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OPPORTUNITIES AND CHALLENGES IN THE INDIAN DAIRY INDUSTRY- AN EMPIRICAL STUDY

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ABSTRACT

Agriculture and Animal Husbandry have a symbiotic relationship, in which the agricultural sector provides feed and fodder for the livestock and animals provide milk, manure and draught power for various agricultural operations. India is endowed with the largest livestock population in the world comprised of 537 million livestock. Milk production and dairy farming as a subsidiary occupation to agriculture have been given immense importance as dairy farming not only gives employment opportunities but also act as a catalyst to improves the dietary supplement of the family and provides a steady income to a large number of people to both the rural and urban poor of the country. The per capita availability of milk in India is much higher than the world average. the daily milk consumption in the country rose from a low of 107 grams per person in 1970 to 427 grams per person in 2020-21 as against the world average of 322 grams per day during 2021. This paper reviews the evolution of the dairy sector in India. It also provides policy recommendations for ensuring sustainable growth of the sector in the coming decade. The paper explains the existing challenges faced by the dairy sector and provides recommendations to the Government for ensuring sustainable growth of the sector, where the private sector is likely to play a critical role.

Keywords: Animal Husbandry, Livestock, Cattle, Buffalo, Growth Rate, Milk Production

1. INTRODUCTION

India being a predominantly agrarian economy has about 70 per cent of its population living in villages, where livestock play a crucial role in the socio-economic life. Being the largest milk producer in the world, India has immense resources of livestock which forms an important segment of economy livelihood and a steady source of nutrition. India is ranked 1st in milk production, accounting for more than 24% of the world. India's per capita milk availability has increased to 444 grams per day in 2021-22, up from 130 grams in 1950-51. Dairy sector is instrumental in bringing socio-economic transformation in India. It has created a lot of employment opportunities and also provides improved nutritional benefits. Over the period, the contribution of this sector in the agriculture sector has been showing steady improvement that signifies its growing importance in the Indian Economy. Milk production has increased significantly from 17 million Tones in 1950-51 to 221.1 M Tones in 2021-22. The per capita availability of milk in India is much higher than the world average. The daily milk consumption in the country rose from a low of 107 grams per person in 1970 to 427 grams per person in 2020-21 as against the world average of 322 grams per day during 2021.

2. OBJECTIVES

The current quest has the following objectives:

- To study the production and consumption pattern of milk in the country
- Attempt to forecast the future production of milk in the country
- To suggest ways and means to promote milk production

3. METHODOLOGY USED

Secondary data were used for the study. They were collected from various publications, journals, magazines, articles from the newspaper, publications from state and central government departments, research articles available on various websites and other internet sources. The following statistical Techniques have been used:

Least Square Method for developing a linear model

$$y = a + bx$$

Where y is milk production

a is constant

b is regression of y on x, and x is years

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This method has been applied for actual value and 3 years moving averages. The moving averages have been estimated using the following formula:

$$y_{i+1} = \frac{(y_i + y_{i+1} + y_{i+2})}{3}$$

We have estimated simple growth rate and compound growth using the following:

$$G = \frac{(y_t - y_0)}{y_0} * 100$$

Compound growth rate R= $$R = \left[\left\{ \frac{y_t}{y_0} \right\}^{\frac{1}{n}} - 1 \right] * 100$$

Projection based on Simple Growth Rate

$$y_t = y_0(1 + ng),$$

Where y_0 is an initial year

y_t is the projection year

n is number of years from base year and g is simple proportionate growth rate

4. RESULT & DISCUSSIONS

The livestock production plays an integral part of rural economy. The dairy sector assumes a great deal of significance for India on various accounts. As an industry, it employs more than 80 million rural households, with the majority being small and marginal farmers as well as the landless. The sector is an important job provider, especially for women, and plays a leading role in women's empowerment. Table-1 present the milk production and per capita milk availability since 2000-01 to 2021-22. It is seen that milk production has been increased from the level of 84.4 M tones in 2000-01 to 221.1 4 M tones in 2021-22 (162% increased). Similarly per capita milk availability has also been increased to 444 gm/day in 2021-22 from 222 gm/day in 2000-01 (200% increased).

