



## REGION-WISE MILK PRODUCTION IN MAHARASHTRA DURING THE POST-REFORM PERIOD

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Received: August 07, 2013; Accepted: September 06, 2013

**Abstract-** Dairy animals comprising of cows and buffaloes, are the major livestock and hold a very important place in the national economy. Apart from their role in milk production, they contribute a huge quantity of organic manure, which is one of the major inputs in our agriculture. Dairy farming is also very important subsidiary occupation. Dairying is one of the most effective instruments for supplementing farmer's income and generating employment in the rural sector. The composition of the livestock population in the state has undergone a significant change over the period.

The present research paper is an attempt to study the dairy development in Maharashtra with respect to livestock population, health facilities for animals and milk production during the post-reform period. The required secondary data are collected from All India Livestock and Farm Equipment Census (1982 to 1997), office of the Commissioner, Department of Animal Husbandry, Maharashtra State, Pune, Animal Husbandry Statistics Reports (1992-93 to 2000-01), Commissioner, Department of Animal Husbandry, Government of Maharashtra, Pune and Cooperative Movement at a Glance in Maharashtra (1990 to 1999), Office of the Commissioner for Cooperation and Registrar of Cooperative Societies, Maharashtra state, Pune.

The study indicated that the livestock population in Maharashtra has grown at the Quinquennial rate of 8.80% between 1951 and 1997. Further the composition of livestock population has also undergone a significant change. The proportion of cattle population has declined substantially and that of buffaloes and goats increased substantially during the period under consideration. There have been a little over three and half fold increase in number of veterinary dispensaries and a four fold increase in number of artificial insemination centres in Maharashtra. Milk production in Maharashtra grew at the annual average rate of 6.01% during the period from 1970-71 to 2000-01. It grew at the highest rate of 7.25% during eighties. The total milk production in Maharashtra state grew at the annual average rate of 4.61% during 1992-93 to 200-01. Estimated milk production recorded relatively higher growth rate in Nashik and Pune divisions and it was the lowest in case of Mumbai division. The milk production in the state has increased substantially in all the regions of state during the above period. The study also indicated that the milk production was largely concentrated in Pune, Nashik, and Aurangabad divisions during the period under study .

**Keywords-** Livestock Population, Milk Production, Veterinary

**Citation:** Misal D.M. and Bhise V.B. (2013) Region-Wise Milk Production in Maharashtra during the Post-Reform Period. Journal of Information and Operations Management, ISSN: 0976-7754 & E-ISSN: 0976-7762, Volume 4, Issue 1, pp.-331-335.

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### Introduction

Dairy animals comprising of cows and buffaloes, are the major livestock and hold a very important place in the national economy. Apart from their role in milk production, they contribute a huge quantity of organic manure, which is one of the major inputs in our agriculture. Dairy farming is also very important subsidiary occupation. Dairying is one of the most effective instruments for supplementing farmer's income and generating employment in the rural sector. It provides employment to millions of unemployed and under employed, and particularly to small farmers, and landless laborers in village. Dairying is being envisaged as an important means of reinforcing the income for economically weaker section of the society constituted by landless and small farmers. Milk constitutes the

most important source of nourishment of both vegetarian and non-vegetarian, for old and young alike. It is important to the consumers in next only to that of their staple food.

At the advent of the first five year plan (1951), the livestock population of the state consisted of 61.68% cattle, 17.21% goats, 11.84% buffaloes and 9.26% sheep. This composition of the livestock population in the state has undergone a significant change over the period. According to 1997 livestock census, the total livestock population of the state consisted of 50.27% cattle, 31.54% goats, 18.98% buffaloes and 8.81% sheep. It means that the proportion of cattle population has substantially declined where as the proportion of goat population has increased very much in Maharashtra during the period under consideration.

The present research paper is an attempt to study the dairy development in Maharashtra with respect to livestock population, health facilities for animals and milk production. The required secondary data are collected from All India Livestock and Farm Equipment Census (1982 to 1997), office of the Commissioner, Department of Animal Husbandry, Maharashtra State, Pune, Animal Husbandry Statistics Reports (1992-93 to 2000-01), Commissioner, Department of Animal Husbandry, Government of Maharashtra, Pune and Cooperative Movement at a Glance in Maharashtra (1990 to 1999), Office of the Commissioner for Cooperation and Registrar of Cooperative Societies, Maharashtra state, Pune.

