

## Estimation of CAGR for milk production in India

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### Abstract

India was leading the world in milk production for the previous 15 years. Agriculture and animal husbandry account for the majority of India's economy, with production playing an important role. Now a day's people give more preference to unbranded milk available in the market to do it freshness and price. In this back ground the present study was undertaken and the objectives are framed. The main objectives of the study: to analyze the Compound Annual Growth Rate of Milk Production in Tamil Nadu. The study was carried out to analysis the growth and performance of Milk Production in the India and Tamil Nadu. The secondary data were collected and analysis by using the compound growth rate. The CAGR of milk production is higher to ensure food and nutritional security of the growing population, there is a need to increase the production of milk from its present level.

**Key words :** Milk, Milk production, Compound annual growth rate, Trendline, Dairy products.

India is ranked first in production of milk in the world followed by United States of America, China and Germany. India is a world's lead in milk production for the past 15 years. Major portion of India's economy is based on agriculture and animal husbandry in which production plays a vital role. It improved the per capita availability of milk to 374 grams per day (National Dairy Development Board). India is the world's largest exporter of skimmed milk powder, although it only exports a few other milk products. The ever

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increasing domestic demand for dairy products and a large demand-supply gap could lead India being a net importer of dairy products in the future. Milk is the major product of livestock sector has long been recognized as complete natural food and also good for growth and maintenance of health. It is the main source of nutrition for baby mammals (including humans who are breastfed) until they are able to digest various kinds of food. Generally, milk is sold loose, in bottles or in polythene sachets. Selling loose milk or milk products like ghee, butter, paneer etc has possibility of contamination, problem of adulteration, etc. For the preparation of the manuscript relevant literature<sup>1-9</sup> has been consulted.

*Global scenario :*

The world's major exporters of milk and milk products are the United States, India, China, and Brazil. China and Russia were the world's leading importers of milk and milk products until 2016, when both nations became self-sufficient, contributing to a global milk glut. Milk and milk products are consumed by the six billion people worldwide. Dairy farming households number around 750 million people. Direct subsidies were replaced by "environmental incentives" which results in the Government buying milk when the price falls to Rs. 15677 per 1,000 liters. The United States provides a voluntary insurance scheme that benefits farmers based on milk prices and feed costs. In the year 2014-17, India milk production increased by 16.9 per cent to 465.5 million tonnes as compared to 398 million tonnes during 2011-14. In the year 2014-17, income of farmers increased by 13.79 per cent to Rs.33 per litre as compared to Rs.29 per litre during 2011-14, as per the data published under

department of animal husbandry of ministry of agriculture in data portal of India (data.gov.in).

*Indian scenario :*

Milk is processed and marketed by 170 Milk Producers' Cooperative Unions, which federate into 15 State Cooperative Milk Marketing Federations. Over the years, several brands have been created by cooperatives like Amul (Gujarat), Vijaya (AP), Verka (Punjab), Saras (Rajasthan), Nandini (Karnataka), Milma (Kerala) and Gokul (Kolhapur). Punjab is the second largest milk producing state in India producing 10 per cent of country's milk. Punjab has the largest per capita availability of milk in the country. These problems can be controlled by offering branded milk and milk products. However, only 14 per cent of the milk produced in Punjab is marketed by cooperative and private milk facilities. The state has 62 milk plants in the private and cooperative sectors with capacity to process 57 lakh liters per day out of which about 59 per cent is being utilized<sup>5</sup>. Cow's milk contains, on average, 3.4% protein, 3.6% fat, and 4.6% lactose, 0.7% minerals and supplies 66 kcal of energy per 100 grams. Nutritional value of donkey and horse milk have the lowest fat content, while the milk of seals and whales may contain more than 50% fat.

*Problem focus :*

Milk is one of the most important nutritious foods which are normally consumed by all age group irrespective of rich and poor. Milk processing in India is around 35 per cent (with the organized dairy industry accounting for 13 percent of the milk produced) while the rest of the milk is either consumed on the farm

or sold in unorganized channels as raw, unpasteurized milk. Now a day's people give more preference to unbranded milk available in the market to do it freshness and price. In this back ground the present study was undertaken and the objectives are framed. The main objectives of the study are i) To analyze the Compound Annual Growth Rate of Milk Production in Tamil Nadu.

