ISSUES AND CONSTRAINTS OF LIVESTOCK SECTOR IN INDIA

6.1 Constraints Faced by Indian Livestock Sector

There are various constraints that hinder the realisation of the full potential of the livestock sector in India. Following is the description of the major constraints faced by Indian livestock sector which defray the country as well as its small scale producers to make the highest possible benefit from the rapidly growing livestock sector.

6.1.1 Low Yield

The current productivity levels of most of the livestock species are low in India and improvement in the livestock productivity is a major challenge. The average milk yield of a buffalo was 1,668 Kg per annum in 2009-10 (Table 6.1) which was about half the world average and much less than the major milk-producing countries like New Zealand, Australia and the United States (FAOSTAT). The productivity of meat animals like sheep, goats and pigs is substantially less in comparison to world averages. The deceleration in productivity growth is more worrisome. There was a rapid deceleration in the yield growth of dairy animals. The growth in milk yield of crossbred cows decreased from 1.8% during the 1990s to 0.7% during 2000s, while for buffaloes it declined from 1.7% to 1.2%. The productivity of meat animals (sheep, goats and pigs) has been stagnating for a long time. The trends in milk yields of crossbred cows and buffaloes indicate that growth in dairy production is becoming number driven.
Table 6.1: Growth in Milk Yield and Production of Different Species

<table>
<thead>
<tr>
<th>Year</th>
<th>Indigenous cow</th>
<th>Cross bred cow</th>
<th>buffalo</th>
<th>Annual Milk yield (Kg/in-milk animal)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Production (MT)</td>
</tr>
<tr>
<td>1992-93</td>
<td>16.7</td>
<td>7.6</td>
<td>31.0</td>
<td>602</td>
</tr>
<tr>
<td>2000-01</td>
<td>18.8</td>
<td>14.1</td>
<td>43.4</td>
<td>701</td>
</tr>
<tr>
<td>2009-10</td>
<td>22.5</td>
<td>25.4</td>
<td>59.2</td>
<td>781</td>
</tr>
<tr>
<td>% Annual growth 1992-93 to 1999-2000</td>
<td>1.6</td>
<td>7.6</td>
<td>3.9</td>
<td>1.7</td>
</tr>
<tr>
<td>2000-01 to 2009-10</td>
<td>1.8</td>
<td>6.0</td>
<td>3.2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Source: Birthal and Negi (2012)

6.1.2 Interstate Variation

There is wide interstate variation in the benefits accrued from livestock sector and distribution of infrastructural facilities in India.

6.1.2.1 There is a wide variation in milk yield of cows and buffaloes across states. In Punjab, Haryana, Gujarat, Tamil Nadu and Kerala, dairying is based on high-yielding cross-bred cows / buffaloes. The average milk yield of a cow (indigenous and cross-bred) and buffalo is very high in these states while, at other extreme are states such as Assam, Chhattisgarh, Jharkhand, Orissa and Madhya Pradesh which have a very low average milk yield of a cow and buffalo.

6.1.2.2 There is a wide variation in the adoption of artificial insemination or cross-breeding technology among Indian states. For example, crossbreds constitute about 93% of the total cattle in Kerala, 72% in Punjab and 66% in Tamil Nadu. While at the other extreme are states such as Assam, Chhattisgarh, Jharkhand and Madhya Pradesh could that could hardly exceed 0.5%.
6.1.2.3 There is also considerable regional variation in veterinary infrastructure and manpower. Livestock units per veterinary institution are very high in some of the poorest states like Jharkhand, Bihar, Madhya Pradesh and Chhattisgarh, while high-income states such as Punjab and Haryana have a relatively better infrastructure and less number of livestock units per veterinary institution.

6.1.2.4 There are also Interstate imbalances in the flow of institutional credit. For example, about two-thirds of the finance by the National Bank for Agriculture and Rural Development (NABARD) for livestock development is concentrated in Uttar Pradesh, Punjab and Haryana.

6.1.2.5. The distribution of benefits from cooperatives also has wide interstate variation. Milk producers in Gujarat, Maharashtra, Tamil Nadu and Karnataka have benefited more from dairy cooperatives than those from other states.