National level analysis

Table-1. All India Milk production and per capita milk availability during 2001-02 to 2021-22

Year	X	Milk M Tones	Growth Rate	Per capita availability gram/day	Growth Rate
2001-02	1	84.4		222	
2002-03	2	86.2	2.13	224	0.90
2003-04	3	88.1	2.20	225	0.45
2004-05	4	92.5	4.99	233	3.56
2005-06	5	97.1	4.97	241	3.43
2006-07	6	102.6	5.66	251	4.15
2007-08	7	107.9	5.17	260	3.59
2008-09	8	112.2	3.99	266	2.31
2009-10	9	116.4	3.74	273	2.63
2010-11	10	121.8	4.64	281	2.93
2011-12	11	127.9	5.01	289	2.85
2012-13	12	132.4	3.52	296	2.42
2013-14	13	137.7	4.00	303	2.36
2014-15	14	146.3	6.25	319	5.28
2015-16	15	155.5	6.29	333	4.39
2016-17	16	165.4	6.37	351	5.41

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2017-18	17	176.3	6.59	370	5.41
2018-19	18	187.7	6.47	390	5.41
2019-20	19	198.4	5.70	406	4.10
2020-21	20	210	5.85	427	5.17
2021-22	21	221.1	5.29	444	3.98
Total		**2867.9**		**6404**	
Average		**136.57**		**304.95**	

Table-2 presents the three yearly moving averages of Milk. It is observed that there is an increasing trend in milk production. The milk production has been increased from the level of 20 M Tones in 1960-61 to 209.83M Tones in 2020-21. The growth rate has been highest at the level of 7.19 % per annum during 2010-11 to 2020-21 and lowest 0.60% during 1960-61 to 1970-71. It is also seen that there increasing trend for per capita milk availability. It has been increased to 426 gm/day in 2020-21 from 126 gm/day in 1960-61. The highest growth rate was observed during 2010-11 to 2020-21 (5.16%) and lowest (-1.11%) during 1960-61 to 1970-71. Population is also having positive trends during all the periods. The highest growth rate is observed of the order of 2.51% during 1970-71 to 1980-81.

Table -2 Three years moving average of Milk production and per capita milk availability

Year.	Milk Production M Tones	Growth rate per annum	Per capita milk availability gm/day	Growth rate per annum	Population Million	Growth rate per annum
1960-61	20.00		126		456	
1970-71	21.20	0.60	112	-1.11	570	2.50
1980-81	32.10	5.14	130	1.61	713	2.51
1990-91	53.67	6.72	175	3.46	889	2.47
2000-01	81.10	5.11	218	2.46	1079	2.14
2010-11	122.03	5.05	281	2.89	1258	1.66
2020-21	209.83	7.19	426	5.16	1408	1.19

Indian has achieved incredible feat in milk production. India has ranked first in Global milk production. India is the world's largest milk producing country, representing over 24% of the world's total milk production annually. The county wise share of Milk production globally is presented in Table-3. It is seen that the total milk production in the country has been 642.47 M tones. India has ranked first in Global milk production. India contributes 30% of global milk production. India along with European Union (25%), United States (16%), China (5%) and Russia (5%) contributed more than 81% of total milk production in the world.

Table-3. Milk Producing Country during 2020

States	Production M Tones	%age Share	Cumulative %age Share
India	194.8	30.32	30.32
European Union	162.21	25.25	55.57
United States	101.02	15.72	71.29
China	34.1	5.31	76.60
Russia	31.65	4.93	81.53
Brazil	26.51	4.13	85.65
New Zealand	22	3.42	89.08
Mexico	12.92	2.01	91.09
Argentina	11.35	1.77	92.85
Others	45.91	7.15	100
TOTAL	642.47		

