

A Review Of Literature On The Sustainability Of Supply Chain Management In The Bangladesh Livestock Industry

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ABSTRACT

In recent days economic growth is a big game-changer for any country. So, adopting a new kind of technology and strategy will help every sector to get more sustainability in this world. Sustainability is becoming a topic for all industries to achieve a new position in this business world. Bangladesh's livestock industry is also the fastest-growing sector with adopting new technology and strategy. With a big, enormous contribution by the government and extreme development dedication by the private sector Bangladesh's livestock industry creates a big hype for new entrepreneurs to invest time money, and labor to achieve profits and meet the demand for animal protein for the country beyond. Large-scale dairy farming opportunity is limited due to the scarcity of land. But the smallholder dairy potential is high in this country. Over the last decade, small-scale farming is increasing significantly. Poultry development growth is significant in this county. Small-scale poultry needs minimum inputs to get a high profit. Now the government is working on biosecurity for farms. This will create more sustainable farming in Bangladesh. To establish a sustainable supply chain management in farms. The government has established high-quality veterinary services for animal health. Private organizations also invest in veterinary services as much as they can. Acute shortage of food and fodder is the single most obstacle to livestock development in Bangladesh. There was a time most poultry and dairy farms faced a problem with commercial feeds and ingredients which has been solved through a balanced source of ingredients imported from all over the world and manufacturing feeds in-house and distributing them in the market. In this review paper, international journals and articles are reviewed on the sustainability of supply chain management in the livestock industry in Bangladesh.

Keywords: Sustainable, livestock, Supply Chain Management

INTRODUCTION

A continuous process in any industry whether it is a service industry or a manufacturing industry SCM plays an important role to turn raw materials into finished goods. Mostly in the supply chain, every industry has its raw material requirements and after that, they will turn it into the finished goods for the customer's use. When customers will be happy with that product then the company will come up with different kinds of product criteria. Industries will make the plan on how to manufacture that product and how they will maintain the demand of the product and supply to the end-users. A sustainable supply chain management is an effort by the different humans in different sectors where they integrate and formulate the various level of human effort which also reflects the morality and the responsibility of humans (Zimon, Dominik & Tyan, Jonah & Sroufe, Robert. 2019). Usually, we

consider the cost, time, and flexibility of the supply chain management but this sustainability is more of this concept. Sustainable supply chain management depends on social, economic, and environmental collaboration. These are the main supporting wizard for constructing perfect and transparent sustainable supply chain management. Bangladesh's GDP receives around 7 to 8 percent economic from the MOF (MOF,2019). Each year in every district in Bangladesh, so many new entrepreneurs are opening livestock farms. Cattle farm, poultry farm, goat farm, etc. Few are taking government training by the department of Livestock services few are starting with their knowledge. Most of them are doing this farming for better earnings in the future and to develop their business perspective. This review paper will give an idea that how new entrepreneurs will use sustainable supply chain management to gain more benefits. This paper is designed with a review study by different magazines, newspapers, and previous research work done by the researchers. In Bangladesh, all livestock animals especially rear and breed on a farm to get economical profits. Cattle, goats, and chickens are the most common livestock items in Bangladesh. Livestock Industry count as a vital wealth for a country. Animal protein, animal products, and by-products each thing contain a big economical value for the country. It is very important to ensure animals' good health, good quality products, and a systematic rearing procedure for a sustainable livestock supply chain. It will help to ensure the demand and supply for the entrepreneurs and livestock-related services. This industry growth will also help to take Bangladesh's agricultural revolution to another step. 2.9% of the Notational GDP contribution comes from the livestock sector showed by Statistics. And the annual growth rate is around 5.5%. Statistics show that around 20% of the Bangladeshi population earns through the livestock industry. Animal by-products are a big source of fertilizer and biogas which helps to increase the GDP in this country. A big number of foreign investments comes to Bangladesh only to collect bones, skin, and feather of livestock animals.

