

# INTRODUCTION

Indian livestock sector has got a high potential for growth, which can provide the much-needed gainful employment for the rural poor and youth and can become the basis for the necessary component of rural economy, without which sustainable growth is not possible. Livestock, in short can contribute significantly to achieve the Millennium Developments Goals of eradicating extreme poverty and hunger. Livestock is not only intricately associated with the social, cultural and traditional values of the region but also serves as an insurance substitute, especially for rural poor households since it is an asset that can be encashed during times of distress. Livestock provides high quality food viz., milk, meat and egg apart from raw hides and skin for leather industry, which has great employment and export potential. Growth in human population, increasing urbanization, rising domestic incomes and changing lifestyles have led to increased demand for livestock products. This sector also contribute to many other social spin offs like slowdown of rural-urban migration, the empowerment of women and protection of the environment.

Livestock, an important component in rural structure, contributes 2.58 per cent to the GSDP in Tamil Nadu and 24.8 per cent to the agriculture and allied activities GSDP during the year 2010-11. Tamil Nadu contributes 18.27 per cent of egg, 8.78 per cent of meat and 5.61 per cent of milk production and stands second in egg, fifth in meat and eighth in milk production in the country. Livestock sector in Tamil Nadu has undergone a perceptible change in the past four decades. The livestock population, production, productivity and per capita availability of livestock products in Tamil Nadu over the years seemed to be in positive trend which indirectly reflects the impact of various livestock development programmes.

## 1.1 LIVESTOCK POPULATION DYNAMICS IN TAMIL NADU OVER THE YEARS

The livestock population in Tamil Nadu over the years is displayed in Table 1.1. According to Tamil Nadu Livestock Census (2007), the cattle population in the state stood at 11.19 millions and buffalo at 2.01 millions. During the same period, there were 7.99 million sheep, 9.28 million goats and 2.84 million pigs. The total livestock population reached to 30.76 millions in the year 2007 from 24.94 millions during 2004. However, the poultry population registered an immense hike from 86.59 millions in the year 2004 to 128.11 millions in the year 2007.

**Table 1.1**  
**Livestock Population in Tamil Nadu (in million numbers)**

Species	1951	1956	1961	1966	1974	1977	1982	1989	1994	1997	2004	2007
<b>Cattle</b>	10.22	9.69	10.82	10.86	10.57	10.8	10.37	9.35	9.09	9.36	9.14	11.19
<b>Buffalo</b>	2.3	2.04	2.6	2.72	2.86	3.08	3.21	3.13	2.93	2.72	1.66	2.01
<b>Sheep</b>	8.02	7.04	7.16	6.62	5.39	5.29	5.54	5.88	5.61	5.37	5.59	7.99
<b>Goat</b>	4.04	3.76	3.43	3.77	3.95	4.2	5.25	5.92	5.86	6.32	8.18	9.28
<b>Pig</b>	0.41	0.51	0.5	0.47	0.56	0.68	0.69	0.66	0.61	0.62	3.21	2.84
<b>Livestock</b>	<b>25.13</b>	<b>23.16</b>	<b>24.64</b>	<b>24.57</b>	<b>23.43</b>	<b>24.15</b>	<b>26.19</b>	<b>26.37</b>	<b>25.68</b>	<b>26.17</b>	<b>24.94</b>	<b>30.76</b>
<b>Poultry</b>	<b>8.37</b>	<b>10.42</b>	<b>11.29</b>	<b>11.23</b>	<b>12.98</b>	<b>14.35</b>	<b>18.28</b>	<b>21.57</b>	<b>23.85</b>	<b>27.34</b>	<b>86.59</b>	<b>128.11</b>

**Table 1.2**

**Annual Compound Growth rates of Livestock Population in Tamil Nadu over various periods (in per cent)**

Species	1951-1961	1961-1974	1974-1982	1982-1994	1994-2004	2004-2007	1951-1977	1977-2007	1951-2007
<b>Cattle</b>	0.57	-0.18	-0.24	-1.09	0.05	6.98	0.21	0.12	0.16
<b>Buffalo</b>	1.23	0.74	1.45	-0.76	-5.52	6.58	1.13	-1.41	-0.24
<b>Sheep</b>	-1.13	-2.16	0.34	0.10	-0.04	12.64	-1.59	1.38	-0.01
<b>Goat</b>	-1.62	1.09	3.62	0.92	3.39	4.30	0.15	2.68	1.50
<b>Pig</b>	2.00	0.88	2.64	-1.02	18.06	-4.00	1.96	4.88	3.52
<b>Livestock</b>	-0.20	-0.39	1.40	-0.16	-0.29	7.24	-0.15	0.81	0.36
<b>Poultry</b>	3.04	1.08	4.37	2.24	13.76	13.95	2.10	7.57	4.99

The analysis of annual compound growth rate in livestock and poultry population in Tamil Nadu over the different time periods is shown in Table 1.2. The annual compound growth rate of cattle population in Tamil Nadu for the period of 1951 to 2007 was 0.16 per cent and it was 0.21 per cent for the period 1951 to 1977 and 0.12 per cent for 1977 to 2007. The annual compound growth rate for cattle population during the last census period (2004 to 2007) was 6.98 per cent. The growth rate of buffalo population for the period 1951 to 2007 was negative at 0.24 per cent, which was influenced during the period 1977 to 2007. However, the annual compound growth rate in buffalo population during 2004-2007 was 6.58 per cent. The sheep and goat had tremendous growth during the same period, which was reflected by their annual compound growth rates of 12.64 and 4.30 per cent, respectively. The sheep population registered negative trend during 1951 to 1977 and revived to positive during 1977 to 2007. However, the goat population had continuous positive growth trend except during the initial period 1951 to 1961. The pig population had a dip during last census period (2004-2007) which had a negative trend of 4.00 per cent. Overall, the livestock and poultry population had an annual compound growth rate of 0.36 per cent and 4.99 per cent, respectively for the period 1951-2007. During last census period (2004 to 2007), both livestock and poultry population had tremendous annual compound growth rate of 7.24 per cent and 13.95 per cent, respectively. This increase in livestock and poultry population might be due to implementation of various development programmes in the livestock sector of Tamil Nadu in recent past.

## **1.2 DYNAMICS OF LIVESTOCK PRODUCTION IN TAMIL NADU OVER THE YEARS**

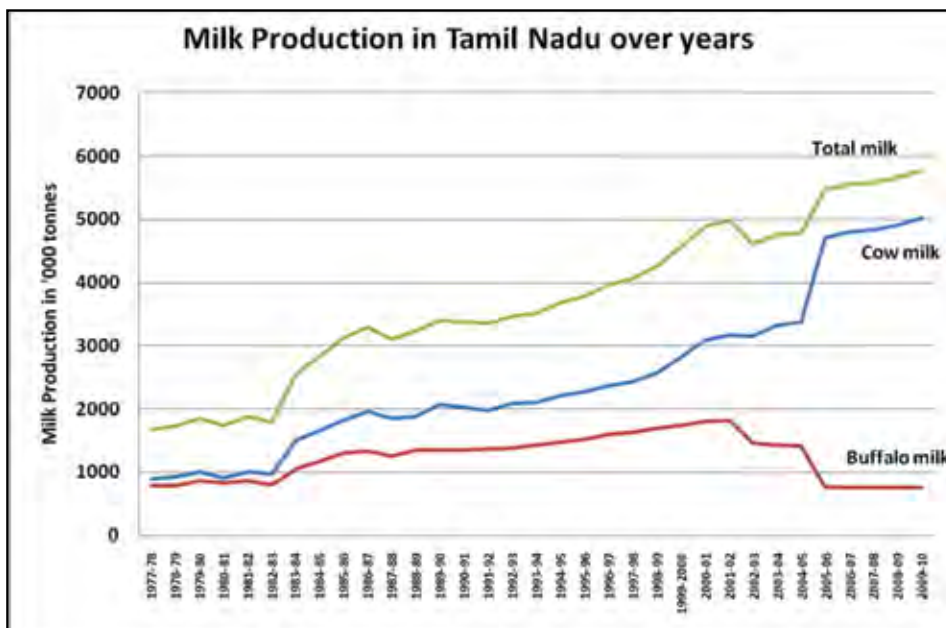
### **1.2.1 Milk**

The total milk production in Tamil Nadu in the year 2009-10 was 5.778 million tonnes, of which cow milk contributed 86.82 per cent and rest by buffalo milk. The trend in milk production in Tamil Nadu over the years is portrayed in Figure 1.1 and their respective growth rates in Table 1.3. The figure clearly shows that the total cow milk production gradually increased upto the period 2004-05 and tremendously increased thereafter which reflected the impact of implementation of various dairy development programmes. However, the buffalo milk production was found to increase till the period 2001-02 and decreased thereafter, which implied the need for implementation of buffalo development programmes. The overall milk production had shown increasing trend with some slackness during the period 2002-03 to 2004-05.

The annual compound growth rate for total milk was 2.41 and 3.14 per cent, for last 10 and 20 years, respectively. The growth rate in milk production was found to be 3.88 per cent per annum for the period 1977-78 to 2009-10. The annual compound growth rate in buffalo milk production was found to be -11.22 per cent for the period 2000-01 to 2009-10. During the same period, the

indigenous milk production was also had the negative growth rate. However, the total milk production recorded a positive growth rate in spite of negative growth rates of buffalo and indigenous cow milk production. It implied that the growth in milk production had contributed solely through cross bred cow which evidenced the successful implementation various cross breeding programmes in Tamil Nadu. Further, it is evident that there is a need for buffalo development programmes.

**Figure 1.1**



**Table 1.3**

**Annual Compound Growth rates of milk production (in per cent)**

Production	1977-78 to 1979-80	1980-81 to 1989-90	1990-91 to 1999-2000	2000-01 to 2009-10	1977-78 to 2009-10	1990-91 to 2009-10
Indigenous cow milk	N/A	N/A	-2.00	-6.90	N/A	-2.51
Exotic and Cross bred milk	N/A	N/A	11.22	12.51	N/A	10.96
Cow milk	5.549	10.06	3.72	6.87	5.33	5.58
Buffalo milk	4.786	6.51	3.05	-11.22	0.50	-3.47
Total milk	5.193	8.50	3.45	2.41	3.88	3.14

## 1.2.2 Egg

The total egg production in Tamil Nadu over the years was tremendously increased as shown in the figure 1.2. The total egg production in Tamil Nadu in the year 2009-10 was 10747.58 millions, which was contributed by improved egg (96.56 per cent) and desi egg (3.44 per cent). The desi egg production was seemed to decrease during 1977 to 1990 and thereafter it sustained its production with out much increase or decrease. However, the improved egg production over the years had shown a gradual increase from the year 1977-78 to 2000-01. During last decade, the improved egg production trend had shown a tremendous increase. The scenario was also reflected in total egg production.

