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Sustainability of Indigenous Dairy Cattle in the Context of Cross Breeding in a South Indian State

KEYWORDS: Indigenous- Cross bred- Population and Milk Production- Time series Analysis.

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ABSTRACT *Milk production in India is by masses and not by mass production. Tamil Nadu, the southernmost state, ranks eighth in milk production in India. The milk production in this state during the year 2012-13 was 7.05 million tonnes. In this study an attempt was made to analyse the sustainability of indigenous cattle in the context of overwhelming cross breeding by Jersey and Holstein Friesian cattle. The data on population and milk production of indigenous cattle and cross bred cattle for a period of twenty years (1993-2013) were collected from secondary sources. The data was analysed by compound growth rate analysis and conventional analysis in the form of averages and percentages. The study period was divided into two phases (1993-94 to 2002-03 and 2003-04 to 2012-13).The overall growth rate showed a positive growth rate in cross bred population and milk production whereas indigenous cattle population and milk production showed a negative growth rate. Milk production from indigenous and cross bred cattle contributed 47.01 per cent and 52.99 per cent to the total milk production in the first phase whereas in the second phase the contribution from indigenous cattle was declined to 18.40 per cent and cross bred cattle was increased to 81.59 per cent. The contribution of Indigenous cattle population to the total cattle population was 71.44 per cent in the first phase whereas in the second phase it has declined to 36.9 per cent. The decline in indigenous cattle population and milk production may be due to the introduction of cross breeding technology in which cross bred animals yield high milk production, higher conception rate, early maturity and less intercalving interval than indigenous animals.*

INTRODUCTION

Livestock make an important contribution to most economies. Livestock produce food, provide security, enhance crop production, provide security, enhance crop production, generate cash income for rural and urban populations, provide fuel and transport, and produce value added goods which can have multiplier effects and create a need for services. Furthermore, livestock diversify production and income, provide year round employment, and spread risk. India has the largest livestock population in the world, accounting for 57 per cent of world's population and 16 per cent of world's cattle and ranking first in respect to cattle and buffalo population, second in goat and third in sheep population in the world. Tamil Nadu the southern most state of India is one of the top ten milk producing states in the country. Contribution with respect to milk production and population to the nation is also immense.

India ranks first in world milk production which went up to 132.43 million tonnes in 2012-13 and it plays a major role in Indian Economy of which major share 51% is contributed by buffalo followed by 24%,21% and 4% for Crossbred/ Exotic cows, Non –Descript Cows and Goats repectively. Per Capita availability of milk has also increased from 112 grams per day in 1968-69 to 299 grams per day in 2012-2013. The total milk production of Tamil Nadu in the year 2012-2013 was 7.004 million tonnes of which cow milk contributed 90 per cent and the remaining 10 percent by buffalo milk. The per capita availability of milk per day has increased from 231 gms during 2005-06 to 254 gms during 2012-13. The contribution of livestock sector to the Gross State Domestic Product (GSDP) is 4.31% and that to the agriculture and allied activities is 41.84%.

The total cross bred population in Tamil Nadu in the year 1993-1994 was 5.96 lakhs whereas in 2011-2012 the total population has increased six folds to 31.61 lakhs. With respect to Indigenous population in the year 1993-1994 was 23.08 lakhs whereas in 2012-2013 the total population has reduced drastically to half about 10.42 lakhs. Though dairy sector had made a significant achievement in production in the state, there had been an alarming reduction in indigenous population for the past several years due to reasons like prolonged age of maturity, low growth and low milk production, introduction of exotic breeds, absence of native bull etc., The question of sustainability of indigenous dairy cattle germ plasm in the context of cross breeding is discussed in this study.

DATA AND METHODOLOGY

The data used in this study were collected from various secondary sources like Integrated Sample Survey, Basic Animal Husbandry Statistics, FAOSTAT and other relevant literatures. The time period considered is for 20 years (1993-2013).

ANALYTICAL TOOLS EMPLOYED

Conventional analysis in the form of averages and percentages.

The Proportion of milk production contributed by Indigenous and crossbred animals was done by average proportion analysis.

Compound growth rate analysis.

The Trend in milk production by indigenous cattle and cross bred cattle was done by Annual compound growth rate (ACGR) analysis (SermaSaravanaPandian, 2013).

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$Y_t = b_0 (b_1)^t$

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

Y_t = Milk production / population in time't'

The annual compound growth rate (r) was given by

r = Anti-ln (b) – 1

RESULTS AND DISCUSSION

The details of the trend in milch animal population and milk production are given in Table 1. The Annual Compound Growth Rate analysis has shown that Indigenous and Cross bred population registered negative (-1.73% & -5.34%) and positive growth rate (6.05% & 10.68%) respectively in both phases. Overall Indigenous and Cross bred population indicates negative (-4.34%) and positive growth rate (10.10%) respectively. Growth rate analysis on milk production revealed that a positive (0.44 %) and negative growth rate (-5.27 %) in indigenous during the first and second phase respectively whereas with respect to cross bred, it showed positive growth rate (9.97% & 11.19%) in both phases respectively.