6.1.3. Livestock Sector-A Missing Focus

In spite of its increasing share in agricultural GDP, the livestock sector has not received much policy attention which it deserves. It also does not receive the sufficient institutional credit, insurance and public spending.
Table 6.2: Crop Vis-a-Vis Livestock Sector in Availing Development Expenditure, Credit and Insurance Facilities

<table>
<thead>
<tr>
<th>Year</th>
<th>Institutional credit</th>
<th>Insurance</th>
<th>Combined (central and state) development expenditure (revenue and capital on livestock and crops (as % of agriculture and allied expenditure)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crops</td>
<td>Livestock</td>
<td>Crops</td>
</tr>
<tr>
<td></td>
<td>Crop loans + Term loans for agricultural and allied (crore)</td>
<td>Out of term loans (crore)</td>
<td>Animal husbandry term loan as a % of term loans to the agricultural sector</td>
</tr>
<tr>
<td>2002-03</td>
<td>63141</td>
<td>2637</td>
<td>15.02</td>
</tr>
<tr>
<td>2006-07</td>
<td>138455</td>
<td>8045</td>
<td>8.85</td>
</tr>
<tr>
<td>2007-08</td>
<td>181393</td>
<td>9033</td>
<td>12.33</td>
</tr>
<tr>
<td>2008-09</td>
<td>210395</td>
<td>11203</td>
<td>12.24</td>
</tr>
<tr>
<td>2009-10</td>
<td>276,656</td>
<td>10260</td>
<td>9.51</td>
</tr>
<tr>
<td>2010-11</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2011-12</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2012-13</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Calculated from GoI, various issues
The share of livestock sector in the credit (short term, medium term and long term) given to agricultural and allied sector has always been less than four percent. Similarly, the sector receives only 4-5% of the total institutional credit that flows to agriculture and allied sector which shows that it is also neglected by the financial institutions. Table 6.2 shows that the share of term loans to animal husbandry decreased from 15% in 2002-03 to 9.51% in 2009-11. The crop sector loans were 23.9 times the loan given to the animal husbandry sector during 2002-03 which increased to about 27 times during 2009-10. Similarly, the farmers head insured were 14.8 times the animals head insured during 2006-07 which rose to 20.8 times during 2009-10 (Table 6.2). Only six percent of the animal heads (excluding poultry) are provided insurance cover. Capital expenditures (central and states) as a percent of agricultural and allied sector on both livestock and crops is almost equal till 2008-09 but from the year 2010 to 2013 the capital expenditure on crops is about double the expenditure on livestock sector while if the share of crop and livestock sector in revenue expenditure given to agricultural and allied sector is considered, it is far lower in comparison to livestock sector than to crop sector, it is almost 4-5 times lower than the revenue expenditure on crops (Table 6.2). The sector does not get any private sector investment as there are negligible tax incentives and lack of lucrative credit facility to private investors (GoI, 2012).

### Table 6.3: Public Spending on Livestock Sector

<table>
<thead>
<tr>
<th>Indicators</th>
<th>TE 1992-93</th>
<th>TE 2000-01</th>
<th>TE 2008-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total spending (Rs. crore at 2004-2005 prices)</td>
<td>3739.60</td>
<td>4156.10</td>
<td>4,726.10</td>
</tr>
<tr>
<td>Public spending (% of total agricultural spending)</td>
<td>13.6</td>
<td>9.9</td>
<td>4.6</td>
</tr>
<tr>
<td>Public spending as % of livestock value of production</td>
<td>3.6</td>
<td>2.8</td>
<td>2.3</td>
</tr>
<tr>
<td>Veterinary services and animal health</td>
<td>23.7</td>
<td>24.1</td>
<td>29.1</td>
</tr>
<tr>
<td>Research education and extension</td>
<td>2.2</td>
<td>3.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Source: Birthal et al. (2014)
The public spending on animal husbandry was 13% of the total agricultural spending during TE 1992-93 which drastically reduced to 4.65% in TE 2008-09, though the public spending on animal husbandry and dairy to total agricultural outlay was 11.8% during the tenth plan which declined to 9.3% during the eleventh plan. Similarly, public spending as a percent of the livestock value of production was 3.6% in TE 1992-93 which also decreased to 2.35% in TE 2008-09 (Table 6.2). The sector deserves a lot of policy and financial attention, but in reality, it has been neglected as it only receives 12% of total public expenditure on agriculture and allied sector which is not in proportion to its contribution to the agricultural GDP. Only 34,500 veterinarians were employed for field services and only 3050 are available for teaching and research against the requirement of 67,000 and 7500 respectively. The expenditure on research education and extension has somewhat increased from 2.2% to 3.0% which is also insufficient as per the need of this sector. Livestock extension has remained grossly neglected in the past. There is almost an absence of livestock extension services only 5.1% of the farm households access any information on animal husbandry against 40.4% for crop farming so the extension format, methodology and setup established for agriculture is unable to serve the needs of the livestock sector. The only centrally sponsored scheme on “Livestock extension and delivery services” with a budgetary outlay of Rs.15.00 crore remained non-operational (GoI, 2012b). Extension services in most of the developing countries are designed around crop husbandry and India is also not an exception (Morton and Matthewman, 1996). Most of the public and private extension initiatives focus on crop husbandry and widely neglect the information delivery on livestock, moreover, livestock information delivery is also skewed towards feeding, breeding and animal health and nutrition and pays less attention on information related to livestock management, processing and marketing, though in the wake of rising demand for animal products, the livestock farmers need a dynamic information flow for decision-making.