Figure 1.2

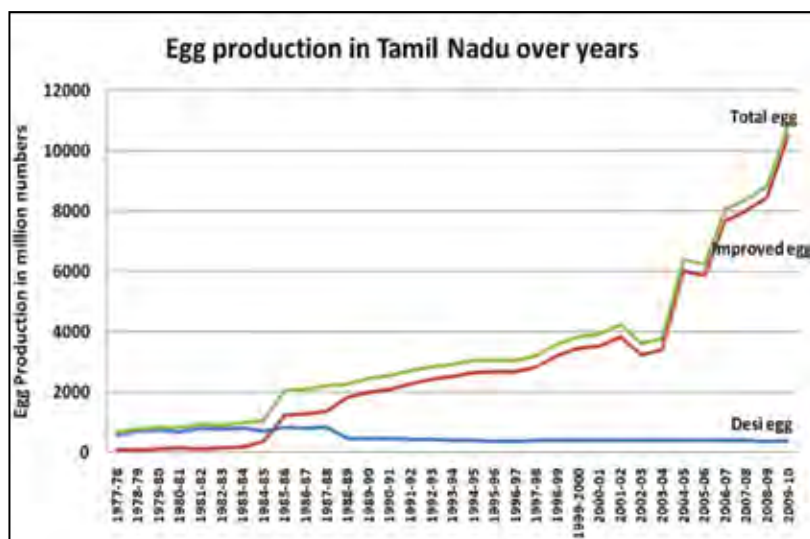


Table 1.4

Annual Compound Growth rates of Egg production in Tamil Nadu (in per cent)

Production	1977-78 to 1979-80	1980-81 to 1989-90	1990-91 to 1999-2000	2000-01 to 2009-10	1977-78 to 2009-10	1990-91 to 2009-10
Desi egg	12.24	-4.07	-1.62	-0.98	-2.62	-0.58
Improved egg	9.25	44.78	4.88	14.49	15.07	8.15
Total egg	11.84	15.29	3.96	13.38	7.94	7.33

The annual compound growth rate in total egg production in Tamil Nadu was worked out to be 7.94 per cent during last 30 years, 7.33 per cent during last 20 years and 13.38 per cent during last 10 years. The decade wise analysis implied that the maximum growth in total egg production was observed during 1980-81 to 1989-90. Similar trend was observed for improved egg production, which had an annual compound growth rate of 44.78 per cent during the period 1980-81 to 1989-90. The annual compound growth rate in desi egg production was observed to be positive only during the period 1977-78 to 1979-80 and negative thereafter.

### 1.2.3 Meat

The total meat production in registered slaughter houses in Tamil Nadu for the year 2009-10 was 39.932 million kgs as portrayed in Figure 1.3 and Figure 1.4 and their respective growth rate in Table 1.5.

Figure 1.3

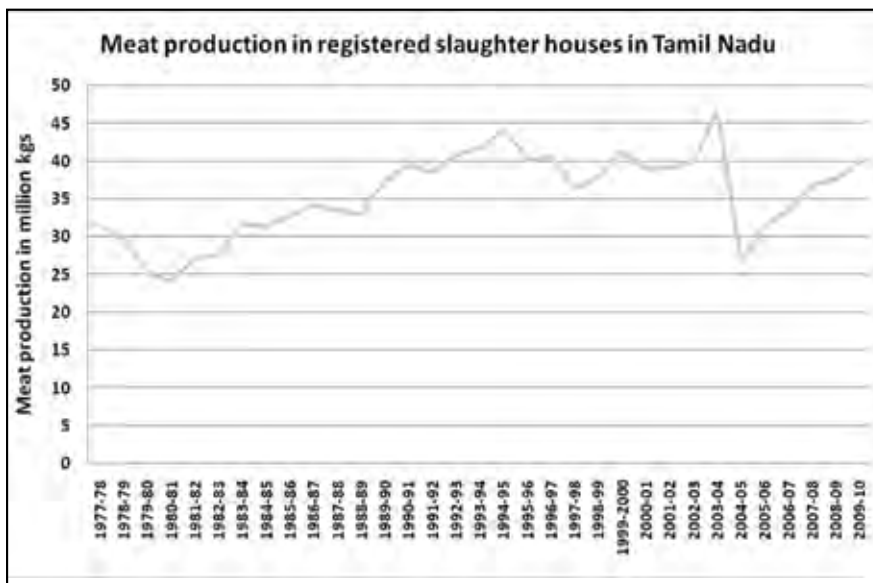
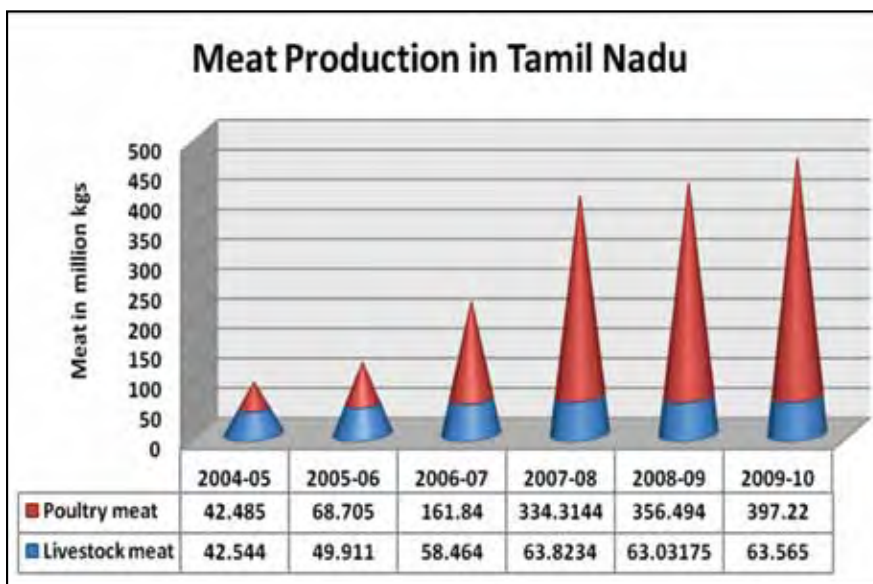


Figure 1.4



The livestock meat production in Tamil Nadu in the year 2004-05 was 42.544 million kgs, which was increased to 63.565 million kgs in the year 2009-10. The poultry meat production in Tamil Nadu was also stood approximately at the same level as that of livestock meat in the year 2004-05. However, the meat from poultry sector reached to the level of 397.22 million kgs in the year 2009-10. The contribution of poultry meat to total meat production was found to be increasing in the recent past.

**Table 1.5**  
**Annual Compound Growth rates of Meat production in**  
**Registered slaughter houses in Tamil Nadu (in per cent)**

Particulars	1977-78 to 1979-80	1980-81 to 1989-90	1990-91 to 1999-2000	2000-01 to 2009-10	1977-78 to 2009-10	1990-91 to 2009-10
<b>Meat in Registered slaughter houses</b>	-10.561	4.07	-0.29	-0.78	0.97	-0.79

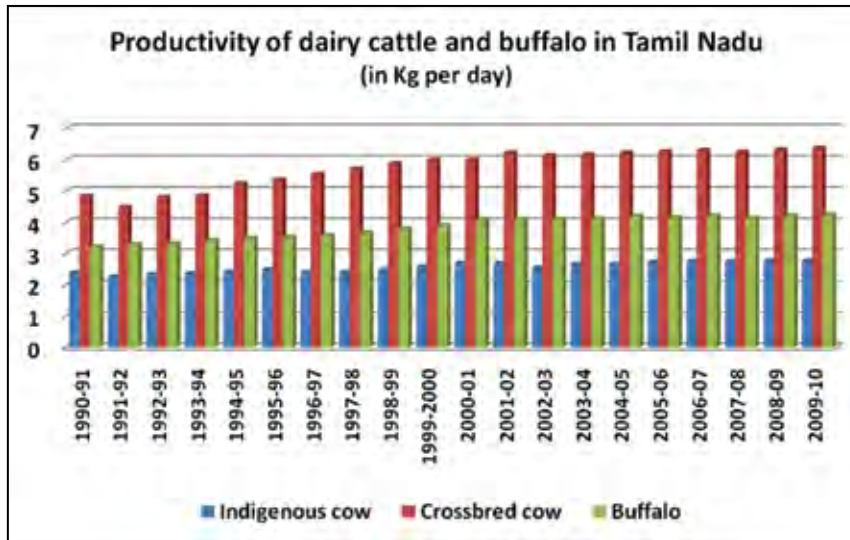
The annual compound growth rate in the meat production in registered slaughter houses was 4.07 per cent in the year 1980-81 to 1989-90, - 0.29 per cent during the year 1990-91 to 1999-2000 and – 0.78 per cent during 2000-01 to 2009-10. In other words, the annual compound growth rate in meat production in registered slaughter houses in Tamil Nadu was – 0.78 per cent during last 10 years, - 0.79 per cent during last 20 years and 0.97 per cent during last 30 years.

### **1.3 SCENARIO IN LIVESTOCK PRODUCTIVITY AND PER CAPITA AVAILABILITY IN TAMIL NADU**

#### **1.3.1 Milk Productivity**

The productivity of dairy cattle and buffalo in Tamil Nadu over last 20 years is shown in figure 1.5. It is clear that over the years, the productivity of indigenous cows is lower followed by buffalo and crossbred cows. The figure also implied that there was meager or even no improvement in the productivity of indigenous cows in last two decades. However, there was little improvement in productivity of buffaloes (3.2 kgs to 4.2 kgs) and considerable improvement in productivity of crossbred cow (4.8 kgs to 6.3 kgs) during the year 1990-91 to 2009-10.

