

International Journal of Agriculture Extension and Social Development

Volume 9; SP-Issue 6; June 2026; Page No. 102-106

Received: 22-03-2026
Accepted: 28-04-2026

Indexed Journal
Peer Reviewed Journal

Dynamics of dairy sector in Puducherry

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DOI: <https://doi.org/10.33545/26180723.2026.v9.i6Sb.3743>

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Abstract

Puducherry, the southern most Union Territory of India consists of four small districts namely Puducherry, Karaikal, Yanam and Mahe respectively. Secondary data on livestock population and production were collected for a time period of 27 years (1996-2023) and classified into three phases in which phase – I accounts between (1996-97 to 2005-06), phase – II accounts between (2006-07 to 2014-2015) and phase – III accounts between (2015-16 to 2022-2023) respectively and the data was analyzed using conventional analysis in the form of averages and percentages. The results indicates that, the overall Indigenous cattle population in the territory indicates a negative growth rate (-10.39%) in the study area whereas the overall Crossbred population in Puducherry showed a positive trend (1.02%) during the study period. With respect to buffalo population, negative growth rate (-5.76%) is noticed during the study period. Regarding milk production, a negative growth rate is obtained in all the regions of Puducherry Union Territory with respect to Indigenous and Buffalo milk production while Yanam region is found to be positive in buffalo milk production which is due to increased buffalo population in the region. Overall Annual Compound Growth Rate Analysis revealed that there is a negative growth rate in Indigenous and Buffalo Milk Production (-6.13% & -3.38%) respectively whereas Crossbred milk production registered a positive growth rate during the study period (2.24%).

Keywords: Dairy sector, population & production, Puducherry

Introduction

In India, over 70 percent of the rural households own livestock and a majority of livestock owning households are small, marginal and landless households. Rural Poverty is largely concentrated among the landless and the marginal households comprising about 70 percent of rural population (Kozel and Parker, 2003) [7] and (Taneja and BIRTHAL, 2004) [11]. Small animals like sheep, goats, pigs and poultry are largely kept by the land scarce poor households for commercial purposes due to their low initial investment and operational costs. Livestock sector acts a main source of proteins for nutritious human diet through supply of milk, eggs and meat. The livestock sector is central to food security, not only for rural smallholders who rely directly on livestock for food, incomes and services, but also for urban consumers, who benefit from affordable high-quality animal-based food (FAO, 2009) [4]. Out of the total output energy in dairy farming 83.83% was contributed by milk and remaining 16.17% was from manure reported by (Divya *et al.*, 2012) [3]. Puducherry, the southern most Union Territory of India consists of four small districts namely Puducherry, Karaikal, Yanam and Mahe respectively. Majority of livestock owners in Puducherry were landless and for majority of them cattle rearing was the only occupation to sustain their livelihood (Ramkumar *et al.*, 2001) [9]. It provides employment and the most valuable supplementary income to the vast majority of rural households, the majority of whom are landless and small

and marginal farmers. The dairy farmers were found losing interest and shifting their occupation from dairying as it is no more remunerative to them (Athilakshmy *et al.*, 2013) [2]. Hence realization of importance of dairy population and production is essential which necessitates the study on dairy sector.

Methodology

The data used in this study were collected from the Department of Animal Husbandry and Animal Welfare, Government of Puducherry. The time period considered is for 27 years (1996-2023) and classified into two phases in which phase – I accounts between (1996-97 to 2005-06), phase – II accounts between (2006-07 to 2014-2015) and phase – III accounts between (2015-16 to 2022-2023) respectively.

