CHAPTER 1

Review of literature

A considerable work has been done on animal husbandry by sociologists, economists, agriculturalists, agriculture economists, veterinarians, dairy economists, farm economists, co-operative managers, dairy technologists and agriculture engineers. Various fields like dairy production, dairy marketing, dairy enterprises, livestock composition, livestock composition and fodder demand, livestock production and development, livestock economy, livestock in mountain and hills, mixed farming, trade of livestock products, women participation, breeding technology, marketing and management, animal feed, meat production, farms model, broiler production and problems and prospects have been largely undertaken by these scientists of different fields from different universities and institutions. But the work by geographers on animal husbandry is very countable. The thematic reviews of work done by scholars in the field of livestock husbandry and allied activities are given below.

1.1 Studies on Livestock Composition

Royal Commission on agriculture reported a wide ranging discussion on animal husbandry in India covering different types of related questions. Later on researches felt the need and importance of livestock husbandry and started the work seriously. After 1970’s it speeded up with the introduction of white revolution i.e Operation Flood First. Halstead, P. (1996) focussed on the need to consider the full range of recent models of animal husbandry and suggested ways of harnessing archacozoological evidence to the investigation of pastoralism. A number of economists have attempted to show the surplus animals of India and its utility in agriculture in different agro-climatic zones. Saikia, A. (2004), Pal, P. K. (2004), Chend, K. (2004), attempted to assess the
growth and composition of livestock population, utilization of livestock in agriculture production and available technological support on the basis of agro-climatic zones followed for agricultural research and development programmes.

Khan et al. (2008) concluded that the Livestock revolution in Monsoon Asia took place in a very quicker way as a new option for the farmers so as to face the challenges of economic non-viability of cereal cultivation that has emerged amidst increasing production cost per unit weight of output. Moreover, all species of livestock grew up in their number except cattle. National commission on Agriculture (1971) concluded that 70-75 percent of the farmers (marginal and small farmers) possess cattle on the basis of size of landholdings in different areas of the country. According to the report, the ownership of distribution of milch animals is less uneven than agricultural land which is a favourable situation that can be exploited to a great advantage in any anti poverty programme.

However, Raut, K.C. (2006), in his paper entitled “Research Priorities in livestock statistics” drew the attention that in the process of enhancing the production it should be kept in mind that well known recognized breeds of cattle and buffalo in the region are not eliminated. There are only four breeds among thirty major breeds of cattle namely Sahiwal, Gir, Rathi and Sindhi which are maintained for milk production in India. Sindhi and Sahiwal reduced significantly and Gir and Rathi are also under severe neglect. Due to the modernization of agriculture and sub-division of landholdings, bullock power in Indian agriculture and losing its importance. There are only few breeds like Deoni, Haryana, Kankeraj and Tharparkar while the rest are draft breeds maintained by farmers for producing bullocks (Hegde, N.G. 2006).

Sastry, N.S.R. (1995) stated that the highest density of buffalo are found in the vast gangetic plains regions except the lower gangetic plain. They stated
about different habitats, different breeds, new linkages groups and the breeding
tools of buffalo. The dairy sector in the country is largely dependent on buffalo
milk because of its rich fat content. Even in a herd of 10-15 cows three or four
buffaloes is usually reared as female buffaloes (Prabu, M.J. 2007).

As far as goat is concerned, Mittal, J.P. (1984), Rana, Z.S. (1984) and
Maity, S.B. and Das, M.M. (2000) have attempted to understand the goat
production and goat farming system in semi arid regions in the context of its
resource management, resource flows and appropriateness and economic
viability of goat enterprise in relation to other farm enterprise and constraints,
which hinder the viability and sustainability of goat production system. Paul,
D.C. et al. (1991), studied to identify and qualify the potential of goat
production in south-west part of Bangladesh. He said that the field grazing was
the main feeding system and was strongly influenced by the season. He
concluded that there is a need to have more information on the role of goats in
rural development so that appropriate research strategies can be developed.

Singh, V. (2000) shows the vital role of draught animals in mountain
agriculture. In respect of plain areas mountainous regions are more difficult in
animal husbandry. Various attempts have been made to examine the socio-
economic perspective of animal rearing in mountainous region. The
performance of Frieswal animal to increase the milk production in the country
is shown by Gaur, G.K. (2002). Many scholars presented an insight into many
prospects associated with livestock farming in mountainous region and they
concluded and suggested that there is a need to call for conscious efforts to
overcome the inaccessibility which is a major hindrance in the mountains to
look for promising enterprises for better livelihoods. Reddy, R. (2008), aimed
to understand the socio-economic condition and adoption of sheep
management practices. He concluded that sheep production is in the hand of
traditional farmers rearing under extensive system of management. He
concluded that the poor socio-economic conditions are mainly due to their illiteracy.


