SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

7.1 Summary

The present chapter summarises the major findings of the study. On the basis of these findings, an attempt has been made to give a brief about the impact of livestock revolution on livestock sector and small-scale producers of India so that possible policy suggestions can be made which may turn this revolution into a boon rather a bane.

7.1.1. Changes at Global Level

The production of livestock products in developed countries is growing at a very slow rate while in the developing countries, it is growing very fast, for example, India is the largest producer of milk in the world. India has increased its eggs, milk and meat production at the growth rate of 9.95%, 6.87% and 3.18% annually during TE 1990 to TE 2013. China in East Asia and Brazil in Latin America are also the star performers like India. China’s milk and egg’s production rose by more than five times and more than 1.5 times respectively. She raised her meat production by almost three times. Livestock production in Brazil also increased remarkably.

The level of consumption of livestock commodities in developing countries is very low in comparison to the developed countries but the consumption of meat, milk and eggs has almost stagnated in developed countries while in the developing countries it is growing at very high rates. The fastest growth in livestock consumption has occurred in Asia where again the star performers are China in case of meat and India in case of milk. The former has doubled its consumption of meat in just a decade while the latter has astonishingly witnessed rapid progress in the production of milk. The per capita consumption of milk in India has increased from 42.98 kg/year to 84.22 kg/year from TE 1983 to TE 2011 at a robust growth rate of 4.17% annually.

7.1.2. Structural Changes in Indian Livestock Sector

Production and consumption of livestock products are rapidly rising. The dramatic rise in demand for livestock products, along with the changes in international trade, is placing pressure on India’s livestock sector both to expand and adapt. This adaptation takes the form of two major shifts - a shift in livestock
functions and species. There is a trend from multi-purpose to single purpose animals, with animal food as the main objective. Another trend is the growing importance of monogastrics, especially poultry as economic converters of concentrate feed.

Between 1997 and 2003, poultry witnessed an all-time high growth of about eight percent a year. A sharpest rising trend can be witnessed in the case of poultry vis-à-vis other livestock species. Cattle population declined from 204.6 million in TE 1992 to 190.9 million in TE 2012. The decline in the cattle population is confined to indigenous stock. The number of indigenous cattle declined while the crossbred increased. This indicates the technological progress in the sector. Within the indigenous stock, the decline was drastic for males. The populations of draught animals witnessed negative and decelerating trend. Cattle and buffaloes used for breeding purposes declined by -8.32 % and -3.46 % respectively while that of used for draught power purposes declined by -7.48% for cattle and -7.45% for buffaloes. This reflects that food function of livestock is getting significant over its other functions such as draught power and breeding.

Species wise livestock population is concentrated among few states; similar concentration is witnessed in the case of livestock production in India.

Milk is the prime product of livestock sector from India. Livestock production in India is highly concentrated towards milk (cow and buffalo). Diversification in the livestock production is decreasing and it is getting more and more concentrated towards milk 88% of livestock production in India comprised of milk. Milk production is continuously increasing since the initiation of Operation Flood in the early seventies. The cow milk production grew at a rate of 5.05% while that of buffalo grew at the rate of 3.54% during 2001. The growth in production of meat has been faster as compared to milk production. Chicken meat witnessed the highest growth rate of 8.24% during the 2001-12 followed by eggs production growth rate i.e. 5.05%.

India experienced a structural shift, with an increasing share of livestock in the agricultural value of output, from 20.57% in 1980-81 to about 30% in 2011-12 while the share of agriculture in country’s total GDP declined from 38.21% to 16.42% during the same period. Livestock has been contributing more value of output than the food grain crops for a decade. The livestock sector grew faster than the agricultural sector in most of the states during 1990’s as well as 2000’s.
The growth of livestock exports has accentuated considerably during the post-WTO period. India’s share in total livestock exports rose from a meagre 0.25% in TE 1984 to 1.44% during 2012. India has made an appreciable rise in global exports still its share is minuscule which is basically due to huge domestic demand for livestock products. The share of bovine meat exports rose from 0.56% in TE 1984 to 7.04% in 2012, India’s share in world's livestock exports increased more than five times from TE 1984 to TE 2012. The performance of livestock exports has been impressive, while the reverse has happened in the case of livestock imports.

The share of bovine meat in total agricultural exports from India has even taken lead over the share of sugar and honey, oilseeds, tea and tobacco and cashew nuts in Indian agricultural exports during the recent years. Buffalo meat has now become the second largest agricultural commodity for exports after rice during TE 2013-14. The rise of livestock share in agricultural export reveals the extent of internationalisation of livestock sector which would be partly attributed to trade policy reforms.