**Livestock Population in Maharashtra**

The data about livestock population in Maharashtra during the period 1951 to 1997 are presented in [Table-1].

Table 1- Population of cattle, Buffaloes, Sheep and Goats in Maharashtra (1951 to 1997).

Year	Cattle	Buffaloes	Sheep	Goats	Total
1951	13.565 (61.68%)	2.604 (11.84%)	2.037 (9.26%)	3.785 (17.21%)	21.991 (100%)
1956	14.109 (60.28%)	2.721 (11.63%)	1.97 (8.42%)	4.606 (19.68%)	23.406 (100%)
1961	15.328 (59.67%)	3.087 (12.02%)	2.093 (8.15%)	5.181 (20.17%)	25.689 (100%)
1966	14.729 (58.69%)	3.042 (12.12%)	2.205 (8.79%)	5.121 (20.4%)	25.097 (100%)
1972	14.705 (56.46%)	3.301 (12.67%)	2.128 (8.17%)	5.911 (22.7%)	26.045 (100%)
1978	15.218 (51.9%)	3.899 (13.3%)	2.636 (8.99%)	7.563 (25.8%)	29.316 (100%)
1982	16.162 (52.97%)	3.972 (13.02%)	2.671 (8.75%)	7.705 (25.25%)	30.51 (100%)
1987	16.983 (50.24%)	4.755 (14.07%)	2.873 (8.5%)	9.195 (27.2%)	35.806 (100%)
1992	17.441 (48.58%)	5.447 (15.17%)	3.074 (8.56%)	9.941 (27.69%)	35.903 (100%)
1997	18.047 (50.27%)	6.816 (18.98%)	3.162 (8.81%)	11.323 (31.54%)	39.348 (100%)
Quinquennial Growth rate (%)	4.17	16.13	6.97	16.64	8.8

Source: Government of Maharashtra, Pune [5].

Livestock population in the state has grown at the quinquennial rate of 8.80%. This growth rate was very high in case of goats (16.64%) and buffaloes (16.13%). The cattle population grew at the quinquennial rate of 4.17% and sheep population at the rate of 6.97% during the period 1951 to 1997.

At the advent of the first five year plan (1951), the livestock population of the state consisted of 61.68% cattle, 17.21% goats, 11.84% buffaloes and 9.26% sheep. This composition of the livestock population in the state has undergone a significant change over the period. According to 1997 livestock census, the total livestock population of the state consisted of 50.27% cattle, 31.54% goats, 18.98% buffaloes and 8.81% sheep. It means that the proportion of cattle population has substantially declined where as the proportion of goat population has increased very much in Maharashtra during the period under consideration.

**Health Facilities for Animals**

The data about health facilities for animals in Maharashtra for the period 1970-71 to 1999-2000 are presented in [Table-2]. It is evi-

dent from the table that the number of veterinary hospitals was 26 in 1970-71, which went up to 56 in 1980-81.

Table 2- Health Facilities for Animals in Maharashtra (1970-71 to 1999-2000).

Years	Veterinary Hospitals	Veterinary Dispensaries	Artificial Insemination Centres	Cattle Breeding Farms
1970-71	26	263	870	15
1974-75	55	241	1456	14
1980-81	56	507	2417	12
1985-86	56	764	2769	13
1990-91	31	815	3602	12
1991-92	31	920	3651	13
1992-93	31	924	3841	13
1995-96	31	1090	4067	12
1997-98	31	1156	4249	12
1998-99	31	1156	4249	12
1999-00	31	1209	4453	12

Sources: Government of Maharashtra, Pune [5]; Mumbai [7].

But thereafter the number of veterinary hospitals has declined to 31 in the state since 1999-2000. There has been substantial increase in the number of veterinary dispensaries from 263 hospitals in 1970-71 to 1209 (a little over three and half-fold increase) hospitals in 1999-2000. The number of artificial insemination centers have also gone up substantially (a four fold increase) from 870 centers in 1970-71 to 4,453 centers in 1999-2000. The number of cattle breeding farms showed a marginal decline during the period under consideration. There were 15 farms in 1970-71 which declined to 12 farms in the state in 1999-2000. As on 31st march, 2001, there were 31 veterinary poly-clinics, 1353 veterinary dispensaries, 206 primary veterinary aid centers and 61 mobile veterinary clinics in the Maharashtra.