1.2 Studies on Livestock Production

A large number of scientists have shown their interests on the study of livestock development and their impacts on farmers with different aspects. Efforts have been made by Bujarbaruch, K.M. and Rohilla, P.P. (2001), to enhance the production of animal husbandry through farming system approach, both under farmhouse system and economic enterprise system. Pandey U. K. et al (2004) examined the spatio-temporal changes in the pace of growth and stocking patterns and major contribution of bovines in India while Singh, J.P. et al. (2003) in their paper suggested that there is a bright scope of livestock production in Uttaranchal as a subsidiary source of income. Again Singh, in (2004) attempted to study the overall scenario of livestock wealth, growth rates in production of milk, meat, egg and wood. Chantalakhana (1996) emphasized on mechanization to ensure a regular flow of standard quality output of livestock which is often achieved through contract farming. This is one of the livestock production systems where the actual production process is contracted out by a company which supplies inputs such as feeder stocks, feed and veterinary supplies and buys the final product back at a pre-established price. Stenfeld, H. (1999) intended to highlight some of the underlying principles of industrialization of livestock production and tried to find the ways to address
the livestock research and development in the light of Asian Economic crisis. He stated that producers and consumers concentrate on those places which are favourable for the production of livestock products. Livestock products in developing countries where infrastructure is not well developed tend to concentrate close to urban centres where consumer's growth (i.e. human population growth) is high which saves the transaction costs of perishable animal products. Thus there is a need to design policies to correct the negative effects of large-scale industrial livestock production. The policies should keep in mind the costs of environmental degradation, emerging public health hazards and growing income disparities.

However, Singh, D. and Raut, K. C. (1977) discussed about regional imbalance in livestock development and they supposed that such a study will be useful in formulating livestock improvement plans on efficient lines in different regions. Kar, N.(2002) revealed that the better quality bovines are confined to dry regions of India, whereas poor quality and non-descript bovines are found in the humid regions of the country. Attempts were made by some scientist to study livestock development in Rajasthan in terms of temporal growth, density, composition, animal health facilities, number of animals served by various infrastructure facilities and milk, meat and egg production in the era of new economic reforms. Birthal, P.S. and Rao, P.P. (2004) seeks to understand the patterns and process of intensification of livestock production in India.

1.3 Studies on Livestock Dairy Centers and Dairy Production

The importance of dairying hardly needs to emphasize in a country like India. Dairy sector plays an important role to improve the socio-economic development of millions of rural households. One of the world's largest and most successful dairy development programs called Operation Flood (OF) program was launched in 1970. Its main target was to link the farmers’ co
operative to the urban consumers. To support and supplement the efforts of Operation Flood and to enhance rural employment opportunities and income generation through dairying the Government of India launched the Technology Mission on Dairy Development (TMDD) program in 1989.

Performance of the Indian dairy industry reveals that over the last three decades from early 1970s to the late 1990s there has been a significant increase in milk production. The major change came after successful implementation of Operation Flood program and other dairy development programs implemented by the State and Central government. Now the average milk production per animal in India has improved substantially both in cows and buffaloes (Sharma, V.P. et al. 2003). But there is still need to increase the milk productivity through improvement and extension of breeding services which includes the artificial insemination services, upgraded health care facilities, better quality feed and fodder and strengthening of research, training and extension services.

However, study regarding ownership of milch animals was conducted by Ganguli, B. K. and Gopal, S. under the aegis of National dairy Development Board (NDDB) in 1975 and 1978 in different parts of the country. Report showed that there are two extreme groups, the big households and landless households in Indian milk sheds who are somewhat better off than small farmers. About 3/4th of the households belong to weaker section that possesses the milch animals in rural areas. Kar, N. (2002) concluded that draught requirement is neither universal in agriculture nor hinder the development of dairying. Milk yield depends on nutrients with buffaloes giving better return for the fodder obtained from crop residues as compared to cows.
Indian dairy farming is an important occupation with lot of potential for socio-economic development of the marginal areas among all the land related activities (Singh Vir, 2002). Milk production is rural based activity which is spread widely across the country. Dwaigayan, B. et al. (2002) overviewed the Indian Dairy Industry for assessing its perceived strength and weaknesses. The ground situation of dairy, prospects of dairy enterprises, economics of mini dairy enterprises, income and employment potential of dairy farming and the resource use efficiency of dairy unit to suggest policy implication for enhancing dairy enterprises are attempted by Elenchezhan, T. and Jayanthi, H. (2004).