The study was carried out to analysis the growth and performance of Milk Production in the India and Tamil Nadu. The secondary data were collected from the Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India. The collected data were analysis by using the compound growth rate. The compound growth rate was determined using the exponential growth model to investigate the trend and annual growth rate of milk production in India and Tamil Nadu.

$$y = a b^t$$

$$\log y = \log a + t \log b$$

$$y = A + B t$$

Where,

Y = log y

A = log a

B = log b

Y = Area (ha)/ production (tonnes) and productivity (tonnes/ha)

t = Time elements which takes the value 1, 2, . . . n for various years

A = Intercept

B = Regression coefficient

Compound Growth Rate 'r' = (Antilog of B-1) X 100.

Student "t" test was used to test the significance of the calculated compound growth rate.

$$t = T/SE(r)$$

Where,

I = Compound growth rate

SE = Standard Error.

*Trend and growth rates of Milk Production in India :*

The trend and growth rates of milk production in India for the past third years were given in the table-1.

Table-1. Scenario of Milk Production in India

S.No	Year	Production (Million tonnes)
1	1991-1992	55.6
2	1992-1993	58.0
3	1993-1994	60.6
4	1994-1995	63.8
5	1995-1996	66.2
6	1996-1997	69.1
7	1997-1998	72.1
8	1998-1999	75.4
9	1999-2000	78.3
10	2000-2001	80.6
11	2001-2002	84.4
12	2002-2003	86.2
13	2003-2004	88.1
14	2004-2005	92.5
15	2005-2006	97.1
16	2006-2007	102.6
17	2007-2008	107.9
18	2008-2009	112.2
19	2009-2010	116.4
20	2010-2011	121.8
21	2011-2012	127.9
22	2012-2013	132.4

23	2013-2014	137.7
24	2014-2015	146.3
25	2015-2016	155.5
26	2016-2017	165.4
27	2017-2018	176.3
28	2018-2019	187.7
29	2019-2020	198.4
30	2020-2021	209.9
	<b>Mean</b>	<b>110.88</b>
	<b>SD</b>	<b>44.33</b>
	<b>CV</b>	<b>39.98</b>
	<b>CAGR</b>	<b>4.50*</b>

**Note:** \* Significant at 1 per cent level of significance.

**Source:** National Action Plan Dairy (2021)

It is evident from the table that the total milk production in India was found that the positive trend and increasing steadily over the three decades with the one per cent level of significance which results in higher availability of milk for India's growing population. The compound annual growth rates of milk over the three decade is 4.50 per cent shows a steady increase in the yield of milk and the availability of milk has seen a healthy growth in the recent years.

*Trend and growth rates of Milk Production in Tamil Nadu :*

The trend and growth rates of milk production in Tamil Nadu for the past twenty years were presented in the table-2.

It is clear from table that the total milk production in Tamil Nadu was found that the positive and increasing trend over the twenty decades with the one per cent level of

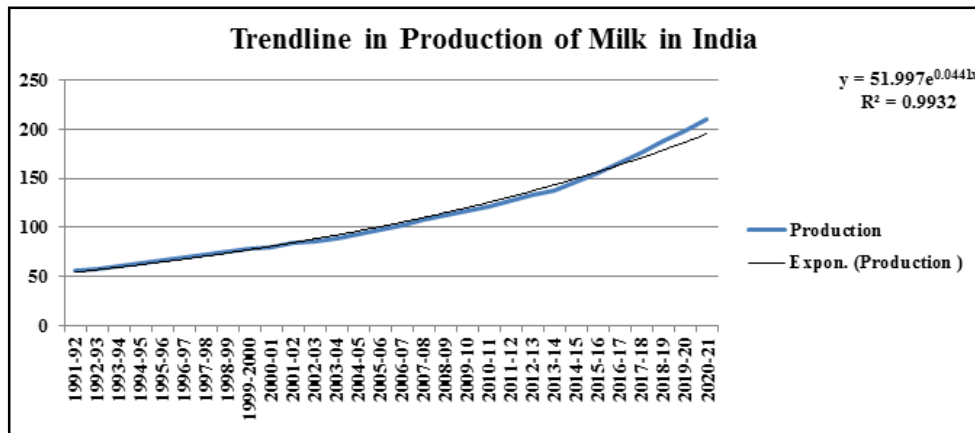
significance. The compound annual growth rates of milk over the two decade is 3.56 per cent shows a steady increase in the yield of milk and the availability of milk has seen a healthy growth in the recent years.

