

Trends in the Growth of Dairy Animal Population in Andhra Pradesh, India

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Abstract: *The study focuses on the changes that have taken place in the bovine population, cows and buffalos, in India and Andhra Pradesh. As per the 20th Livestock Census, the total livestock population is 535.78 million in India in the year 2019 and it shows an increase of 4.6% over livestock census of 2012. However, the cattle and buffalo population of Andhra Pradesh is 10.82 million in 2019 and it shows a decline compared to previous census. When the trends in the growth of cattle and buffalo population of the state from the year 1956 is observed it is evident that the cattle population is consistently declining while that of buffalo population is increasing over the years. However, there is a decline in the buffalo population of the state in the recent past. Though the population of cattle and buffalos declined, the milk production in the state has remarkably increased and this could be attributed to the successful implementation of breeding programs and to removal of less productive and unproductive animals from the population.*

Keywords: Crossbred cows, buffalos, trends in growth, livestock census

1. Introduction

The crop-livestock mixed farming system is one of the most important characteristics of Indian agrarian economy and livestock sector is the integral part of India's agriculture sector. Dairy farming has been an integral part of Indian agriculture providing livelihood and nutritional security to about 70% of rural masses. Livestock rearing has been a vital component of small holder's production system comprising marginal, small and semi-medium farmers. Majority of these animal keepers are of below poverty line and livestock rearing provides food security as well as social security to these livestock keepers against natural calamities. (Gandhi, 2014).

However, dairy farming depends on various factors that influence the productivity of dairy animals of the dairy farmers. On the other hand, the demand for milk and milk products in India is growing fast. It is emphasized that the three drivers of demand for milk that is population growth, urbanization and income growth are strongly in progress due to which the demand for milk and milk products is rising fast (Saxena, 2019). To achieve this rising demand there is need for the growth of milk producing animals. Therefore, the analysis of trends in the growth of dairy animals would elucidate the status of dairy farming in the state of Andhra Pradesh and in India.

Data Source

The method adopted by Reddy, 2020 is followed in the present study. The study is intended to assess the changes in the population of dairy animals over the years, change in milk production over the years – species wise and breed wise; availability and requirement of feed to the bovines in order to achieve higher milk yields from dairy animals. To achieve this objective livestock census data related to 20th livestock census and previous census is collected from statistical data published by Government of India and other relevant agencies (Dairying in Andhra Pradesh -A Statistical

Profile 2018, National Dairy Development Board. and Socio-Economic Survey Report of Government of Andhra Pradesh). Further, milk production data from the publications of National Dairy Development Board is also collected and analyzed. This data is analyzed for the changes in the structure and size of cattle and buffalo population to elucidate whether the changes are towards dairy development or not. Further, the data related to the supply and demand of feeds and fodders required for cattle and buffaloes is also collected and processed to know the feed supply position in the state.

2. Results and Discussion

1) Dairy animal population of India

The total livestock population of India is 535.78 million in the year 2019; according to the 20th livestock census (Table-1). There is an increase of 4.6 percent in the total livestock population, compared to previous census of 2012. Further, the dairy animal population (total bovine population-- Cattle, Buffalo, Mithun and Yak) is 302.79 million in 2019 and it has shown an increase of only 1.0% over the previous census. Among total bovines, cattle population of India is 192.49 million while the population of buffaloes is 109.85 million in the year 2019. Thus, about 36 percent of the total livestock is contributed by cattle and it indicates that cow is the predominant livestock species in India. Compared to previous census of 2012, the cattle population has increased by 0.83 percent while buffalo population has increased by 1.06 percent showing an increasing trend of buffalo population. Further, the cattle population of 2019 is decreased when compared to the livestock census of 2007. On the other hand, there is a consistent increase of buffalos over the last three livestock census. This clearly shows that the buffaloes are gaining importance as milk producing animals in India over cows. At this juncture it is pertinent to know whether the changes in the bovine population that have been observed at the national level are the same in the different states of India or not.