Analytical Tools Employed

1. Conventional analysis in the form of averages and percentages.
2. Compound growth rate analysis. (Pandian *et al.*, 2013)

$$Y_t = b_0 (b_1)^t$$

$$\ln Y_t = \ln b_0 + t \ln (b_1)$$

The annual compound growth rate (r) was given by
 $r = \text{Anti-}\ln(b) - 1$

Results and Discussion

Table 1: Indigenous Livestock Population

Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97	2702	2809	0	102	5613
1997-98	2600	2796	0	87	5483
1998-99	1787	2236	0	294	4317
1999-00	2597	2674	0	249	5520
2000-01	1855	1596	0	303	3754
2001-02	1430	2791	0	257	4418
2002-03	1447	2796	0	179	4302
2003-04	1558	2530	0	101	4189
2004-05	1863	2290	0	55	4209
2005-06	1525	1976	0	55	3501
2006-07	1919	2133	0	45	4098
2007-08	1712	1788	0	145	3636
2008-09	1518	2063	0	33	3613
2009-10	1990	1935	0	33	3926
2010-11	2063	2076	0	33	4101
2011-12	1045	1266	0	120	2434
2012-13	953	803	0	128	2169
2013-14	728	302	0	45	1075
2014-15	389	349	0	74	812
2015-16	300	295	0	80	675
2016-17	285	280	0	89	654
2017-18	255	240	0	84	579
2018-19	240	232	0	91	563
2019-20	220	214	0	95	529
2020-21	220	200	0	100	520
2021-22	210	190	0	108	508
2022-23	199	181	0	120	500

Source: Integrated Sample Survey, Govt. of Puducherry

Table 2: Annual Compound Growth Rate Analysis

Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97 – 2005-06	-5.98	-1.95	0	-8.84	-4.06
2006-07 – 2014-15	-16.09	-21.97	0	10.48	-17.62
2015-16 – 2022-23	-5.70	-6.88	0	5.34	-4.36
1996-97-2022-23	-10.34	-11.83	0	-1.63	-10.39

Table 2 depicts that the, Annual compound growth rate analysis has shown that Indigenous Cattle population registered a negative growth rate in all phases in Puducherry (-5.98%, -16.09% & -5.70%) and Karaikal (-1.95%, -21.97% & -6.88%) region respectively whereas in Yanam region Indigenous cattle population shown a negative and positive growth rate (-8.84%, 10.48% & 5.34%) in the first, second and third phase respectively. Mahe region do not possess any Indigenous population. Growth rate was found to be negative in all the regions of Puducherry. Overall Indigenous cattle population in the territory indicates a negative growth rate (-10.39%) in the study area.

Table 1 shows that, there was a decreasing trend in Indigenous cattle population in the territory over a period of years which needs special concern. This has been happening mostly because of introduction of cross breeding technology in which cross bred animals yield high milk production, greater rate of returns, higher conception rate, early maturity and less inter calving interval than indigenous animals, gradual giving up of animal husbandry practices by the resource poor farmers in the territory and also due to movement of animals to adjoining states. The Annual

Compound Growth Rate Analysis has shown that Indigenous cattle population registered negative in Tamil Nadu (Serma *et al.*, 2016) ^[10]. Similar finding was observed by (Ganesh Kumar and Serma Saravana Pandian, 2003) ^[5] in which they found that indigenous population was lower when compared to cross-bred cows and buffaloes.

Table 3: Crossbred Livestock Population

Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97	38058	9321	1850	702	49931
1997-98	36058	8530	1612	644	46844
1998-99	37139	9027	850	611	47628
1999-00	38035	8117	827	600	47579
2000-01	35131	11212	1558	27	47928
2001-02	34488	9394	426	169	44487
2002-03	33957	9269	825	51	44102
2003-04	33600	9568	650	62	43880
2004-05	33427	9981	231	71	43710
2005-06	34042	9806	246	259	44353
2006-07	35504	9345	429	123	45401
2007-08	34263	10239	474	128	45103
2008-09	35323	10442	364	158	46294
2009-10	35595	10325	371	117	46408
2010-11	36163	10161	408	133	47060
2011-12	38132	14411	481	231	52624
2012-13	35736	12677	431	292	48994
2013-14	37373	12398	386	252	50409
2014-15	37360	11162	355	349	49226
2015-16	38004	11890	402	385	50681
2016-17	40000	12198	419	398	53015
2017-18	41800	12995	390	450	55635
2018-19	42100	13201	388	585	56274
2019-20	43050	13410	386	650	57496
2020-21	43900	13506	361	785	58552
2021-22	44254	14003	350	815	59422
2022-23	44989	14251	329	902	60471

