

Growth and Performance of Indian Dairy Industry: An Analysis

B. Balaji naik¹,

Research Scholar, Dept of Economics, Yogi vemana university, kadapa-516005

Prof. Srinivasulu bayineni²,

Dept of Economics, Yogi vemana university, kadapa-516005

Introduction

Dairy industry is of crucial importance to India. The country is the world's largest milk producer, accounting for more than 13% of world's total milk production. It is the world's largest consumer of dairy products, consuming almost 100 per cent of its own milk production. Dairy products are a major source of cheap and nutritious food to millions of people in India and the only acceptable source of animal protein for large vegetarian segment of Indian population, particularly among the landless, small and marginal farmers and women. Dairying has been considered as one of the activities aimed at alleviating the poverty and unemployment especially in the rural areas in the rain-fed and drought-prone regions. In ancient and middle ages the place of cattle in the economic and social life of people gained importance. By the time the Britishers come to advent India; the little republics (villages) were flooded with milk animals, occupying a unique position among the world nations. India has emerged as the largest world producer of milk with an annual production of 100 million tonnes in 2007, surpassing the production of 88 million tonnes by USA in that year. The milk production in the country quadrupled from 23 million tonnes in 1973 to 100 million tonnes in 2007, with the remarkable annual growth rate of 4.5 per cent as against the world's average of about one per cent. Consequent to the New Economic Policy, 1991 and the recent amendments to the Milk and Milk Products Order (MMPO)1992, India offers a level playing field to Indian and foreign investors alike to invest in dairying both with a view to serve domestic and export markets. India got further boost with the signing of Uruguay Round Agreement on Agriculture (URAOA) in 1994, eventually culminating in the establishment of the World Trade Organization (WTO) in 1995. The dairy industry was de-licensed in 1991 and the private sector, including Multi National Companies (MNCs), was allowed to set up milk processing and product manufacturing plants.

As efficiency is the key factor in privatization policy.

Global Dairy Scenario

In the world about 2450 million people are involved in agriculture, out of which probably two-thirds or even three-fourths are completely or partially dependent on livestock farming. Until recently many countries have considered milk too bulky and perishable to make long-distance trade feasible. Therefore, they developed capabilities satisfying domestic liquid milk requirements through domestic dairy industries or depended on milk product imports, or a combination of both. For these vary reasons, most dairying nations have a complex mechanism to regulate their dairy industries through interventions, financial supports and physical controls.

Cooperatives dominate dairy industry. In the United Kingdom, all the milk produced by farmers is procured by cooperatives. There are no private sector dairy plants in New Zealand. A total of 90 per cent of the dairies in former West Germany are cooperative, and in Denmark, Netherlands and Sweden the entire dairy industry is organized on cooperative lines. In the USA, 70 per cent of the dairy industry is in cooperative sector. Dairy programmes are subject to significant government participation and regulation than most other domestic agricultural industries in the USA. There are several laws to encourage dairy cooperatives and protect the interests of the farmers. Table: 1 present milk production in India has compared to other top nine proceedings countries of the world for 7-year period, 1998 to 2004. It is heartening no note that India's percentage share in total world milk production has kept upward trend, competing with USA for top position. The combined share of top ten countries in milk production covers around 70 per cent throughout the reference period. In the year 1998 India's milk production was on par with USA, which was ranked first by producing 71.4 mt of milk in that year. India held the second rank in the production of milk to the tune of 71.3 mt in the same year. India overtook the United States in milk production in the year 1999 by producing 74.6 mt of milk, as compared to the 73.84 mt production of milk in USA. With the volume of milk production of 83 mt in the year 2004, India became number one milk producer in the world.

**Table-1: Milk Production in India vis-à-vis other Countries:
From 1998 to 2004**

(In '000 tonnes)

