



Food and Agriculture
Organization of the
United Nations

**MAINSTREAMING
NUTRITION IN THE
AGRICULTURE SECTOR
IN SRI LANKA**

TECHNICAL BRIEF

**LIVESTOCK
SECTOR**



INTRODUCTION

The Sri Lankan animal husbandry sector is mainly comprised of cattle, buffalo, goat, sheep, swine, and poultry. The main livestock-derived foods in Sri Lanka include milk, meat, and eggs. The livestock sector contributes to nearly 1.2% of the national GDP (Central Bank of Sri Lanka, 2019). There are nearly 1.3 million cattle, 0.3 million buffalo, 0.4 million goats, 13 million poultry, and 80,000 pigs in the country with a small number of sheep, ducks, and other animal breeds (Department of Animal Production and Health, 2019).

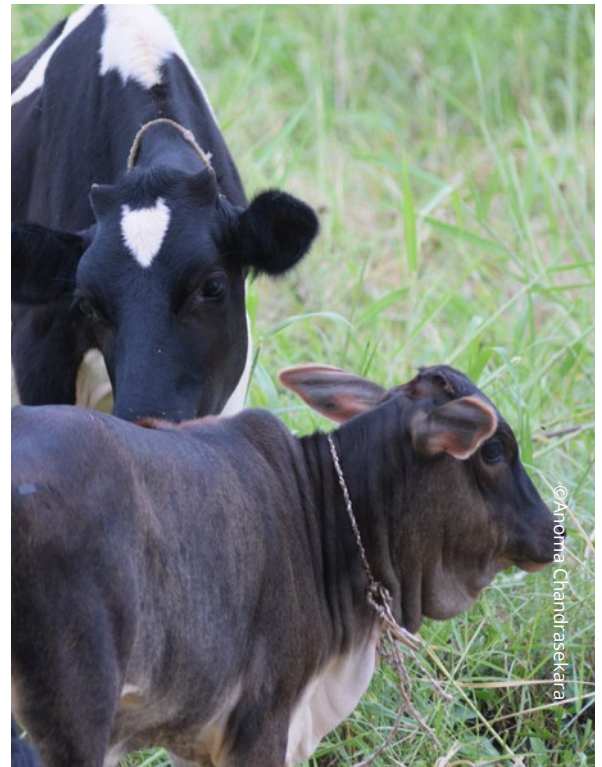
Animal-source foods (ASF) play a vital role in the nutrition of a nation as they provide higher quality protein than those of plants. The amino acid profile of ASF closely resembles the amino acid requirement of humans. Thus, ASF based proteins are more effectively utilised than plant-based proteins. Moreover, the digestibility of ASF protein is higher compared to that of plant-sourced proteins. Furthermore, ASF provide many micronutrients such as iron, zinc, vitamin A and vitamin B-12. The bioavailability of micronutrients is in general much higher than that of plant-derived nutrients.

The ASF availability as a protein source in Sri Lanka is lower than the global levels and barely meets the daily protein requirement (Department of Census and Statistics, Sri Lanka, 2015-2018). The total per capita daily protein consumption in Sri Lanka stands at 73 g of which only 19 g arise from ASF; this is merely 26% of the total daily protein requirement (Department of Census and Statistics, Sri Lanka).

The poultry industry in Sri Lanka which originated as a backyard production system, grew tremendously with the open economy starting from 1977 and developed into a large industry. Throughout this period, the broiler sector showed a prominent growth due to the contribution and participation of the private sector (Department of Census and Statistics, 2014). Poultry accounts for nearly 70% of the livestock sector. Poultry meat, eggs and day-old chicks have been exported to the Maldives over the last few years (Livestock Statistics Bulletin, 2017). The per capita consumption of chicken meat and eggs have changed from 100 g and 38 eggs in 1980 to 9.3 kg and 132.9 eggs in 2017 (Livestock Statistics Bulletin, 2017).

The poultry production is mostly operated by the private sector, with forward contracts for input supplying and marketing, mainly in small-scale broiler production. Although small-scale rural farmers obtain their inputs at the doorstep, they have to market their products at pre-agreed prices. Nearly 83% of poultry farming is carried out by commercial farms while the rest is produced under the backyard system (Livestock Statistics Bulletin, 2017).