Tomar, A. K. S. (2002) suggested the optimum production of mutton, milk and wool and can be enhanced by scientific layout of the farm, while Shaha, A.K. and Jain, D. K. (2004) assessed the technical efficiency of dairy farms in developing countries which could be an important measure to understand the competitiveness of smallholder dairying. This is because potential reform in the international agricultural policy arena is on the cards and World Trade Organisation policy initiatives on the agenda will serve to increase the world access to the markets of developing countries. This can have a very big impact on the welfare of millions of dairy farmers. Whether the existing dairy enterprises is optimum or needs overhauling either partially or completely is examined by Kamble, S.H. et al.in 2004.

Keeping in view the importance of milk Kumar Jagdish et al. (2000) economically analysed the production and disposal pattern of milk in Haryana. Chauhan, A.K. et al. (2004) attempted to examine the variability in milk production among sixteen major states of India and suggested that disparity in per capita availability among different states can be reduced by increasing the productivity of animals by introducing high yielding animals, enhancing fodder availability in different states and increasing the ratio of wet animals in bovine


1.4 Studies on Livestock Breeding Technology

It was felt to improve the quality of both draught and milch animal from pre-independence period. Male stocks which provide most of the draught power and fulfil meat requirement for Indian agriculture and trade respectively, need to be improved their quality. Breeding technology is such a policy of government which improve the quality as well as genetic characteristics of the livestock. This policy played a dramatic change during 1960s when animal husbandry experts and policy makers stressed on cross breeding of indigenous cows with exotic bull to achieve a quick breakthrough in milk production. But due to less resistant to disease and climate of different ecological zones in the country, it relegated the efforts to improve the quality of Indian draught cattle more and more. However, based on the justification that the overall result of cross breeding is development of total draught power in the country, the national commission on agriculture in 1979 strongly recommended the policy of large scale cross breeding. George, P. S. and Nair, K. N. (1990), tried to understand current practices of feeding, breeding and management of cattle at the farm level. He concluded that crossbreeding technology has contributed to significant increase in diffusion of crossbreeding technology has contributed to significant increase in the genetic transformation of the cattle population.
Some efforts were made to examine the economic impact of breeding technology on dairy farming and factors in which dairying with cross breed cows becomes profitable respectively. Rajapurohit (1979) stated that the physical efficiency of cross bred males in draught power should not be mistaken with the economic efficiency. Singh, H. (2006) associated with Department of Geography and Regional Science, Kashmir University showed the impact of cross breeding technology on economic efficiency of dairy farming in Kashmir valley. He also tried to study the regional variation in adaptation of cross breeding technology and find economic efficiency of dairy animals. However, Awasthi,P. K.et al (2004) viewed the differential impact of socio-economic factors on reproduction performance of crossbred dairy cows.

1.5 Studies on Fodder Demands

In India livestock number is more than enough but the potential product is very low as compared to other countries. The main and primary reason behind this is that we are maintaining our livestock on poor grade roughage. So, biotechnology is the only solution for improving the utilization of these traditional feed resources to improve livestock productivity. Socio-economic factors, and public acceptability as well as its scientific merits must be considered for the utilization of this technology Gupta, L. and Tank, U.N.(2003). Whyte, R. O. and Mathur, M. L.(1968) concluded that Fodder production can be increased by transferring the land for food and cash crop, keeping in view the loss of economy of the farmers and without production and cash crops within a milk procurement area. He observed that under the condition of more intensive and irrigated agriculture fodder crops becomes competitive with any of the food and cash cops of India.