6.1.4 Feed and fodder deficit

Development of feed and fodder, which is crucial to increase productivity, has not received much attention. Its share in total livestock expenditure has hardly ever exceeded one percent in the last two decades though feed and fodder scarcity has been a serious problem in India. India is reported to be the deficit in dry fodder, green fodder and concentrate feed by 11%, 35% and 28% respectively (Ramachandra et al., 2007). Common property resources have been deteriorating quantitatively as well as qualitatively over the time.
6.1.5 Problem of Surplus Cattle

The utility of male cattle as a source of draught power, however, has declined over the time because of increasing mechanisation of agricultural operations. Disposing them is difficult because of a ban on cow slaughtering in most of the Indian states.

6.1.6 Poor Veterinary Services

The number of livestock units per veterinarian decreased from more than 15,540 in 1982 to less than 7,000 in 2010. The delivery of veterinary services also remains weak. Shortage of manpower, poor supplies of medicines, vaccines and equipment are responsible for inefficiency in the delivery of services. The focus on animal health programmes has been largely on the provision of curative services. Less attention has been paid to preventive mechanisms Rinderpest is a devastating disease of ruminants that has been eradicated. But, a number of other severe diseases like foot and mouth disease, black quarter, hemorrhagic septicemia etc. continue to persist, and sometimes in severe forms. These diseases are detrimental to the growth of the livestock sector.

6.1.7 Lack of Market Access to Small Farmers

The lack of access to markets acts as a disincentive to farmers to adopt improved technologies and quality inputs, and hence to improve livestock productivity. Except for poultry products and, to some extent, milk markets, the markets for livestock and livestock products are underdeveloped and dominated by informal intermediaries. Marketing and transaction costs associated with livestock products are very high, which act as a hurdle to the participation of small-scale producers in the markets (Birthal, 2008).

6.1.8 Issues Related to Processing and Marketing

A good infrastructure for processing and product development with an efficient marketing network is the basic requirement for rapid development of the livestock sector. Only 30% of the milk produced comes from organised sector. The perishable nature of animal products demands a whole range of infrastructure in the form of cold chain, good roads, efficient transport, markets, etc. need to be developed in order to tap the full developmental potential of this sector.
6.1.9 Data and Information Related Issues

Effective planning and implementation of developmental programmes require factual and objective data. In the crop sector, there are well-established mechanisms for data collection and documentation periodically even up to village level, the same does not exist for the animal sector. There is low research investment in livestock sector which could hamper its balanced growth.

6.2 Issues Concerning Small Scale Farmers in India during Livestock Revolution

The livestock sector improved tremendously and achieved great success in raising livestock derived products especially in developing countries of monsoon Asia especially India (Khan and Iqubal, 2010). But, this revolutionary success has given rise to various issues and challenges which deserve for academic and scientific discussion as consequences of the Livestock Revolution in India.

6.2.1 The Ongoing Revolution and Incomes of the Poor

Livestock Revolution is a fundamental change in the way people eat owing to rise in income urbanisation and population growth. As the income rise people diversify their diets by giving up traditional staple cereals in favour of more milk, meat, eggs and fish. This process has been termed as “Livestock Revolution”. It is called a revolution because change is happening rapidly and on a massive scale. One dimension of Livestock Revolution is its impact on small-scale farmers (ILRI, 1999).