Table 1: Livestock population of India (in millions)

| Species | 2007 | 2012 | 2019 | % growth over 2012 |
|-----------------|--------|--------|--------|--------------------|
| Cattle | 199.08 | 190.90 | 192.49 | 0.83 |
| Buffaloes | 105.34 | 108.70 | 109.85 | 1.06 |
| Sheep | 71.56 | 65.07 | 74.26 | 14.13 |
| Goats | 140.54 | 135.17 | 148.88 | 10.14 |
| Total livestock | 529.70 | 512.06 | 535.78 | 4.63 |

Data Source: Livestock Census of India, 2019

2) Trends in the growth of livestock population in some major states of India:

The total livestock population of India has shown a marginal growth of 4.6% from the year 2012 to 2019. However, the growth of livestock varies across major states in India. States like Uttar Pradesh, Rajasthan and Gujarat registered a decline in the livestock population in 2019 over the year 2012 (Table-2). On the other hand, livestock population registered a positive growth in the states such as Andhra Pradesh, West Bengal, Telangana, Bihar, Madhya Pradesh etc. Further, in the state of Maharashtra, the livestock population has remained same with little positive growth.

Table 2: Livestock population of major states

| S.No. | States | Population (in millions) 2012 | Population (in millions) 2019 | Percent change |
|-------|----------------|-------------------------------|-------------------------------|----------------|
| 1 | Uttar Pradesh | 68.7 | 67.8 | -1.35 |
| 2 | Rajasthan | 57.7 | 56.8 | -1.66 |
| 3 | Madhya Pradesh | 36.2 | 40.6 | 11.51 |
| 4 | West Bengal | 30.3 | 37.4 | 23.32 |
| 5 | Bihar | 32.9 | 36.5 | 10.67 |
| 6 | Andhra Pradesh | 29.4 | 34.0 | 15.79 |
| 7 | Maharashtra | 32.5 | 33.0 | 1.61 |
| 8 | Telangana | 26.7 | 32.6 | 22.21 |
| 9 | Karnataka | 27.7 | 29.0 | 4.70 |
| 10 | Gujarat | 27.1 | 26.9 | -0.95 |

When it comes to dairy farming, the growth of cattle and buffaloes alone need to be considered. The cattle population has registered tremendous growth in the states such as Jharkhand (28.16%), Bihar (25.18%), West Bengal (15.18%) while Rajasthan, Assam, Chhattisgarh etc., registered a moderate growth in the year 2019 over the year 2012 (Table-3). There is a drastic decline in the cattle population in Maharashtra, Odisha while there is moderate decline in the states like Uttar Pradesh, Madhya Pradesh, and Andhra Pradesh (Table-3). In the case of buffaloes, a different trend is observed. In the states such as Uttar Pradesh and Madhya Pradesh, where the cattle population has declined, the buffalo population has considerably shown a very higher growth rate. In the states, where good dairy breeds of buffaloes are found, like Haryana and Punjab remarkably lower growth rate of buffaloes is registered in the year 2019 compared to the year 2012 (Table-4). The state of Andhra Pradesh also registered a negative growth of buffaloes as in the case of cattle. In other words, the cattle and buffalo population in Andhra Pradesh has registered a slightly negative growth in the year 2019 compared to the year 2012. As the present study is being carried out in Andhra Pradesh, it is necessary to examine the changes that have taken place in the size and composition of cattle and buffaloes in the state so as to draw a conclusion on the status of dairy farming in the state of Andhra Pradesh.