Bangladesh Livestock Industry

A big number of economic profits come from the livestock industry in Bangladesh. To get more profits and benefits this kind of livestock animals are kept on a farm with better biosecurity and a healthy environment. Cattle, buffalo, goats, and poultry are mainly considered livestock animals in Bangladesh. Sheep and pigs are also considered livestock animals but the farming of these two animals is not too popular in Bangladesh. Livestock animals are the main source of animal protein for the human body. Milk, meat, and eggs and all nutritious products made by these animals. On the other hand, the waste of these animals has also considered a better source of fertilizer for the soil for cultivation. Bangladesh National encyclopedia motioned that the current population of livestock in Bangladesh is cattle around 25.7 million, buffaloes around 0.83, sheep and goats 1.9 million, and 14.8 million. The poultry industry is the largest in this country around 118.7 million live chicken rearing and production going on currently. Other hand ducks are the comparatively growing industry in this country currently 34.1 million ducks are rearing and production going on. The animal population density per acre of arable land is 7.37 which is increasing every year. This livestock population density is in a much better position than in other countries. But still, Bangladesh has a high demand for animal protein and a low capacity to fulfilling the demand. Currently, in Bangladesh, around 85.9% of milk, 88.1% meat, and 70.7% eggs shortage respectively going on. But still, Bangladesh's livestock industry increasing its capacity and trying to fulfill its demands with new farms and innovation. A higher number of investments and government encouragement with funds and training help to create new entrepreneurs to achieve the desired goal. BLRI working on a new model of farming and new breed for livestock animals to get more animal proteins and profit. Around 83.9%

of households own cattle, goats, or chickens, 1.52% cattle, 0.9% goats and sheep, and 6.8% chicken and ducks owned by each household on average. In 1992 it was found that 0.30 percent livestock was found against 0.63 for land which was calculated by a Gini co-efficient survey on 62 villages. But in recent days it is increased. An article, the Census of Agriculture 1996, showed that the inequality of land distribution was 0.66% against 0.37% for cattle farming and 0.17% for chicken which suggests that further investment in livestock will have a positive impact on income distribution Bangladesh bureau of statistics (BBS, 2020).

Suitability means a continuous work follow where all kinds of veterinary health services are ensured, a continuous veterinary biological products delivery system should be flowless. To get a bigger growth production quality should be checked and extension of veterinary services with better collaboration with the private and government sector. Ground-level monitoring, disease prevention, and protection are also ensured by the government under the extension policy 2013. Genetical Standard improvement, AI development, technological interchange, etc, are also key players in changing this industry. The development of the livestock industry in Bangladesh is completely handled by the Department of livestock services. Private organizations and non-government organizations are following the extension policy by the government to increase the development of this sector. Bangladesh government has taken many steps to make a sustainable livestock industry for a new era. Government funds, the Asian development bank, and the world bank place their contribution to this industry to make a more sustainable and well-growth livestock industry for Bangladesh.

As per the study on livestock and poultry breeds, banglapedia posted on their website that around three types of cattle are available in Bangladesh. Local, exotica and hybrid cattle are available, and the name of those cattle is red Chittagong Goyal, Pabna is the most local breed. The exotic breeds are Haryana, Sindhi, Sahiwal, Jersey, and Holstein- Friesian and hybrid cattle are Zebu. There are three types of buffalo available in Bangladesh, watercourse, wetland, and watercourse wetland type. Black Bengal, Jamunapari, hybridized of black Bengal janunapari are the common goat in Bangladesh. The poultry industry is the biggest in Bangladesh. Bangladesh livestock research institute continuing its research work on innovating a new breed of poultry for Bangladesh. Currently, asseel, Chittagong fowl, and naked neck is the most common poultry breed in Bangladesh. Some exotic breeds are white leghorn chicken, rhode Island red chicken, fayomi chicken, australop chicken, and different type of commercial broiler and layer breeds are the popular poultry item in Bangladesh for meat and egg purpose. Duck farming became popular day today. Sylhet mete, Nageswari, Moscovy, and Goose are the common local ducks in Bangladesh. Khaki cambell, Indian runner, Jinding, Cherry valley are the alien category ducks are available in Bangladesh. Sheep farming is not so popular in Bangladesh, so common local sheep are available in Bangladesh.

The government of Bangladesh has given top priority to the livestock department in recent times. The only reason to give topmost priority to this sector is to encourage entrepreneurs for society. This is the fastest-growing sector in this country. To encourage new entrepreneurs' the government, provide funds as small-scale loan and training for the new investors. Even though those who come up with bigger investments in the livestock sector will get some financial benefits to develop this sector with new plans and programs which will help to create a sustainable livestock supply chain management for this country.