India has the competitive advantage in the production of different livestock products. A comparative study of producer prices of different livestock products with the countries having a booming livestock sector revealed that producer prices of buffalo milk, buffalo meat and pig meat in India are substantially lower than producer prices of all other countries from TE 1993-TE 2011. NPC of various Indian livestock products was also less than one which also indicated the competitiveness of Indian livestock products.

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 a reduction in expenditure on food grains. 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%. The share of food expenditure on meat, milk and eggs increased from 6% to 9% respectively during the same period. The consumption level of animal based products in urban, as well as rural areas is rising. Nutritional intake from livestock products in India is also showing a sharp rising trend.
7.1.3. Significance of Livestock Sector for Small Scale Farmers in India

Livestock can be considered to be the generators of agricultural growth in India. The rate of growth in livestock sector has been higher than that of the growth in the crop and forestry sector since 1980’s. The livestock sector grew at 5.4 % annually during 1980’s. Livestock products represent a significant proportion of agricultural exports in India. Animal husbandry contributes significantly in providing self-employment to rural people. Animal husbandry can be seen as the most important agricultural activity in providing self-employment to rural women.

The growth of livestock sector contributes remarkably towards poverty reduction as indicated by the significant negative regression coefficient of share of livestock GDP in agricultural GDP. However, the significant positive values of the regression coefficient for the share of agricultural GDP in national GDP are an indication of the fact that the trickle down process and the inclusiveness of agricultural growth process have been limited.

The share of income from crop farming showed a positive relationship with farm size whereas the share of income from livestock was inversely related to farm size. Hence, the income from livestock holds utmost importance to small and marginal farmers. Moreover, Livestock is closer to the line of equality, compared to the Lorenz curve for land, indicating that livestock resources are more equitably distributed than land. The Gini-coefficient index for livestock is lesser than the Gini-coefficient ratio for land which again indicates that livestock holdings are more equitably distributed than land. Hence, the income from livestock is more beneficial to the marginal and small landholders.

7.1.4. The impact of Livestock Revolution on Small Scale Producers

Until quite recently the environmental, social and health impacts of livestock production in India have generally been considered to have more positive implications than negative ones because the production system is still numerically dominated by rural-based integrated smallholder crop-livestock mixed farming systems.

In milk production, which is the prime product of Indian livestock, small-scale producers continue to dominate. Marginal and small holders together controlled 68.97% of total livestock holdings during 1996-97 which increased to 75.65% during 2011-12 while the share of semi-medium, medium and large holdings in the country's
total livestock holdings declined from 16.85% to 14.67%, 10.85% to 7.93% and 3.33% to 1.75% respectively during the same period. The total livestock holdings of small and marginal farmers have been increasing since 1980-81, while the reverse is the case with the other farm categories.

The share of small and marginal holders increased for all types of livestock from 1996-97 to 2011-12, while the share of semi-medium, medium and large holdings declined for almost all types of livestock species. The increment in the proportion of livestock species kept by small and marginal holders shows that they have the potential to enhance their scale of production as they are capable of producing at a lower cost because of availability of sufficient labour with them.

In the case of small and marginal livestock producers, SID increased remarkably from 0.52 in 1996-97 to 0.78 in 2011-12. The diversification among the livestock species kept by the smaller sized farm categories i.e. marginal, small, and semi-medium increased, while the diversification among the livestock species kept by medium and large farmers decreased. The results point to the fact that in the era of the Livestock Revolution small and marginal farmers are able to diversify their livestock portfolio faster than the larger ones.

Livestock Revolution has positive effects on small and marginal farmers` income. Their annual income per livestock increased almost two times from 1990-91 to 2011-12, although it increased for all farm sizes but the most robust growth rate in livestock income (4.65%) was witnessed in the case of small and marginal farmers. Moreover, the growth rates in income of livestock per animal had an inverse relationship with the farm size. The smaller is the size of farm, the greater is the growth in the income from livestock.

Further, two different periods were taken to show the impact of Livestock Revolution on small-scale producers. During the first period, 1980-90, only two factors were significantly impacting the share of livestock kept by small-scale producers i.e. livestock production index and consumption of livestock products in the best set of predictors. Both the factors were impacting the share of livestock kept by small-scale producers positively. Remaining variables were not impacting share of small-scale producers livestock in this period, while in the next period i.e. 1991-2011, five out of ten factors were impacting the share of livestock kept by small-scale producers. This means that the impact of Livestock Revolution has become more
evident on small-scale farmers over time. During the latter period, two factors i.e. prices of feed crops and livestock production index were impacting the share of livestock kept by small-scale producers negatively while the remaining three factors i.e. consumption of livestock products, processing of milk and livestock inventory were impacting the share of small-scale producer's in a positive way. Consumption of livestock products turned out to be more beneficial for small scale producers over time. This clearly indicates that Livestock Revolution is helpful for small scale producers. Processing of milk had the highest regression coefficient (1.08) followed by consumption of livestock products (0.91) and livestock inventory (0.29). The regression coefficient of livestock production index which was positive in previous period turned negative in the latter period with a regression coefficient of -0.84, this might be because of the fact that livestock production is gradually shifting into the hands of industrial producers. Although, up till now the negative impact of livestock production on small scale producers is minuscule. The prices of feed crops also impacted them in a negative way. Livestock production from small-scale producers could be affected by feed constraint.

