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Meat Production in India-A Review

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Abstract

India is having a good potential for meat production because of large livestock population. In India, the largest meat producer species is poultry followed by bovines, goat and sheep. Production of meat is largely an unorganized activity in India. The lack of appropriate slaughtering facilities leading to unnecessary losses of meat as well as valuable by-products. The major constraints in hygienic meat production are lack of hygienic facilities in slaughter houses, poor transport and cold storage facilities, ignorance about hygiene at butcher level and religious taboo. The global demand for livestock products is an opportunity for India to increase its exports. Meat exported from India is risk-free, lean, nutritious and competitively priced meat. It has resulted in consistent, high compound growth rate in the export volumes. The importers of Indian meat are Vietnam, Malaysia, Thailand, Australia, UAE, Saudi Arabia and Egypt. Uttar Pradesh state has emerged as the major exporter of buffalo meat followed by Punjab and Maharashtra. The value addition to slaughterhouse by products generate additional income as well as the costs of disposing of by products can be minimised. Measures should be taken to increase the meat production efficiency of different species of animals using the improved management practices. There is huge potential in this sector for economic development of country through increasing exports so the policy makers should adopt critical measures at every stage to encourage and support this vital segment of the Indian agriculture.

Keywords: Export, Hygienic, Livestock, Meat production, Marketing channel, Trade.

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1. Introduction

Globally the livestock sector is highly dynamic and in developing countries, there is rapid increase in the demand of livestock products (Thornton, 2010). There is increase in the contribution of livestock to GDP of country which accounts for more than 40% of total agricultural sector and more than 12% of GDP (Jayathilakan *et al.*, 2012). According to estimates of the Central Statistical Office (CSO), the output from livestock sectors at current prices during 2013-14 was Rs 406035 crore which is about 21.58 % of the value of the output from total agriculture and allied sector (DAHDF Annual Report, 2014-15). Among agriculture produce, meat occupies a significant place as about 70-80% of Indian population is non-vegetarian. The growth of livestock sector was much faster than crop between 1981 and 2006, livestock sector grew at rate of 3.9% annually while crop sector grew by 2.8% (Singh

and Meena, 2012). Meat is a valuable commodity and an important source of protein. The meat availability in India is only about 15g/person/day against the ICMR recommendation of 30g/person/day (Islam *et al.*, 2016). The traditions and culture influence meat consumption to a great extent in India (Devi *et al.*, 2014). The animal protein foods are at the top of the food chain (Chemnitz and Becheva, 2014). Meat is considered as an integral component of human diet, which is a rich source of valuable proteins, vitamins, minerals, micronutrients and fats. Meat supplies omega 3 fatty acid and conjugated linoleic acid which provides valuable nutrients (Devi *et al.*, 2014). The bio-availability of muscle food proteins is high with (Net protein utilization value around 0.75 as against 0.5-0.6 for plant proteins) balanced amino acid profile having higher digestibility (Sharma, 2003).

2. Livestock Resources in India

Presently India possesses 108.7 million buffaloes, 190.9 million cattle, 135.2 million goats, 65.07 million sheep, 10.3 million pigs and 729.2 million chicken (19th Livestock census). Livestock provide milk, meat, draft power, hides and skins, manure and other valuable by products thus significantly contributing to sustainable human nutrition and economy of the nation. The largest meat producer species is poultry followed by bovines, goat and sheep. The per capita availability of goat meat is far below the requirement in India. Ninety five per cent of goat meat produced is consumed locally and there is a considerable potential for developing goat production for internal consumption and also for export. India ranks high among the goat skin exporting countries (Devi *et al.*, 2014). The low productivity of goats is resulting declined production potential in terms of meat, milk, fiber and skins (Devendra, 2013). The average fat content of Indian meat (buffalo/poultry) is around 4% which is considered as lean meat compared to 15-20% in most of the developed countries (Guleria *et al.*, 2015); (Rais and Kuruvilla, 2016).

