasticity estimated by Srivastava *et al.* (2013) for milk and milk products at 1.00 for rural households and 0.82 for urban households. Patel and Rami (2013) estimated elasticity of milk at 0.742 in the rural areas and 1.206 in urban areas considering data for 55th (1999-2000), 61st (2004-05) and 66th (2009-10) Rounds. Kumar (1998) estimated income elasticity for milk at 0.46 for the rural households and 0.37 for the urban households. Expenditure elasticity for milk and milk products in India is estimated by Dastagiri (2004) at 1.365 for rural and 1.070 for urban areas taking the data for 1993-94. Gandhi and Zhang (2010) estimated elasticity of liquid milk at 1.821 for rural households and 0.955 for urban households.

### *Demand Estimation of Milk*

Given its high income elasticity, demand for milk and dairy products is expected to grow rapidly. Further, increases in per capita income, urbanisation and changing consumption patterns would lead to acceleration in demand for milk in India and thus would give a boost to this sector.

Kumar (1998) projected demand for milk and milk products at 142.7 million tonnes by 2020 at 5 per cent growth in gross domestic product (GDP) and 182.8 million tonnes if the economy registered a growth rate of 7 per cent. Dastagiri (2004) projected the demand for milk at 5 per cent of economic growth at 147 million tonnes

in the year 2020 and the estimation was done with the base year milk consumption of 45 million tonnes during the year 1993. The demand projection by Dastagiri (2004) was limited to household consumption only.

These estimates however are required to be revised as there is a significant change in the economic growth rate, population growth and per capita income and also elasticity of demand.

For the calculation of probable future demand for fresh liquid milk, the data related to projected population and average per capita income growth was estimated. The projected population of the country was estimated taking the Compounded Annual Growth Rate (CAGR) of population between the census period of 2001 and 2011. With this CAGR, the population was projected for the year 2020 and 2025. The CAGR between 2001 and 2011 census period was estimated at 1.643.

The growth rates in per capita income under alternative scenario was worked out by subtracting the population growth from income growth.

TABLE 3. PROJECTED POPULATION AND PER CAPITA INCOME

Year (1)	Projected population (2)	Growth in per capita income (per cent) (3)
2011	1210569573*	5.86
2020	1401698924	6.36
2025	1520632179	6.56

\*as per census 2011, Office of the Registrar General and Census Commissioner, Govt of India, New Delhi.

With the assumption that the economy would grow at 8 per cent during the year 2020 and 8.2 per cent in 2025, the projection of demand for milk was estimated. It is also relevant to mention that projection of demand was done both for fresh liquid milk for the households' segment and also total milk production including processing of products. With the analysis of NSS unit level data quantity of milk consumed at the household level can be arrived for the year 2011-12 but consumption of total milk including through milk products, tea and coffee etc. cannot be estimated. Hence it was assumed that with the negligible import and export of milk and milk products in the country, total milk produced in the country is all consumed.

The base year demand of liquid milk for household consumption as estimated through NSS unit level data was 63.5 million tonnes in 2011-12. The total demand for milk as produced during the same year was 127.9 million tonnes.

TABLE 4. ESTIMATED DEMAND OF LIQUID MILK AND TOTAL MILK

Year (1)	Demand of fresh liquid milk - for household consumption only		Demand for total milk (3)
	(2)		
2011-12 - Base year	63.5		127.9
2020-21	107		218
2025-26	146		293

Source: Authors' estimation from NSS unit level data (2011-12).

The demand for fresh liquid milk for households' consumption projected at 107 million tonnes in 2020-21 and 146 million tonnes in 2025-26. The demand for total milk is projected at 218 million tonnes in 2020-21 and 293 million tonnes in 2025-26.

#### SUMMARY AND CONCLUSION

At the national level, 78 per cent of rural households and 85 per cent of urban households consumed liquid milk. Of the 78 per cent of the rural households consumed milk, only 27 per cent consumed out of home produce and 51 per cent do so through outright purchase. This means in the rural areas, there was greater number of milk consumers who bought milk than those who produced. It is therefore, the rural areas are gradually drawing attention as potential market to the dairy companies for liquid milk marketing. It is comparatively more in the states of Andhra Pradesh, Tamil Nadu, Maharashtra and Kerala where significantly higher number of rural households (69-76 per cent) purchased milk.

In the rural households, 270 grams of milk was consumed per day per consumer when animals are owned that is when milk is produced at home. As against this, only 131 grams of milk was consumed per day per consumer when it is purchased. This implies that in rural areas the households which reared animals consumed about 2 times more milk than the households which purchased milk. This also has an implication to achieve higher level of nutrition for the animal rearing households as additional consumption of milk adds more to their nutritional security. In the urban households, 201 grams of milk was consumed per day per consumer through outright purchase. It was also lower when compared to the households in rural areas consumed milk through home produce.

Among the states, consumption of milk by producing households in rural areas was highest in Haryana (697 grams/day) and lowest was in Manipur and Meghalaya (68 grams each/day). With regard to milk consumption through purchase in urban households, it was the highest in Punjab (368 grams/day) and lowest was in Manipur (72 grams/day).

There is a good scope for the organised sector to increase the network of liquid milk marketing both in rural and urban India. It is also very relevant to mention that rural India was not lagging behind urban India in milk consumption through purchase, however most of them remain dependent mostly on the unorganised sector. The estimated size of liquid milk market in rural areas (based on outright purchase) was 489 lakh litres per day (LLPD), while for urban areas it was 542 LLPD in 2011-12.

The income elasticity of demand for liquid milk was estimated at 0.80 in rural households and 0.61 in urban households. Therefore, with the increase in income of the rural households more of demand for milk is likely to generate from rural areas than urban areas.

With the economic growth rate of 8.0 per cent during the year 2020, demand for fresh liquid milk is expected at 107 million tonnes for the households' consumption and the total demand of milk including demand for product processing is expected at 218 million tonnes. Further with the economic growth rate of 8.2 per cent, the total demand for liquid milk is expected at 146 million and total demand for milk at 293 million tonnes in 2025.

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#### NOTE

1. Per capita milk consumption refers to per consumer milk consumption. Instead of per capita, it may be more appropriate to use per consumer unit as children's milk consumption is expected to be higher than adults. Consumer unit makes an adjustment in the household size to take into account the demographic composition. As NSS unit level data provides information up to the household level, hence further analysis of consumption pattern at member level is not feasible. With the availability of such information, it would draw more insights to the sector.

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## ANNEXURE 1. STATE WISE MILK PRODUCTION IN 2011-12

State (1)	Milk production (000 tonne) (2)
Andhra Pradesh	12088
Arunachal Pradesh	22
Assam	796
Bihar	6643
Chhattisgarh	1119
Goa	60
Gujarat	9817
Haryana	6661
Himachal Pradesh	1120
Jammu and Kashmir	1614
Jharkhand	1745
Karnataka	5447
Kerala	2716
Madhya Pradesh	8149
Maharashtra	8469
Manipur	79
Meghalaya	80
Mizoram	14
Nagaland	78
Odisha	1721
Punjab	9551
Rajasthan	13512
Sikkim	45
Tamil Nadu	6968
Tripura	111
Uttar Pradesh	22556
Uttarakhand	1417
West Bengal	4672
Delhi	502
India	127904

Source: Basic Animal Husbandry and Fisheries Statistics, 2014, Ministry of Agriculture and Farmers Welfare, Government of India.