**Milk Production in Maharashtra**

The [Table-3] shows that the milk production in Maharashtra state has grown at the annual average rate of 6.01% during 1970-71 to 2000-01. The milk production in the state grew at the highest annual rate of 7.25% during the eighties. It grew at the rate of 5.22% per annum during the seventies and at the annual rate of 5.53% during the nineties.

Table 3- Growth Rate of Milk Production in Maharashtra.

Period	Growth Rate (%)
1970-71 to 1979-80	5.22
1980-81 to 1989-90	7.25
1990-91 to 2000-01	5.53
1970-71 to 2000-01	6.01

Source: Office of the Dairy Development Department, Government of Maharashtra, Mumbai.

The data about region wise total milk production in Maharashtra during 1992-93 to 2000-01 are presented in [Table-4]. It indicates that the total milk production in Maharashtra has shown a steady increase during the aforesaid period. The estimated milk production in the state has grown at the annual average rate of 4.61%. Among the different regions of state, the estimated milk production has recorded the highest rate of 6.36% in case of Nashik division followed by Pune division (5.80%).

Table 4- Region Wise Total Milk Production in Maharashtra (1992-93 to 2000-01).

Region/State	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	Annual Growth Rate (%)
Mumbai	5,048.88 (12.31%)	5,014.33 (11.80%)	4,789.35 (9.95%)	5,168.47 (10.15%)	5,248.224 (10.24%)	5,295.54 (10.20%)	5,607.69 (10.00%)	5,606.04 (9.82%)	5,668.30 (9.690%)	1.52%
Nashik	8,830.94 (21.53%)	9,219.37 (21.69%)	11,475.87 (23.85%)	12,171.69 (232.90%)	12,135.45 (23.67%)	12,254.16 (23.60%)	13,348.73 (23.80%)	13,748.66 (24.09%)	14,203.95 (24.28%)	6.36%
Pune	13,477.35 (32.86%)	14,146.89 (33.28%)	17,000.56 (35.33%)	17,959.26 (35.27%)	18,235.59 (35.57%)	18,490.76 (35.61%)	19,997.76 (35.66%)	20,353.73 (17.84%)	20,916.91 (35.76%)	5.80%
Aurangabad	7,938.61 (19.36%)	8,219.99 (19.34%)	8,841.08 (18.38%)	9,319.85 (18.30%)	9,237.64 (18.02%)	9,402.71 (18.11%)	10,076.42 (17.97%)	10,178.73 (17.84%)	10,341.81 (17.68%)	3.40%
Amravati	3,189.35 (7.78%)	3,281.62 (7.72%)	3,166.16 (6.58%)	3,399.71 (6.68%)	3,453.94 (6.74%)	3,490.70 (6.72%)	3,810.62 (6.79%)	3,885.18 (6.81%)	3,969.34 (6.79%)	2.84%
Nagpur	2,527.03 (6.16%)	2,621.68 (6.17%)	2,841.39 (5.91%)	2,898.36 (5.69%)	2,953.33 (5.76%)	2,985.33 (5.76%)	3,243.82 (5.78%)	3,307.58 (5.80%)	3,398.97 (5.81%)	3.81%
Maharashtra	41,012.16 (100%)	42,503.88 (100%)	48,114.41 (100%)	50,917.34 (100%)	51,264.19 (100%)	51,264.19 (100%)	56,085.04 (100%)	57,061.92 (100%)	58,499.28 (100%)	4.61%

Source: Government of Maharashtra, Pune [5].

The growth in the milk production in these two regions was comparatively higher than that at the state level. It can be concluded that the estimated milk production in the state has increased substantially in all the regions during the period under consideration. The [Table-4] also reveals that the percentage share of Pune and Nashik division in total estimated milk production of the state was the highest throughout the period under study.

The data about the region wise indigenous cows estimated milk production in Maharashtra are given in [Table-5]. The table indicates that the estimated milk production from indigenous cows has shown a raising trend in Maharashtra state and it's different regions during 1992-93 to 2000-01. It has grown at the annual rate of 1.46% at the state level. This growth rate was the highest in case of Nashik division (6.19%). It was positive but low in Pune (0.87%) and Mumbai (0.47%) divisions during the same period. It can be said that the estimated milk production from indigenous cows has increased in the Maharashtra state. Further, this increase was confined to Nashik, Pune and Mumbai divisions.