Data from the National Sample Survey Organization (GoI) shows that there is a continuous upward trend in expenditure on livestock products which is at the expense of the reduction in expenditure on foodgrains. Between 1983 and 2011, the share of milk in total food expenditure increased from 13.7% to 19%, while that of cereals declined from 42.7% to 21.16 (Table 3.11). The share of food expenditure on meat, milk and eggs increased from 6% to 9% respectively during the same period.

Livestock production offers one of the few rapidly growing markets in which poor, rural people can participate even if they lack substantial amounts of land, training and capital. The significance of livestock for women's income in India has been widely emphasised. Dairy cooperatives have been a major means of
successfully bringing women in poor areas. Evidence from studies and a pattern from developing countries show that the poor farmers earn a higher share of income from livestock than do the wealthy ones (Quisumbing et al., 1995). The sharp rising trend in demand for animal products is evident mainly among countries in transition and certain developing countries, above all in China and India. Smallholders have a good opportunity to increase income by making use of the rising international and regional livestock markets.

It raises the possibility that the Livestock Revolution will be beneficial for the Poor. The revolution offers two main reasons for optimism. First, the Poor can very easily improve their income when they have a significant stake in a sector that is growing. Second, the current rapid intensification of animal production comes at a time when the rural poor direly need higher returns to their shrinking land (Lokollo, E. M, 2005).

Livestock provides economic security to the small-scale livestock producers. There is a concentration of livestock in general and small ruminants in particular among marginal, small holdings, which mostly represent the poor section of the society. Thus, progress in the livestock sector is directly related to a more balanced development of rural economy and upliftment of small-scale farmers (Press Information Bureau, 2001).

Smallholders play a pivotal role in India’s milk Production. They contribute about 70% of milk production in India. Their contribution reached to as high as 90% of the milk production in Uttarakhand, West Bengal and the North Eastern States.

Small and marginal farmers comprise of 85.03% of operational holdings in 2011-12. Small and marginal farmers together had 68.80%, 73.58%, 69.50% and more than 73% of in-milk bovines, pigs and small ruminants (sheep and goat) and poultry respectively, during 1996-97, which rose to 75.53%, 80.49%, 75.73% and 82.54% respectively during 2011-12. Livestock distribution is highly skewed in favour of small holders (Birthal, 2006). The growth in livestock income is inversely related with farm size.

NDDB data of ownership of milch stock drawn from a broad canvas across different types of farming strata also establish that the Gini coefficient for livestock income was as low as 0.12 (NDDB, 2003 mimeo). Greater equity is witnessed in livestock
ownership compared to arable land (Swaminathan, 2003). These results indicate that the distribution of dairy animals across different types of operational holding is uniform to a large extent, and such uniformity is found to be empirically strong. Therefore, wherein the land ownership structure in India has been skewed which favours the bigger landlords the animal holding structure is rather more equitable.

Empirical evidences indicate that any increase in income from livestock activity would help in the reduction of income inequalities Patel and Das (1979); Sambrani (1981); Adams Jr-He (1995) and Birthal (1997). An equitable distribution of assets has a much wider welfare implication, especially for distribution and redistribution of rural economic assets. Similarly, an inequitable distribution is not socially desirable from the point of income and wealth creation and hence in this context the relevance of equity assumes the significant position from welfare angle.

Moreover, among various agricultural activities, livestock production has more income redistributive effect on households and is very useful in reducing rural income inequality (Adams and He, 1996; Birthal and Singh, 1995; Kumar et al., 2007). Hence, livestock farming is immensely important for the economic viability of land scarce farmers. Moreover, the Livestock Revolution offers the way towards the prosperity of small and marginal farmers. Farm income could rise dramatically with a rising demand for livestock products. If Livestock Revolution is handled correctly, it will help millions of poor to come out of poverty.

"Lack of policy action will not stop the Livestock Revolution, but it will ensure that the form it takes is less favourable for growth, poverty alleviation, and sustainability in developing countries" (Delgado et al., 2001). One of the very critical issues regarding Livestock Revolution is that a sector on which small-scale producers are heavily relied is growing, but if they fail to participate, they are condemned to even worse marginalisation.