Table 3: Cattle population of major states of India

| S.No. | States | Population (in millions) 2012 | Population (in millions) 2019 | Percent change |
|-------|----------------|-------------------------------|-------------------------------|----------------|
| 1 | West Bengal | 16.5 | 19.0 | 15.18 |
| 2 | Uttar Pradesh | 19.6 | 18.8 | -3.93 |
| 3 | Madhya Pradesh | 19.6 | 18.7 | -4.42 |
| 4 | Bihar | 12.2 | 15.3 | 25.18 |
| 5 | Maharashtra | 15.5 | 13.9 | -10.07 |
| 6 | Rajasthan | 13.3 | 13.9 | 4.41 |
| 7 | Jharkhand | 8.7 | 11.2 | 28.16 |
| 8 | Assam | 10.3 | 10.9 | 5.29 |
| 9 | Chhattisgarh | 9.8 | 10.0 | 1.63 |
| 10 | Odisha | 11.6 | 9.9 | -15.01 |
| 11 | Andhra Pradesh | 4.61 | 4.57 | -0.87 |

Table 4: Buffalo population of major states of India

| S.No. | States | Population (in millions) 2012 | Population (in millions) 2019 | Percent change |
|-------|----------------|-------------------------------|-------------------------------|----------------|
| 1 | Uttar Pradesh | 30.6 | 33.0 | 7.81 |
| 2 | Rajasthan | 13.0 | 13.7 | 5.53 |
| 3 | Gujarat | 10.4 | 10.5 | 1.52 |
| 4 | Madhya Pradesh | 8.2 | 10.3 | 25.88 |
| 5 | Bihar | 7.6 | 7.7 | 2.02 |
| 6 | Andhra Pradesh | 6.5 | 6.2 | -3.76 |
| 7 | Maharashtra | 5.6 | 5.6 | 0.17 |
| 8 | Haryana | 6.1 | 4.4 | -28.22 |
| 9 | Telangana | 4.20 | 4.22 | 1.59 |
| 10 | Punjab | 5.2 | 4.0 | -22.17 |

3) Cattle and Buffalo population of Andhra Pradesh

Andhra Pradesh is well known for its livestock wealth and the state has the world famous breed of Ongole cattle. It is worthwhile to note that the livestock development in Andhra Pradesh has attained the status of agro-based industry generating economic growth, gainful employment and livelihood to many weaker sections in the State. Small and marginal farmers and landless poor are contributing about 62% of total milk production and own 70% of livestock in Andhra Pradesh. Women population of the state provides nearly 60% of livestock farming labour. Similarly, rural shepherds own 90% of sheep population and entire piggery development is the monopoly of weaker sections (GOAP, 2019). Thus, the livestock sector has become a powerful tool for socio-economic change and an important priority component in rural development and poverty alleviation programs in the State.

The total livestock population of the state is 34.04 million and among the livestock, total bovine population (both cattle and buffaloes put together) of the state is 108, 19, 586 (10.82 million). Among total bovines, buffaloes dominate with 6.22 million over cattle of 4.58 million (Table-5). When the trends in the growth of cattle and buffalo population of the state from the year 1956 is observed it is evident that the cattle population is consistently declining while that of buffalo population is increasing over the years. However, there is a decline in the buffalo population of the state in the recent past. The decline in the number of cattle could be due to elimination of unproductive and less productive animals, and also due to lack of demand for male progeny. The decline in the number of buffaloes could be attributed to conversion of less productive non-descript buffaloes in to high yielding

graded- murrah buffalos and also due to elimination of less productive animals and male progeny.

Table 5: Livestock population of Andhra Pradesh (in millions)

| Species | 1956 | 1966 | 1977 | 1987 | 1999 | 2007 | 2019 |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|
| Cattle | 6.10 | 6.23 | 5.73 | 5.67 | 5.09 | 5.47 | 4.58 |
| Adult female cattle | 2.12 | 2.07 | 1.93 | 1.74 | 1.54 | 2.02 | 1.97 |
| Buffaloes | 4.33 | 4.72 | 5.01 | 5.88 | 6.30 | 8.23 | 6.22 |
| Adult female buffalos | 2.18 | 2.31 | 2.62 | 3.09 | 3.47 | 4.43 | 3.16 |
| Total bovines | 10.43 | 10.95 | 10.74 | 11.54 | 11.39 | 13.70 | 10.82 |
| Sheep | 4.89 | 4.71 | 3.73 | 3.89 | 5.08 | 12.18 | 21.01 |
| Goat | 2.42 | 2.62 | 2.46 | 2.85 | 2.67 | 4.82 | 6.43 |