The data about region wise estimated milk production from crossbred cows [Table-6] has recorded a positive growth rate of 6.65% per annum during the period 1992-93 to 2000-01. It has grown a relatively higher rate in Nagpur (9.87%), Aurangabad (8.77%) and Nashik (7.51%) divisions during the same period. The milk production from crossbred cows exhibited a substantial positive growth and it fared very well in Nagpur, Aurangabad and Mumbai divisions during the same period under consideration. The [Table-5] also reveals that the production of milk from crossbred cows was largely concentrated in Pune and Nashik divisions in 1992-93. It was largely concentrated in these two divisions (43.10% and 30.60% respectively) during 2000-01 as well. It could be seen from the table that the percentage share in state's estimated milk production from crossbred cows was higher in case of Nashik, Aurangabad and Nagpur divisions in 2000-01 as compared to their respective percentage shares in 1992-93. From the above it can be said that the crossbred cow milk production was largely concentrated in Pune, Nashik and then in Aurangabad divisions of the state during the period under consideration.

Table 5- Region Wise Indigenous Cow Milk Production in Maharashtra (1992-93 to 2000-01).

Region/State	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	Annual Growth Rate (%)
Mumbai	1,007.45 (10.11%)	988.33 (9.73%)	835.21 (8.60%)	915.05 (9.27%)	951.02 (9.39%)	923.11 (9.27%)	1,010.99 (9.30%)	999.16 (9.28%)	1,021.98 (9.19%)	0.47
Nashik	2,209.26 (22.17%)	2,321.40 (22.84%)	2,949.11 (30.36%)	2,942.73 (29.83%)	3,042 (30.05%)	3,007.15 (30.19%)	3,293.50 (30.30%)	3,329.83 (30.94%)	3,488.88 (31.36%)	6.19
Pune	1,735.65 (17.42%)	1,757.36 (17.29%)	1,607.95 (16.55%)	1,658.73 (16.81%)	1,688.39 (16.67%)	1,667.40 (16.74%)	1,854.37 (17.06%)	1,804.02 (16.76%)	1,840.10 (16.54%)	0.87
Aurangabad	3,005.55 (30.16%)	3,092.56 (30.43%)	2,733.36 (28.14%)	2,816.85 (28.55%)	2,856.39 (28.21%)	2,843.45 (28.54%)	3,031.12 (27.89%)	2,940.10 (27.32%)	2,969.45 (26.69%)	-0.01
Amravati	1,155.29 (11.59%)	1,151.16 (11.33%)	982.26 (10.11%)	950.12 (9.63%)	979.99 (9.68%)	945.32 (9.49%)	1,027.90 (9.46%)	1,035.92 (9.63%)	1,085.45 (9.76%)	-0.55
Nagpur	852.36 (8.55%)	850.86 (8.37%)	607.11 (6.25%)	582.37 (5.90%)	607.40 (6.00%)	575.26 (5.77%)	651.23 (5.99%)	652.24 (6.060)	720.71 (6.480)	-1.25
Maharashtra	9,965.56 (100%)	10,161.67 (100%)	9,715.00 (100%)	9,865.85 (100%)	10,126.17 (100%)	9,961.69 (100%)	10,869.11 (100%)	10,761.27 (100%)	11,126.57 (100%)	1.46

Source: Government of Maharashtra, Pune [5].

Region-Wise Milk Production in Maharashtra during the Post-Reform Period

Table 6- Region Wise Crossbred Cow Milk Production in Maharashtra (1992-93 to 2000-01).

Region/State	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	Annual Growth Rate (%)
Mumbai	328.73 (3.16%)	343.47 (3.16%)	344.64 (2.50%)	356.81 (2.50%)	354.80 (2.46%)	361.91 (2.47)	398.25 (2.47%)	417.35 (2.50%)	426.32 (2.50%)	3.35
Nashik	33,018.99 (29.02%)	3,154.21 (29.02%)	4,218.45 (30.60%)	4,367.30 (30.60%)	4,417.64 (30.63%)	4,492.71 (30.62%)	4,943.61 (30.62%)	5,108.35 (30.60%)	5,218.11 (30.60%)	7.51
Pune	4,805.21 (46.19%)	5,020.82 (46.19%)	5,941.668 (43.10%)	6,151.32 (43.10%)	6,220.46 (43.13%)	6,327.96 (43.13%)	6,963.00 (43.13%)	7,195.10 (43.10%)	7,349.70 (43.10%)	5.59
Aurangabad	1,339.93 (12.88%)	1,399.56 (12.88%)	2,012.73 (14.60%)	2,083.73 (14.60%)	2,107.14 (14.61%)	2,143.51 (14.61%)	2,358.64 (14.61%)	2,437.92 (14.60%)	2,489.59 (14.60)	8.77
Amravati	443.17 (4.26%)	463.03 (4.26%)	523.86 (3.80%)	542.34 (3.80%)	549.50 (3.81%)	558.67 (3.81%)	614.74 (3.81%)	634.37 (3.80%)	648.00 (3.80%)	4.94
Nagpur	467.11 (4.49%)	488.03 (4.49%)	770.70 (5.40%)	770.70 (5.40%)	773.05 (5.36%)	786.14 (5.36%)	865.04 (5.36%)	901.47 (5.40%)	920.84 (5.40%)	9.87
Maharashtra	10,403.14 (100%)	10,869.12 (100%)	14,272.20 (100%)	14,272.20 (100%)	14,422.59 (100%)	14,670.90 (100%)	16,143.28 (100%)	16,694.56 (100%)	17,052.56 (100%)	6.65