6.2.2 Social Consequences/Equity Issues

There is an apprehension that the large intensive livestock farming can replace small-scale producers. Delgado, et al. (2003a) analysed the livestock sector in four developing countries including India. They focused on the competitiveness between small and large livestock firms. The studies showed that there was a significant gain
in efficiency when the livestock producers move from small backyard production to
the small holder commercial production, though not in a linear fashion. Large
efficiency gains were not achieved until larger increases in unit size occurred.
Transaction cost and labour cost are especially important for the relative
competitiveness of smallholder producers. Smallholders can only stay in business
when the opportunity cost of family labour is low.

There are two possible scenarios of Livestock Revolution (the dramatic rise in
per capita consumption of livestock products, especially in Asia). One scenario is that
the demand will be met by large-scale industrialised units, another is that the small
scale producers will develop livestock production that can satisfy market demand. He
found that industrial large scale production units are growing out of economics of
scale vertical integration and high demand for animal based products. It tends to
marginalise small-scale producers.

Small farmers are losing since many small-scale farms can suffer a reduction
in competitiveness and will be replaced by large-scale industrial farms (Delgado et al.,
1999b) In general; the Livestock Revolution has not sufficiently translated into
benefits for smallholders Pica-Ciamarra (2007). FAO has estimated that large-scale
commercial livestock operations are growing two times as fast as traditional mixed
farming systems (FAO, 2005a). In Asia, where the growth of livestock production has
been most evident, large-scale industrial production accounts for about 80% of the
total increases in livestock products since 1990 (FAO, 2005b).

An article published in Economic and Political Weekly naming "Death of
small farmer dairies amidst India and dairy boom" by Sagari R. Ramdas stated that
AMUL is a gigantic cooperative which has monopolised milk markets in eleven
Indian states and is ranked fifth among the top twenty global dairy players has started
functioning as a corporation. It sells cheap milk, which in turn is driving out many
small local producers out of the market. AMUL’s reduction in milk price will
automatically have a snowball effect on other dairy processors in the country, and
they will also be forced to reduce their milk price. He further opined that the decrease
in price would ultimately threaten the livelihoods of small-scale farmers who cannot
sustain their business by lowering out the selling price of milk, so the cheap milk from
AMUL is driving out the small-scale local producers. He further opined that the huge
domestic demand for milk in the country is responsible for rising corporatization of this sector with foreign firms and venture funds investing in cooperatives and then building chains with forward and backward linkages. The cooperative spirit which was responsible to drive dairy development of India until the mid-1990’s is disappearing fast. He also mentioned that India’s dairy growth aspirations are centred around corporations capturing the share of an unorganised market, whether it is Amul, Danone, Heritage, Nestle and Reliance. The livelihood of small-scale farmers seems to be in danger, if proper policies are not taken by the government regarding the livestock sector.

Industrialisation of livestock production with production getting changed from the traditional local multipurpose activity to an immensely market-oriented and vertically integrated business (Delgado et al., 1999a; Steinfeld, 2002). Industrialisation affects the rural mass engaged in small-scale livestock production. There is also a danger that large-scale intensive producers might undermine the viability of small-scale livestock production (Steinfeld, 2002).

The Livestock Revolution also has many challenges in the way of achieving successful targets. Intensification and scaling-up of livestock industries usually managed by corporate sectors present a threat to the survival of small farmers, enterprises and the ecological balance (Steinfeld, 2006).

The poultry sector of India is rapidly industrialising and consolidating. There are six major players which account for forty percent of country’s eggs production. India’s largest poultry company, Sugana poultry has been instrumental in developing a contract arming system which is rapidly replacing traditional means of raising chickens in small scale backyard flocks.

(Birthal, 2008) assessed the emerging trends in the livestock sector of India and their impact on smallholders in the era of market liberalization of market liberalization and globalization. He also stated that the rising demand for livestock products would favour large scale producers and the economies of scale in large production system which would undermine the competitiveness of smallholders by declining real producer prices, poor infrastructural facilities and stringent food safety measures might be fatal to small-scale producers. He further mentioned that traditional marketing systems are dominated by ad hoc transactions and intermediaries
are being replaced by coordinated systems like cooperatives producer associations and contract farming. These systems are expected to improve the efficiency and induce a shift in livestock production from subsistence to commercial enterprise, but there is an apprehension about the small-scale producers that they can fail to participate in the market-oriented production systems because they lack the ability to comply with emerging food and safety /quality standards which may restrict their participation in domestic as well as global market.