7.2. Conclusion

In India, implications of Livestock Revolution have not yet become negative as the farming system is still predominated by mixed crop-livestock farming but in future it may cast ill effects as in case of poultry sector the industrial system is rapidly growing and cause problems to small-scale farmers, so right now it’s only a concern rather than implications as India is only in the initial phases of Livestock Revolution. Until quite recently the environmental, social and health impacts of livestock production in India have generally been considered to have more positive implications than negative ones because the production system is still numerically dominated by rural-based integrated smallholder crop-livestock mixed farming systems. As it was seen in this study that the consumption of livestock products is beneficial to small-scale producers. Over time it’s impact became more positive on the share of livestock kept by them indicating that consumption of livestock products is giving them a golden opportunity to enhance income and livelihood. Their income has increased they have started diversifying their husbandry, their share in livestock has increased over time, value addition services like processing of milk are beneficial for small scale producers. Hence, up till now, the Livestock Revolution is helpful for the small
scale producers of the country like India. But, a general apprehension can’t be ignored i.e. overtime large farms will continue to outcompete smallholders and gain further market share because of Livestock Revolution. Although, small scale producers of India seem to be on a far safer side as pointed by Delgado et al. (2003) India, where most farms are small and dairy dominates, is a notable exception. The happiest picture of livestock sector in case of pro-poor is of dairy farmers in India. But, precautions need to be taken as India is witnessing a dualistic mode of development, with two conflicting components. First, a modern, demand-driven and capital-intensive sector, producing poultry meat, eggs, pork, and sometimes milk, increasingly uses state-of-the-art technologies. It is rapidly expanding to meet urban demand. At the same time, a traditional, resource-driven and labour-intensive sector continues to provide a multitude of services to subsistence-oriented farms. While not efficient in terms of introduced inputs, this sector uses resources of little or no alternative uses, and for the same reason, its potential to expand beyond moderate growth rates is constrained by low technology uptake, insufficient market facilities and infrastructure, and small economies of scale.

In the present study some negative impacts of Livestock Revolution can also be seen like the regression coefficient of livestock production index which was positive in former period turned negative in the latter period with a regression coefficient of -0.84, this might be because of the fact that production is gradually shifting into the hands of industrial producers so, the apprehension of shifting of livestock production from the hands of small-scale producers and moving into the hands of corporates can’t be ignored. If it happens, small scale producers may face problems. Moreover, if feed prices go up, it will be difficult for them to survive in the livestock business.

7.3. Policy Implications

India exhibits all the signs of being at the onset of its livestock sector boom as incomes are growing along with the rise in consumption level of animal based products in urban as well as rural areas. The livestock sector is responding to rapid increases in demand by growing size and changing structure. But, the main issue in India is related to the future of small holders.

Livestock Revolution can raise farm income dramatically, but smallholders and landless farmers who need development could be undermined. The critical
question for economic planners in India is to what extent smallholders can play a significant part in this enterprise. The ongoing dietary transition, driven by income, population and urban growth, leaves little room for policy to alter the widespread increase in demand for animal products. Policy can, however, help make the form of the revolution as beneficial as possible to the overall well-being of the small-scale producers. The big issue in a development perspective is how to stimulate and support the livestock sector so that the growing demand for animal products will benefit them and lead to more equity. Whether the seemingly unstoppable growth of livestock products is a good or a bad thing for the poor will completely depend on the government policies regarding the Livestock Revolution. Following are the policy suggestions based on the findings of study:

7.3.1. The demand for livestock-based products is expanding globally as well as in India because of rising income, population growth and urbanisation. These factors along with the size and distribution of India’s livestock population present a golden opportunity for India to enhance income of small and marginal farmers, empower women and speed up the pace of poverty alleviation as the majority of livestock resources are concentrated among small and marginal landholders and livestock resources are more equitably distributed than land in India. The land ownership structure in India has been skewed favouring the bigger landlords while the livestock holding structure is more equitable. Empirical evidences indicate that any increase in income from livestock activity would help in reduction of income inequalities. 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 small-scale producers to come out of poverty. Its effects are up till now more positive to small-scale producers than negative. Their income is getting increased they are diversifying their husbandry; their share in livestock has been increasing. The increment in the proportion of livestock species kept by small and marginal holders shows that they have the potential to enhance their scale of production as they are capable of producing at a lower cost because of availability of sufficient labour with them. Hence, the potential of small-scale producers should be recognised by the policy makers and efforts should be done to make the prospects of livestock revolution all the more bright for small-scale producers. Small and marginal farmers must be encouraged by giving incentives and good infrastructural facilities so that they can perform in a better ways. They should be given enough access to financial,
extension services, new technologies and markets so that their potential to earn from this growing sector can be optimised.