2.1 Livestock Marketing in India

The contribution of livestock towards the livelihoods of small farmers and landless labourers is imperative in India. Income is generated by livestock providing both food and non-food items for the farmers which can be sold in the markets (Thornton, 2010). More than 60 percent farmers in India are engaged in livestock production and 80 per cent are having less than 2 ha of land (Bithal, 2008). The lack of transportation and communication facility, results in non-efficient marketing of livestock (Das *et al.*, 2006). About 2,000 livestock markets for live animals marketing are available, but they not well developed. Separate markets for different species of animals are not available. There is lack of basic marketing and infrastructure facilities in most of the markets (Bithal, 2008). Most of these markets are lacking of transparency in transactions, especially in pricing and they are irregular and uncertain. The animals are brought to the market weekly or fortnightly from villages on foot or occasionally on trucks. In poultry marketing, that local animal production system at many places is not able to meet the demand for birds. The supply of birds is done through long distant transportation (>150 kms) particularly from neighbouring states with 8-14 hours journey in hilly region (Thakur *et al.*, 2014). Transportation of livestock induces stress in farm animals and results in deleterious effects on health and product quality (Von Borell, 2001). Transportation of livestock at high ambient temperature results in high ultimate pH, water-

holding capacity and shear force values as well as darker meat surfaces (Kadim *et al.*, 2007). Due to lack of contacts in the terminal markets and access to transportation, the sale of animals are done with the help of brokers. Sheep and goats are also marketed similarly to cattle and buffaloes. The transportation and other marketing costs are increased due to distant markets and lack of infrastructure. Marketing costs increase by 20-30 percent of the sale price in case of cattle and buffaloes (Chandra Mohan Reddy, 2000). The vertical integration between processors and livestock producers are very low. There is need for increasing market yards for sale of live animals in major livestock rearing areas. Meat yield is expected upon the observation of musculature and fat distribution. The traders buy animals from the farmers and sell them in the market at much higher prices (Bithal, 2008). The animal market yard should have basic facilities for feeding, watering and holding animals for a few days. Proper care should be taken during transporting of the live animals. All the factors responsible for deterioration of the condition of animals' health should be checked, which will effects the meat quality. For the development of livestock and welfare of livestock farmers, there is need for development of model livestock markets at different levels (Das *et al.*, 2006). Marketing and processing activities are even more critical in India since most livestock producers are small, resource poor, and often unable to establish their own linkages with markets, processors and consumers.

3. Meat Production Scenario

The meat production is largely an unorganized activity in India (Thakur *et al.*, 2012). The unregulated meat markets, tropical climate, inadequate abattoir hygiene measures and the absence of surveillance of meat-borne diseases enhances the risk of meat-borne diseases and occupational hazards (Singh *et al.*, 2013). The majority of the people purchase meat from traditional meat shops, where butchers slaughter few animals for sale of meat throughout the day. There are 5,520 registered and 4,707 unregistered slaughter houses in the country (Government of India, 2006). Most of the slaughter houses in India are lacking basic amenities like light, ventilation and water (Kondaiah and Pragati, 2005; Ali, 2007). The slaughtering and carcass-dressing processes are performed in open areas in highly unhygienic conditions and the meat is sold with little or no veterinary inspection (World Bank, 2011). The fresh meat is sold in unhygienic retail outlets exposing meat to dust leading to contamination. There are chances that raw meat may harbor many important pathogenic microbes making the meat a risk for human health (Norrung *et al.*, 2009).

Table 1: Domestic supply and per capita supply of meat

Category	Meat Production (1000 MT)	Export (1000 MT)	Import (1000 MT)	Total domestic supply	Total Per capita Supply (kg/year)
Total Meat	6215	1589	1	4619	3.69
Mutton and goat meat	747	21	0	725	0.58
Pig meat	354	0	1	354	0.28
Poultry meat	2358	6	0	2352	1.88
Meat other	180	1	0	171	0.14
Meat offal	529	54	0	475	0.38

Source: FAO Stat, 2014

Table 2: Exports of meat and meat products (Quantity in MT, value in Rs)

THREE YEAR EXPORT STATEMENT OF APEDA ANIMAL PRODUCTS								
Production	Value in Rs. Lakhs				Qty In MT			
	2012-13		2013-14		2014-15		% growth on previous year in (Rs)	%share in 2014-15
	Qty	Rs. Lakhs	Qty	Rs. Lakhs	Qty	Rs. Lakhs		
Buffalo Meat	1107506.27	1741289.30	1449758.65	2645781.59	1475526.01	2928258.19	10.68	22.30
Sheep/Goat Meat	16046.91	42565.86	22608.95	69411.53	23611.54	82811.34	19.30	0.63
Other Meat	180.75	215.90	255.23	323.43	261.92	267.17	-17.39	0.00
Processed Meat	796.92	937.41	488.78	691.75	406.11	1419.71	105.23	0.01
Animal Casings	602.53	1837.08	352.20	2845.84	260.15	1933.25	-32.07	0.01
Poultry Products	577864.27	49493.41	437673.53	56587.37	556698.81	65119.18	15.08	0.50