Swine production, which is mostly concentrated in the Western coastal belt, has also remained static over the last decade despite the growing demand for pork products. The growth of swine husbandry is mainly hampered by environmental issues. (Alahakoon et al., 2016). Three subsectors, namely large-scale farms, middle-scale intensive farms, and semi-intensive back yard farms are being developed with the guidance of the Livestock Master Plan, which is the development framework of the industry. Pork is an excellent source of protein and provides several important vitamins and minerals such as thiamin, selenium, protein, niacin, vitamin B-6 and phosphorus, and is a good source of zinc, riboflavin and potassium. Rural farmers manage pigs in free-range systems on a low input basis by feeding kitchen waste, and conduct natural, controlled breeding.





In contrast, over the last decade, neat cattle, buffalo, goat and sheep population has not shown a significant growth (Livestock Statistical Bulletins, 2013-2017). Goat production is basically practiced as a traditional, extensive production system, mostly in the dry and intermediate zones. Goat production is a common, small-animal production that mainly comprises of intensive and semi-intensive management systems. In both systems, animals are reared primarily for mutton, though some are also milked and the milk is sold.

Goat milk is becoming popular due to its merit in contributing to health benefits. Therefore, rearing dairy goats under intensive management is becoming popular since recently, with rapid developments in the Northern and Eastern provinces. Goat milk, on average, contains 13.2% total solids, consisting of 4.5% fat, 3.6% protein, 4.3% lactose, and 0.8% minerals, indicating that it has slightly more total solid fat, total protein, casein and minerals, and less lactose than cow's milk. Goat milk is less allergenic than cow's milk as the former contains less alpha-S1 casein. Furthermore, the fructo-oligosaccharide content of goat milk is higher than that of cow's milk; thus, goat milk outperforms cow's milk in symbiotic activity.

Beef production seems to be stagnant throughout the last decade. There is a strong objection for cattle slaughtering from several ethnic groups in the country. Moreover, buffalo meat is not popular among Sri Lankans and buffalo slaughtering has been completely banned in the country.

The five-year plan to attain self-sufficiency in dairy commenced in 2010 but the country did not achieve the set target. Currently, the local milk production is sufficient only to fulfil about 40% of the demand and therefore the rest is imported. In 2018, both neat cattle and buffaloes produced 467 million litres of milk (Department of Animal Production and Health, 2019). In 2019, 854,434 MT of milk powder was imported into the country (Annual Review of the Department of Animal Production and Health, 2019). Small-scale dairy is still predominant in the country. Presently, it is one of the major forms of employments for the rural poor. Dairy animals generate a continuous flow of income, and act as a cushion against income shocks arising due to crop failure for resource-poor people (Livestock Statistical Bulletin, 2013-2017).

Milk and milk products have a good balance of protein, fat and carbohydrate and are a very important source of essential nutrients, including calcium and riboflavin. The content of oleic acid conjugated linoleic acid (CLA), short and medium chain fatty acids, vitamins, minerals, and bioactive compounds promote positive health effects.

Eggs contain several proteins: ovalbumin, ovotransferin, ovomucoid and ovomucin and contain the highest biological value for protein. Eggs provide nearly 7 g of high quality protein, 5 g of fat, and 1.6 g of saturated fat along with iron, vitamins, and minerals. Poultry eggs constitute of riboflavin, folic acid, vitamin B6, vitamin B12, choline, iron, calcium, phosphorus, and potassium. The price of poultry eggs fluctuates continuously throughout the year.



PROBLEMS

- ✿ Ethno-religious beliefs. The majority of the country are Buddhist who show some reluctance to slaughter animals and consume flesh. The Hindus treat the cow as a sacred animal and thus, they do not consume beef. Muslims do not consume pork or pork products. This has led to the sluggish growth in meat consumption and the meat processing industry. However, there are less restrictions on the consumption of poultry, eggs, milk and dairy products. As a result, poultry meat consumption has shown a sharp increase over the past decade.
- ✿ Livestock management in Sri Lanka is still a rural livelihood activity which utilises idling labour, underutilised agricultural by products and marginal lands. Nearly 17% of chicken is managed under the backyard system, while 51% and 34% of cattle rearing is carried out under semi-intensive and extensive systems respectively. Over 162,000 registered backyard poultry farms have been reported in 2018 (Livestock Outlook of Sri Lanka, DAPH 2017-2018).
- ✿ Dwindling marginal lands with fodder and grass for goats and cattle. As a result of haphazardly executed developmental activities in the country, the marginal lands which have been in use for extensive rearing of livestock such as goat and cattle, have been cleared for building and other projects. This has led to a reduction of available lands for rearing animals, especially in the dry zone.
- ✿ Poor goat milk production. Although goat milk is appreciated for its better nutritional properties and less allergenicity, goats reared in the dry zone produce only a little quantity of milk. Goat breeds such as Saanan produce a comparatively higher quantity of milk. However, they are difficult to be reared in the dry zone.
- ✿ Low proportion of milking cows at a given time. The Department of Animal Production and Health reveals that the actual milking population of cattle and buffalo was 23.8% of the total herd of the country, while the non-milking cows was 15.7% and the rest was heifers, calves, males, infertile or aged animals, during the five year period spanning from 2013-2018 (Livestock Information Bulletin, 2019).
- ✿ Poor performance of dairy cows in the country. European breeds do not produce the full potential of milk in the country due to differential environmental conditions such as temperature, pests and diseases, poor feed and management practices. Moreover, the milk production of local and Indian crosses is not as high as the European breeds.
- ✿ Misinformation/unconsolidated facts over red meat and meat product consumption. Some studies have shown a weak relationship between red meat consumption and colorectal cancer incidences. However, a strong correlation is yet to be established.