**7.3.2.** The increasing globalisation of livestock products market is an opportunity Indian livestock sector. The performance of livestock trade has been impressive during the post-WTO period. Buffalo meat is the main product for India’s livestock exports. She exported buffalo meat worth 4.7 billion $ during 2014-15 (APEDA, 2015) and she widens lead over Brazil as a top exporter.

The main problem in harnessing the untapped production or export potential is the lack of incentives to farmers to raise male buffalo calves to an optimum slaughter age. A majority of the slaughtered male buffaloes are less than one year of age, implying a potential loss in buffalo meat production. There is also an opportunity for exports of dairy products to neighbouring countries such as Bangladesh, Bhutan, Nepal and Sri Lanka, which are deficit in dairy products (Birthal, 2008). Small-scale farmers should be linked up with the exporting agencies so that they can be able to take advantage of the increasing globalisation of livestock sector.

**7.3.3.** Policymakers should recognise that the growth in livestock sector is more pro-poor than the overall agricultural growth and hence, the growth in agricultural production alone will not bring about a substantial reduction in the incidence of rural poverty unless supported by the livestock sector’s growth. The development of livestock sector should be used as a weapon against rural poverty.

There could be dramatic rise in the farm incomes if poor are made to participate in the development of livestock sector, but the extent to which smallholders and women take advantage of this sector’s growth will depend on the policy makers’ ability to inculcate the feature of pro-poor element in the policies related to the Indian livestock sector.

Poverty reduction strategy of government must target the group of small and marginal holders. They have a higher stake in the livestock sector as most of the livestock resources as most of the livestock are concentrated among them. Hence, greater care should be taken in framing the policies for livestock sector as any repercussion in this sector due to inappropriate policies is more susceptible to hit hard small and marginal farmers and swell rural poverty further.
7.3.4. **Livestock Revolution** can be a boon to poor rural women in enhancing their livelihood. Policymakers should seriously take note of the fact that livestock plays a very significant role in the empowerment of rural women. Different livestock products are also to be identified which can especially serve women. Unfortunately, curriculum in agricultural universities does not give any importance to gender-related issues. Gender issues must be covered under the curriculum in agricultural universities so that more gender sensitive policies and programmes in livestock and agricultural sector can be made.

7.3.5. Small scale and women livestock producers form a heterogeneous group so the policy framed for the whole country may prove ineffective when there are distinct differences among them based on caste, geographical area, type of livestock reared and livestock products. Hence, the same nationwide policy may not be feasible for the whole country. Hence, tailor-made policies should be framed taking account the above-mentioned factors.

7.3.6. In spite of its rising share in agricultural GDP, the livestock sector has not received as much policy attention as it deserves. Its share in the total public spending on agricultural and allied activities has never been in congruence with its income contribution. In absolute terms, spending on the livestock sector increased but as a share of the total spending on the agricultural sector, it declined continuously, livestock expenditure as a proportion of the value of output of livestock also declined.

The time has come where the policy makers should recognise the massive potential of livestock sector. It has experienced remarkable growth during the last two decades in terms of production, production, value of output from livestock and trade. The public spending in this sector needs to be raised and prioritised. The sector’s potential will remain untapped if the sector remains neglected in comparison to crop sector.

7.3.7. In the crop sector, there are well-established mechanisms for periodic data collection and documentation, even up to village level; the same does not exist for the livestock sector. Considering the growing importance of this sector, periodic data collection should be done which would help in not only deciding the developmental priorities, region and commodity wise but also in planning and implementing appropriate developmental interventions for speedy growth of the sector.
7.3.8. The increasing demand for animal food products results in an increased demand for feed and fodder and therefore an intense competition for limited land and water resources between food and feed-fodder crops emerged. Hence, it is necessary to have a greater focus on feed and fodder research, feed management and feed processing technologies and their dissemination among livestock producers. Better management of common grazing lands should be done so that it can add to improved fodder supplies. Further, feed deficit is localised and seasonal (Singh and Muzumdar, 1992). Hence, there is a need to promote community, fodder banks where surplus fodder can be stored as hays/silage for use during the time of scarcity. It was also found in the study that the prices of feed crops impacted small scale producers in a negative way. Livestock production from small-scale producers could be affected by feed constraint.