Country	Years						
	1998	1999	2000	2001	2002	2003	2004
India	71300 (16.35)	71900 (16.47)	76490 (17.12)	79490 (17.46)	81855 (-17.72)	84380 (-17.96)	88000 (-18.54)
USA	71377 (16.37)	73807 (16.91)	76004 (17.02)	75608 (-16.6)	77139 (-16.69)	77252 (-16.44)	77220 (-16.27)
Russia	33197 (7.63)	33140 (7.59)	31938 (7.15)	33000 (-7.25)	33467 (-7.24)	33300 (-7.09)	33000 (-6.95)
Germany	28378 (6.51)	24334 (5.57)	28331 (-6.34)	28191 (-6.19)	27874 (-6.03)	28533 (-6.07)	28100 (-5.92)
France	24763 (5.70)	21461 (4.91)	24975 (5.59)	24909 (-5.47)	25254 (-5.46)	24590 (-5.23)	24200 (-5.1)
Brazil	21630 (4.97)	21700 (4.97)	22134 (4.95)	22580 (-4.96)	22635 (-4.9)	23000 (-4.9)	23500 (-4.95)
China	6621 (1.52)	8460 (1.93)	8420 (1.88)	10255 (-2.25)	12998 (-2.81)	17463 (-3.71)	19000 (-4)
United Kingdom	14632 (3.35)	15015 (3.44)	14489 (3.24)	14707 (-3.23)	14869 (-3.21)	15017 (-3.2)	14714 (-3.1)
New Zealand	10500 (2.40)	11900 (2.73)	12700 (2.84)	13300 (-2.92)	13900 (-3)	14450 (-3.08)	14500 (-3.06)
Ukraine	13738 (3.15)	11172 (2.56)	12658 (2.83)	13444 (-2.95)	14142 (-3.06)	13658 (-2.9)	13200 (-2.78)
Total (top ten countries)	296136 (67.94)	292899 (67.13)	308139 (69.01)	318898 (70.06)	324133 (70.16)	331643 (70.60)	335414 (70.67)
Other Countries	139726 (32.05)	143404 (32.86)	138391 (30.99)	136320 (29.94)	137795 (29.84)	138081 (29.40)	139200 (29.33)
Grand Total (11+12)	435862 (100.00)	436293 (100.00)	446530 (100.00)	455218 (100.00)	461928 (100.00)	469724 (100.00)	474614 (100.00)

Note: Figures in parenthesis are percentages to respective low totals.

Source: <http://www.dairyinfo.gc.ca/pdf>

Growth of Dairy Sector

The green revolution has now reached stagnation. In such a case, there is a need for diversification of crop production system by greater integration of livestock and inland fisheries. Fortunately, various government initiatives through the promotion of dairy cooperative movement under Operation Flood Programme and several other dairy production schemes have resulted in augmenting milk production at an average annual growth of 4.5 per cent. The implementation of Operation Flood brought a “White Revolution” in India with milk production increasing from 21.2 million tonnes per

annum in 1968-69 to 66 million tonnes by 95-96, at the end of project period.

The Indian dairy sector owes its success to millions of small producers who have one or two milch animals yielding 3-4 liters of milk per day. Annual milk yield of dairy animal in India is about one-tenth of that achieved in the USA and about one-fifth of the yield of a grass-fed New Zealand dairy cow. Dairying has increasingly become a part of the state's anti-poverty programme. Organizations like the Small Farmers Development Agency (SFDA) and the Integrated Rural Development Programme (IRDP) give priority to dairy development projects as an instrument for uplifting the economic conditions of the weaker sections of the rural population.

Dairying in India is considered as a sub-system of the farming system, for the milch animals are generally fed with crop residues, agricultural wastes, compound cattle feed and oilseed cakes. The cost of milk production in India is one among the lowest in the world. Dairying in India, through the small herd dairy systems with feeding practices that do not place pressure on land, has significant competitive advantages. The low capital investment and steady returns make dairying a coveted activity among the marginal and small farmers and even the landless, which depend for fodder on common grazing and forest lands. India has 2 per cent of the geographical area of the world and supports about 18 per cent of the world's cattle population, but it contributing only around 14 per cent of the world's milk output. Dairy farming contributes to prosperity of rural folk in more than one way. The Royal Commission on Agriculture observed that the cow and the working bullock carry on their pertinent back the whole structure of the Indian agriculture.

Table-2: Share of Livestock Sector in GDP

(Rs. in billions)

Year	GDP	Value of Livestock Products	
		Live stock Production	Col: 3 % ge of Col: 2
1	2	3	4
1986	2,338	139	5.95
1987	2,600	156	6.00
1988	2,949	183	6.21
1989	3,527	217	6.15
1990	4,087	275	6.73
1991	4,778	308	6.45
1992	5,528	375	6.78
1993	6,307	432	6.85
1994	7,813	507	6.49
1995	9,170	577	6.29
1996	10,733	650	6.06
1997	12,435	747	6.01
1998	13,901	819	5.89
1999	15,981	911	5.70
2000	17,618	992	5.63
2001	19,030	1,093	5.74
2002	20,910	1,187	5.68
2003	22,495	1,209	5.37

Source:<http://www.nddb.org/statistics.livestock-sectors9.html>.