- ❁ Negative perception on meat curing. The use of nitrite in meat curing has also been correlated to the development of cancer in studies carried out many decades ago. This has led to a negative perception on processed meat products such as ham, luncheon meats, sausages, frankfurters, bologna, salami, pepperoni, bacon and smoked meats. This arose from the generation of nitrosamine. However, the industry rectified this by mandating the addition of erythrobates or ascorbates along with nitrites, which has minimised the generation of nitrosamines, most of which are carcinogenic. The sluggish development of the meat processing industry is partly attributed to these beliefs.
- ❁ The use of leftover meat, binders and other non-meat ingredients in the manufacture of meat products is also perceived negatively. Thus, some consumers have concerns over the consumption of processed meats.
- ❁ Misinformation and unsubstantiated facts about milk and dairy products. Some Sri Lankan professionals advise the general public against the use of imported milk powder on unsubstantiated claims that it is adulterated, carry toxicants and is harmful to health. Moreover, they indicate that only infants should consume milk but not adults. This inaccurate information and unsubstantiated facts have led to lowered milk and milk product consumption during the past decade.
- ❁ Misconceptions over the consumption of eggs. Some believe that the consumption of egg yolks is detrimental to cardiovascular health and therefore, they tend to reduce the consumption of eggs. Some can be allergic to egg proteins. However, egg protein allergy is not very common in Sri Lanka.
- ❁ Cow's milk protein allergy and myths about milk consumption. Many Sri Lankans tend to believe that milk consumption leads to mild allergic conditions, unrest, stuffy head etc. As a result, some refrain from drinking milk.



- ✿ Cost of meat products. Chicken is the cheapest meat as is the case in many parts of the world while beef, pork and mutton are expensive. According to the Hector Kobbekaduwa Agrarian Research Institute (HARTI), the price of one kilogram of chicken, beef, pork and mutton was SLR 480, SLR 950, SLR 600 and SLR 1800, respectively in 2017. Although there is a high demand for goat mutton, the demand cannot be met at present. Due to fairly high prices of meat, consumers tend to limit meat consumption.
- ✿ A general relationship between meat consumption and income. The low income earners tend to meet their protein requirement mainly through vegetable proteins, while consumers with a high disposable income tend to consume more ASF to meet their protein requirements.
- ✿ High prices of animal feed. Since the cost of animal feed is high, the cost of production especially of chicken, remains high which affects the retail price. Bone meal (19,446 MT), fish meal (6,849 MT), oil cake (219, 917 MT), maize (192,918 MT) and soybean meal (226, 437 MT) have been imported to the country in 2017 (Livestock Statistics, 2017). The prices of all these feed ingredients, vitamin and mineral premixes, and antibiotics have gone up during the past five years. Although currently a significant portion of maize is cultivated locally, a large quantity of the aforesaid ingredients needs to be imported.
- ✿ High cost of day-old chicks. Although the average price of a day-old broiler chick has been recorded as SLR 69.29 in 2019, the actual price is usually more.
- ✿ Concerns over the safety of chicken and other meats. Some believe that broiler chicken comes to the full weight in 30-35 days due to the use of growth promoters and related substances. These suspicions have led to a reduced consumption of meat, especially chicken.
- ✿ Safety and quality of milk and milk products. Farmers tend to adulterate liquid milk in order to obtain undue profits. Thereby they compromise the safety and quality of liquid milk. Water, urea, sugar, flour and hydrogen peroxide are a few things that they commonly add into milk.
- ✿ Poor handling and storage of animal feed. On account of poor handling and storage of animal feed, the safety of feed is compromised. Development of aflatoxins and other mycotoxins in coconut cake and silage is commonly observed in Sri Lanka. These toxins laden feed compromise the safety of animal products such as milk and meat. A recent study reported that nearly 35% of liquid milk samples had been tainted with aflatoxins which are high potent carcinogens (Pathirana et al., 2010).
- ✿ The presence of antibiotic residues in meat. The use of prophylactic antibiotics on farm animals and the non-adherence to guidelines on tissue clearance has led to antibiotic residues in meat, especially in chicken. This is a safety issue and some consumers are concerned over the presence of antibiotic residues in meat. Moreover, this leads to the development of antibiotic resistance in bacteria.
- ✿ Shortage of labour. As a result of negative attitude towards animal farming and agriculture in general, many especially among the younger generation, stay away from animal husbandry. Therefore, labour is becoming more and more expensive. The high cost of labour raises the cost of production and as a result, the market prices go up. Therefore, they find it difficult to stay competitive in the market.