4) Milk production in Andhra Pradesh:

This could be stated that the milk production in the state is growing constantly while the animal population is decreasing. Milk production of Andhra Pradesh is considerably higher with 150.44 lakh tons in the year 2018-19. Buffalo milk constitutes about 69 per cent of total milk production in the State indicating the preference for buffalo milk in the state. It is to be noted that the five districts of Krishna, Prakasam, Guntur, Chittoor and East Godavari together produced about half of the total milk production of the State. The growth is seen amidst two consecutive dry spell and drought conditions in the State and solely due to pragmatic policy of the State government (GOAP, 2019). It supplied silage, Total Mixer Ration (TMR) and fodder to the farmers on subsidy price so that the profit from dairying remains high.

Milk production of Andhra Pradesh has increased over the years from 3, 939 thousand tons in the year 2001-02 to 15, 044 thousand tons in the year 2018-19. The growth in milk production is appreciably higher above 5% per annum. This rise in milk production is due to increase in-milk dairy animal population coupled with increase in per day yielding capacity of the animals. The numbers of animals producing milk are 3, 307 thousands in the year 2001-02 and this number gradually increased to 6, 544 thousands by the year 2018-19 (Table-6). Further, the milk production in the state is the result of improvement in the average daily yields of the existing milk producing animals. The average daily milk yield of the animal is 3.26 kg in the year 2001-02 and it rose to 5.8 kg in the year 2018-19 (Table-6). The perusal of species-wise milk production indicates that there is increase in the production of milk by indigenous cows, crossbred cows and buffalos. Thus, the growth in milk production is the result of increased production of milk by crossbred cows, indigenous cows and buffalos (Table-7). Therefore, it could be inferred that dairy farming is an increasing livelihood source of the people in the state. Further, it could be stated that the state may have congenial atmosphere for the maintenance of dairy animals.

Table 6: Year-wise In-milk Bovine Population, Milk Yield and Milk Production in Andhra Pradesh

| Year | In-milk Bovine population('000) | Milk Yield (kg/day) | Bovine Milk Production ('000 MT) |
|---------|---------------------------------|---------------------|----------------------------------|
| 2001-02 | 3, 307 | 3.26 | 3, 939 |
| 2002-03 | 3, 597 | 3.33 | 4, 369 |
| 2003-04 | 3, 317 | 3.90 | 4, 727 |
| 2004-05 | 3, 456 | 4.25 | 5, 360 |
| 2006-07 | 3, 842 | 3.93 | 5, 504 |
| 2007-08 | 4450 | 3.81 | 6, 193 |
| 2009-10 | 4, 798 | 4.13 | 7, 238 |
| 2010-11 | 4980 | 4.26 | 7, 735 |
| 2011-12 | 5309 | 4.34 | 8, 402 |
| 2013-14 | 5017 | 4.96 | 9, 084 |
| 2015-16 | 5459 | 5.43 | 10, 813 |
| 2016-17 | 6000 | 5.56 | 12, 175 |
| 2017-18 | 6276 | 5.72 | 13, 725 |
| 2018-19 | 6544 | 5.80 | 15, 044 |

Source: Integrated Sample Survey reports, Directorate of Animal Husbandry, Govt of Andhra Pradesh and Basic Animal Husbandry Statistics report, Ministry of Agriculture and Farmers Welfare, Govt. of India. Reproduced from Integrated Sample Survey (ISS) reports published by the Directorate of Animal Husbandry, Govt. of Andhra Pradesh.

