CHAPTER - I
INTRODUCTION

India is predominantly an agricultural country with more than three fourths of its population depending on agriculture for their livelihood. Livestock, especially cattle, supply an important source of power for agricultural operations. They are also an important means of transporting agricultural produce from village to the market. They are also the chief source of manure for agricultural field. It does not seem possible or even feasible for some reasons that mechanization in agricultural operations in India will totally replace the animal power. In India where the great majority of the people are vegetarian, milk provides a vital source of animal protein in human nutrition.

Cattle in India are reared for two main purposes, draught and milk. Most of the Indian breeds of cattle are of draught type, except Red Sindhi, Sahiwal, Gir, Tharparkar and Rath which are of milk type. However, a few draught breeds have shown a reasonably good milking potential. On these breeds (designated as dual purpose breeds) great efforts for improvement of draught and milk producing ability have been made.

Cattle and human beings have established a very close link from time immemorial for economic and social reasons. Milk and milk products are obviously the most widely accepted form of animal protein in India. Improvement in dairy production is an important factor for promoting social and economic betterment. It is more important for rural families for their livelihood security.

Livestock sector which is considered as subsidiary to agriculture plays a significant role is contributing to the national economy in general and rural economy in particular as it contributed nearly 3.9% to the national economy in term of Gross Domestic Product (NDDB Annual Reports, 2013-14).

Livestock sector was expanded during 2013-14 by 5.5 % as against total agriculture, forestry and fishing sector growth of 3.7% during same period. Gross value added from livestock sector at current prices was about 21.58% of the Gross value added from total agriculture, forestry and fishing sector at current prices in
2013-14. India is the largest producer of milk in world. Milk production has increased from 102.6 million tonnes at the end of the Tenth Plan (2006-07) to 127.9 million tonnes at the end of Eleven Plan (2011-12). Milk production during 2015-16 was 155.49 million tonnes which is about 6.28% higher than last year. Estimated per capita availability in 2015-16 was 337 grms/day an increase of 4.7% over the previous year (NDDB annual report 2015-16).

The value of output in livestock sector has steadily increased during the period from 2007-08 to 2011-12 at an annual growth rate of 16.36%. According to 19th livestock censes India owns the largest cattle production of 190.90 million which constitute 37.28% of the national livestock population and 13% of world cattle population. India is bestowed with a rich cattle genetic diversity comprising 40 acknowledged breeds. There are 4 milch breed, 8 dual purpose, and 28 draft purpose breeds registered in NBAGR. The acknowledged breed constitute only 20-25% of total population while rest are mixed cross of different indigenous breeds collectively classified a non-descript breeds. The total cattle population has decreased from 199.075 million in 2007 to 190.904 million in 2012 with a rate of -4.10%. The overall average milk production of cattle is 3.87 kg/day which is lower than buffalo (4.80 kg/day) because of large population of low producing non-descript cattle (2.36 kg/day).

Dairy husbandry is the backbone of Indian rural economy and plays a significant role in sustaining rural livelihood. The Indian dairy industry is dominated by small producers, who hold an average two or three cow. India with only about 2.3% of the land area of the world is maintaining around 10.71% of the world livestock. Having vast population of non-descript cattle & very few milch breeds, it is of great importance to improve the genetically low producing breeds for milk production.

The acknowledged indigenous milch cattle breeds of country i.e. Gir, Sahiwal, Red Sindhi, Tharparker, Rathi and Kankrej are well adapted to tropical climate and can perform well under harsh climatic condition, convert low quality feed and fodder into milk, resistant to various tropical diseases and are also known for their milk production. The genetic potential of these breeds for milk production is not fully exploited. Great amount of genetic variation still do exist among the indigenous cattle.
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Gir is well known milk breed of Indian cattle. It has a origin in Saurashtra, is well known for its milk production, docility and emotional temperament. This breed of cattle are found in and around districts like Junagadh, Amreli, Bhavnagar, Gir Somnath, Rajkot, Porbandar and some parts of Jamnagar, Morbi, Surendranagar District of Saurashtra. This breed is also locally known as Biodali, Kathiyawari, and Sorathi. Bullocks of this breed are used for draft power in field. Pure breeding is preferentially practiced throughout Saurashtra region of Gujarat state. Professional breeders like Charan, Ahir, Koli, Gosovi, Rabari and Bharavad are the community mainly involved in traditional cattle breeding.

Gir has also been imported by other countries like Brazil, Mexico, USA, and Venezuela. In these countries Gir breed is successfully bred. The breed has also been exported to other parts of the world. In Brazil, where large herds are found it is known as ‘Gyr’. Brazil has also established a strain called Indubrasil which is a cross between Gir and Kankrej. Gir has also been exported to USA especially to Texas, Florida and Louisiana states (Prabhakar and Singhal, 2006).

A thorough study of Genetic architecture of a population with regard to production, reproduction and milk production traits is vital for building a quality dairy herd. This necessitates information on the magnitude of phenotypic variation as well as the coefficients of heritability, repeatability and phenotypic and genetic correlations of milk production and other related important economic traits.

The main task of an animal breeder is to develop a strategy which leads to higher milk yield per day of life in dairy cattle. Higher production can be achieved by improving the mean breeding value of the animals in population or by improving the environment or by combination of both. Thus, segregation of phenotypic variation into genetic and environment will enable the breeder in assessing the effectiveness of selection programme and improving managerial conditions over time. This will help in designing more appropriate breeding strategies to maximize genetic gain and also suggest amendments in managemental standards if required.

Selection for higher production has been practiced in many herds in India. Few attempts have been made to evaluate genetic improvement. Since the early twenty century breeding strategy was to combine with pure breeding with selection which was practiced widely to improve and preserve well defined breeds of cattle in India.
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The improvement in appearance and performance of these animals exhibited uneven results.

Genetic improvement in milk yield is vital for the dairy producers and higher lactation milk yield has been primarily object of selection in dairy breeding (Strabel and Szwaczkowski, 1997). Gir cattle need to be genetically improved through selective breeding programme.

Traits related to milk, fat and protein production, body conformation, length of productive life, reproduction, draftability and health are included in breeding programmes of dairy cattle in many countries (VanRaden, 2004). Such an approach maximizes the improvement of a breeding goal involving traits related to income and costs (VanVleck, 1979).

Genetic estimates of a herd of Gir cattle are useful for determining breed performance. It is also important to assess the magnitude of various non-genetic factors significantly influencing the production and reproduction traits. This is necessary for preparing future breeding plans, execution of selection in herd for further genetic improvement.

The present study was undertaken on Gir cattle with the following objectives:

1. To study the performance of Gir cattle under its native environment.
2. To study the magnitude of effects of various non-genetic factors on production and reproduction traits in Gir cattle.
3. To study the extent of genetic and phenotypic variation existing in various production and reproduction, first lactation and all lactation traits in Gir cattle in its breeding tract.
4. To optimise various production and reproduction traits of Gir Cattle as breed characteristic.