- ✿ Environmental issues associated with livestock farming. Solid and liquid waste, malodors, dust, and noise generated in animal farms become serious environmental issues. Hence many do not wish to have animal farms in populated areas. Moreover, the local authorities are hesitant to offer licences for livestock farms especially in urban and semi-urban areas.
- ✿ Environment-related problems associated with animal husbandry. Many swine farms were closed to avoid the crisis between animal farmers and the public.
- ✿ Concerns over environmental pollution. Livestock has been identified globally as a significant green-house gas generating activity. Furthermore, livestock has been blamed for water pollution through emitting a large quantity of nitrogen, phosphorous, organic matter and selenium leading to eutrophication, creating high BOD. Furthermore, livestock farms release pathogens such as E coli and Salmonella as well as pharmaceutical residues.
- ✿ High environmental impact of the livestock industry. Water footprints for different meats are estimated to be 4,325 l/kg for chicken, 5,988 l/kg for pork, 8,763 l/kg for sheep/goat meat (mutton), 15,415 l/kg for beef and 1,020 l/kg for milk, while vegetables showed a water footprint of only 322 l/kg. This indicates that livestock cause a severe impact on earth for water. It is estimated that farming accounts for about 70% of water used in the world today (www.waterfootprint.org).
- ✿ Low availability of high quality grass for cattle. There is a severe shortage of good quality grass for imported cattle which require high quality grass in large quantities. There is only a few dedicated grasslands in the country. In most of the marginal lands, there are many weeds, small bushes and hedges which are not eaten by imported cattle.
- ✿ There is an immense need for proper marketing practices and transport systems for the meat industry, especially in rural areas. Inadequate cold chain infrastructures especially at rural level. Overcrowding of food animals during transport results in poor meat quality. Therefore, a proper transportation system should be introduced to both small and large-scale producers throughout the country.





- ✿ Lack of sanitary slaughter facilities to produce meat under hygienic conditions. In many abattoirs in the country, floor slaughtering is practiced for large animals with poor hygienic conditions. Moreover, most of these places are overcrowded and untidy.
- ✿ Difficulty in meat inspection. Animals should undergo both ante-mortem and postmortem inspections. However, due to the use of unauthorised places for animal slaughtering, meat inspection has become impractical.
- ✿ Environmental pollution and offensive odour due to poor infrastructure and insufficient cleaning and drainage facilities in abattoirs.
- ✿ Animal diseases. Many animal diseases affect the growth and production of animals, and at times these compromise the safety of animal products.
- ✿ Poor artificial insemination and breeding programmes.
- ✿ Shortage of high protein feed ingredients such as fish meal, meat meal, and soybean meal in the country. Therefore, high protein feed ingredients are currently imported into the country for compound feed manufacture.



