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Study of livestock population dynamics in india

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Abstract

The present study has been undertaken to put forward a reflection of the status of the livestock population in India for the inter-census period between 1982 and 2012. The growth trend in total buffalo population was seen to be persistently positive with CAGR of 41.5, 1.58 and 9.81 during the 14th, 15th and 16th Livestock Census respectively. However, it dipped to a negative growth rate of 3.23 CAGR during the 18th Livestock Census and resurfaced with a decent CAGR of 5.31 CAGR in the 19th Livestock Census. Positive growth rate is seen in exotic/ crossbred milch cattle whereas, indigenous milch cattle showed marginal growth overall. Since the 14th Livestock Census, the total buffalo population showed a steady state of growth with 2.45, 2.12, 1.45, 1.61 and 1.92 till the 18th Livestock Census but ended with a negative growth rate of 2.40 CAGR. Total sheep population had a negative growth rate of 1.24 CAGR in the 14th Livestock Census but picked up with a positive growth rate of 2.33, 2.51 and 3.08 CAGR over the successive Livestock Censuses. The male goat population showed negative growth rate but on the whole the total goat population including male and females shows sustained growth pattern over the years.

Keywords: Buffalo, Cattle, Compound Annual Growth Rate (CAGR), Goat, Livestock, Population and Sheep.

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Introduction

India is one of the largest economies in the world with a positive GDP annual growth rate. Along with agriculture and other allied sectors the contribution of livestock sub-sector to national GDP has increased impressively in the last 20 years (Economic Survey, India, 2011-2012, Directorate of Economics and Statistics, Govt. of India). According to the 19th livestock population census, the total livestock population consisting of cattle, buffalo, sheep, goat, pig, horses & ponies, mules, donkeys, camels, mithun and yak in the country is 512.05 million numbers in 2012 which makes the country the wealthiest in livestock population globally.

The livestock population census has a key role to play in an integrated national statistical programme both as a source of information on animal capital and also as an instrument of providing frame for subsequent surveys in many sectors. It has evolved into a thorough way to track changes in a country's demographics and the information from a population census is important for many government decisions like monitoring the on-going schemes of the country and most importantly, plan for the future. This study has been carried out to analyse the composition and trend in livestock production for the country to focus on the differences of growth trends in livestock production.

Methodology:

In this present study, livestock census data from 1982 to 2012 was obtained from Department of Animal Husbandry & Dairying, Ministry of Agriculture, Government of India. The total male and female population was calculated and was expressed in terms of thousands. Then, the analysis of population growth pattern was projected by means of interpolation using the method of Compound Annual Growth Rate (CAGR). The formula states the method for Point to Point growth rate, which is mentioned as below:

$$CAGR\ (t_o, t_n) = \{(V(t_n)/V(t_o))^{1/tn-to} - 1\}$$

Where, $V(t_o)$= start value, $V(t_n)$= finish value & t_n-t_o= number of years.

Thus, the values of the structural change of the livestock population data were obtained and the results were examined for further study, which was particularly useful to compare growth rates dynamics of livestock population.

Results:

Cattle Population: The male cattle cross breed population showed declining trend from 26.55 in 1987 to a negative growth rate of -2.69 in the 2012 livestock population census. Whereas, the female

cattle cross-bred population shows a structural change of 9.508 CAGR in 1987 to 8.14 in 2012, despite the sudden drift to a negative growth rate of -0.76 in the 17th livestock census in 2007. Overall, the total male & female population shows a collective structural change from 12.92 to 6.27 CAGR over a period of 20 years.

The indigenous male population shows a negative growth rate of -4.20 in 2012 from its initial growth rate of 71.86 CAGR. Females on the other hand shows a considerable positive growth rate of 9.74 from its initial growth rate of 46.46. On the contrary, the total indigenous cattle population shows a drift from 48.71 in 1982 to 5.15 in the year 2012 over the period of seven consecutive livestock census.

Thus, on the whole the entire population of both cross-breed and indigenous male & female cattle together show a structural change in population of 5.31 in the 19th livestock census with a negative growth rate of -3.23 in the 16th livestock census when compared to the 13th livestock census of 41.53 in the period between 1982-1987.

Buffalo Population: The buffalo livestock population was also analysed by calculating the compound annual growth rate. The male buffaloes shows a structural population change from 1.79 in the period between 1987 to 1992 while steadily acquiring a positive growth rate of 1.84 in 17th livestock census but ending at a negative growth rate of -3.85 in the most current livestock census of the year 2012. The female buffaloes however, show a steady positive growth rate of 3.07 in 1987 to 2.04 all the way till 2003 but, quite unexpectedly the 19th livestock census shows a negative growth rate of 2.18 in 2012.

Therefore, collectively, male and females show a drift in population from 2.45 in 1987, 1.45 in 1997 subsequently and finally a negative growth rate of -2.40 in the period between 2007 -2012.

Sheep Population: The year-over-year growth rate of sheep was calculated for the past six consecutive livestock census. The male sheep cross-breed population has changed from 6.03 in 1987 to a positive growth rate of 1.07 in 2012. Structural population of females on the other hand shows a drift of 5.75 in '92, 5.09 in '97, despite the negative growth rate of -7.38 in 2007 from its initial growth rate of 2.87 in 1982. Together male & females show a structural change in population of 0.27 in the 19th LS census with a negative growth rate of -8.22 in the 17th livestock census when compared to its initial growth rate 3.89.

The indigenous male sheep has been drifting positively from 0.73 in '87 to 2.94 in '97 and finally ending with a negative growth rate of -3.16 in 2012. The indigenous female sheep population with a

negative growth rate of -2.08 in 1987, progressing towards a positive growth rate of 2.18 in '97 and 4.49 in the year 2007.

On the whole, both cross breed & indigenous sheep population show a structural change from -1.24 in the 13th livestock census to -1.88 in the current 19th livestock census with a positive growth rate of 2.51 in '97 and 3.08 in the period from 2003 - 2007.

Goat Population: The male goat population was also calculated with the help of compound annual growth rate equation. It showed a drift of -1.06 at the 13th livestock census when compared to the positive growth rate of 1.51 in the 14th livestock census in 1992. Female goat population showed a promising positive growth of 0.87, 0.40, 2.41 and 57.78 all throughout the period between 1982 till 2012 at the 13th livestock census.

Collectively, the total male and female goat population show a positive growth rate of 2.82 in '87, 1.25 in '97 and finally ending in a positive growth rate of 48.44.

Conclusion

Knowledge of livestock population provides for a better understanding of the functional attributes and development potential of the livestock sector. The present study helps in the quantification of livestock population dynamics. It gives the indication of results of livestock cycle which is sustainable to economic diversification. On the brink of the 21st century, India is still aspiring of becoming a developed and industrialized nation and the role of animal husbandry in this process is diverse. With the changes in pattern of livestock enhancing its production remains a major challenge, thus proper emphasis and support to develop policies needs to be framed to revolutionize the livestock sector in the country.

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