Source: DGCIS Annual Data

Meat is highly susceptible to spoilage, biochemical changes during the process of slaughter, processing and preservation frequently implicated to the spread of food-borne illness (Olaoye *et al.*, 2010). There are a few large modern abattoirs running on modern lines mostly for export purposes (Bhandare *et al.*, 2009). In the process of hygienic meat production, the slaughter houses must have basic facilities for dressing of carcasses, light for post-mortem inspection of carcass and ventilation for fresh air, removal of foul odour. The important constraints in hygienic meat production are lack of hygienic facilities in slaughter houses, poor transport and cold storage facilities and ignorance about hygiene at butcher level. Strict hygienic care should be taken as there are chances of great loss, depreciation, contamination and deterioration endangering the health of the consumer. There is urgent need to improve existing slaughter houses, establish new plants that can process animal carcasses and by-products throughout the country (Ghatak and Singh, 2015). Few export oriented modern

slaughter houses established in the private sector, which follow HACCP and GMP and other food safety practices (Das *et al.*, 2006).

3.1 Improving the Infrastructure of Slaughter Houses for Hygienic Meat Production

The growing number of fast food outlets in the country has significantly influenced the meat producing industry. The slaughter houses in India are primarily catering to the needs of domestic market. However, exporters have been also procuring the meat from some of these Municipal Slaughter houses. Most of these slaughter houses are very old and they lack essential amenities such as water, light, drainage, lairage, holding pens, etc. The Government is improving the conditions of these slaughter houses for increasing the exports. India also has several integrated mechanized slaughter house-cum meat processing plants with facilities for slaughtering, processing, freezing, packing and cold storage of meat. Some of the exporters have started backward integration in meat production. They

provide veterinary health coverage and concentrated feed in the catchment area for rearing of animals. Skilled and technical manpower for slaughtering, processing, packaging of meat is adequately available in the country. Das *et al.* (2006) reported that, the important constraints which are affecting the production and distribution of animal food products are energy requirements, labour and transportation inefficiencies and high capital requirements. Growing demand for Indian meat in global market attracted plenty of private investment in meat processing industry (Ali, 2007). Many corporate firms have set up modern integrated plants with state-of-the-art facilities for slaughtering and dressing of animals, carcass deboning, packing, chilled and frozen storages, by products processing, effluent treatment, which are adopting international standard sanitary and phytosanitary (SPS) measures. These plants are eco-friendly, where all the slaughter house byproducts are utilized in the production of carcass meal, meat-cum-bone meal, tallow, bone chips and other value-added products. (Gadekar and Shinde, 2011).

3.2 Meat Processing and Storage

Poor infrastructure and investment are hindrance in level of processing in India. It has been reported that, only 6 percent poultry meat and 21 percent buffalo meat are processed in the organized sector in India (Government of India, 2005). Even after having vast scope for meat processing industry the processing industry is still in infant stage (Gadekar and Shinde, 2011; Ali, 2007). Processing meat to value added products will provide reasonable returns from meat animals to the farmers (Kondiah, 2004). There is very little processing of meat in India, hardly 1% of the total meat produced is used for processing remaining meat sold in fresh or frozen form (Guleria *et al.*, 2015). The meat produced for the domestic market is sold as hot meat (Ranjhan, 2004). The meat processing cost depends upon level of product processing and packaging. The production cost of meat processing broadly includes labour, capital, raw material and energy used. The share of raw material accounts for about 80 percent followed by capital investment 8.4 percent, wages and salaries 6.1 percent and energy use accounts for 6.0 percent of total processing cost (Ali, 2007). Meat is highly perishable food item and so for hygienic meat production it should be protected from contamination, dirt and microbes. Special vans built with metal bodies with ventilation facility should be used for transportation of meat carcass. Meat carcasses should be transported on hooks. Cold chain should be maintained at all the processing stages till it reaches the consumers. Cold chain will slow down or retard the growth of microorganisms (Bharti, 2014).