In a study FAO\(^8\) Surveyed 520 milk producers in Gujarat. The sample collected ranged from smallholder producers to large-scale commercial producers. The study aimed to assess the likelihood that smallholders will continue to compete successfully in a liberalised market. The results of financial profitability inferred that small-scale producers have higher profits without family labour) per litre of milk than large-scale producers. Further study indicates that small-scale farmers are technically more efficient than large-scale farmers. However, small-scale producers can be driven out of market due to large farmer's production volume

In another study of FAO\(^9\), empirical investigation of two states of India i.e. Punjab and Haryana was done to find out the extent of differences in profit efficiency per unit of output in broiler production among small and large farm. The study found that profitability per unit does not differ significantly between small and large farms, but the efficiency of these two types of farm differs significantly. Small farms are relatively inefficient, and the prime reason was the high transaction costs and pollution abatement costs.

The experience over the last few decades in capitalising on the pro-poor potential of livestock sector has been less encouraging, a large proportion of the growth in production of livestock products has been captured by large-scale intensive production systems to the exclusion of small-scale producers. This has been made more pronounced by the policy which considers livestock as an addition rather than an essential component of smallholder agriculture (Ahuja, 2011).

The Livestock Revolution has caused a major increase in pig and poultry farm size. Several factors, although difficult to identify individually have contributed to this trend. First, the level of investment for housing, feeding, breeding, and animal health technology seems to favour large-scale enterprises, total profits are much higher in the large farms.

\(^8\) http://www.fao.org/wairdocs/lead/x6170e/x6170e2x.htm
\(^9\) http://www.fao.org/WAIRDOCS/LEAD/X6170E/x6170e2k.h
The Livestock Revolution in the form of vertical integration and scaling-up of livestock production has given a threat to the survival of millions of small livestock holders. Their scale of economy and traditional form of livestock rearing with small capital might not be competitive with large-scale capital intensive high-technology oriented multinational companies. It might lead to the socioeconomic crisis in developing monsoon countries where about 90% landless, marginal and small farmers are found.

High demand for quality products is responsible for the expansion of Industrialized large-scale livestock production. The industrialised production is often favoured by more or less hidden subsidies, but it leads to environmental hazards and risk of enzootic diseases, it is responsible to change consumer preferences and tend to marginalise small-scale producers who have difficulty in competing them due to the low level of investment. Industrialised large scale production has a negative impact on economic growth and employment in rural areas.

Industrialisation may divert the livestock production from being an important factor in the rural economy to an activity with limited development effect, particularly in a developing country like India, where a vast majority of livestock keepers are small holders, who keep livestock just for their livelihood and depend on traditional natural resource-based integrated mixed crop-livestock systems (Chacko, 2010).

Demand for poultry meat and eggs are growing at the rates higher than the production and hence more number of big farms as well as more birds in the existing farms are occurring at a rapid pace. The predictions show that there will be rapid changes towards large scale production as small independent farmers will find it increasingly difficult to run farms with marginal profits (Sharma et al, 2003). Displacement of smallholders and involution of backyard farming system (loss of biodiversity) are other negative impacts of the fast changes happening in the poultry sector in Chhattisgarh (an Indian state).

It is an apprehension that smallholder livestock producers may be displaced by large industrial producers who can invest better in food quality and safety and can sell their products through well-organized outlets. The concern becomes significant in the context of the present system of poor standards of hygiene and sanitation maintained by the informal sector. A Large quantity of milk and meat marketed in the country is
processed through systems of substandard quality. Smallholder production in India is often based on hand milking, with few or no cooling facilities and inappropriate animal housing and poor animal health protection in most parts of the country (Chacko, 2007).