The growth pattern of the livestock production vis-à-vis GDP during 1951 and 2003 is furnished in table: 2. It can be observed livestock production was Rs.139 billions in the initial year 1986 which increased to Rs.1209 billions in the terminal year 2003, recording 77 per cent increased over 17 year period. Live stock production as percentage GDP has been fluctuations between the lowest of 5.37 per cent in 2003 and the highest of 6.85 per cent in 1999.

Growth of Crossbreed Cows vis-à-vis Indigenous Cows

Successive rounds of livestock census have clearly established the speed with which crossbreeding has spread in different parts of the country since its beginning in 1960s. Table: 3 Portrays growth pattern of livestock population in India in the reference period, 1951 to 2003. Adult female cattle percentage of

cattle was highest 35 per cent in 1951 and lowest at 29.40 per cent in 1961. Adult female buffalos percentage of buffalos was highest at 52.05 per cent in 2003 and lowest at 47.46 per cent in 1961. Total bovines as percentage of total livestock was highest at 67.86 in 1951 and lowest at 58.17 per cent in 2003. From the preceding analysis it can be concluded that the proportion adult female buffaloes in total buffaloes population has been higher has compared to the proportion of adult female cattle to total cattle population. Further proportion bovine population in total livestock has shown consistent down trend.

Table-3: Growth Pattern of Livestock Population in India: From 1951 to 2003

(Rs. in millions)

Year	Cattle	Adult Female Cattle	Buffaloes	Adult Female Buffaloes	Total Bovines (2+4)	Total Livestock
1951	155.3	54.4 (-35.02)	43.4	21.00 (48.38)	198.70 (67.86)	292.8
1956	158.7	47.30 (29.80)	44.9	21.70 (48.33)	203.60 (66.41)	306.6
1961	175.6	51.00 (29.04)	51.2	24.30 (47.46)	226.80 (67.62)	335.4
1966	176.2	51.80 (29.40)	53	25.40 (47.92)	229.20 (66.61)	344.1
1972	178.3	53.40 (29.95)	57.4	28.60 (49.83)	235.70 (66.69)	353.4
1977	180	54.60 (30.33)	62	31.30 (50.48)	242.00 (65.58)	369
1982	192.5	59.21 (30.76)	69.78	32.50 (46.57)	262.40 (62.51)	419.6
1987	199.7	62.07 (31.08)	75.97	39.13 (51.51)	257.80 (61.91)	445.3
1992	204.6	64.36 (31.46)	84.21	43.81 (52.02)	289.00 (61.33)	470.9
1997	198.88	64.42 (32.39)	89.92	46.77 (52.01)	288.80 (59.50)	485.38
2003	185.18	64.51 (34.84)	97.92	50.97 (52.05)	283.10 (58.37)	484.98

- Notes:** 1. Figures in parenthesis in col.3 is adult female cattle expressed as Percentages of cattle in col.2
 2. Figures in parentheses in col.5 are adult female buffaloes
 3. Expressed as percentage of buffaloes in col.4
 4. Figures in parenthesis in col.6 are total bovines expressed as percentage of total livestock in col.7

Source: GOI, Basic Animal Husbandry Statistics 2004,
Department of Animal Husbandry and Dairying,
Ministry of Agriculture.

Table: 4
Annual Growth Rates of Livestock Population: From 1951-2003
(percentage)

Five Year Periods	Cattle	Adult Female cattle	Buffaloes	Adult Female Buffaloes	Total Bovines	Total Live sock
1951-56	0.43	-2.76	0.68	0.66	0.49	0.93
1956-61	2.04	1.52	2.66	2.29	2.18	1.81
1961-66	0.07	0.31	0.69	0.89	0.21	0.51
1966-72	0.24	0.61	1.61	2.4	0.56	0.53
1972-77	0.19	0.45	1.55	1.82	53	0.87
1977-82	1.35	1.63	2.39	0.76	1.63	2.6
1982-87	0.74	0.95	1.71	3.78	1.01	1.2
1987-92	0.48	0.73	2.08	2.28	94	1.12
1992-97	-0.56	0.02	1.32	1.32	-0.01	0.61
1997-03	-1.18	0.02	1.43	1.44	-0.33	-0.02

Source: GOI, Basic Animal Husbandry Statistics 2004, Department of Animal Husbandry and Dairying, Ministry of Agriculture.

Table: 4 presents annual average growth rates of cattle, buffalo, bovine and livestock and population for five year periods stating from 1951-56 and ending with 1997-03. It can be observed that adult female buffaloes have witnessed then female cows. Bovine population has grown at lower rates than livestock population.