Bangladesh has extraordinary fertile agricultural soil. In this country besides soil, the climate and the geographical conditions are also well developed and the growth of domestic animals is also outstanding. The livestock sector is one of the major economical developers in this country. Young entrepreneurs are showing their interest to develop this field. The Bangladesh government provides the necessary help to develop this sector. Encouraging new investors and allowing new technologies to develop in this sector. Farming is mostly done in rural areas where land is available. Bangladesh's, last few years experienced tremendous development in the Livestock sector which helps to give a major contribution to the GDP of Bangladesh's economy. A strong motivation for farming with the development of the livestock fields in this country goes beyond the expectations of the global economy. This country has achieved around 7% to 8% on average national per capita income of USD 1,698 in 2018. Department of livestock services every year publish their livestock economical database where they represent their total livestock population and the contribution of livestock to GDP. In that report, they also mention the consumption of demand and availability of livestock products.

LITERATURE SURVEY

Economical changes with different kinds of innovation in this globalization supply chain are getting more complex and vital for organizations. There are so many issues that will break when a firm takes an initiative to operate supply chain management. Research provides the idea about the strategy formulation, how to improve the flow of materials and performance and how sequentially all the steps could be followed by the firm. Under their deep observation, they found the major issues of supply chain management under logistics, outsourcing, and the environment too (Varma et al., 2006). Sustainable supply chain management is the encouragement of generating valuable internal organizational resources, which helps to develop competitive advantages through environmental and social issues. The collaborative paradigm will help to increase the sustainability in supply chain management at any organization (Gold et al., 2010a, b). The word sustainable supply chain management is becoming famous since 2000. When researchers started working on this by evaluating different kinds of case studies and practical work they come up with a recommendation. All organizations must be work in the same manner to achieve sustainability. They must practice a common line to measure sustainability. But the end of the initiative could be different based on the organization (Searcy et al., 2009). The supply chain management process starts with raw materials collection to produce final goods with the help of in and out of the company (Cox et al., 1995).

Internal and external partners are the basic link for the supply chain line. Information flow from all links is mandatory. So, a flow of supply chain management is the view under one single line (Lumms and Vokurka, 1999). Supply chain concepts provide a step towards the broader adoption and development of sustainability that integrates issues of disposal, recycling, reconditioning, and remanufacturing of used products (Kocabasoglu, C., Prahinski, C., and Klassen, R. D., 2007). Supply chains also include the consideration of product design, manufacturing by-products, by-products produced during product use, product life extension, product end-of-life, and recovery processes at end-of-life (Jonathan D. Linton, Robert Klassen, and Vaidyanathan Jayaraman, 2007). Sustainability is "the potential for reducing long-term risks associated with resource depletion, fluctuations in energy costs, pollution, and waste management" (Shrivastava, 1995). Throughout this study, any organizational sustainability mainly focused on ecological durability which directly or indirectly supports social and economic responsibilities (Jennings, 1995).

METHODOLOGY

In this study, researchers will get to know how this sustainability will help to grow up a strong supply chain management between the manufacturers to end-users. This study is covered with a literature review on different social, economic, and environmental sustainability. And follow some fellow research works on sustainability models and tables on SCM in the Bangladesh livestock industry. Sustainability depends on social, economic, and environmental issues. So, based on these three factors livestock companies can achieve a sustainable SCM in their business. Sustainability contains survival, flexibility, and efficiency which helps to create a multi-dimensional nature in environmental, economic, and social perspectives (C. Peacocka and Shermanb 2010). In Bangladesh, livestock production is playing a vital role in the economical sector. This sector helps to grow more job opportunities along with new entrepreneurs (Shamsuddoha and Sohel,2008). Cattle, poultry, goat, and duck are the major rearing livestock animals in Bangladesh. But Poultry and cattle farming take a major place in Bangladesh. A big source of income generates from this farming business in a rural areas (Shamsuddoha and Sohel,2004). A low-cost and healthy nutrition source comes from the poultry industry. Which helps to boost the fundamental nutrition of the human body by consuming meat and eggs (Shamsuddoha, 2010). Environmental, Social, and economic impacts create a sustainable supply chain management for goods and services (D. Holt and A. Ghobadian 2009). “Development that meets the needs of the present without compromising the ability of future generations to meet their needs” which was the aim to implement a sustainable supply chain system for long term benefit (Hutchins & Sutherland 2008)

REVIEW ANALYSIS

Environmental perspective for Sustainability Livestock Supply Chain Management:

Environmental conservation is the prime and most important issue for SSCM. With the proper protection and ensuring all kinds of safety measures livestock supply chain management process run these days. That’s why reavers supply chain management process also takes place to maintain the environmental balance. As we all know the industrial revolution is a big cause of to damage our environment. That’s why organizations are taking safety measures and some green policies to stop damaging the green environment. Researchers think environmental sustainability creates more impact on society rather than social sustainability (Banerjee, 2003). Different authors have conducted different analyses of the supply chain to study the impact on environmental sustainability and found that the techniques for optimal use of energy in manufacturing result in a substantial decrease in carbon emission by minimizing energy consumption to a minimum cost which helps in green supply chain process (Bevilacqua et al., 2014). Researchers have included the concept of sustainability in the field of logistics and supply chain malmanagement and suggested the use of high productivity freight vehicles for transportation as it would minimize the cost of transportation by 33.5% and also it will create an impact on the environment (Lee and Wu, 2014). The world bank comes up with a project to improve the livestock sector with the involvement of sustainability. They will support the growth of harmless and significant contributions to the environment to produce animal protein. The World Bank is also interested to invest in veterinary infrastructure and animal disease examination to increase animal health. Which will help to reduce the economic impact of any kind of animal disease. Through the website and publication source world bank invested funds to make better livestock operations on an average of US\$150 million, to about US\$700 million in the last three years. Most of the growth has been noticed in Africa, South Asia, and Central Asia with an investment of US\$1.9

billion in livestock development in these counties (World Bank, 2021). Currently, the world bank is funding around US\$108.million and 259 million dollars to Ethiopia and Bangladesh to develop the climate. Climate changes make a vital effect on farming. World Bank ensure climate-smart practices and makes awareness regarding greenhouse gas emission with monitoring to add value to their farming (World Bank, 2021)

Social perspective for Sustainability Livestock Supply Chain Management:

Sustainability is something which carryforward by a human with new technology and makes sustainable growth for survival (Sharma S. and Ruud, 2003). Gladwin mentioned that sustainability is “an inclusive, connected, equitable, prudent and secure manner” to connect all human and industrial chains. (Gladwin et al.1995). From 1979 to 1991 Carroll mentioned the social responsibility concept on economic, legal, ethical, and other responsibilities to identify the supply chain management activities which can create social responsibility (Archie B Carroll, 1979). Social sustainability mentioned by Krause is something that ensures justice and human rights and welfare for society and industry also (Krause et al., 2009). Social sustainability helps to create employment for society and help business enterprises to take on the different challenge (van der Heijden et al., 2012). Comprehensive training program announced by DLS to improve rural farming communication. It will help to create more field assistant Livestock assistants, support teams for vaccination, disease diagnosis, and other works. Sometimes contact farmers are selected for a 2-to-3-week training program by the DLS. Which helps to create communication among the field agents and rural or urban farmers. 12-week poultry farm training program organized by the DLS to develop the knowledge and skills of farmers. Sometimes NGOs are also conducting this program for the farmers to ensure the sustainability of this industry. Cattle rearing training, artificial insemination, and other works are getting more prioritized in these programs.

Economic perspective for Sustainability Livestock Supply Chain Management:

Money-making from a business is the major and primary objective of any business organization. Financial cash flow should be continued in this case. Now how does sustainability come in this situation and how economic sustainability will make sure continuous supply chain management under this flow. Carter and Easton mentioned that to ensure the improvement of long-term supply chain management they should adopt economic sustainability to be more active and profitable for any situational period (Carter and Easton, 2011). The companies that want to adopt sustainable practices into their supply chain must find a tradeoff between any contradictory objectives like generating profits and reducing environmental issues to ensure social responsibilities. The importance of social and environmental sustainability makes a big change in supply chain management (Zailani et al., 2012). Bangladesh government try to find out a more profitable way to encourage framers to ensure livestock farming in this country. Different kinds of financial packages and subsidies are given to the investors and farmers. The livestock economical tables are bellowed. This clearly shows that the economic growth how helps this industry to get more sustainability.