Table 7: Milk production in Andhra Pradesh – Bovine milk ('000 MT)

| Year | Bovine milk | Crossbred cows | Indigenous cows | Buffalo milk |
|---------|-------------|----------------|-----------------|--------------|
| 2001-02 | 3, 939 | 489 | 600 | 2849 |
| 2002-03 | 4369 | 657 | 656 | 3056 |
| 2003-04 | 4727 | 699 | 482 | 3546 |
| 2004-05 | 5504 | 779 | 654 | 4073 |
| 2006-07 | 6193 | 879 | 731 | 4582 |
| 2007-08 | 7328 | 1475 | 599 | 5164 |
| 2009-10 | 7735 | 1613 | 659 | 5463 |
| 2010-11 | 8402 | 1779 | 699 | 5924 |
| 2010-13 | 9084 | 2142 | 672 | 6268 |
| 2015-16 | 10813 | 2560 | 809 | 7445 |

Source: Integrated Sample Survey reports, Directorate of Animal Husbandry, Govt. of Andhra Pradesh. Note: Reproduced from Integrated Sample Survey (ISS) reports published by the Directorate of Animal Husbandry, Govt. of Andhra Pradesh.

Milk production capacity in Andhra Pradesh is improving every year and it may be due to increase in the number of milk-producing animals and due to better performance of dairy animals in terms of average daily yield. NDDB has made an analysis to elucidate how much of increase in milk production is due to increase in the number of milch animals and how much is due to breed improvement that resulted in the raise of per day milk yielding capacity of the animals (Table- 8). Total milk production of the year 2003-04 is taken as base year performance in order to identify the change in milk production due to improvement in average yield and number of animals. The total milk production of cattle and buffaloes (bovine milk) in the state is 4.73 million tons in the year 2003-04 and it rose to 6.19 million tons by the year 2007-08 (Table-8). Within this improvement in milk yield, there is no improvement in the average milk yield of animals and it registered negative growth of -0.13 kg per animal per day in the year 2007-08 and thereafter there is a steady increase in the average daily milk yields of dairy animals. In the case of change in milk yield due to

increase in number of milk-producing animals there is remarkable increase in the total milk production year by year (Table-8). For instance, the milk production due to change in the number of in-milk animals is 1.60 million tons in the year 2007-08 and it rose to 3.92 million tons by the year 2017-18.

The development in the total milk production of the animals is due to improvement in the milk yielding capacity of buffaloes, crossbred cows and indigenous cows. The total milk production by buffaloes is 3.55 million tons in the year 2003-04 and thereafter it stood at 4.58 million tons in the year 2007-08 (Table-9). The improvement in the milk production in this period could be attributed to increase in the number of animals only and not to the rise in the average yield of animals. After the year 2007-08, improvement in milk yield could be attributed to both the rise in the average productivity of buffaloes and also to the increase in the number of buffaloes. However, the change in the average milk yield of buffaloes is about half liter of milk per day per animal whereas the rise in the average milk yield is 2.44 liters per day per animal and this could be due to breed improvement of the desi buffaloes. In the case of crossbred cows the change in the average daily milk yield and the change due to increase in the number of animals is very limited in crossbred cows compared to buffaloes (Table-10). This could be due to lower adaptation mechanism of crossbred cows to the Indian conditions. In the case of indigenous cows, the change in the average milk yield is negative and the improvement in milk production due to increase in number of milk-producing animals is positive but very low (Table-11). The above analysis emphasizes that performance of buffaloes in Andhra Pradesh is significantly higher than crossbred cows and indigenous cows. Further, the increase in the number of crossbred cows and milk yields of crossbred cows clearly reveals that crossbred cows adapt well to the existing climatic conditions of the state. Earlier, it was reported that crossbreds have not acclimatized fully to widely varying agro-climatic conditions of the country leading to many health and adaptation problems attributed to the existence of genotype-environment interaction (Steane, 1999, Trivedi, 2010). Therefore, crossbred animals need to be replaced frequently in order to sustain the level of performance which is potentially available in crossbreds (Acharya, 1987; Singh and Sahani, 2012). But the present study emphasizes that crossbred cows are well acclimatized to the climatic conditions of the state.