The details of average proportion of milk production are given in table 2. The phase wise analysis by average proportion indicated that indigenous milk production contributed 47.01 per cent to the total milk production in the first phase whereas in the second phase it has sloped down to 18.40 percent. In contrast to that, cross bred milk production contributed 53.42 per cent in the first phase whereas it has increased to 81.59 per cent in the second phase. The overall share of milk production to the state from indigenous and cross bred is 32.70 per cent and 67.50 per cent respectively. This result is in line with the findings of Prabu *et.al* (2012) where they stated that decrease in cattle population in India might be due to rapid urbanization, decrease in grazing land, decrease in supply of agricultural labour, nonremunerative price for milk, decrease in indigenous population, etc

Table 1. Details of Cattle population and Milk production

Year	Indigenous		Cross - Bred	
	Population (in '00 thousands)	Milk production (in '000 tonnes)	Population (in '00 thousands)	Milk production (in '000 tonnes)
1993-94	23.08	1283.47	5.96	818.80
1994-95	23.05	1248.58	6.61	961.62
1995-96	23.00	1208.62	7.76	1064.85
1996-97	22.00	1082.62	8.74	1287.96
1997-98	21.66	1086.67	8.81	1345.14
1998-99	21.65	1142.77	8.79	1435.50
1999-00	21.69	1216.58	8.93	1611.71
2000-01	19.13	1285.35	9.90	1811.51
2001-02	20.00	1266.88	10.51	1904.68
2002-03	20.85	1271.28	10.58	1885.77
2003-04	19.95	1278.58	11.93	2044.45
2004-05	18.35	1264.71	12.89	2102.29
2005-06	13.09	812.90	24.05	3889.94
2006-07	12.89	791.38	24.54	4683.78
2007-08	12.77	778.00	24.86	4971.00
2008-09	12.59	767.00	25.07	5092.00
2009-10	12.40	767.00	30.69	5227.00
2010-11	12.54	774.32	31.16	5246.86
2011-12	12.18	776.54	31.61	5412.36
2012-13	10.42	719.25	30.69	5580.28
ANNUAL COMPOUND GROWTH RATE (ACGR IN %)				
1993-94 to 2002-03	- 1.73	0.44	6.05	9.97
2003-04 to 2012-13	- 5.34	- 5.27	10.68	11.19
1993-94 to 2012-13	- 4.34	- 3.17	10.10	11.56

Table 2.
Average Proportion of Milk Production Shared by Indigenous and Cross Bred Cattle

AVERAGE PROPORTION (%)		
Year	**Milk production**	**Cross – Bred Milk production**
1993-94 to 2002-03	47.01	53.42
2003-04 to 2012-13	18.40	81.59
1993-94 to 2012-13	32.70	67.50

It appears from the study that indigenous cattle population is declining day by day .This has been happening mostly because of introduction of cross breeding technology in which cross bred animals yield high milk production, greater rate of returns higher conception rate, early maturity and less inter calving interval than indigenous animals and gradual giving up of animal husbandry by the resource poor farmers in the state. Similar finding was observed by Ganesh Kumar and Serma Saravana Pandian (2003) in which they found that the cost of milk production was lower in crossbred cows followed by buffaloes and indigenous cows. Although crossbreds are high producing, they demand heavy initial investment as well as high maintenance cost which is unaffordable to majority of the farmers. The reasons might be attributed to the indiscriminate cross breeding with exotic germplasm like Jersey and Holstein Friesian If immediate and appropriate measures are not taken to conserve our indigenous bovine genetic resources, an irrecoverable damage is likely to occur in the agriculture system of Tamil Nadu. The speculated damage includes loss of valuable AnGR, loss of rural employment opportunity, loss of valued livestock products from indigenous animals, a decline in agricultural power system and degradation of many other allied issues.

CONCLUSION

The results of the study to analyse the sustainability of indigenous cattle in the context of cross breeding in the south Indian state of Tamil Nadu showed that the overall growth rate depicted a positive growth rate in cross bred population and milk production whereas indigenous cattle population and milk production showed a negative growth rate. Milk production from indigenous and cross bred cattle contributed 47.01 per cent and 52.99 per cent to the total milk production in the first phase whereas in the second phase the contribution from indigenous cattle was declined to 18.40 per cent and cross bred cattle was in-

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creased to 81.59 per cent. The contribution of Indigenous cattle population to the total cattle population was 71.44 per cent in the first phase whereas in the second phase it has declined to 36.9 per cent. The decline in indigenous cattle population and milk production may be due to the introduction of cross breeding technology in which cross bred animals yield high milk production, higher conception rate, early maturity and less inter calving period than indigenous animals.

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