Source: Government of Maharashtra, Pune [5].

Table 7- Region Wise Buffalo Milk Production in Maharashtra (1992-93 to 2000-01).

Region/State	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	Annual Growth Rate (%)
Mumbai	3,649.73 (19.47%)	3,427.56 (17.71%)	3,543.13 (15.70%)	3,794.82 (16.19%)	3,854.28 (15.84%)	3,883.71 (15.71%)	4,096.48 (15.47%)	3,998.31 (15.14%)	4,110.34 (14.92%)	1.58
Nashik	3,104.71 (16.57%)	4,047.22 (20.91%)	3,762.75 (16.67%)	3,859.52 (16.46%)	4,066.68 (16.72%)	4,095.87 (16.57%)	4,431.20 (16.73%)	4,491.33 (17.09%)	4,766.64 (17.30%)	5.96
Pune	6,380.07 (34.04%)	6,590.08 (34.05%)	8,844.03 (39.18%)	9,227.13 (39.36%)	9,537.25 (39.35%)	9,769.01 (39.52%)	10,426.44 (39.37%)	10,444.67 (39.74%)	10,921.40 (39.64%)	7.39
Aurangabad	3,116.67 (16.63%)	3,039.26 (15.70%)	3,587.12 (15.89%)	3,556.61 (15.17%)	3,707.90 (15.24%)	3,799.77 (15.37%)	4,053.18 (15.30%)	4,037.04 (15.36%)	4,206.53 (15.27%)	3.99
Amravati	1,414.18 (7.55%)	1,292.92 (6.68%)	1,482.74 (6.57%)	1,637.01 (6.98%)	1,714.66 (7.05%)	1,743.71 (7.05%)	1,933.73 (7.30%)	1,868.19 (7.11%)	1,985.94 (7.21%)	4.59
Nagpur	1,075.49 (5.74%)	956.79 (4.94%)	1,354.78 (6.00%)	1,370.79 (5.85%)	1,411.18 (5.80%)	1,424.78 (5.76%)	1,544.34 (5.83%)	1,460.19 (5.56%)	1,561.92 (5.67%)	5.70
Maharashtra	18,240.85 (100%)	19,353.83 (100%)	22,574.55 (100%)	22,344.61 (100%)	24,327.95 (100%)	24,716.85 (100%)	26,248.37 (100%)	26,281.73 (100%)	27,552.77 (100%)	5.04

Source: Government of Maharashtra, Pune [5].

Table 8- Region Wise Goat Milk Production in Maharashtra (1992-93 to 2000-01).