Source: Integrated Sample Survey, Govt. of Puducherry

Table 4: Annual Compound Growth Rate Analysis

Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97 – 2005-06	-1.44	1.26	-18.82	-22.20	-1.36
2006-07 – 2014-15	0.93	3.40	-1.28	14.48	1.51
2015-16-2022-23	2.23	2.52	-2.98	14.42	2.39
1996-97-2022-23	0.86	1.93	-4.45	5.13	1.02

The Annual compound growth rate for crossbred population were persistently positive up in Karaikal during all the phases (1.26%, 3.40% & 2.52%) whereas in Puducherry (-1.44%, 0.93% & 2.23%) and Yanam (-22.20%, 14.48% & 14.42%) registered a negative and positive growth rate in the first, second and third phase respectively. The overall Crossbred population in Puducherry showed a positive trend (1.02%) during the study period as given in Table 4. The Annual Compound Growth Rate Analysis has shown positive growth rate in Tamil Nadu (Serma *et al.*, 2016) ^[10]. Even though crossbred population show a mixed trend as given in Table 3, they play a vital role in Livestock sector of this territory. The number of Crossbred cattle in found to be higher when compared to other livestock species excluding poultry. Farmers in this territory prefer to rear Crossbred cattle due to following reasons like high milk production, less inter calving interval and early maturity etc., which in

turn increases their income when compared with rearing other livestock species. This could be the foremost reason for increase in Crossbred population and also due to extensive cross breeding programme and various development schemes and extension programmes implemented by the Department of Animal Husbandry in the Territory which is a healthy indicator for future dairy development. Similar findings were given by Prabu *et al.*, (2012) [8].

Table 5: Buffalo population

Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97	3000	1026	0	986	5012
1997-98	2742	881	0	834	4456
1998-99	2320	649	0	835	3804
1999-00	1867	828	0	1579	4274
2000-01	1798	422	0	888	3108
2001-02	880	955	0	1525	3360
2002-03	4545	2635	0	4374	11554
2003-04	3064	1402	0	2895	7361
2004-05	1164	780	0	964	2908
2005-06	950	466	0	1323	2739
2006-07	1061	400	0	1076	2537
2007-08	921	475	0	995	2391
2008-09	935	492	0	1149	2575
2009-10	916	461	0	942	2319
2010-11	948	555	0	999	2522
2011-12	1037	315	0	1097	2321
2012-13	1027	329	0	1015	2362
2013-14	642	156	0	995	1793
2014-15	448	162	0	1046	1656
2015-16	400	190	0	1000	1590
2016-17	385	181	0	990	1556
2017-18	300	175	0	954	1429
2018-19	296	166	0	940	1402
2019-20	285	154	0	931	1370
2020-21	280	150	0	920	1350
2021-22	264	160	0	911	1335
2022-23	220	151	0	902	1273

Source: Integrated Sample Survey, Govt. of Puducherry

Table 6: Annual Compound Growth Rate Analysis

Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97 – 2005-06	-7.58	0.11	0	8.51	-1.24
2006-07 – 2014-15	-6.79	-12.69	0	-0.35	-4.47
2015-16-2022-23	-7.24	-3.23	0	-1.48	-2.95
1996-97-2022-23	-9.56	-8.45	0	-1.53	-5.76

Results on Table 6 revealed that Karaikal (0.11%) and Yanam (8.51%) registered a positive and negative growth rate in the first phase whereas in Puducherry region it is found to be negative in all the phases. In Puducherry region, the buffalo population showed a negative growth rate. The buffalo population is an exception which showed a decreasing trend in the last decade (Annual Administration Report, 2010). The decline in growth of buffalo population might be due to the existence of higher number of cattle over buffaloes over the years in Puducherry, difficulties in breeding management of buffaloes due to existence of silent heat, success of cross breeding in cows which inhibit the dairy farmers to go for buffaloes. Infertility problem is one of the major constraints perceived by farmers in buffalo

rearing (Kathiravan and Selvam, 2011) [6].