Table 8: Milk production Performance dairy animals – Bovine milk

| Year | Milk production in base year 2003-04 (MMT) | Total milk production (MMT) | Change in total milk production due to change in average yield (kg/animal/day) | Change in total milk production due to change in number of in-milk animals (MMT) |
|---------|--|-----------------------------|--|--|
| 2003-04 | 4.73 | 4.73 | | |
| 2007-08 | 4.73 | 6.19 | -0.13 | 1.60 |
| 2009-10 | 4.73 | 7.24 | 0.34 | 2.17 |
| 2010-11 | 4.73 | 7.74 | 0.53 | 2.48 |
| 2011-12 | 4.73 | 8.40 | 0.68 | 3.00 |
| 2015-16 | 4.73 | 10.81 | 2.44 | 3.65 |
| 2018-19 | 4.73 | 15.04 | 2.72 | 3.92 |

Data Source: Dairying in Andhra Pradesh -A Statistical Profile 2018, National Dairy Development Board and Socio-

Economic Survey Report of Government of Andhra Pradesh.

Table 9: Milk production Performance dairy animals – Buffalo milk

| Year | Milk production in base year 2003-04 (MMT) | Total milk production (MMT) | Change in total milk production due to change in average yield (kg/animal/day) MMT | Change in total milk production due to change in number of in-milk animals (MMT) |
|---------|--|-----------------------------|--|--|
| 2003-04 | 3.55 | 3.55 | | |
| 2007-08 | 3.55 | 4.58 | -0.03 | 1.06 |
| 2009-10 | 3.55 | 5.16 | 0.14 | 1.48 |
| 2010-11 | 3.55 | 5.46 | 0.28 | 1.64 |
| 2011-12 | 3.55 | 5.92 | 0.36 | 2.02 |
| 2015-16 | 3.55 | 7.45 | 1.68 | 2.22 |
| 2018-19 | 3.55 | 7.82 | 2.65 | 2.88 |

Data Source: Dairying in Andhra Pradesh -A Statistical Profile 2018, National Dairy Development Board. and Socio-Economic Survey Report of Government of Andhra Pradesh.

Table 10: Milk production Performance dairy animals – Cross-bred cattle milk

| Year | Milk production in base year 2003-04 (MMT) | Total milk production (MMT) | Change in total milk production due to change in average yield (kg/animal/day) MMT | Change in total milk production due to change in number of in-milk animals (MMT) |
|---------|--|-----------------------------|--|--|
| 2003-04 | 0.70 | 0.70 | | |
| 2007-08 | 0.70 | 0.88 | 0.11 | 0.07 |
| 2009-10 | 0.70 | 1.48 | 0.10 | 0.67 |
| 2010-11 | 0.70 | 1.61 | 0.12 | 0.79 |
| 2011-12 | 0.70 | 1.78 | 0.16 | 0.92 |
| 2015-16 | 0.70 | 2.56 | 0.24 | 1.62 |
| 2018-19 | 0.70 | 2.82 | 0.53 | 2.12 |

Data Source: Dairying in Andhra Pradesh -A Statistical Profile 2018, National Dairy Development Board. and Socio-Economic Survey Report of Government of Andhra Pradesh.

Table 11: Milk production Performance dairy animals – Indigenous cattle milk

| Year | Milk production in base year 2003-04 (MMT) | Total milk production (MMT) | Change in total milk production due to change in average yield (kg/animal/day) MMT | Change in total milk production due to change in number of in-milk animals (MMT) |
|---------|--|-----------------------------|--|--|
| 2003-04 | 0.48 | 0.48 | | |
| 2007-08 | 0.48 | 0.73 | -0.04 | 0.29 |
| 2009-10 | 0.48 | 0.60 | -0.05 | 0.17 |
| 2010-11 | 0.48 | 0.66 | -0.03 | 0.21 |
| 2011-12 | 0.48 | 0.70 | -0.02 | 0.24 |
| 2015-16 | 0.48 | 0.81 | 0.12 | 0.21 |
| 2018-19 | 0.48 | 0.95 | 0.35 | 0.32 |

Data Source: Dairying in Andhra Pradesh -A Statistical Profile 2018, National Dairy Development Board and Socio-Economic Survey Report of Government of Andhra Pradesh.