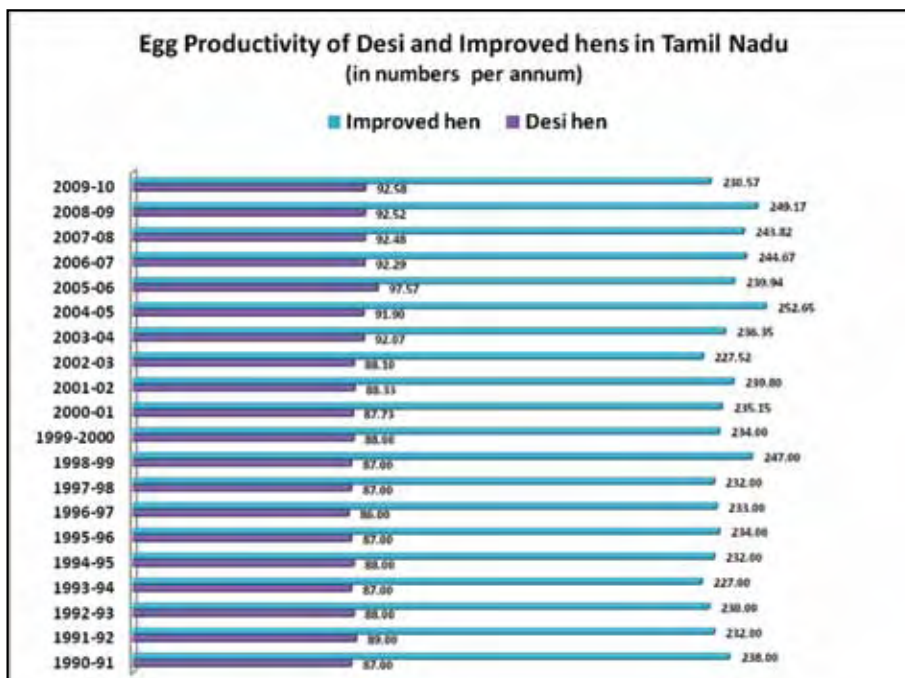
Figure 1.5



### 1.3.2 Egg Productivity

The egg productivity of desi and improved hen in Tamil Nadu over last 20 years is shown in figure 1.6. It is clear that over the last 20 years, the egg productivity varied between 87 to 97 eggs per annum for desi hen and 227 to 252 eggs per annum for improved hen.

Figure 1.6





### 1.3.3 Per capita availability of milk and egg

The per capita availability of milk and egg over the years is shown in figure 1.7 and 1.8. The figure implied that the per capita availability of milk increased from 98 gms/ day in the year 1977-78 to 236 gms/day in the year 2009-10, which implied tremendous milk production compared to the growth in human population in Tamil Nadu.

Figure 1.7

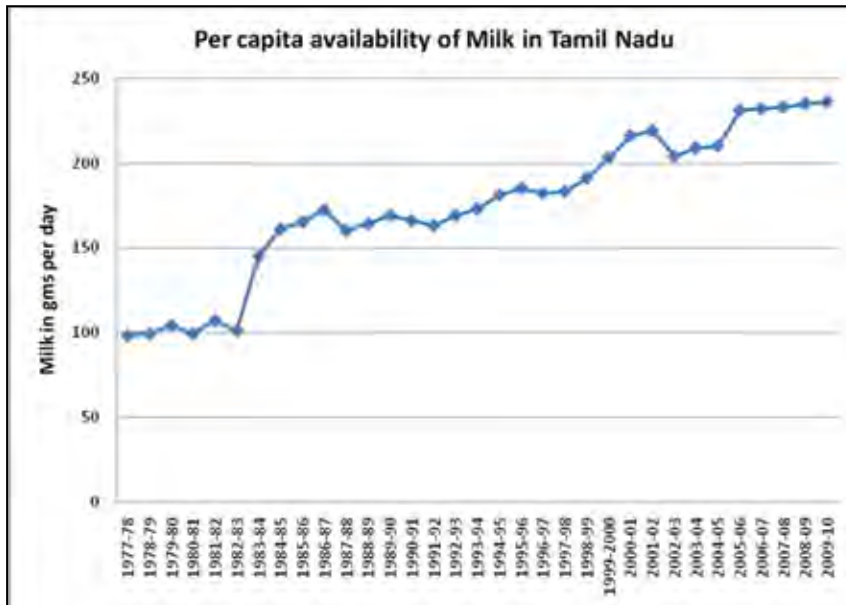
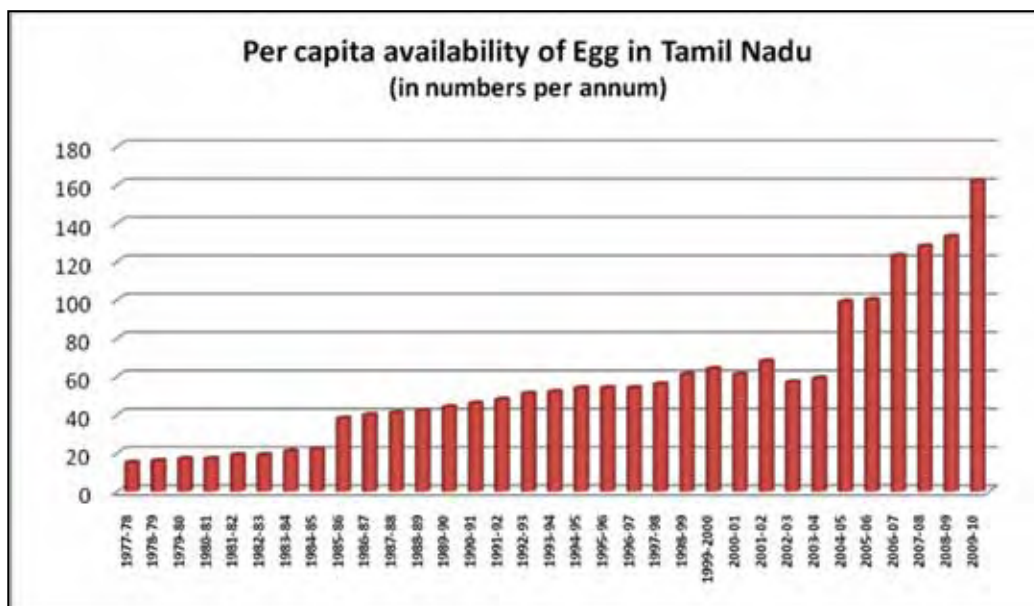


Figure 1.8



The per capita availability of egg in Tamil Nadu was found to 15 numbers per annum during 1977-78 to 162 eggs per annum in the year 2009-10. The increase in per capita availability of egg was visualized tremendously during last six years as shown in figure 1.8.

### 1.3.4 Annual compound growth rates in productivity and per capita availability of milk and egg in Tamil Nadu

The annual compound growth rate in productivity and per capita availability of milk and egg in Tamil Nadu is displayed in Table 1.6. The growth rate in productivity of cross bred cow was found to the highest in crossbred cow (1.74 per cent) during 1990-91 to 2009-10, followed by buffalo (1.57 per cent) and indigenous cow (1.08 per cent). The growth rate in productivity of desi hen was found to be negative (-0.10 per cent) during the period 1990-91 to 1999-2000 and turned to positive (0.68 per cent) during 2009-10. However the growth rate in productivity of improved hen stood at 0.25 to 0.30 per cent during the same mentioned period.

The annual compound growth rate in per capita availability of milk and egg is given in Table 1.6. It implied that the growth rate in per capita availability of milk was 1.44 per cent during last 10 years, 2.08 per cent in last 20 years and 2.69 per cent in last 30 years. In case of egg, growth rate in per capita availability was found to be 12.71, 6.16 and 6.72 per cent for last 10, 20 and 30 years, respectively.

**Table 1.6**  
**Annual Compound Growth rates in productivity and per capita availability of milk and egg in Tamil Nadu (in per cent)**

<b>Productivity</b>	<b>1977-78 to 1979-80</b>	<b>1980-81 to 1989-90</b>	<b>1990-91 to 1999-2000</b>	<b>2000-01 to 2009-10</b>	<b>1977-78 to 2009-10</b>	<b>1990-91 to 2009-10</b>
Cow	3.21	4.97	N/A	N/A	N/A	N/A
Indigenous cow	N/A	N/A	0.93	0.59	N/A	1.08
Exotic / crossbred cow	N/A	N/A	3.13	0.49	N/A	1.74
Buffalo	6.05	1.84	2.08	0.44	1.47	1.57
Desi hen	1.44	-5.23	-0.10	0.68	-1.66	0.42
Improved hen	-1.46	0.78	0.25	0.30	0.54	0.26
<b>Per capita availability</b>						
Milk	3.02	6.66	2.14	1.44	2.69	2.08
Egg	6.46	13.19	3.22	12.71	6.72	6.16

#### 1.4 VALUE OF OUTPUT FROM LIVESTOCK SECTOR IN TAMIL NADU

The value of output from livestock sector of Tamil Nadu (at current prices) over the years is shown in Table 1.7. During the year 2010-11, the gross value of output from livestock sector in the state was Rs. 22018 crores. The annual compound growth of the value of output (at current prices) from livestock sector in Tamil Nadu was significantly high at 13.46 per cent.

**Table 1.7**  
**Value of Output from Livestock Sector in Tamil Nadu (At current prices)**

<b>Year</b>	<b>Value of Output (Rs. in Crores)</b>
2001-02	7801.85
2002-03	7386.55
2003-04	7481.09
2004-05	8745.30
2005-06	9276.16
2006-07	9654.33
2007-08	11652.14
2008-09	14489.98
2009-10	20940.00
2010-11	22017.59
<b>Growth rate in per cent</b>	<b>13.46</b>
<i>Source: Central Statistical Organisation, Various Years</i>	



# 2

## DAIRY DEVELOPMENT SCHEMES



# DAIRY DEVELOPMENT SCHEMES

## 2.1 INTRODUCTION

Animal husbandry and agriculture are synergistically involved and are the important source of income and employment in rural areas. Among them, dairying provides security to farmers, especially when agriculture fails. Dairy farming is essential to millions of poor households across the country not only as a source of income but also as a major source of protein, supplementary nutrition, fertilizer, fuel and store of wealth. During early days, farmers reared indigenous or native breeds of cattle which had low production capacity. To improve the milk production and productivity of dairy animals, Central and State Government took initiatives through implementation of various dairy development programmes over the years. As the result, milk production in the country and as the state had shown a tremendous increase. To evaluate implementation of various dairy development programmes in Tamil Nadu, the present study is being done with the following objectives:

### 2.1.1 Objectives

- ❖ Review the past performance of major Dairy Development Schemes by analysis of secondary data;
- ❖ To identify the approach, mandate, target and present status of the schemes of Dairy Development especially on Oestrus synchronization techniques, Supply of Mineral Mixtures and Fodder Development Schemes;
- ❖ To identify the gaps, constraints – SWOC analysis of the schemes;
- ❖ To get feedback from the stakeholders through interactions and Focus Group Discussions; and
- ❖ To suggest measures for further development which will serve as inputs for twelfth plan document.