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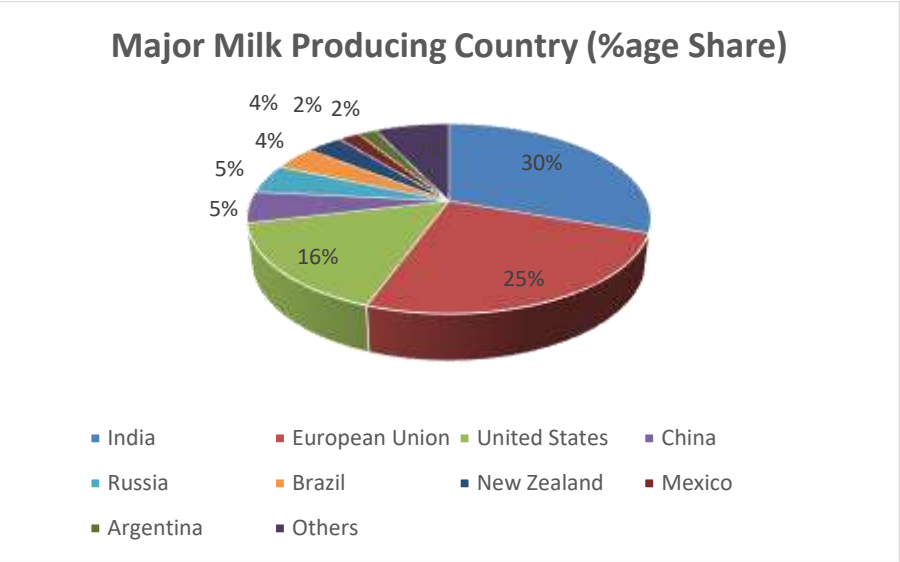

Table-4. Present the major milk producing state during 2021-22. It is observed that Uttar Rajasthan share has been 15.05% of the total production of 221 M tones, followed by Uttar Pradesh (14.93%), Madhya Pradesh (8.6%), Gujrat (756%), Andhra Pradesh (6.97%), Maharashtra (6.47%) %) and Punjab (6.37%). These State contributes about 66% of total milk production in the country.

Table-4. Milk Production in Major States during 2021-22

States	Production M Tones	%age Share	Cumulative %age Share
Rajasthan	33.26	15.05	15.05
Uttar Pradesh	33.01	14.93	29.98
Madhya Pradesh	19.00	8.60	38.57
Gujarat	16.72	7.56	46.14
Andhra Pradesh	15.40	6.97	53.10
Maharashtra	14.31	6.47	59.58
Punjab	14.08	6.37	65.95
Bihar	12.12	5.48	71.43
Karnataka	11.80	5.34	76.77
Haryana	11.63	5.26	82.03
Others	39.73	17.98	100
ALL INDIA	221.06	100	

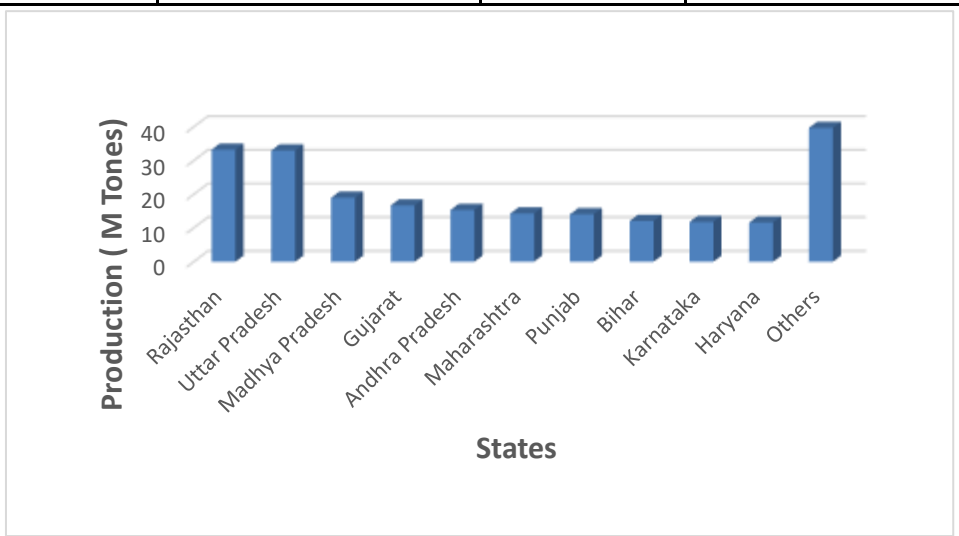

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Table -5 reveals that cattle population has increased to 193.50 million in 2019 from 155.30 million in 1951. The highest growth rate in cattle was observed during 1951 to 1961 (1.31%) and lowest (-0.86%) during 1992 to 2003. In case of Buffalos, the highest growth rate was observed 2.13 % during 1982 to 1992 and lowest was 0.16% during 2012 to 2019. The total Bovines has increased from 198.70 million in 1951 to 303.40 million in 2019.