5) Feed Resources: Availability vs. Requirement

In the above analysis it is evident that growth in milk production in the state is the result of breeding programs

implemented as well as natural growth in the animal population. The genetic improvement of the animals can be developed through proper breeding but to achieve the higher milk yield of those animals, proper feeding is necessary. While adapting crossbreeding in cattle involving *Bos taurus* (exotic) and *Bos indicus* (indigenous) species, it seems that relevance of program vis-à-vis availability of feed and fodder resources both in quality and quantity has not been viewed properly (Sonali, et al 2014). Therefore, it is necessary to examine the availability and requirement scenario of feeds and fodders in India.

Table 12: Availability, requirement and Surplus/Deficit of Feed nutrient (Dry Matter (*000 MT))

| Year | Availability | Requirement | Srplus/ deficit | Percent shortage |
|------|--------------|-------------|-----------------|------------------|
| 1997 | 15, 608 | 28, 042 | -12, 434 | 44.34 |
| 2003 | 18, 440 | 35, 431 | -16, 991 | 47.95 |
| 2007 | 23, 153 | 47, 136 | -23, 983 | 50.88 |
| 2008 | 29, 774 | 49, 798 | -20, 024 | 40.21 |
| 2009 | 28, 030 | 53, 318 | -25, 288 | 47.42 |
| 2010 | 24, 914 | 57, 821 | -32, 907 | 56.91 |
| 2011 | 26, 970 | 61, 935 | -34, 965 | 56.45 |
| 2015 | 29, 026 | 65, 946 | -36, 920 | 55.98 |
| 2019 | 32, 036 | 67, 952 | -35, 916 | 52.85 |

Data Source: Feedbase 2012, National Institute of Animal Nutrition and Physiology, Bengaluru: Livestock census data and Director of Economics and Statistics, Govt. of India, and Statistical Report of Govt. of Andhra Pradesh (GOAP).

Generally, every animal requires feed for its body maintenance, growth, reproduction, milk production and pregnancy. When all these requirements are satisfied or balanced ration is given then that animal yields milk to the extent of its full genetic potential. From the data given in Table-12, it is apparent the there is feed scarcity in the country up to 52.85% of its requirement and thus all the dairy animals may not produce milk as per its genetic potential. Under these circumstances the milk yield of dairy animals belonging to different land holding groups will not be the same (Reddy and Subramanyam, 2002; FAO, 2019). The dairy animals belonging to poor may produce less milk than those of rich. The improvement of genetic capacity of any population beyond the limits established by nutritional and environmental conditions in which the population is to perform can be of no use and often counter-productive. It was emphasized that it makes little sense to initiate genetic improvement programs in livestock population where annual feed availability is less than 1.5 times the animal's maintenance feed requirements. Therefore, the breeding objectives must be relevant to the prevailing production system of an area (McDowell, 1985; Trivedi, 2010). Therefore, it could be emphasize that the shortage of feed and fodder might have lead to the existing lower productivity of high- yielding milch animals compared to exotic dairy animals, and thus, the higher milk production potential of these high yielding animals has remained unexploited.

3. Summary and Conclusions

The study indicates that there is decline in the population of cattle and buffaloes, particularly indigenous cattle in the

year 2019 compared to previous livestock census. There is drastic decline in the male progeny of all the species of dairy animals while the female progeny of all the species i.e., cattle and buffaloes registered a higher positive growth. Though the population of cattle and buffaloes declined, the milk production in the state has remarkably increased and this could be attributed to the successful implementation of breeding programs and to removal of less productive and unproductive animals from the population. The study further indicated that there is shortage of feed and fodder in the state and thus there is need to address this problem so as to realize the milk production potential of the existing dairy animals.

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