### 2.1.2 Implementing agencies of various dairy development programmes

- ❖ Department of Animal Husbandry (DAH), Tamil Nadu
- ❖ Dairy Development Department (DDD), Tamil Nadu
- ❖ Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) and
- ❖ Tamil Nadu Livestock Development Agency (TNLDA)

### **2.1.3 Funding agencies of various dairy development programmes**

- ❖ Central Government
- ❖ State Government
- ❖ International agencies like World bank and other private funding agencies

## **2.2 DAIRY DEVELOPMENT PROGRAMMES IN TAMIL NADU**

### **2.2.1 Improvement in Breeding**

- ❖ Door step Artificial Insemination (ai)
- ❖ Buffalo calf management
- ❖ Distribution and management of heifer calves
- ❖ Oestrus synchronization and artificial insemination
- ❖ Production, storage and distribution of frozen semen

### **2.2.2 Feed and Fodder Development**

- ❖ Fodder seed / seedling development (fodder seed bank) and distribution
- ❖ Enhancing fodder cultivation by farmers at their field
- ❖ Efficient utilization of fodder through chaff cutter, silage making, etc.
- ❖ Efficient utilization of feed like by-pass protein supplementation
- ❖ Mineral mixture production and distribution

### **2.2.3 Animal health care**

- ❖ Infrastructure and manpower for providing dairy animal health care
- ❖ Conduct of mass contact programmes through “Kalnadai Padukappu Thittam”
- ❖ Livestock insurance schemes
- ❖ Vaccine and diagnostics production, efficient vaccination and deworming

### **2.2.4 Marketing and infrastructure development in milk collection and processing**

- ❖ Strengthening of co-operatives for efficient milk collection
- ❖ Clean milk production and efficient milking through milking machines
- ❖ Efficient milk storage through bulk coolers
- ❖ Efficient milk transportation through cold chain network
- ❖ Quality laboratory for maintaining milk quality
- ❖ Value added milk products manufacture



### **2.2.5 Technological empowerment**

- ❖ Empowerment of technical staff
- ❖ Training to dairy farmers for skill creation and improvement
- ❖ Exposure visit to farmers

### **2.3. GOVERNMENT ORDERS**

The Government Orders (G.O) for the important Dairy Development Programmes are listed below;

- ❖ G.O (MS) No.198 dated 31.10.2011 of the Agriculture (AP1) Department, Government of Tamil Nadu
- ❖ G.O (MS) No.200 dated 31.10.2011 of the Animal Husbandry, Dairying and Fisheries (AH2) Department, Government of Tamil Nadu
- ❖ No.20-21/2011 –DP dated 25.10.2011 of the Department of Animal Husbandry, Dairying and Fisheries, Government of India
- ❖ G.O (MS) No.115 to 125 dated 20.10.2011 of the Animal Husbandry, Dairying and Fisheries (MP-I) Department, Government of Tamil Nadu
- ❖ No. 3-10/2007-DP dated 23.12.2010 of the Department of Animal Husbandry, Dairying and Fisheries, Government of India
- ❖ G.O (MS) No. 97 dated 29.06.2010 of the Animal Husbandry, Dairying and Fisheries (AH2) Department, Government of Tamil Nadu
- ❖ No. 3-10/2010-DP dated 29.03.2010 of the Department of Animal Husbandry, Dairying and Fisheries, Government of India
- ❖ G.O (MS) No. 103 dated 28.08.2009 of the Animal Husbandry, Dairying and Fisheries (AH2) Department, Government of Tamil Nadu
- ❖ G.O (MS) No. 111 dated 13.08.2008 of the Animal Husbandry, Dairying and Fisheries (AH2) Department, Government of Tamil Nadu
- ❖ G.O (MS) No.71 dated 29.05.2008 of the Animal Husbandry, Dairying and Fisheries (AH2) Department, Government of Tamil Nadu
- ❖ G.O (MS) No. 154 dated 05.10.2007 of the Animal Husbandry, Dairying and Fisheries (AH2) Department, Government of Tamil Nadu
- ❖ No. 3-10/2007-DP dated 30.03.2007 of the Department of Animal Husbandry, Dairying and Fisheries, Government of India

- ❖ G.O (MS) No.76 dated 29.05.2007 of the Animal Husbandry, Dairying and Fisheries (AH4) Department, Government of Tamil Nadu
- ❖ G.O (MS) No.34 dated 15.03.2007 of the Animal Husbandry, Dairying and Fisheries (AH2) Department, Government of Tamil Nadu
- ❖ G.O (MS) No. 331 dated 19.05.2006 of the Revenue (NC.IV) Department, Government of Tamil Nadu

## 2.4 SELECTED DAIRY DEVELOPMENT AND FODDER DEVELOPMENT PROGRAMMES

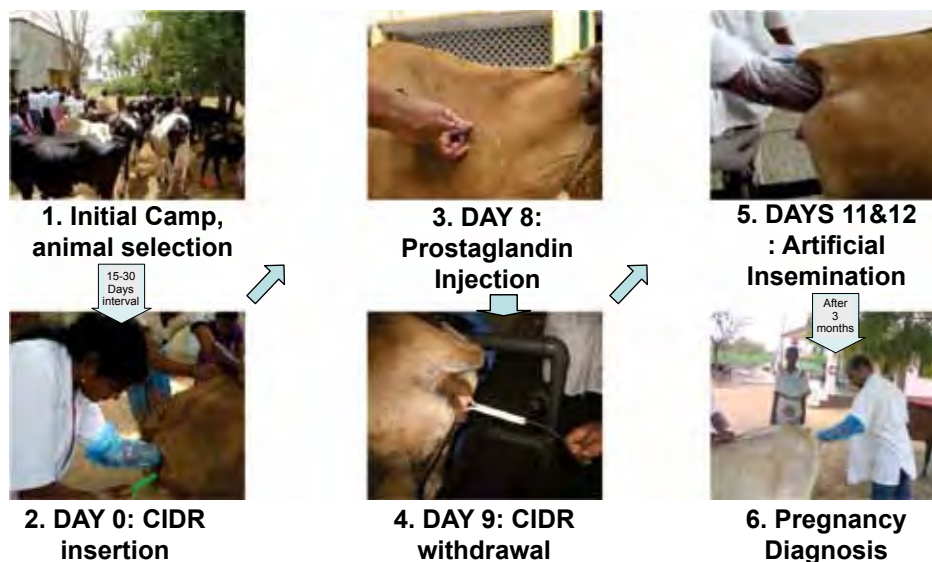
Among various dairy development programmes, the following three programmes are taken into consideration for the evaluation.

- ❖ Oestrus synchronization techniques
- ❖ Supply of mineral mixtures and
- ❖ Fodder development schemes

### 2.4.1 Oestrus Synchronization Techniques

About 30 per cent of milch animals suffer from reproductive failure, resulting in very long calving interval of more than two years as against the desired one year. Hence, adoption of Oestrus synchronization technique in cows and buffaloes leads to improved fertility, reduced inter-calving period, improved milk production and enhanced economic returns to the farmer. Oestrus synchronization technology involves the use of certain drugs to bring a group of cows and buffaloes into oestrus at a predetermined time and breeding them.

#### SYNCHRONIZATION PROTOCOL EMPLOYED IN SELECTED COWS



Oestrus synchronization programme was implemented by TANUVAS in co-ordination with the Department of Animal Husbandry, Government of Tamil Nadu and Dairy Development Department through the funding from National Agriculture Development Programme (NADP) during the year 2008-09 (Fund Outlay: Rs.250 lakhs) and 2010-11 (Fund Outlay: Rs.50 lakhs). During the year 2008-09, 15000 animals (cows and buffaloes) in 20 districts of Tamil Nadu were synchronized, while during 2010-11, 3750 animals (cows and buffaloes) in five districts of Tamil Nadu were synchronized.

**Important achievements for the programme in the year 2008-09**

- ❖ *Pregnancy Achieved:* Induction of heat was 100 per cent in anoestrus cows. A conception rate of 60.23 per cent achieved in infertile cows and buffaloes is a significant achievement.
- ❖ *Improvement in Milk Production:* This project resulted in improvement in milk production is estimated to about 46.00 lakh litres on annual basis.
- ❖ *Salvaging infertile cows:* This project could have salvaged at least 20-30 per cent of cows and buffaloes from going to slaughter as unproductive animals.

**Estimate of economic returns from this project**

S.No	Economic Impact and return to the farmer	Rs. in Crores
1	The increase in value of the animal as it becomes pregnant	7.20
2	Savings through reduction in calving interval	2.05
3	Incremental days of milk production as calving interval is reduced	7.39
4	Economic gain through sale of female calves	2.99
	<b>Total economic benefit</b>	<b>19.63</b>

If the synchronization technology is adopted in fairly large number of cows i.e. in 2.0 lakh cows, it would improve the total milk production by 700 lakh litres in a year, which would help to meet the increasing demand for milk and also help to control price inflation.

**2.4.2 Supply of mineral mixtures**

Majority of cows and buffaloes in Tamil Nadu are suffering from mineral deficiency leading to infertility problems, lesser conception rate, increase in inter-calving period, decrease in production and productivity of milch animals. To eliminate such problems caused by mineral deficiency under field conditions, mineral mapping scheme was implemented through the funding of NADP and

implemented by TANUVAS. Mineral deficiency map was drawn based on the mineral status of soil, grass and blood / serum of dairy animals in all the districts of Tamil Nadu. Based on the results of the study, cost effective “TANUVAS SMART” mineral mixture was introduced for the benefit of dairy farmers of Tamil Nadu. Supply of one kg or two kilograms of mineral mixtures to dairy cattle and buffalo farmers in Tamil Nadu through various development schemes helped the farmers in rectification of mineral mixture deficiency and improvement in conception rate, animal productivity and milk production.

### 2.4.3 Fodder Development Schemes

Availability of fodder for dairy animals is a major constraint experienced by the dairy farmers of Tamil Nadu due to urbanization, shrinkage in grazing land, competition for land with agricultural crops. Fodder Development Programmes are funded by Central (NADP) and State Governments (TNIAMWARM) and implemented by Department of Animal Husbandry, Dairy Development Department and TANUVAS. The fodder development is achieved through production of fodder seeds/ seedlings / slips in Government farms, Establishment of fodder seed banks in Government farms / farmers’ field, supply of fodder seeds / seedlings / slips, etc.

## 2.5 PAST PERFORMANCE OF MAJOR ONGOING DAIRY DEVELOPMENT SCHEMES

The performance of the various dairy development programmes is indirectly linked to the changes in dairy animal population, improvement in the productivity and performance of milk production before and after the scheme implementation.

## 2.6 METHODOLOGY

### *Data collection*

The secondary data pertaining to various districts of Tamil Nadu and overall state was collected from various departments viz., Directorate of Animal Husbandry and Veterinary Services, Chennai, Dairy Development Department, Chennai, Tamil Nadu Livestock Development Agency, Chennai (at the State and district level), Evaluation and Applied Research Department, Tamil Nadu, Department of Economics and Statistics, Government of Tamil Nadu, etc.