Region/State	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	Annual Growth Rate (%)
Mumbai	70.97 (3.62)	71.65 (3.55)	83.03 (3.88)	85.13 (3.82)	88.14 (3.82)	93.88 (3.95)	101.97 (3.94)	107.56 (3.96)	109.46 (3.98)	5.66
Nashik	506.98 (25.83)	513.18 (25.41)	562.26 (29.14)	585.75 (26.31)	608.15 (26.33)	625.06 (26.27)	680.42 (26.30)	715.27 (26.37)	730.32 (26.57)	4.71
Pune	565.04 (28.79)	595.69 (29.50)	623.56 (29.14)	649.33 (29.17)	673.49 (29.16)	693.36 (29.14)	753.95 (29.14)	790.28 (29.13)	800.72 (29.13)	4.47
Aurangabad	484.46 (24.69)	504.89 (25.00)	524.53 (24.51)	545.85 (24.52)	566.21 (24.52)	582.63 (24.49)	633.49 (24.48)	662.61 (24.43)	670.14 (24.38)	4.16
Amravati	194.71 (9.92)	19.19 (9.47)	193.96 (9.06)	201.99 (9.07)	209.79 (9.08)	215.67 (9.07)	234.45 (9.06)	245.54 (9.05)	245.95 (8.95)	3.01
Nagpur	140.27 (7.15)	142.68 (7.07)	152.83 (7.14)	157.95 (7.10)	163.70 (7.09)	168.52 (7.08)	183.21 (7.08)	191.52 (7.06)	192.48 (7.00)	4.07
Maharashtra	1,962.43 (100)	2,019.28 (100)	2,140.17 (100)	2,226.00 (100)	2,309.48 (100)	2,379.12 (100)	2,587.49 (100)	2,712.78 (100)	2,749.07 (100)	4.32

Source: Government of Maharashtra, Pune [5].

The data about region wise estimated buffalo milk production in Maharashtra are shown in [Table-7]. It is seen from the table that buffalo milk production in state has shown a rising trend during the period from 1992-93 to 2000-01. It has grown at the annual rate of 5.04% in Maharashtra state. For Pune, Nashik and Nagpur divisions, this growth rate was than the state level growth rate. The percentage in state's buffalo milk production seems to have improved in 2000-01 over that in 1992-93 in case of Pune and Nashik divisions only.

The data about region wise estimated goat milk production in Maharashtra state are presented in [Table-8]. It could be seen from this table that estimated goat milk production in the state has grown at the annual average rate of 4.32% during the period 1992-93 to 2000-01. This growth rate has varied from one region to another region. The highest growth rate of 5.66% was found in case of Mumbai division and the lowest rate of 3.01% was found in case of Amravati division. The table also reveals that the goat milk production was mostly concentrated in Pune, Nashik and Aurangabad divisions of the state. Further the percentage share of different region in state's goat milk production has indicated a marginal change over the period under consideration.

### Conclusions

The study indicates that the livestock population in Maharashtra has grown at the Quinquennial rate of 8.80% between 1951 and 1997. Further the composition of livestock population has also undergone a significant change. The proportion of cattle population has declined substantially and that of buffaloes and goats increased substantially during the period under consideration. There have been a little over three and half fold increase in number of veterinary dispensaries and a four fold increase in number of artificial insemination centres in Maharashtra.

Milk production in Maharashtra grew at the annual average rate of 6.01% during the period from 1970-71 to 2000-01. It grew at the highest rate of 7.25% during eighties. The total milk production in Maharashtra state grew at the annual average rate of 4.61% during 1992-93 to 200-01. Estimated milk production recorded relatively higher growth rate in Nashik and Pune divisions and it was the lowest in case of Mumbai division. The milk production in the state has increased substantially in all the regions of state during the above period. The study also indicated that the milk production was largely concentrated in Pune, Nashik, and Aurangabad divisions during the period under study.

### References

- [1] Acharya K.T. and Rangappa K.S. (1994) *Indian Dairy products*, Asia Publication House, New Delhi.
- [2] Kumar A. and Pandey U.K. (1999) *National Center for Agricultural Economics and Policy Research*, New Delhi, India, 9, 3-12.
- [3] Dandekar V.M. (1980) *The Cattle Economy of India*. Indian Secular Society.
- [4] Doorknobs M. (1985) *Dairy Aid Development in India's Operation Flood*, Sage Publication, New Delhi.
- [5] Government of Maharashtra, *Animal Husbandry Statistics Reports - 1992-93 to 2000-01*, Department of Animal Husbandry, Pune.
- [6] Government of India, *All India livestock and Farm Equipment Census - 1982 to 1997*, Ministry of Statistics and Programme

Implementation, New Delhi.

- [7] Government of Maharashtra, *Statistical Abstract - 1970-71 to 1999-2000*, Directorate of Economics and Statistics, Planning Department, Mumbai.
- [8] Gregory M., Judith K.J. and Lois D. Mc Bean (2000) *Dairy Foods and Nutrition*, CRC Press, New York.
- [9] Kenneth T.L. (1969) *Livestock Production in India*, Food Foundation, New Delhi.
- [10] Mathur M.L. and Whyte R.O. (1968) *The Planning of Milk Production in India*, Orient Longmans, New Delhi.