Table -5 Livestock population Cattle and Buffalos (Million)

Year	Cattle	Annual Growth Rate Cattle	Adult Female Cattle	Annual Growth Rate Adult Female Cattle	Buffalo	Annual Growth Rate Buffalos	Adult Female Buffalo	Annual Growth Rate Adult female Buffalo	Total Bovines	Annual Growth Rate Total Bovines
1951	155.30		54.40		43.40		21.00		198.70	
1961	175.60	1.31	51.00	-0.63	51.20	1.80	24.30	1.57	226.80	1.41
1972	178.30	0.14	53.40	0.43	57.40	1.10	28.60	1.61	235.70	0.36
1982	192.50	0.80	59.20	1.09	69.40	2.09	32.50	1.36	261.90	1.11
1992	204.60	0.63	64.40	0.88	84.20	2.13	43.80	3.48	288.80	1.03
2003	185.20	-0.86	64.50	0.01	97.90	1.48	51.00	1.49	283.10	-0.18
2012	190.90	0.34	76.70	2.10	108.70	1.23	56.60	1.22	299.60	0.65
2019	193.5	0.19	81.4	0.88	109.9	0.16	55	-0.40	303.40	0.18

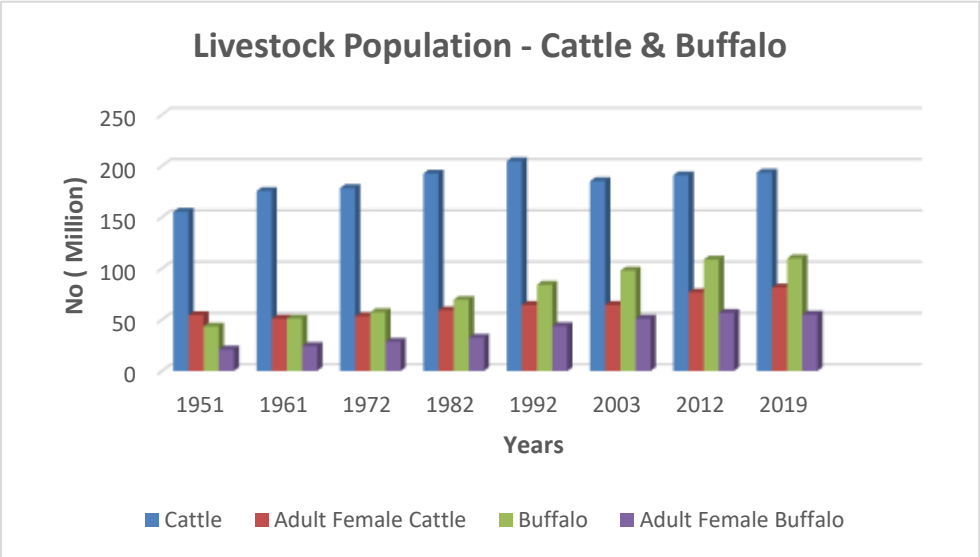

Table 6–Projected Population, Milk production and per capita availability of milk

	2025-26	2030-31
Human Population (Million)	1504	1589
Milk Production (M Tones)	219	246
Per Capita milk availability (gm/day)	437	481

Table-6 presents the projected population, milk production and per capita availability of milk for 2025-26 and 2030-31. The least square model has been used for projection. It is seen that the estimated population will be 1504 million in 2025-26 and 1589 million in 2030-31. The Milk production will be 219 M tones in 2025-26 and 246 M tones in 2030-31. The per capita milk availability will be 437 gm/day and 481 gm/day for 2025-26 and 2030-31 respectively.

5. CONCLUDING NOTE

Livestock plays a central role in the natural resource-based livelihood for the vast majority of the population, which is mostly confined to rural areas. Dairy sector plays a critical role in providing livelihood opportunities to millions of people, largely women, in rural areas. It has an important role to play if the target of doubling farmer's income has to be achieved in near future. A review of dairy development in the country presents encouraging trends in terms of milk

production, per capita availability of milk, sources of milk production and also accessibility of milk. However, in order to meet the challenges ahead, it calls for an integration of interventions at the level of farmers associating nutrition, health, reproduction and management. This would not only bring more economic benefits to small holder farmers and improve dairy production, but also would pave way for better integration of the traditional and industrialized systems of dairy production.

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