3.3 By Product Utilization

The by products of slaughter houses contributes significantly to the meat industries but their utilization are often ignored (Irshad *et al.*, 2015). Out of 60% animal by products 40% are edible and 20% are inedible on live weight basis (Chatli *et al.*, 2005). Webster *et al.* (1982) reported that the by-products contain protein content one-eighth of total protein in the lean meat. By value addition of animal by products, the meat industry will get additional revenue as well as the costs of disposing of these secondary items will be avoided. Value addition supports the industries as a cushion to cover losses suffered in the trade. Due to inadequate biological stability, potentially pathogenic nature, high water content, potential for rapid auto oxidation and high level of enzyme activity of by product the utilization and disposal is difficult (Jayathilakan *et al.*, 2012). Animal by-products and wastes can be a good source of renewable energy. Due to competition among the industries utilization of by products becomes important. The by-product utilization helps in economic development and better returns to the farmers (Irshad *et al.*, 2015). Russ and Pittroff (2004) reported that by-product management in food processing industry pose problems in the areas of environmental protection and sustainability.

4. Export of Meat and Meat Products

India is the sixth largest producer of meat in the world (Birtal, 2008). Increasing global demand for livestock products is an opportunity for India to increase its exports for the products whose domestic demand is low (Kumar, 2010). Meat industry has shown a tremendous development in the last decade. Share of buffalo meat is highest in export followed by poultry, sheep and goat, processed meat and animal casing. The buffalo meat has become as an important component of India's agricultural exports. Buffalo meat valued at 17,400.59 crores (USD 29 million) was exported in financial year 2012-13 (FICCI). The important importers of Indian bovine and other meat are Vietnam, Malaysia, Thailand, Australia, UAE, Saudi Arabia and Egypt. India exports both frozen and fresh chilled meat (Guleria *et al.*, 2015). The percentage growth rate over previous year was maximum in processed meat followed by sheep and goat. Buffalo meat has a growth rate of 10.68%, because it contains lower saturated fat than beef and pork. Buffalo meat contains 40% less cholesterol, 55% less calories, 11% more protein and 10% more minerals compared to bovine meat (Nanda and Nakko, 2003). India is the world's biggest beef exporter. The beef export increased from 0.6 million tonnes to over 2 million tonnes between 2009 and 2014 in terms of carcass weight equivalent. The beef has become India's No. 1 agri-export item, ahead of basmati rice. The Unit

cost of production of beef/bovine meat, pork and eggs is much lower in India compared to major exporting countries (Birthal, 2008). Indian meat contains less fat and the present international trend is favourable for low fat meat (Guleria *et al.*, 2015). The high cost of processing and transportation, changes in world markets and strict food safety and quality standards are some of the constraints in India's exports (Birthal, 2008). It is been estimated that India has 10-12% share in the world's leather market. In India alone, 23.2 million cattle hides, 20.3 million buffalo hides, 90.6 million goat skins and 37.3 million sheep skins are produced as primary/principal by product worth Rs 30,220 crore out of which of Rs 20,000 crore come through exports (APEDA, 2014).

5. Future Strategies for Increasing Meat Production

India is having a good potential for meat production because of large livestock population. Measures should be taken to increase the meat production efficiency of different species of animals using the improved management practices. Adoption of improved shelter management practices can reduce the environmental stress. New breeds should be developed for meat production with higher feed conversion efficiency, faster growth and disease resistant. Health management practices should be followed for prevention of diseases and economic loss to the farmers. Regular prophylactic health measures should be carried out against infectious diseases. Regular

screening of animals should be carried out against disease such as tuberculosis, brucellosis, salmonellosis etc. The livestock market yard should have basic facilities for feeding, watering and holding animals for a few days. By vertical integration with meat processing industries the middle men can be eliminated, which will ultimately increase the profit of farmers. Need for modernizing the quality control laboratories of the State Govt, need for strict laboratory inspection of meat and meat products, training programmes for meat workers regarding hygiene and sanitation need to be organized regularly. Modernization of abattoirs, setting up of rural abattoirs and registration of all slaughter houses in cities/towns are essential for quality meat production. The setting up of large commercial meat farms have been recommended to address the traceability issues necessary for stringent quality standards of CODEX alimentarius.

6. Conclusion

In view of the immense potential for meat production in India and dependency of people on this industry, the policymakers should take critical measures to support this vital segment of the Indian agriculture for hygienic meat production.

Conflict of Interest

The authors declare that they have no conflict of interest.

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