Livestock keeping with crop production and agro forestry is a source for achieving maximum sustainable productivity. The most limiting factor for livestock productivity in semi – arid areas is dry season fodder supply which can
be solved by the combination of conserved grasses and legumes, leaves and pods from trees or bushes and crop by-products and household wastes (Ogle, B.1990). Feeding of animals which is a major issue for farmers studied by many scholars and said that fodder trees which provide green fodder during winter and summer are important source of green forage. The farmers should be encouraged by the state forest and agriculture departments to plant these trees to the boundaries of fields and waste land. Research should also focused on grasses which can grow under the agro-climatic condition. Raut, K.C. in 2006 emphasized that for policy makers a sound basic data are must as a foundation. For this there is need to collect and analyze more information on current and potential feed resources, particularly of grasslands, forage crops and agro industrial wastages as well as on the utilization of these resources in different regions and under different farming systems.

1.5 Studies on Livestock Economy

Livestock provide economic security and social status to the family. Concentration of livestock in general and small ruminants in particular is in marginal, small and semi medium holdings which mostly represent poor section of the society. Thus progress in livestock sector is directly related to more balanced development of rural economy and upliftment of the poorer section of the society (Press Information Bureau, 2001). To provide the employment in India, agriculture is still a considered as major sector of income (Ramrao, W.Y et al.2005). However seasonal work in crop production of landless, marginal and small farmers is a major cause of unemployment and underemployment for them. This situation encourages livestock husbandry as a source of off season employment for them.

Kar, N, and Dwivedi, K.K. (2002) studied the profitability of bovine stock on the basis of net return at individual household level and compared
between and among different agro-climatic regions. Fulhage, C.D. (1997) made an economic analysis of manure systems in Missouri and it was analysed that cost of manure management increased by 50 percent of milk produced as the herd increased from 100 to 500 cows.

The lives of a large portion of rural India depend on animal husbandry. Thus the economic viability is greatly depending on agriculture as well as animal husbandry. People particularly marginal and small farmers are deriving a handsome amount of their income from animal husbandry. Poor people have few opportunities to increase their income because of limited access to land and capital. Small scale and backyard livestock enables the poor to earn income from animal grazing on common property pastures or fed with household waste. Lokollo, E. M. (2005) identified the two main reasons for livestock revolution for optimism. First the income of the poor can be more easily improved through livestock husbandry when they have a major step in a sector that is growing. Second the current rapid intensification of animal production comes at a time when the rural poor disparately need higher returns to their shrinking land than field crops alone can offer.

Kumar, V. et al. (2004) examined the relative importance of livestock in terms of its contribution towards gross state domestic product across districts, spatial and temporal changes in the composition of livestock population. Sidhu R.S and Bhullar, A.S. (2004) tried to analyse the growing importance of the livestock economy in the agriculture sector of the state and estimated its impact on the income and employment generation in the rural areas. They also examined factors responsible for the growth of dairy in the state.

Technological and organizational complementarities between successive stages (Chander, A.D.J. 1996) may arise the vertical economies of scale. The firm operating several stages of production are said to have vertical economies of scale if the costs of jointly producing several vertically adjacent products are
less than the costs of producing the products independently. This can also be achieved from eliminating factor distortions in monopolised markets and transaction costs of contractual or market exchanges (Perry, M.1989).

1.7 Studies on Mixed Farming

Mixed farming system is a better means for providing regular employment to the marginal, small and landless farmers in rural masses in tribal areas (Ramrao, W.Y. et al. 2005). In an international workshop on integrated crop-livestock production for the slop land of Asia held in Ho Chin-Minh city, Vietnam, it was concluded that combining livestock with crops is a sustainable and profitable systems of production for low income slop land farmers in Asia. It uses diverse resources such as fodder, legumes, crop residues and livestock manure in a system of nutrient recycling. Livestock have the great advantage of being relatively easy to market compared to harvested crops FFTC (Food and Fertilizer Technology Centre, 1998).

Keeping in view the importance of livestock husbandry in the present era of globalization of agro-trade, emergence of various kinds of socio-economic issues, environmental challenges and health hazards of livestock and humans, Khan, et al. (2008) tried to find out the comparative analysis of growth of livestock sector, spatial variation in the growth of livestock and the impact of livestock revolution on economic viability of marginal and small farmers and sustainability of agriculture in Monsoon Asia. They suggested that Livestock and cropping integrated farming (mixed farming) must be encouraged on the basis of reciprocal use of their products for enhancing ecological, social, and economic viability of agriculture in Monsoon Asia. Poverty alleviation programme should also be merged with this sector (Inforesources, 2007).