Table-5: Milk Production in India: From 1951 to 2010

Year	Production (in million tonnes)	Yearly % ge Change	Per capita Availability (Grams /day)
1951	17.0		124
1961	20.0	5.26	124
1971	22.0	3.77	112
1981	31.6	8.54	128
1991	53.9	3.33	176
2001	80.6	2.94	220
2002	84.8	5.21	235
2003	86.2	1.65	230
2004	88.1	2.2	231
2005	92.5	4.75	233

2006	97.1	5.00	241
2007	100.0	3.00	245
2008	106.8	3.00	249
2009	110.0	3.00	252
2010	115.0	4.54	255

Source: www.nddb.org/statistics/milkproduction.html.

(2) public private partnership in Indian dairy industry,
initiating white revolution II, May-2010.

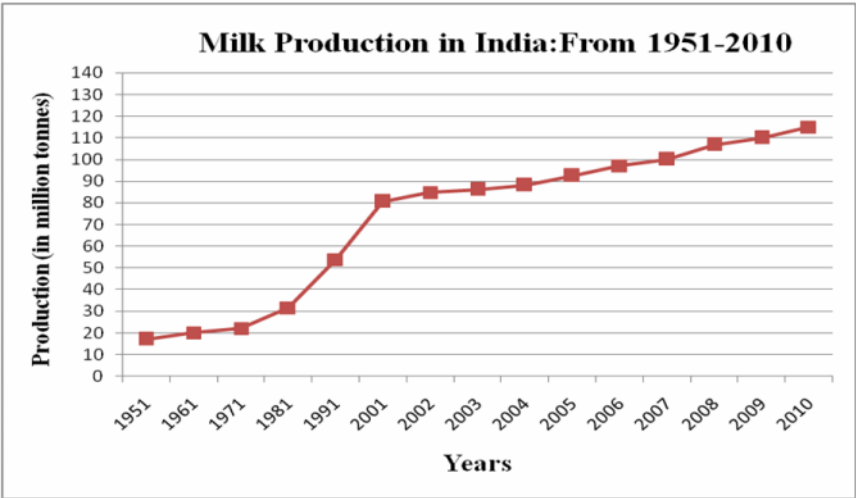


Fig-1

Table: 5 show the milk production and per capita availability of milk during 1951-2010. It can be observed that there is a steady growth of milk production over the years. Despite inter being the largest milk producer in the world, its per capita milk availability is one of the least in the world. It can be also noted that the per capita availability of milk, which declined during the 1950s and 1970s from 124 grams per day, increased substantially in 1990s and reached about 235 grams per day in 2002. In the year 2010, the per capita availability of milk was 255gms per day which was higher more against the requirement of 220 grams per day as recommended by Indian Council of Market and Research (ICMR) 2008.

Co-operative Dairying

An impressive development has taken place as far as dairying as co-operatives are concerned. Strengthening the cooperative business is a thrust area that focuses on expanding and reinforcing the cooperative infrastructure at every level and enhancing market potential through modern dairy plant technology, new product development and innovative marketing. Today, women dairy farmers

are encouraged to play a major role. Thus, it has become an important instrument for their empowerment; NDDDB is committed to increase women participation by establishing 2,062 women dairy cooperative societies with 90,000 women participants.

Table-6: Dairy Development under Operation Flood Programmes in India

Parameters	Phase-I		Phase-II	Phase-III					% increase in 2002 over 1971
	1971	1981	1985	1990	1994	1995	1996	2002	
Panel A-Procurement									
Number of milk sheds	5	39	136	170	170	170	170	170	3400.00
Number of DCS ('000's)	1.6	13.3	34.5	60.8	67.32	69.6	72.74	75.24	4700.25
Number of farmers membership (in lakhs)	2.8	17.5	36.3	70	86.9	90	93.14	95.24	3401.42
Average milk Procurement (llpd)	5.2	25.6	57.8	98.1	111.45	102	109.42	107	2057.69
Peak milk Procurement (1lpd)	6.5	34	79	120	130	116	140	151	2323.07
Panel B-Procurement									
Rural dairies (llpd)	6.8	35.9	87.8	140.3	167.5	172	193.7	185.25	2724.26
Metro dairies (llpd)	10	29	35	37.9	38.3	52.3	72.4	86.5	765.00
Panel C-Procurement									
Metro dairies (llpd)	N.A	21.8	29.5	30.6	32.34	35	38	45	206.42
Other cities & town (llpd)	0.9	6.1	20.6	41.9	53.9	59	61.38	52.26	5806.67
Total marketing	N.A	27.9	50.1	72.5	86.24	94	99.38	97.26	368.30
Milk dairy capacity (llpd)	N.A	261	507.5	663	831.5	842	74	956	366.30
Milk powder Production ('000 'tones/year)	22.4	76.5	102	165	185	195	195.5	250	1016.07 %ge
Panel D-Procurement									% increase in 2002 over 1981
Number of AI canters ('000,s)	N.A	4.9	7.5	10.9	15.12	16.28	16.5	15.25	211.22
Number of AI Done (in lakhs)	N.A	4.98.2	13.3	30.1		37.9	39.5	41.5	733.33
Cattle feed capacity ('000' tonnes/day)	N.A	1.7	3.3	4.3	4.7	4.9	5	5	294.11
Investment (Rs. Crores)	N.A	116.54	277.17	411.59	690.6	896.21	1303.1	151.6	130.08