Table-2 Tamil Nadu Scenario of Milk Production

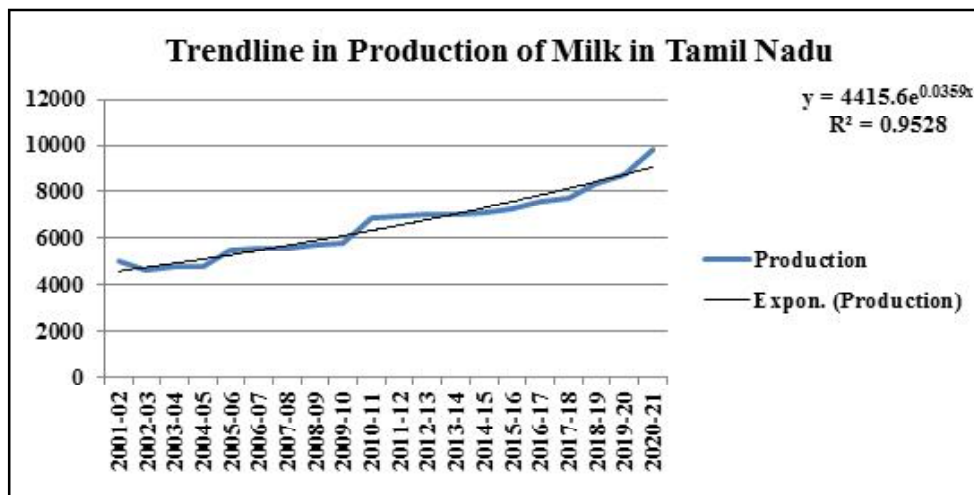
S. No	Year	Production (In 000 <sup>3</sup> tonnes)
1	2001-02	4988.09
2	2002-03	4622.27
3	2003-04	4752.73
4	2004-05	4783.75
5	2005-06	5473.61
6	2006-07	5560.47
7	2007-08	5586.16
8	2008-09	5673.73
9	2009-10	5778.11
10	2010-11	6834.49
11	2011-12	6968.00
12	2012-13	7004.73
13	2013-14	7049.19
14	2014-15	7132.47
15	2015-16	7243.53
16	2016-17	7556.35
17	2017-18	7741.82
18	2018-19	8361.68
19	2019-20	87.59.01
20	2020-21	9790.36
	<b>Mean</b>	<b>6583.03</b>
	<b>SD</b>	<b>1442.60</b>
	<b>CV</b>	<b>21.91</b>
	<b>CAGR</b>	<b>3.56*</b>

**Note:** \* Significant at 1 per cent level of significance.

**Source:** National Action Plan Dairy (2021)



Graph - 1. Trendline in Production of Milk in India



Graph – 2. Trendline in Production of Milk in Tamil Nadu

The CAGR of milk production is higher to ensure food and nutritional security of the growing population, there is a need to increase the production of milk from its present level. Hence, there is a need to boost the production of milk and this prediction can be beneficial for policy makers in formulating strategies for augmenting and sustaining production of milk in the country and this can

be broadly achieved by tackling supply side problems with increase number of cross breed populations, adequate nutrition while also creating an efficient market with clear demand signals.

References :

1. Hoolageri, P., K. V. Ashalatha, T. Pavan,

- and A. S. Patil, (2022). *The Pharma Innovation*. 11(11): 2012-2017.
2. Kumari B, R Malhotra, and AK. Chauhan, (2016). *Indian Journal Dairy Science*, 69: 487-491.
  3. Lyngkhoi R. Dipriya, Singh Basanta S., Ram Singh, and Tyngkan Hehlangki (2022). *Asian Journal of Dairy and Food Research*. 41(2): 183-187.
  4. Shuaibu Nehemiah and Tella O Modupeola., (2021). *FUW Trends in Science & Technology Journal*, 6(3): 937-940.
  5. Taneja, V.K. (2007) News and events [www.gadvasu.in](http://www.gadvasu.in).
  6. Vanishree M, R Sendhil, S Sirohi, A K Chauhan, H M Rashmi, and K. Ponnusamy, (2018). *Indian Journal Dairy Science*, 71: 502-508.
  7. Yayeh Z, A Kassa, and E. Dagneu, (2017). *Journal of Nutrition and Food Sciences*, 7: 607.
  8. Zewde MM, and WS. Mustefa, (2022). *International Journal of Veterinary Sciences and Research*, 8(3): 80-85.
  9. <https://www.agrifarming.in/district-wise-crop-production-in-tamil-nadu>.