SOLUTIONS PROPOSED

- ✿ Demystification of myths about meat consumption. There are many myths surrounding ASF consumption such as red meat, poultry, milk and milk products and eggs. Therefore, it is of paramount importance to create awareness and demystify myths regarding ASF through public awareness programmes.
- ✿ Increased production of raw materials for animal feed such as maize. Maize is a crop that can easily be cultivated in dry zone areas without many inputs. Currently, there are many corn plantations in Siyambalaanduwa, Moneragala, Bibile, Wellawaya and Buttala areas. However, maize cultivation suffered a temporary setback due to the fall army worm infestation. There are many other feed ingredients that the country depends on imports such as fish meal, bone meal, oil cake, soybean meal, and vitamin and mineral premixes. It is suggested that these ingredients be manufactured locally. Development of facilities to produce high protein feed ingredients such as fish meal, meat and blood meal in the country is suggested.
- ✿ Utilisation of indigenous livestock to improve food and nutrition security. Indigenous chicken, cattle and goats are comparatively more resistant to pests and diseases and climate resilient compared to exotic breeds. Therefore, they can thrive under harsh conditions. Indigenous livestock keepers tend to consume more ASF and thereby contribute to food and nutrition security at household level (Hetherington et al., 2017). Moreover, milk from indigenous animals is considered to be more flavourful and results in a firm texture when curd is prepared. Indigenous chicken meat is also considered to be more flavourful than broiler meat (FAO-Policy Brief, 2020). Furthermore, it is women who are mostly involved in indigenous livestock management and thus, it is important to uplift their livelihood.
- ✿ Preservation of genetic characteristics of indigenous animals such as cattle. Continuous crossing of indigenous animals with exotic breeds may lead to the extinction of the indigenous gene pool.
- ✿ Development of a collection network for maize and storage facilities. It is essential to expand the corn storage facilities in these areas. Corn becomes mouldy easily when storage conditions become unfavourable, posing a threat of developing mycotoxins and leading to heavy postharvest losses.
- ✿ Expansion of the animal feed formulating industry. The animal feed industry has shown some developments over the years. Nevertheless, there is still much room for expansion to cater to the rising demand, especially from the poultry sector.
- ✿ Meat production and distribution in rural areas should be modernised to avoid a lack of coordination between the producer and the consumer. Thereby consumers could purchase good quality meat at a reasonable price.





- ✿ Handling, transportation, and storage of meat should be carried out under proper conditions to improve the keeping quality of meat and consumer acceptance. Meat being a highly perishable product, cold chains are an essential part in the storage and during transportation, until it reaches the consumer.
- ✿ Development of abattoirs with proper drainage and waste disposal capacity and monitoring of their functions.
- ✿ Enforcement of both ante-mortem and postmortem for animals to assure the quality and safety of meat.
- ✿ Improvement of farm standards, selecting appropriate locations, and educating farmers on waste management to avoid crisis situations between producers and the public.
- ✿ Expansion of veterinary extension services. It is essential to enhance support for disease management through the expansion of veterinary extension services, with advice on the use of therapeutic antibiotics, vaccination etc.
- ✿ Registration of farms. Farm registration has been introduced by the Department of Animal Production and Health in 2008 and the database is available online. However, there are many farms still not within the database. The database is very important for the veterinary surgeons and extension officers to access the farms in time and for passing on information promptly.
- ✿ Regulation of the use of animal pharmaceuticals. The haphazard use of antibiotics leads to high levels of residual antibiotic levels in meat compromising the safety of meat. Therefore, it is essential to regulate the dispensing of antibiotics and other animal pharmaceuticals.
- ✿ Assurance of the quality of liquid milk and milk products by frequently testing for the presence of adulterants, mycotoxins and other toxic substances. Currently, only a limited number of milk producers test milk for the presence of toxicants such as aflatoxin while the vast majority do not.
- ✿ Importation of potent dairy cows depending on the need, following careful evaluation of the need. Haphazard importation of animals will not bring good results.
- ✿ Development of parent lines of broilers and layers. Currently, parent lines are imported from other countries.
- ✿ Strengthening the existing breeding programmes for cattle and improvement of artificial insemination facilities in the country.
- ✿ Development of micro-livestock such as rabbits, guinea-pigs and quails.
- ✿ Production of sexed semen. Through the production of sexed semen of cattle, it is possible to assure the sex of the offspring with 80-90% accuracy and this will enhance the dairy production. Production of sexed semen is possible in the country.
- ✿ The differential effects of A1 and A2 milk on chronic diseases such as diabetes mellitus are fairly well established. It is found that the local and Indian crosses produce A2 milk which does not lead to chronic diseases, while the European breeds and crosses tend to produce A1 milk. Therefore, it is suggested that more emphasis be given to this and that local and Indian crosses are promoted.



SUMMARY

Livestock plays a pivotal role in the food and nutrition security of Sri Lanka. Animal sourced foods provide high quality protein along with vitamins and minerals. Only 26% of protein arises from ASF in Sri Lanka, while the value in developed countries is much higher, indicating that nearly 75% of the protein requirement is met through plant proteins. A significant proportion of the livestock sector still operates under the extensive system, thereby contributing to household food security. Except for the broiler chicken sector, other meats such as pork, beef and mutton have not shown a significant improvement over the past decade. Several different factors including ethno-socio-religious factors, environmental issues, high cost of feed, low availability of grass and poor artificial insemination facilities hamper the growth of the livestock sector in Sri Lanka.