### *Analytical tools*

The Annual Compound Growth Rates (ACGR) of animal population was calculated for last two census from 2004 to 2007 by using the following formula of Point to Point growth rate.

$$G = \{ e^{[\ln(Y_t / Y_o)] / t} - 1 \} \times 100$$

where, G = Annual compound growth rate  
 $Y_o$  = Population of livestock species in base year  
 $Y_t$  = Population in the t<sup>th</sup> year (current year)  
t = Number of years (current year - base year)

The growth rates were also calculated for continuous data on estimated animal population, animal production and productivity over years. The Annual Compound Growth Rate was worked out using the following formula.

$$\text{Annual Compound growth rate (G)} = (1/Y_t)^t * (dY/dt) * 100$$

where, G = Annual compound growth rate

$Y_t$  = Estimated Population / Production / Productivity of livestock

t = Number of years (1...n)

## 2.7 DAIRY DEVELOPMENT IN TAMIL NADU

### 2.7.1 Cattle and Buffalo population scenario in Tamil Nadu during last two census

The annual compound growth rate (point to point) of cattle and buffalo population during last two census period was estimated to be 6.31 per cent for cattle and 6.60 per cent for buffaloes, which implied that the cattle and buffalo population was in increasing trend. Among them, the exotic / cross-bred milch cattle population and milch buffalo population was increased at the annual compound growth rate of 9.32 per cent and 0.55 per cent, respectively. In contrast, the indigenous milch cattle population was declined at the rate of 2.57 per cent per annum. The reasons for the above scenario might be the successful implementation of cross-breeding programme including oestrus synchronization programme.

S.No.	Particulars	2004 (in numbers)	2007 (in numbers)	ACGR (point to point)
1.	Cattle	9141043	10983963	<b>6.31</b>
2.	Buffalo	1658415	2009002	<b>6.60</b>
3.	Exotic / Cross bred milch cattle	2352493	3073479	<b>9.32</b>
4.	Indigenous milch cattle	1341272	1240432	- 2.57
5.	Milch buffalo	792847	806077	<b>0.55</b>

Source : 17<sup>th</sup> and 18<sup>th</sup> Livestock Census, Basic Animal Husbandry Statistics, Government of India

Note : ACGR – Annual Compound Growth Rate in percentage

### 2.7.2 Estimated milch cattle and buffalo population over the years in Tamil Nadu

The annual compound growth rate of estimated milch cattle and buffalo population over last 10 years and 5 years was worked out and the results are shown in the table. From the table, it is evident that the annual compound growth rate (over last five years and 10 years) of population of productive exotic / crossbred cows (in milk, dry and total) was found to be positive which revealed the success rate of dairy development and cross breeding programmes. However, the total productive buffaloes

including in milk and dry were found to be negative but at less than one per cent, which might be due to the lesser coverage of buffaloes under the dairy development schemes. The growth rate of estimated total indigenous milch cattle population was -6.54 per cent, which implied the drastic reduction in indigenous cow population. As a whole, it is evident that dairy development programmes might be one of the reason for the above status of population.

S.No.	Particulars	2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10
1.	Indigenous cow in milk (in '00)	7780	- 7.44	- 1.26
2.	Indigenous dry cow (in '00)	4630	- 4.85	- 2.09
3.	Total Indigenous productive cows (in '00)	12410	- 1.59	- 6.54
4.	Crossbred / Exotic cow in milk (in '00)	18140	<b>11.95</b>	<b>1.63</b>
5.	Crossbred / Exotic dry cow (in '00)	7160	<b>20.70</b>	<b>0.27</b>
6.	Crossbred / Exotic productive cows (in '00)	25300	<b>13.95</b>	<b>1.24</b>
7.	Buffalo in milk (in '00)	4920	- 11.61	- 0.68
8.	Dry Buffalo (in '00)	2690	- 9.10	- 0.50
9.	Total productive buffalo (in '00)	7610	- 10.88	- 0.70

Source : Integrated Sample Survey Reports of various years, Government of Tamil Nadu  
 Note : ACGR – Annual Compound Growth Rate in percentage

### 2.7.3 Estimated Productivity Scenario of cattle and buffalo (in kgs per day / animal)

S.No.	Particulars	2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10
1.	Indigenous milch cattle	1.741	<b>0.05</b>	<b>0.45</b>
2.	Exotic or crossbred milch cattle	4.577	- 0.47	<b>0.77</b>
3.	Milch buffalo	2.748	- 0.38	<b>0.35</b>

Source : Integrated Sample Survey Reports of various years, Government of Tamil Nadu  
 Note : ACGR – Annual Compound Growth Rate in percentage

The estimated productivity of indigenous, milch or crossbred milch cattle and milch buffalo were worked out and presented in the table. During last five years, the annual compound growth rate in productivity of the above classes of cattle and buffalo population were estimated to be positive at the rate of 0.45, 0.77 and 0.35 per cent, respectively indicating the improvement in productivity of indigenous, exotic/ cross bred milch cattle and milch buffaloes. The above results matched with the target of dairy development programmes whose only mandate is improvement of milk production and productivity.

#### 2.7.4 Milk Production scenario (in '000 tonnes) in Tamil Nadu

S.No.	Particulars	2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10
1.	Indigenous cow milk	789.214	- 6.90	- 0.83
2.	Exotic or crossbred cow milk	4227.437	<b>12.51</b>	<b>2.02</b>
3.	Total cow milk	5016.651	<b>6.87</b>	<b>1.55</b>
4.	Total buffalo milk	761.461	- 11.22	- 0.31
5.	Total milk	5778.112	<b>2.41</b>	<b>1.29</b>

Source : Integrated Sample Survey Reports of various years, Government of Tamil Nadu  
Note : ACGR – Annual Compound Growth Rate in percentage

The total cow milk production in Tamil Nadu was estimated to be 5.02 million tonnes in the year 2009-10 with the growth rate of 1.55 per cent in last five years. Among the total cow milk production, exotic/ cross bred cow contributed 84.27 per cent in the year 2009-10 and its production growth rate over last 5 years was estimated to be 2.02 per cent. In contrast, the indigenous cow milk production had the negative growth rate of 0.83 per cent over last five years. The buffalo milk production in the above said year was 0.76 million tonnes, with the negative growth rate of 0.31 per cent over last 5 years. Overall the milk production in the state was estimated to be 5.78 million tonnes and had the positive growth rate of 1.29 per cent over last five years, which clearly reflects the success rate of various dairy development programmes.

#### 2.7.5 Fodder Development Activities in Tamil Nadu

S.No.	Activity	2009-10
1	Total area brought under fodder cultivation (ha.)	1700.68
2	Distribution	
	a. Slips (lakhs)	169.75
	b. Seeds (MTs)	0.032
	c. Tree seedlings (lakhs)	0.083
	d. Seed production units (no.s) – (DAH)	7
3	Total area of farmers owned land brought under fodder cultivation (in acres) through NADP	1540
4	Total area of farmers owned land brought under fodder cultivation (in acres) through TNIAMWARM in the year 2008-09	4745
5	Total area of farmers owned land brought under fodder cultivation (in acres) through TNIAMWARM in the year 2009-10	6180

Source : Directorate of Animal Husbandry and Veterinary Services, Chennai – 6  
Tamil Nadu Economic Appraisal ([www.tn.gov.in/dear](http://www.tn.gov.in/dear))

Balanced feeding alone could bring about an increase of 30 per cent in milk production. The economic viability of dairy farming depends upon the feed and fodder which accounts for more than 60 per cent of the production cost. For producing cattle feed, three cattle feed centres (Madhavaram, Kappalur and Erode) were set up by Tamil Nadu Co-operative Milk Producers Federation (TCMPF) and one centre (Kattupakkam) by TANUVAS. The production of fodder seeds, slips and tree seedlings was carried out in seven units (Padappai seed farm, District Livestock Farms at Hosur, Chettinadu, Abishekapatti, Eachenkottai, Chinnasalem and Udthagamandalam).

The total area brought under fodder cultivation was about 1700 hectares in Tamil Nadu in the year 2009-10 and it was estimated to be increasing at the rate of 10.99 per cent per annum over last five years. Besides, a total area of 1540 acres of farmer's owned land have been brought under irrigated fodder cultivation under (National Agriculture Development Project (NADP) and 4745 acres under TNIAMWARM project during the year 2008-09 and 6180 acres during the year 2009-10. This clearly indicates the extent of fodder development in the state. During the year 2009-10, 169.75 lakh fodder slips, 0.032 MT fodder seeds and 0.083 lakh tree seedlings were distributed to the beneficiaries. Further, it was estimated that an impressive growth rate in distribution of fodder slips (85 per cent) occurred over last five years. An outlay of Rs. 10 crores was provided for fodder development during XI plan in the State.

## **2.8 RESPONSE GROUP DISCUSSION**

Response group discussion involving various beneficiaries of dairy development programmes, officials of implementing agencies like department of animal husbandry and dairy development department and TANUVAS was arranged and held at D.Perumapalayam, Salem on 04.02.2012. 106 Beneficiaries of various Dairy Development Programmes in Tamil Nadu, officials of Animal Husbandry department, Dairy Development Department (Aavin) participated in the Programme. The Principal Investigator co-ordinated the meeting and interacted with the participants and the minutes were recorded. Observations made in the meeting are detailed below.





Beneficiaries registering for the Response Group Discussion meeting at Salem on 04.02.2012



Beneficiaries of the Dairy Development Programmes participated in Response Group Discussion



Principal Investigator explaining agenda of meeting and co-ordinating the discussion



Response and Feedback expressed by the Beneficiaries of the Dairy Development Programmes



Interaction with officials of project implementing agencies(TANUVAS, DAH and DDD)



Oestrus synchronized cow with its calf along with the beneficiary Mrs. A. Chitra, Chittampatti and Veterinarian Dr. M. Ramesh, Thirumanur

**2.9 FEEDBACK AND SUGGESTIONS EXPRESSED BY BENEFICIARIES AND LINE DEPARTMENT OFFICIALS DURING THE RESPONSE GROUP DISCUSSION ON DAIRY DEVELOPMENT PROGRAMMES AT SALEM ON 04.02.2012**