The sudden hike in population during 2002-2004 as given in Table 5, is due to the geographical location of the territory where animals move towards or come in from neighboring states such as Tamil Nadu and Andhra Pradesh. Hence in order to sustain the buffalo population in the territory, Animal Husbandry Department implemented Key Village Scheme through which the germplasm of superior bulls of Murrah buffalo breed is recommended for grading up the local buffalo population of our Union Territory of Puducherry by doing Artificial Insemination (Dept. of Animal Husbandry & Animal Welfare, Govt. of Puducherry). Since Mahe being the smallest region and less populated in the territory most people do not possess any livestock where the consumers procure dairy products from Kerala.

Table 7: Indigenous Cattle Milk production ('000 tonnes)

Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97	0.959	0.944	0	0.231	2.134
1997-98	0.848	0.853	0	0.023	1.724
1998-99	0.64	0.681	0	1.107	1.428
1999-00	1.054	0.778	0	0.103	1.935
2000-01	0.714	0.434	0	0.087	1.236
2001-02	0.463	0.788	0	0.104	1.355
2002-03	0.528	0.828	0	0.022	1.378
2003-04	0.612	0.795	0	0.03	1.437
2004-05	0.717	0.853	0	0.022	1.592
2005-06	0.651	0.804	0	0.022	1.455
2006-07	0.75	0.855	0	0.011	1.616
2007-08	0.634	0.785	0	0.039	1.458
2008-09	0.551	0.691	0	0.011	1.252
2009-10	0.825	0.755	0	0.011	1.58
2010-11	0.802	0.777	0	0.011	1.579
2011-12	0.421	0.346	0	0.04	0.807
2012-13	0.418	0.343	0	0.045	0.806
2013-14	0.318	0.11	0	0.013	0.441
2014-15	0.151	0.131	0	0.023	0.305

Source: Integrated Sample Survey, Govt. of Puducherry

Table 8: Crossbred Cattle Milk production ('000 tonnes)

Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97	26.165	5.139	2.012	0.455	33.771
1997-98	25.114	4.735	1.175	0.357	31.381
1998-99	26.102	5.448	2.002	0.512	34.064
1999-00	25.798	5.168	0.875	0.004	31.643
2000-01	24.971	7.512	0.962	0.014	33.46
2001-02	26.768	6.778	0.251	0.028	33.826
2002-03	27.113	6.715	0.483	0.025	34.336
2003-04	28.658	6.9	0.369	0.033	35.96
2004-05	29.335	7.405	0.223	0.044	37.007
2005-06	30.386	8.363	0.226	0.177	39.151
2006-07	32.297	8.403	0.374	0.099	41.173
2007-08	31.447	9.71	0.421	0.103	41.68
2008-09	32.567	9.168	0.352	0.146	42.233
2009-10	32.303	9.64	0.319	0.105	42.366
2010-11	33.062	9.375	0.35	0.113	42.091
2011-12	33.342	10.192	0.379	0.166	44.079
2012-13	33.616	10.179	0.374	0.183	44.352
2013-14	34.361	10.599	0.375	0.197	45.532
2014-15	34.78	10.478	0.329	0.285	45.872

Source: Integrated Sample Survey, Govt. of Puducherry

Table 9: Buffalo Milk production ('000 tonnes)

Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97	2.164	0.588	0	0.455	3.207
1997-98	2.043	0.399	0	0.351	2.793
1998-99	1.509	0.308	0	0.371	2.188
1999-00	1.385	0.378	0	0.945	2.708
2000-01	1.218	0.193	0	0.353	1.764
2001-02	1.166	0.399	0	0.736	2.301
2002-03	1.251	0.461	0	0.749	2.461
2003-04	1.101	5.32	0	0.811	7.232
2004-05	1.065	0.998	0	0.843	3.129
2005-06	0.791	0.353	0	0.914	2.058
2006-07	0.848	0.334	0	0.742	1.924
2007-08	0.752	0.415	0	0.625	1.791
2008-09	0.74	0.433	0	0.852	2.025
2009-10	0.761	0.387	0	0.717	1.865
2010-11	0.781	0.453	0	0.8	2.035
2011-12	0.914	0.22	0	0.744	1.87
2012-13	0.856	0.255	0	0.764	1.875
2013-14	0.553	0.13	0	0.776	1.459
2014-15	0.406	0.131	0	0.921	1.458