1.8 Studies on Women Participation in Livestock

Rearing of animals is not a single handed work but it involves all family members in rural areas particularly women are active participant in animal
husbandry. Feeding, caring, milking are the main works of females in rural areas. Kumar Anil (2003) analysed the significance of rural women in improvement of livestock production with the empowerment of their knowledge, skills as well as financial support. Thus a traditional division of labour existed within the household particularly with respect to animal husbandry activities. Time utilized by women is comparatively more in landless and small households than big landholders. In another study, it is revealed that as the size of holdings increased, household women labour decreased (Raut. K.C.2004). Delago, C.et al. (1999) showed that a higher share of income of rural poor women and landless farmers comes from livestock.

Jamal, S.(1994), tried to provide useful and empirical information about the role of farm women in relation to productivity of milk by dairy animals in rural social system. She also studied the role of farm women as perceived by themselves and as expected by their spouses, the extent of involvement in decision making in relation to dairy animals production, the level of knowledge and skill of farm women about selected dairy husbandry practices, the role performance in relation to productivity of dairy animals and the dynamic interplay of various factors influencing the role of farm women in relation to productivity of dairy animals. The study provided the realistic information on the role of farm women and their contributions in dairy husbandry in the rural social system. The study suggested several far reaching implications to the extension planners, policy makers, academicians, scientists and rural social workers for training and transferring the livestock based technology to the actual user.

1.9 Studies on Livestock Trade and Marketing

To making livestock user-friendly, so that the developing countries/regions can export more livestock and livestock products to the developed countries and other developing regions without risking human or animal health, efforts are progressing to clarify international standards for livestock trade (Catley, A.2008). In order to compete in the world market it is
necessary to look at the bacteriological and hygienic quality of raw milk and find ways and means to improve, right from the point of milk production in the village upto consumption point (Patil, G. R.2003)

Committee on Agriculture (2005), addressed the ways in which globalization is changing the livestock sector and affect the small scale livestock producers, traders and processors of developing countries. It further concluded that globalization of livestock markets is a deriving factor for changing the livestock sector. In doing so it summarized the evidences to examine the impacts of market changes on society, the environment and public health and proposed a framework to assist member nations in balancing the positive and negative impacts of globalization on the livestock sector.

Khan, et al. (2006) tried to find the behaviour of livestock marketing in agriculturally developed area of India. Socio-Economic variables affecting the marketing process of the livestock have been also taken into consideration. He concluded that the livestock marketing system is very rudimentary and the transaction is spatio-temporal and socio-economic motivated in the study area Aligarh district, India. Meat production was discussed by Kulkami . V.V. et al. (2000) that water buffalo perform well as milk producer but also have excellent muscle conformation that demonstrate potential for veal and beef production. Within the livestock products the export of meat and meat preparation showed stable and increasing performance. India is highly competitive in pork and beef, moderately competitive in butter in the international markets. There exists a scope for India to increase its exports of livestock products in future. But in general in the world, scenario, India’s export performance is gloomy because of the fact that it has large bovine and sheep population (Rao, B. Dayakar et al, 2005). Awasthi, M. K. (2004) attempted to examine the export on potential of livestock products in India by using domestic resource cost (DRC) method
which is based on social profitability approach of measuring global competitiveness.

At its 17th Session in 2003, COAG (Committee on Agriculture) had noted the need to strengthen the capability of small farmers in market access. At its 29th Session in May 2003, the Committee on World Food Security identified international trade as a factor affecting food security and food safety. International trade is an important element in the larger phenomenon known as globalization. Globalization can be seen as integration of economies through trade, flows of finance, knowledge, ideas and people. Globalization in the livestock sector is manifested as increasing international flows of livestock and livestock products as well as capital, exchange of information and technologies, pervasiveness of increasingly demanding standards, and changes in sectoral structure towards concentration and integration. As such, it can affect the functioning of domestic livestock markets (Committee on Agriculture, 2005).

1.10 Studies on Livestock Problems and Prospects

It is well known fact that in every field of life, there are challenges at every step and simultaneously the process of solving those goes on. Therefore in context of animal husbandry Yadau, L.S. (2000), Patil, G.R. (2003), Jangid, B.L. and Rohilla, P.P. (2004) tried to investigate the various problems faced by farmers and their prospects as well to improve the practices of animal husbandry. Davoy, K. et al. (2008), revealed that main constraints for livestock production is disease and lack of feed for ruminants and a special problem for goat production was theft because most of the goats were raised in free grazing system with no food supplements.
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