S.No	Dairy Development Programme	Feedback	Suggestions given
1	Oestrus Synchronization techniques	<p><i>Beneficiaries</i></p> <ul style="list-style-type: none"> <li>• Almost all the beneficiaries opined that their cows and buffaloes which were in the state of anoestrus came to oestrus through Oestrus synchronization technique and became pregnant after Artificial Insemination</li> <li>• Identification of oestrus animals is not required</li> <li>• Reduction in calving interval as well as dry period and improvement in milk production</li> </ul> <p><i>Line department officials</i></p> <ul style="list-style-type: none"> <li>• Scheme may be included or combined with “Kalnadai Padukappu Thittam” as expressed by the officials of line departments</li> </ul>	<p><i>Beneficiaries</i></p> <ul style="list-style-type: none"> <li>• Area of operation of the scheme should be expanded</li> <li>• Exclusive Breeding programme to result female calf birth may be introduced and combined with the oestrus synchronization</li> </ul> <p><i>Line department officials</i></p> <ul style="list-style-type: none"> <li>• In the scheme, along with the CIDR, disinfectants (Povidone Iodine), Lubricants (liquid paraffin), Gloves and Antibiotics may be given to line department officials for smooth conduct of the programme</li> </ul>
2	Supply of mineral mixture	<p><i>Beneficiaries</i></p> <ul style="list-style-type: none"> <li>• Majority of beneficiaries expressed that the administration of mineral mixture had positive impact in the reproductive and productive performance of animals</li> <li>• Apart from scheme, there is shortage and unavailability of good quality mineral mixture with optimum price</li> </ul>	<p><i>Beneficiaries</i></p> <ul style="list-style-type: none"> <li>• Mineral mixture and Feed unit may be established by Dairy Development Department for improving the supply of good quality feed and mineral mixture on optimum price</li> </ul>
3	Fodder development schemes	<p><i>Beneficiaries</i></p> <ul style="list-style-type: none"> <li>• Almost all the beneficiaries expressed that there is shortage in green fodder and unavailability of fodder slips and seeds. Thus the fodder development scheme (Supply of fodder seeds/ slips and chaff cutter) is very useful for uninterrupted fodder supply</li> <li>• Important constraints in fodder development activity is the irrigation in terms of power supply and electricity charges for animal husbandry activities</li> </ul>	<p><i>Beneficiaries</i></p> <ul style="list-style-type: none"> <li>• Fodder seed bank has to be established at regional level for uninterrupted supply of fodder seeds / seedlings</li> <li>• Awareness programme and training on fodder cultivation practices should be conducted</li> <li>• Improvement in water saving irrigation facilities through supply of Rain gun or Sprinklers</li> </ul>

## 2.10 SWOC ANALYSIS OF DAIRY DEVELOPMENT PROGRAMMES

S.No	Dairy Development Programme	Strengths	Weaknesses	Opportunities	Challenges
1	Oestrus Synchronization technique	<ul style="list-style-type: none"> <li>Bringing the anoestrus bovine to the stage of oestrus</li> <li>Greater conception rate leading to year round milk production</li> <li>Artificial Insemination using proven bull semen</li> <li>Stronger Linkage between implementing agencies viz., TANUVAS, DDD, DAH and TNLDA</li> </ul>	<ul style="list-style-type: none"> <li>Infection of animals during the insertion and removal of CIDR</li> <li>Small and scattered herds</li> <li>Poor monitoring, follow-up and impact assessment of the programme</li> </ul>	<ul style="list-style-type: none"> <li>Higher population of poor breeding / anoestrus / unproductive cows and buffaloes</li> <li>Existing scenario of prolonged inter-calving and dry period for cows and buffaloes in field conditions</li> <li>Missed heat in cows and buffaloes</li> </ul>	<ul style="list-style-type: none"> <li>Negative consequences in cross breeding programme</li> <li>Socio-cultural and psychological inhibitions</li> </ul>
2	Supply of mineral mixture	<ul style="list-style-type: none"> <li>Improvement in productive and reproductive performance due to mineral mixture supplementation</li> <li>Simple and easy to supplement</li> <li>Economical</li> <li>Location specific mineral mixture</li> <li>Implemented through line departments which is having good network</li> </ul>	<ul style="list-style-type: none"> <li>Shortage in supply</li> <li>Discontinuous supplementation</li> </ul>	<ul style="list-style-type: none"> <li>Existing reproductive problems in cows and buffaloes</li> <li>Lesser dairy animal productivity due to mineral deficiency</li> </ul>	<ul style="list-style-type: none"> <li>Lesser number of mineral mixture plant</li> <li>Quality maintenance</li> <li>Cost of production and pricing of mineral mixture</li> </ul>

S.No	Dairy Development Programme	Strengths	Weaknesses	Opportunities	Challenges
3	Fodder development schemes	<ul style="list-style-type: none"> <li>• Improvement in productive performance due to feeding of fodder</li> <li>• Cost-effective animal feeding</li> <li>• Enhancement of unutilized land through fodder cultivation</li> <li>• Availability of good quality, high yielding, improved and nutritious fodder varieties</li> <li>• Availability of specific fodder varieties based on the area, nutritive value, irrigation facility, intercrop, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Not useful for landless dairy farmers</li> <li>• Irrigation and electricity problems</li> <li>• Lack of awareness on fodder cultivation practices</li> </ul>	<ul style="list-style-type: none"> <li>• Gap in demand and supply of fodder</li> <li>• Establishment of Fodder seed bank at farmers' field</li> <li>• Extension programmes to promote scientific feeding practices</li> </ul>	<ul style="list-style-type: none"> <li>• Personal and psychological ignorance on fodder feeding</li> <li>• Labour shortage and high wage rate</li> <li>• Competition for land for crop cultivation</li> <li>• Existence of more number of marginal and landless farmers</li> <li>• Poor marketability of fodder in case of excess production</li> </ul>

## 2.11 CONCLUSION AND RECOMMENDATIONS

Based on the review of the past performance of major dairy development schemes through secondary data analysis, SWOC analysis of the schemes, feedback from the stakeholders through interaction and response group discussion, the following suggestions are put forth for further dairy development.

- ❖ Selected schemes namely Oestrus synchronization, Supplementation of mineral mixture and fodder development were observed to be highly beneficial to the dairy farmers and hence, all the three schemes might be regularly implemented in the state with wide area of operation.
- ❖ All the infrastructural facilities required for successful implementation of the programmes have to be provided to the implementing agencies.
- ❖ Timely release of funds and raw materials is required.
- ❖ People should be made aware about various dairy development programmes and fodder cultivation practices through conduct of awareness and mass contact programmes.
- ❖ Mineral mixture and Feed unit may be created by the Government for improving the supply of good quality feed and mineral mixture on optimum price.
- ❖ Fodder seed bank has to be established at regional and village level for regular supply of fodder seeds / seedlings.
- ❖ Irrigation facility and uninterrupted power supply have to be made for extensive fodder cultivation.
- ❖ Combining one or two related development programmes for efficient implementation.
- ❖ Augmenting dairy animal population through buffalo calf programme and heifer rearing programme.
- ❖ Drought resistant and high yielding fodder may be popularized.
- ❖ Due importance or share should be given for buffaloes in various dairy development programmes.
- ❖ Chaff cutters may be made available in all the blocks and may be popularized.
- ❖ Importance of legume fodders needs to be highlighted in all fodder development activities.
- ❖ Grazing land may be improved and protected to help landless livestock farmers.
- ❖ Proper monitoring and reporting about the scheme activities would further ensure the successfulness of the scheme.

**ANNEXURE**  
**Total cattle and buffalo population scenario in various districts of Tamil Nadu (in numbers)**

SI.No	District	Cattle Population			Buffalo Population		
		2004	2007	ACGR	2004	2007	ACGR
1	Chennai	3973	3068	-8.26	2736	2906	2.03
2	Coimbatore	362570	343385	-1.80	40912	36484	-3.75
3	Cuddalore	343131	337692	-0.53	38407	19784	-19.84
4	Dharmapuri	297796	452410	14.96	100074	64731	-13.52
5	Dindigul	245116	250399	0.71	68112	80731	5.83
6	Erode	398572	549451	11.29	230004	242464	1.77
7	Kanchipuram	364813	621651	19.44	115650	154434	10.12
8	Kanyakumari	101712	89704	-4.10	6077	2509	-25.54
9	Karur	117781	121272	0.98	65486	55581	-5.32
10	Krishangri	299512	-	-	18935	-	-
11	Madurai	226507	349095	15.51	12380	6205	-20.57
12	Nagapattinam	292335	300946	0.97	56666	31841	-17.48
13	Namakkal	222381	285958	8.74	182202	219878	6.47
14	Perambalur	284208	126908	-23.57	22341	5046	
15	Pudukkottai	333326	682174	26.96	31958	83955	37.98
16	Ramnad	128566	132064	0.90	3877	3549	-2.90
17	Salem	593847	564223	-1.69	176521	146589	-6.01
18	Sivagangai	280572	227913	-6.69	15183	7835	-19.79
19	Thanjavur	489693	446750	-3.01	34476	28154	-6.53
20	The Nilgiris	53075	37372	-11.04	3412	1146	-30.49
21	Theni	101683	136791	10.39	11955	5351	-23.51
22	Thiruvallur	261915	324222	7.37	111877	194532	20.25
23	Thiruvannamalai	481443	717336	14.22	23229	22686	-0.79
24	Thiruvarur	332124	269555	-6.72	18286	7665	-25.16
25	Thoothukudi	163343	959029	80.40	20933	319163	147.97
26	Thiruchirapalli	354301	429823	6.65	49577	46971	-1.78
27	Thirunelveli	418694	504332	6.40	78777	114758	13.36
28	Vellore	501634	573686	4.58	29392	34032	5.01
29	Villupuram	824136	865683	1.65	49003	33056	-12.30
30	Virudhunagar	262284	281071	2.33	39977	20859	-19.49
31	Ariyalur	-	204746	-	-	16107	-
	<b>Total</b>	<b>9141043</b>	<b>10983963</b>	<b>6.31</b>	<b>1658415</b>	<b>2009002</b>	<b>6.60</b>