Note: 1: llpd (lakh litres per

day) 2: tpd (tonnes
per day)

Source: Gupta, P.R., Operational Flood-Third
phase, Dairy India Year Book, 5th
Edition New Delhi,
Rekha Printers, 1997, p.148, India Year Book, 2002 p.47

Present Status of Operation Flood Programme:

OF Programme is now a movement of some 91.70 lakh rural families, who are the primary members of the milk cooperatives. As on march, 1995, about 69,600 DCS were organized into 170 milk sheds which procured 116 lakh kg of milk per day and marketed about 94 lakh liters per day (llpd) of liquid milk in over 600 cities and towns. Milk processing capacity of 842 tonnes per day was established. To operate the N.M.G and balance regional and seasonal fluctuations in milk procurement and marketing, some 1108 road and rail milk tankers were provided for long distance transportation of liquid milk. Adequate storage facilities were setup 33750 tonnes for milk powder and 4280 tonnes for butter to facilitate the operation of the NMG. With the increase in the production of milk and milk products, the country has been achieving a greater degree of self reliance than before. To stabilize the domestic prices of milk and milk products and exploit any export potential for Indian dairy products, the Government has recognized the NDDB as the canalizing agency for export.

For improving the productivity of dairy cattle and thereby milk production, the OF programmes provided animal health and breeding facilities. Nearly 40,313 DCS have been covered with the animal health programme, while 16280 DCS are provided with A.I. facilities. The bypass protein feed, developed by NDDB, has been increasingly adopted by farmers. This increases the protein conversion efficiency of the cattle feed by 33 per cent and dry fodder conversion by 30 per cent and minimizes the dry fodder requirement for milk production by 24 per cent. The treatment of straw with urea, a cheap and simple technique to raise the nutritional level of the straw, is being promoted. Feeding with urea-treated straws reduces the concentrate requirements by 33 per cent, minimizes wastage of straw and improves animal health. These technologies have

implications on lowering the cost of milk production and thereby, maximizing returns to farmers. Balanced cattle feed compounding capacity of 4905 tonnes per day has been setup and currently some 34576 DCS are engaged in marketing. Bypass protein technology has been introduced in 17 cattle feed plants, the feed being marketed thorough 5943 DCS. In addition, 8 Urea Molasses Block (UMB) plants with a total capacity of 72 tonnes per day have been established. Through Foot-and-Mouth Disease (FMD) control project, over 42 million vaccinations have been carried out. The Indian Immunological Technology Mission (IITM), Hyderabad, a subsidiary of NDDB, produced nearly 43.90 lakh doses of FMD vaccine, 8.92 lakh vials of veterinary formulations, 1,97,450 vials of rabies vaccine and 9.2 tonnes of vitamin premixes during the year 1995-96.

Conclusion

Milk production in India has come a long way over the years from a low volume of 17million tonnes in 1951 to 110 million tonnes in 2009 which is projected to reach 115 million tonnes in 2010. Today India is the world leader in milk production and the Indian dairy industry stands at mammoth size of US \$70 billion. The Indian dairy industry presently contributes 15 per cent to the total milk production of the world. Share of livestock sector hovers round 5 per cent of GDP of India. Bovine population constitutes 58 per cent of livestock population in India in 2002. India with 19 per cent share in world milk production closely followed by USA with 16 per cent share. Yearly percentage changes in milk production have been constitutently positive. Per capita availability of milk in India was 245 grams per day in 2007. Anand model of cooperative milk cooperative structure integrates rural producers and urban consumers. Replication of model led to phenomenal growth of societies and membership. OF-I, II, III achieved unprecedented growth in procurement, processing, and marketing of milk and provision of technical inputs, percentages share of outlay on animal husbandry and dairying in total plan outlay was 0.11 per cent .in first plan and 0.33 per cent in eighth plan. Due to external sector liberalization dairy industry has turned to be highly competitive with the entry of private players, domestic and foreign. Perceptive 2010 aims at beginning more women into cooperative field.

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