6.2.3 Environmental Impacts of the Livestock Revolution

6.2.3.1 Increasing Grazing Pressure in Arid, Semi-Arid Dry Lands

The grazing intensity in India is already very high. The present stocking rate is 1-5 adult cattle units (ACU) /ha in rainfed areas, against the permitted rate of 1 ACU /ha, while the stocking rates are 1-4 ACU /ha as against 0.2-0.4 ACU /ha in arid zones, (Shankar and Gupta, 1992). It is estimated that about 100 million cow units graze in forests having a capacity for only 31 million. Approximately, 80% of resource poor households depend on common property resources for the fodder of their livestock. There is a steady decline in common grazing areas, Quality and productivity of grazing lands are also showing a declining trend Pastoral system is putting more pressure on the limited land available. The LEAD study (2005) Conducted in five semi-arid watersheds in India investigated that common grazing land in most of the villages studied is under various stages of degradation. Moreover, the increasing demand for feed grains and fodder crops are decreasing the availability of land for food crops cultivation, which resulted in stress among small and marginal farmers who own small pieces of land for example poultry is one among the fastest growing segments of the agricultural sector in India. The poultry population has shown a rapid rise of 59% during the same period. It is forecasted that the poultry sector in India has a potential to grow over 20% a year over the next ten years. The broiler industry in India is growing at about 15% per year. Fast growth in the commercial poultry sector can cast serious environmental, social and health implications. Grains are the main feed ingredients for poultry production. Maize comprises of 50-55% of broiler feed. Rising demand for grains will create pressure on land to cultivate and import feed grains, which will ultimately compete with grain production for human consumption A large proportion of India`s maize production only is used as feed for poultry. The rise in feed price may give a set back to the commercialization of small-scale livestock production.
6.2.3.2 Lack of Crop-Livestock Integration

The crop-livestock integrated mixed farming is generally viewed as a sustainable system as it effects resource enhancement and supports resource sharing. Trends indicate that in some parts of India like the Indo-Gangetic river basin, where high input farming is practised, there is lack of integration of livestock with crops such as paddy. In the western part of the Indo-Gangetic region, farmers normally burn the straw (over 70% of rice straw and 50% of wheat straw produced in the region are burnt) in the field (Parthasarathy Rao, 2003). Burning results in loss of valuable organic carbon necessary to maintain soil health and it is also responsible for increasing greenhouse gases in the atmosphere and contribute to environmental pollution.

There is also a decline in a recycling of farm yard manure due to lack of crop-livestock integration. This necessitates increased use of inorganic fertilisers in soil. This affects the soil quality, soil health, water holding capacity and infiltration. Another important implication of reduced crop-livestock integration is its impact on water use efficiency. A much-discussed study conducted to estimate the irrigation water productivity of dairy animals in Gujarat (Singh et al., 2004) found that, 1,900 to 4,600 litres of water was required for the production of one litre of milk. Milk and meat production, which are especially based on intensive grain feeds and irrigated forages, requires 10-50 times more water than crop production (Onyekakeyah, 2006). Besides, the consumption of water in the form of irrigation for feed grain production, Washing the animals and cleaning their sheds as well as use in livestock derived product processing units could generate a crisis for water. As a result, the surface and underground water are depleting both quantitatively and qualitatively and the acute water crises will hit hard the smallholder livestock production system. They will have to face the problem of water deficit in rearing their animals which may result in the productivity decline of their livestock.

6.2.3.3 Harmful Gas Emissions

Excessive nitrogen, phosphate, and heavy metal levels in the effluent of intensive livestock farms causes environmental pollution methane (CH$_4$), nitrous oxide (N$_2$O) and carbon dioxide (CO$_2$) are the three important greenhouse gases associated with livestock. Methane and other gases are produced due to enteric fermentation in ruminants and their dung when released into the environment; they
join methane produced from other sources such as rice fields, coal burning, biomass burning, transport, etc. N2O production is mostly from manure. India has the highest density of cattle /buffaloes and small ruminants, reared under the extensive system. Small herds in large numbers are dispersed over a vast area. There is a significant contribution of methane by livestock in India towards global warming. Accumulation of these gases in the atmosphere leads to damage of the protective ozone layer that filters sun’s ultra violet rays which result in a rise in temperature. This in turn has deleterious effects on climate and thus on agriculture and human life. Again small scale producers are susceptible to hit hard by global warming as they don’t have enough resources to protect their livestock from climate change.