Note : ACGR – Annual Compound Growth Rate in percentage

**Milch cattle and buffalo population scenario in various districts of Tamil Nadu (in numbers)**

Sl.No	District	Exotic and crossbred milch cattle			Indigenous milch cattle			Milch buffalo		
		2004	2007	ACGR	2004	2007	Growth rate	2004	2007	ACGR
1	Chennai	774	315	-25.89	1169	1165	-0.11	1493	1237	-6.08
2	Coimbatore	159538	135109	-5.39	10275	7135	-11.45	19836	16938	-5.13
3	Cuddalore	85337	87587	0.87	52000	31535	-15.36	17717	7369	-25.35
4	Dharmapuri	88807	128698	13.16	44261	59337	10.26	53277	29487	-17.90
5	Dindigul	79375	97968	7.27	23845	16240	-12.02	33636	36321	2.59
6	Erode	104561	169654	17.51	51972	37519	-10.29	105933	90992	-4.94
7	Kanchipuram	31302	112726	53.28	93377	118925	8.40	52616	64764	7.17
8	Kanyakumari	48346	38576	-7.25	1777	2534	12.56	2649	965	-28.58
9	Karur	31669	41173	9.14	20458	14758	-10.31	33357	27778	-5.92
10	Krishangri	72793	-	-	62345	-	-	9759	-	-
11	Madurai	78197	133256	19.44	21832	25656	5.53	6378	2840	-23.64
12	Nagapattinam	54061	71130	9.58	64519	47167	-9.92	26934	13027	-21.50
13	Namakkal	80447	107570	10.17	18617	12874	-11.57	93866	90793	-1.10
14	Perambalur	78413	36039	-22.83	42982	4194	-53.96	11208	1217	-52.29
15	Pudukkottai	25664	91003	52.49	81574	125237	15.36	12432	28899	32.47
16	Ramnad	25501	51286	26.23	27041	252	-78.96	1796	1369	-8.65
17	Salem	208251	190372	-2.95	57662	34859	-15.44	88497	56507	-13.89
18	Sivagangai	27673	28439	0.91	65027	54276	-5.85	4737	3085	-13.32
19	Thanjavur	104489	116001	3.55	74235	52459	-10.93	17119	12263	-10.52
20	The Nilgiris	23347	13167	-17.38	7013	2791	-26.44	1603	495	-32.41
21	Theni	37373	58042	15.81	7134	8128	4.44	4449	2300	-19.74
22	Thiruvallur	34628	76832	30.43	67996	30765	-23.23	56444	66278	5.50
23	Thiruvannamalai	108139	210172	24.80	60899	55294	-3.17	9494	7113	-9.18
24	Thiruvarur	72726	70181	-1.18	60387	35630	-16.13	8489	3675	-24.35
25	Thoothukudi	47536	247942	73.42	21038	115015	76.16	9823	125581	133.83
26	Thiruchirappalli	114366	137362	6.30	33212	34372	1.15	22185	19823	-3.68
27	Thirunelveli	136898	162342	5.85	52135	61896	5.89	37301	54253	13.30
28	Vellore	163635	182199	3.65	50773	53547	1.79	14944	14169	-1.76
29	Villupuram	136509	155152	4.36	142071	127138	-3.63	18913	12170	-13.67
30	Virudhunagar	92138	79541	-4.78	23646	32183	10.82	15962	7339	-22.82
31	Ariyalur	-	41638	-	-	37551	-	-	7030	-
	<b>Total</b>	<b>2352493</b>	<b>3073479</b>	<b>9.32</b>	<b>1341272</b>	<b>1240432</b>	<b>-2.57</b>	<b>792847</b>	<b>806077</b>	<b>0.55</b>

Note : ACGR – Annual Compound Growth Rate in percentage

**Estimated productive Indigenous cow population in various districts of Tamil Nadu (in '00)**

SI.No	District	In milk		In dry		Total Indigenous productive cows			
		2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10		
1	Chennai	10	-27.97	3.34	0	-	10	-2.82	-21.51
2	Coimbatore	70	-23.65	-4.55	30	-23.65	110	-3.48	-23.28
3	Cuddalore	300	-8.56	-2.41	210	-8.35	500	-0.28	-8.61
4	Dharmapuri	190	-17.98	0.10	180	-12.84	370	-3.29	-15.90
5	Dindigul	120	-13.29	-0.16	90	-10.35	210	-1.23	-12.08
6	Erode	310	-3.90	1.66	250	0.26	550	-5.36	-2.20
7	Kanchipuram	510	-5.54	-2.26	400	-0.70	910	1.60	-3.88
8	Kanyakumari	10	-29.78	2.67	10	-25.03	20	4.51	-28.08
9	Karur	140	-5.98	-2.33	60	-10.52	200	-2.45	-7.66
10	Krishangri	300	-	-2.12	270	-	570	-2.15	-
11	Madurai	140	-15.99	1.24	60	-10.70	190	-4.36	-14.24
12	Nagapattinam	370	-4.78	-0.90	120	-6.77	490	-3.81	-5.47
13	Namakkal	110	-15.40	-1.96	70	-10.05	180	-1.71	-13.59
14	Perambalur	220	-5.88	-5.03	140	-7.11	360	-2.85	-6.45
15	Pudukkotal	540	-1.90	-0.08	190	-3.31	730	-1.24	-2.44
16	Ramnad	190	-8.88	0.92	70	-7.80	270	-0.64	-8.54
17	Salem	320	-6.80	-0.45	220	0.82	530	-1.99	-4.25
18	Sivagangai	380	-2.23	-2.36	220	3.98	610	-1.32	-0.29
19	Thanjavur	480	-0.92	0.33	190	-4.14	670	-0.69	-2.00
20	The Nilgiris	40	-7.28	-0.98	20	-5.94	60	-5.18	-6.98
21	Theni	50	-21.71	-2.62	20	-24.43	70	0.20	-22.61
22	Thiruvallur	400	-2.96	-2.20	260	2.72	660	-0.27	-1.13
23	Thiruvannamalai	380	-11.25	-2.62	200	-7.80	570	-0.96	-10.28
24	Thiruvarur	370	-2.28	-2.24	150	-7.20	520	-2.55	-4.03
25	Thoothukudi	130	-12.82	2.75	40	-12.29	170	-1.95	-12.61
26	Thiruchirappalli	200	-12.91	-3.76	100	-12.65	300	-0.72	-12.81
27	Thirunelveli	320	-5.06	0.76	110	-7.92	430	-1.54	-6.01
28	Vellore	290	-11.35	-4.19	220	-2.64	520	-1.19	-9.01
29	Villupuram	770	-6.85	-0.89	640	3.75	1410	-1.90	-3.60
30	Virudhunagar	120	-7.04	4.91	90	1.19	210	3.41	-4.06
	<b>Total</b>	<b>7780</b>	<b>-7.44</b>	<b>-1.26</b>	<b>4630</b>	<b>-4.85</b>	<b>12400</b>	<b>-2.09</b>	<b>-6.54</b>

Note : ACGR – Annual Compound Growth Rate in percentage



**Estimated Productive Cross-bred/ Exotic cow population in various districts of Tamil Nadu (in '00)**

SI.No	District	In milk		In dry		Total crossbred productive cows			
		2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10		
1	Chennai	10	-22.78	12.48	0	-	10	-25.85	4.56
2	Coimbatore	1230	13.35	1.18	460	22.42	1690	15.16	2.11
3	Cuddalore	640	7.30	1.02	280	17.81	920	9.73	1.80
4	Dharmapuri	630	16.34	1.42	320	35.79	950	20.51	1.11
5	Dindigul	640	10.55	1.31	210	18.99	850	12.28	0.99
6	Erode	830	4.21	1.28	340	12.87	1170	6.26	0.30
7	Kanchipuram	260	4.59	4.47	90	19.26	360	7.80	2.87
8	Kanyakumari	450	4.43	1.66	80	4.05	530	4.22	1.36
9	Karur	250	14.44	2.47	110	24.05	350	16.51	1.15
10	Krishangri	600	-	3.98	210	-	800	-	1.54
11	Madurai	660	4.67	1.09	180	8.20	840	5.25	1.78
12	Nagapattinam	390	19.74	2.51	160	27.76	550	21.61	0.72
13	Namakkal	640	10.15	1.92	210	13.25	850	10.83	1.32
14	Perambalur	600	17.31	3.11	220	23.14	820	18.60	1.08
15	Pudukkottai	250	3.90	2.50	70	9.10	320	5.00	0.70
16	Ramnad	230	2.25	4.69	80	3.75	310	2.39	4.44
17	Salem	1480	26.27	2.43	610	36.68	2090	28.79	1.39
18	Sivagangai	240	11.18	2.60	100	17.70	340	11.87	1.67
19	Thanjavur	710	11.52	0.01	340	27.15	1050	15.24	-1.36
20	The Nilgiris	220	4.17	4.25	50	6.25	270	4.39	3.12
21	Theni	330	2.82	2.01	110	10.99	440	4.27	1.55
22	Thiruvallur	290	6.35	2.15	100	14.15	390	8.00	2.09
23	Thiruvannamalai	850	7.93	1.61	350	27.35	1210	11.30	0.13
24	Thiruvarur	540	12.63	1.37	210	24.25	750	17.92	0.49
25	Thoothukudi	390	13.38	2.41	140	21.77	540	15.19	2.20
26	Thiruchirappalli	830	16.81	1.43	390	30.91	1220	19.95	1.55
27	Thirunelveli	1060	20.76	1.45	430	30.51	1490	22.80	2.00
28	Vellore	1180	8.65	0.31	520	16.51	1700	10.41	1.22
29	Villupuram	990	17.89	0.62	530	24.64	1520	19.82	0.89
30	Virudhunagar	720	20.42	0.68	260	27.78	980	21.82	1.19
	<b>Total</b>	<b>18140</b>	<b>11.95</b>	<b>1.63</b>	<b>7160</b>	<b>20.70</b>	<b>25310</b>	<b>13.95</b>	<b>1.24</b>

Note : ACGR – Annual Compound Growth Rate in percentage

**Estimated Productive Buffalo population in various districts of Tamil Nadu (in '00)**

Sl.No	District	In milk		In dry		Total productive buffaloes	
		2009-10	ACGR for the period 2000-01 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10
1	Chennai	10	-32.26	10	-32.82	20	-31.88
2	Coimbatore	120	-19.39	60	-17.75	180	-18.87
3	Cuddalore	100	-11.71	70	-8.71	170	-11.01
4	Dharmapuri	300	-6.29	190	-2.48	490	-4.96
5	Dindigul	200	-12.86	80	-11.73	280	-12.49
6	Erode	720	-4.41	250	-7.04	970	-5.32
7	Kanchipuram	290	-8.93	170	-5.79	460	-10.21
8	Kanyakumari	20	-17.79	10	-20.26	30	-18.60
9	Karur	230	-6.94	110	-3.84	340	-5.99
10	Krishangri	90	-	20	-	110	-
11	Madurai	80	-19.13	30	-21.94	110	-19.94
12	Nagapattinam	130	-13.97	110	-3.13	240	-10.18
13	Namakkal	620	-6.51	320	-6.99	940	-6.73
14	Perambalur	60	-20.19	40	-15.12	100	-18.51
15	Pudukkottai	90	-19.20	50	-15.97	140	-18.50
16	Ramnad	20	-22.79	20	-17.92	40	-21.01
17	Salem	560	-2.90	300	3.82	850	-1.39
18	Sivagangai	30	-17.94	10	-14.06	40	-16.89
19	Thanjavur	100	-16.84	90	-11.44	190	-15.12
20	The Nilgiris	10	-	0	-	10	-
21	Theni	40	-21.35	20	-24.81	50	-22.97
22	Thiruvallur	330	-10.16	230	-2.86	560	-8.03
23	Thiruvannamalai	60	-20.56	40	-17.98	110	-19.53
24	Thiruvarur	50	-21.05	40	-18.72	80	-20.73
25	Thoothukudi	60	-17.24	40	-15.74	100	-16.84
26	Thiruchirappalli	140	-14.14	90	-10.80	220	-13.32
27	Thirunelveli	190	-12.71	120	-9.90	310	-11.82
28	Vellore	90	-21.84	60	-17.64	150	-20.56
29	Villupuram	80	-20.94	60	-17.23	140	-19.71
30	Virudhunagar	100	-8.88	50	-11.25	150	-9.81
	<b>Total</b>	<b>4920</b>	<b>-11.61</b>	<b>2690</b>	<b>-9.10</b>	<b>7580</b>	<b>-10.88</b>
			<b>-0.68</b>		<b>-0.50</b>		<b>-0.70</b>