Table 1. The livestock population of Bangladesh (in lakh number)

Name of Species	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Cattle	231.95	233.41	234.88	236.36	237.85	239.35	240.86	242.38	243.91	245.45
Buffalo	14.43	14.50	14.57	14.64	14.71	14.78	14.79	14.86	14.93	15.00
Sheep	30.82	31.43	32.06	32.70	33.35	34.01	34.68	35.37	36.07	36.79
Goat	251.16	252.77	254.39	256.02	257.66	259.31	261.00	262.67	264.35	266.04
Total Ruminant	528.36	532.11	535.90	539.72	543.57	547.45	551.33	555.28	559.26	563.28
Chicken	2428.66	2490.11	2553.11	2617.70	2683.93	2751.83	2821.45	2892.83	2966.02	3041.06
Duck	457.00	472.54	488.61	505.22	522.40	540.16	558.53	577.52	597.16	617.46
Total Poultry	2885.66	2962.64	3041.72	3122.93	3206.33	3292.00	3379.98	3470.35	3563.18	3658.52
Total Livestock	3414.02	3494.75	3577.62	3662.65	3749.90	3839.45	3931.31	4025.63	4122.44	4221.80

Source: Livestock Economy DLS

Table 2. Contribution of Livestock and Poultry in the National Economy of Bangladesh (2020-21) p

Contribution of Livestock in Gross Domestic Product (GDP) (Constant Prices)	1.44%
GDP growth rate of Livestock (Constant Prices)	3.80%
GDP volume (Current prices) (Crore Taka)	50301
Share of Livestock in Agricultural GDP (Current prices)	13.10%
Employment (Directly)	20%
Employment (Partly)	50%

Source: Livestock Economy DLS, GDP Calculated at a constant price by Bangladesh Bure of Statistics

Table 3. Production of Milk, Meat & Eggs

Products	Unit	Fiscal Year									
		2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Milk	Lakh Metric Ton	34.60	50.70	60.92	69.70	72.75	92.83	94.01	99.23	106.80	119.85
Meat	Lakh Metric Ton	23.30	36.20	45.21	58.60	61.52	71.54	72.06	75.14	76.74	84.40
Egg	Crore Number	730.38	761.74	1016.80	1099.52	1191.24	1493.31	1552.00	1711.00	1736.00	2057.64

Source: Livestock Economy DLS

Table 4. Demand, Production, and availability of milk, meat, and eggs year 2020-21

Name of the Product	Demand	Production	Availability
Milk	154.94 Lakh Metric Ton (250 ml/day/head)	119.85 Lakh Metric Ton	193.38 (ml/day/head)
Meat	74.37 Lakh Metric Ton (120 gm/day/head)	84.40 Lakh Metric Ton	136.18 (gm/day/head)
Egg	1765.92 Crore number (104 number/year/head)	2057.64 Crore numbers	121.18(Number /year/head)
# The estimated population of the country on 1st July 2020: 16 crore 98 lakhs			

Source: Livestock Economy DLS

Table 5. Livestock Contribution to GDP

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21(p)
GDP*	1.90	1.84	1.78	1.73	1.66	1.60	1.53	1.47	1.46	1.44
Growth Rate of GDP	2.68	2.74	2.83	3.08	3.19	3.31	3.40	3.54	3.56	3.80

Source: Livestock Economy DLS, GDP Calculated at a constant price by Bangladesh Bure of Statistics

*GDP calculated at the constant price (Source: BBS); P denotes Provisional; Prepared by Dr. Hossan Md. Salim, Planning Section, DLS

DECISIONS

Livestock industry as we all know the fastest growing industry in South Asian countries. The reason behind this geographical area is the weather and animal disease resistance power. From the business, the perspective government ensures the sustainable business condition through different aspects. In Bangladesh, there are many journals and research papers have been published on the poultry industry Dairy, and cattle breeding and marketing industry. But there is a shortage of core business supply chain-related papers on the complete livestock industry. This review paper as much as paper was reviewed with some related papers on publishing in other countries. Sustainability depends on three major aspects. If we consider these major three key aspects of sustainability of the livestock industry those are economic, social, and environmental. Based on these aspects few recommendations are given below for making this industry more sustainable in the upcoming days. For taking more care of environmental sustainability, the industry must take care of natural risks like climatic change, green supply chain policy, and eco-friendly industry with west management. Under social sustainability, the livestock industry should take care of skilled human resources or create skilled human resources, collaborate with the government to find out the best development policy for this industry, and ensure the support of up to root level farmers. Now in the end economical sustainability will ensure more perfectly if the financial cash flow will be continued for this industry. Day to day new technology is introduced in this sector. So make sure investors can get the opportunity to import and utilize this technology for meeting the demand and ensure sustainable livestock supply chain management for Bangladesh. We can hope that in the future new research work will come with a new decision on this topic.

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