6.2.4 Animal and Human Health effects of the Livestock Revolution

The increasing demand for animal products has increased the geographical density of livestock and the interface between livestock and people and is giving way to genetically uniform but highly vulnerable livestock populations. These trends are also prime contributors to the emergence and re-emergence of animal and human diseases. As in the case of environmental effects global data are often unavailable, but some illustrative facts are:

About each year, an emerging animal-related disease like the Nipah virus, Bovine Spongiform Encephalopathy (BSE), Severe Acute Respiratory Syndrome (SARS), and Highly Pathogenic Avian Influenza (HPAI) makes a threat to the global human population. Animal diseases have caused extraordinary losses. The economic losses due to livestock diseases are enormous. This is accompanied by the killing of large numbers of animals, often belonging to smallholders, this leads to the subsequent social hardships and animal welfare consequences. Inadequate control and eradication policies are causing these diseases to become endemic and it’s much more costly for small and marginal farmers to bear with these diseases.

Avian flue out break during 2005 in an eastern state of Maharashtra at several commercial farms has triggered signals of concern and fear among many. It leads to a large number of poultry deaths, at more than 50 farms in the area, had been noted. The disease was transmitted to humans by direct or indirect contact with infected wild
ducks and chickens. Timely steps were taken like isolation of the area, mass killing of birds in the affected farms, ban on importing of live chickens and other poultry products from countries affected with ‘bird flu' were taken by the state and central governments. The economic value and marketability of small-scale producer’s products are often reduced due to hygienic problems (Chako, 2007).

Whether the seemingly unstoppable growth of livestock products and consumption is a good or a bad thing for the poor will also depend on the environmental and public and animal health impact of rapidly rising livestock production/consumption (Delgado et al., 1999a) and most significantly how these impacts are foreseen and then tackled by the government will decide the plight of small-scale producers in the vague of Livestock Revolution.

Though the issues discussed above are not very critical at the moment, these will assume greater significance in the near future, unless appropriate corrective mechanisms are put in place. The environmental, social and health concerns can be somewhat justified owing to the change in livestock production as large scale industrial production units are likely to grow in umber displacing at least partially the smallholder production system (Chacko et.al, 2007).

6.3. Suggestions to overcome the constraints in Livestock Sector

The livestock sector, however, faces numerous constraints, which need to be alleviated for faster growth and holistic development of the livestock sector. Steps should be taken to improve livestock products marketing and to provide better access to livestock inputs and service delivery. Following are the suggestions to improve livestock sector of India so that it can become more helpful to enhance the income and livelihood of small-scale producers.

6.3.1. The deceleration in yield growth is a matter of serious concern and needs to be tackled, as number-led growth with a given limited land and water resources, is unlikely to be sustainable in the long run. Future growth has to be technology-driven, duly supported by appropriate policies, institutions, markets and investments to capitalize on the pro-poor growth potential of livestock. There is a huge scope to improve livestock productivity because the
considerable gap exists between attainable and actual yield. In the case of dairying, a gap of 25% to 75% between the attainable and the realised milk yield of different species in different parts of the country, Birthal and Jha (2005) livestock yield should be improved through technologies, institutions and policies to harness its untapped potential for the benefit of the poor

6.3.2. Animal breeding research has to be reoriented taking into consideration the changing functions of livestock.

6.3.3. With the imminent changes in climate, the severity and pattern of animal diseases are likely to be altered, indicating a need for preparing the livestock sector to cope with climate change. Hence it is necessary to emphasise developing early-warning systems and mechanisms for preventive disease management.

6.3.4. Public insurance schemes should be flexible regarding the period of cover and the number and quality of animals insured to enable poor livestock producers to insure their animals. Private insurance companies should also be encouraged to provide livestock insurance.

6.3.5. Dairy cooperatives played an important role, but procurement is limited to a few states Gujarat, Maharashtra, Karnataka and Tamil Nadu. Although vibrant dairy cooperatives are found in many states, still large number dairy farmers are not covered by cooperatives Small marketable surplus of small-scale producers does not allow them to fetch a handsome price for their product. Hence, there is a need of organised processing institutions that can handle the marketable surplus of small-scale producers to make them achieve the good price of their product and prevent them from production losses and wastages.

6.3.6. There is a need to develop efficient value chains to process and market the livestock products. Livestock products are highly perishable and require immediate processing, storage and Preservation. So, better infrastructural facilities should be given to small-scale producers so that the depreciation in the value of their product can be prevented.
6.3.7. There is wide interstate variations in terms of livestock sector development. The North Eastern states have been lagging behind in livestock sector’s growth and developmental facilities given to the sector. The public spending on the livestock sector should be increased and prioritised considering the emerging challenges and regional imbalances.