Source: Integrated Sample Survey, Govt. of Puducherry

Table 10: Annual Compound Growth Rate Analysis

Indigenous Milk Production					
Year	Puducherry	Karaikal	Mahe	Yanam	Overall
1996-97 – 2005-06	-4.38	0.07	0	-23.39	-2.93
2006-07 – 2014-15	-14.94	-22.87	0	6.47	-17.87
1996-97 – 2014-15	-5.10	-7.05	0	-12.33	-6.13
Cross Bred Milk Production					
1996-97 – 2005-06	1.96	5.85	-22.89	-16.96	1.84
2006-07 – 2014-15	1.10	2.38	-0.94	12.53	1.40
1996-97 – 2014-15	2.01	4.59	-7.83	5.46	2.24
Buffalo Milk Production					
1996-97 – 2005-06	-8.99	11.12	0	10.42	1.69
2006-07 – 2014-15	-5.50	-13.71	0	2.25	-3.08
1996-97 – 2014-15	-6.53	-5.01	0	3.58	-3.38

Table 10 figures out a negative growth rate is obtained in all the regions of Puducherry Union Territory with respect to Indigenous and Buffalo milk production while Yanam region is found to be positive in buffalo milk production which is due to increased buffalo population in the region. Overall Annual Compound Growth Rate Analysis revealed that there is a negative growth rate in Indigenous and Buffalo Milk Production (-6.13% & -3.38%) respectively whereas Crossbred milk production registered a positive growth rate during the study period (2.24%). The ACGR on milk productivity declined in buffalo and desi cows at the rate of 0.29 and 0.54% respectively in Tamil Nadu (Kathiravan & Selvam, 2011) [6]. The positive growth rate could be due to the effect of schemes implemented by the Government in the territory which primarily focus on multiplication of Cross bred cattle due to its increased productivity. More concern should be given towards improving Indigenous and Buffalo milk production which would enhance to sustain milk production in Puducherry. Table 7-9 indicates the Trend in Milk Production and it was found to be increasing only for Crossbred while a decreasing trend is noticed in Indigenous and Buffalo Milk production in the state. This could be due to increase in crossbred population in the state over a period of years and decrease in Indigenous and Buffalo population. An

increasing and decreasing trend is noticed in Crossbred and Indigenous milk production respectively which is mainly due to the increase in productivity in Crossbred cows whereas the productivity tends to be in meager with respect to Indigenous cows (Serma *et al.*, 2016) [10].

Summary and Conclusion

On the basis of the important findings of the study, the following conclusions are drawn and presented here. In the past livestock rearing was considered as the main subsidiary occupation which provided respectable status and income. Many of the landlords reared livestock to help them in agriculture operation in which both livestock rearing and agriculture was complementing each other. But according to the present scenario, farmers in Puducherry Union Territory are losing interest in livestock rearing. The main reason for people losing interest in livestock farming is due to uncertainties in production as well as marketing. The second reason would be the availability of jobs in industries and urban areas which fetch them regular and dependable income compared to livestock rearing. The other reasons would be the preference of the people for white collar jobs rather than working with animals.

The projects and schemes implemented in Puducherry did not help in reducing the demand supply gaps. It is an irony the livestock owners are not being benefitted by the ever increasing market potential for all these products. Hence a strong supply response with focus on production, productivity and marketing is required to meet the domestic demand of this territory and also to improve the socio economic status of the livestock farmers. Long term breeding policy, enhancing the availability of quality green fodder to the farmers, streamlining the marketing channels to eliminate the role of middleman which was the foremost constraint perceived by livestock farmers, improving livestock services and proper pricing policy of livestock products would help to improve and sustain livestock population, production and productivity which in turn enhances the nutritional security in the territory.

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