Note : ACGR – Annual Compound Growth Rate in percentage

**Estimated Productivity Scenario of cattle and buffalo in various districts of Tamil Nadu (in kgs per day / animal)**

Sl.No	District	Indigenous milch cattle		Exotic or crossbred milch cattle		Milch buffalo	
		2009-10	ACGR for the period 2000-01 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10
1	Chennai	2.218	3.67	5.581	2.53	2.855	-4.25
2	Coimbatore	2.070	0.59	4.976	0.52	2.748	-5.54
3	Cuddalore	1.578	0.88	4.652	-0.58	2.486	-7.34
4	Dharmapuri	1.416	-1.22	3.983	-1.36	2.801	4.90
5	Dindigul	1.436	-1.95	3.828	-2.63	2.595	-4.48
6	Erode	1.458	0.15	4.604	-0.03	3.773	2.63
7	Kanchipuram	1.640	-0.50	4.160	-2.14	2.466	-1.87
8	Kanyakumari	2.226	0.89	7.209	6.18	2.570	5.24
9	Karur	1.918	0.24	4.561	1.80	3.031	-1.53
10	Krishangri	1.259	-	4.289	-	3.065	-
11	Madurai	1.930	1.29	4.971	1.29	2.593	-1.94
12	Nagapattinam	2.096	3.44	4.728	1.95	2.380	-2.25
13	Namakkal	1.641	-3.48	4.059	-2.36	2.845	5.70
14	Perambalur	1.557	-0.06	4.922	-0.14	2.345	-
15	Pudukkottai	2.193	1.25	5.207	1.59	2.489	0.96
16	Ramnad	2.093	1.64	4.133	0.06	2.395	-0.97
17	Salem	1.771	-0.79	4.408	-2.66	2.881	5.34
18	Sivagangai	1.767	-1.73	4.802	1.56	2.662	-0.53
19	Thanjavur	1.851	3.41	4.421	-1.32	2.256	-1.89
20	The Nilgiris	1.875	-	9.866	7.11	2.420	-
21	Theni	2.337	0.88	4.416	-1.31	2.510	-1.44
22	Thiruvallur	1.759	0.52	4.618	-1.90	2.312	-1.09
23	Thiruvannamalai	1.700	-1.23	5.042	1.76	2.188	-3.07
24	Thiruvarur	1.871	4.50	4.166	-0.28	2.035	-0.01
25	Thoothukudi	1.785	-2.06	4.375	0.11	2.651	-2.22
26	Thiruchirappalli	1.870	-1.13	4.152	-2.38	2.634	-2.98
27	Thirunelveli	2.064	4.97	4.150	2.55	2.142	-1.14
28	Vellore	1.699	-1.59	3.870	-0.92	2.348	-0.58
29	Villupuram	1.630	-1.18	4.258	-1.00	1.964	-3.04
30	Virudhunagar	1.478	-4.47	4.617	1.35	2.330	-2.63
	<b>Total</b>	<b>1.741</b>	<b>0.05</b>	<b>4.577</b>	<b>-0.47</b>	<b>2.748</b>	<b>-0.38</b>
							<b>0.35</b>

Note : ACGR – Annual Compound Growth Rate in percentage

Milk production scenario of cattle in various districts of Tamil Nadu (in '000 tonnes)

S.I.No	District	Indigenous cow			Exotic or crossbred cow			Total cow milk		
		2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10	ACGR for the period 2005-06 to 2009-10
1	Chennai	1,016	-27.83	7.78	2,243	-23.90	12.87	3,259	-25.52	11.12
2	Coimbatore	8,020	-22.36	-7.36	306,477	15.21	-0.85	314,497	10.30	-1.03
3	Cuddalore	28,931	-8.42	-2.75	156,683	7.95	0.27	185,614	3.24	-0.25
4	Dharmapuri	19,322	-18.36	2.56	138,209	16.24	0.80	157,531	2.94	1.01
5	Dindigul	10,810	-13.65	-0.19	118,357	9.67	-1.96	129,167	5.26	-1.82
6	Erode	29,437	-3.36	11.01	195,871	4.70	1.98	225,308	3.02	3.00
7	Kanchipuram	54,333	-4.12	-1.10	54,495	4.70	3.47	108,828	-0.57	1.04
8	Kanyakumari	1,327	-28.12	15.80	139,048	7.70	8.52	140,375	5.75	8.58
9	Karur	14,106	-7.33	0.18	58,201	17.81	2.25	72,307	8.69	1.77
10	Krishangri	26,245	-	-3.53	155,077	-	5.04	181,322	-	3.38
11	Madurai	13,605	-15.61	-3.89	152,445	4.04	0.99	166,050	0.62	0.53
12	Nagapattinam	37,703	-3.76	-1.92	95,992	22.13	4.58	133,695	8.81	2.53
13	Namakkal	10,957	-15.93	-6.42	126,218	8.83	-2.57	137,175	3.93	-2.90
14	Perambalur	20,640	-5.80	-7.84	147,092	18.12	3.73	167,732	11.43	1.89
15	Pudukkottai	58,751	-0.70	2.21	61,905	4.68	7.23	120,656	1.61	4.62
16	Ramnad	20,318	-7.23	2.78	46,037	0.92	0.57	66,355	-2.33	1.24
17	Salem	34,454	-5.92	-0.09	336,812	25.10	1.01	371,266	16.81	0.90
18	Sivagangai	39,000	-2.21	-3.71	58,604	10.77	5.23	97,604	3.82	1.21
19	Thanjavur	45,193	-0.42	8.40	169,494	12.98	2.14	214,687	8.78	3.08
20	The Nilgiris	4,276	-	-	97,331	11.66	23.58	101,607	10.17	24.62
21	Theni	5,770	-21.95	-4.22	71,288	1.21	-2.92	77,058	-3.18	-3.02
22	Thiruvallur	42,004	-1.66	-2.63	65,846	6.25	3.18	107,850	2.42	0.70
23	Thiruvannamalai	35,436	-11.42	-7.20	221,584	10.63	3.84	257,020	3.99	1.95
24	Thiruvarur	35,585	-1.54	-8.24	114,190	16.31	1.16	149,775	9.67	-1.25
25	Thoothukudi	11,512	-11.68	-2.71	85,295	12.35	4.13	96,807	5.65	3.18
26	Thiruchirappalli	20,709	-12.03	-9.79	184,372	16.49	1.38	205,081	9.11	0.04
27	Thirunelveli	32,196	-3.94	5.31	226,555	22.81	-0.81	258,751	15.12	-0.16
28	Vellore	31,983	-10.15	-8.06	240,255	8.62	-4.94	272,238	4.63	-5.29
29	Villupuram	84,023	-5.14	5.56	235,593	18.13	13.10	319,616	7.17	10.64
30	Virudhunagar	11,552	-8.88	18.03	165,868	21.83	2.96	177,420	16.24	3.74
	<b>Total</b>	<b>789,214</b>	<b>-6.90</b>	<b>-0.83</b>	<b>4227,437</b>	<b>12.51</b>	<b>2.02</b>	<b>5016,651</b>	<b>6.87</b>	<b>1.55</b>

Note : ACGR – Annual Compound Growth Rate in percentage

Milk production scenario of cattle and buffalo in various districts of Tamil Nadu (in '000 tonnes)

Sl.No	District	Cow milk		Buffalo milk		Total milk		
		2009-10	ACGR for the period 2000-01 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10	2009-10	ACGR for the period 2000-01 to 2009-10	
1	Chennai	3.259	-25.52	1.729	-35.44	4.988	-31.04	3.73
2	Coimbatore	314.497	10.30	18.435	-22.96	332.932	3.04	-1.09
3	Cuddalore	185.614	3.24	15.136	-16.79	200.75	-0.46	-0.37
4	Dharmapuri	157.531	2.94	49.996	-1.56	207.527	1.69	-0.99
5	Dindigul	129.167	5.26	26.767	-16.38	155.934	-2.17	-1.99
6	Erode	225.308	3.02	133.577	-2.16	358.885	0.89	3.11
7	Kanchipuram	108.828	-0.57	40.909	-12.05	149.737	-5.08	1.75
8	Kanyakumari	140.375	5.75	2.683	-14.62	143.058	4.44	8.73
9	Karur	72.307	8.69	37.023	-8.70	109.330	0.38	2.14
10	Krishangri	181.322	-	12.802	-	194.124	-	3.66
11	Madurai	166.050	0.62	10.400	-21.75	176.450	-2.82	0.55
12	Nagapattinam	133.695	8.81	21.247	-13.43	154.942	2.62	1.55
13	Namakkal	137.175	3.93	97.479	-0.05	234.654	2.04	-2.79
14	Perambalur	167.732	11.43	8.578	-	176.310	4.38	2.71
15	Pudukkottai	120.656	1.61	13.336	-16.81	133.992	-2.44	3.81
16	Ramnad	66.355	-2.33	3.097	-23.46	69.452	-4.89	1.74
17	Salem	371.266	16.81	89.979	3.37	461.245	12.98	1.03
18	Sivagangai	97.604	3.82	3.889	-17.67	101.493	1.48	1.40
19	Thanjavur	214.687	8.78	15.860	-17.62	230.547	3.26	3.50
20	The Nilgiris	101.607	10.17	1.122	-	102.729	8.47	24.77
21	Theni	77.058	-3.18	5.038	-24.05	82.096	-6.71	-2.70
22	Thiruvallur	107.850	2.42	47.212	-8.95	155.062	-2.61	-1.42
23	Thiruvannamalai	257.020	3.99	8.372	-22.21	265.392	0.92	1.37
24	Thiruvaur	149.775	9.67	6.349	-19.98	156.124	5.02	-1.56
25	Thoothukudi	96.807	5.65	9.259	-18.67	106.066	-0.13	2.80
26	Thiruchirapalli	205.081	9.11	21.297	-15.17	226.378	3.75	-0.03
27	Thirunelveli	258.751	15.12	24.667	-11.65	283.418	8.51	-0.48
28	Vellore	272.238	4.63	12.351	-20.87	284.589	0.81	-5.58
29	Villupuram	319.616	7.17	10.293	-22.97	329.909	2.96	10.96
30	Virudhunagar	177.420	16.24	12.579	-11.91	189.999	11.07	3.88
	<b>Total</b>	<b>5016.651</b>	<b>6.87</b>	<b>761.461</b>	<b>-11.22</b>	<b>5778.112</b>	<b>-0.31</b>	<b>1.29</b>

Note : ACGR – Annual Compound Growth Rate in percentage

