

Milk, Meat and Egg Production in Ceylon*

W. V. S. WIJERATNE

*Livestock Division, Department of Agriculture, Peradeniya,
Ceylon*

INTRODUCTION

FOOD of animal origin such as milk, meat and eggs are rich sources of protein, fat, vitamins and minerals in the human diet. They constitute the essential but expensive items of food that help in forming a balanced diet with rice, a source of carbohydrate. It should be the aim of the country to bring these foods within the reach of the average citizen so that the future Ceylonese will be a healthy nation. There are already indications that the dietary habits are slowly but surely changing in favour of the Western dishes, especially among the higher income groups. Some upper and middle class families consume only one meal of rice a day, usually at lunch. Bread and courses usually make up the dinner. This is likely to increase the consumption of animal protein in the future. The present consumption rates on a 'per capita' basis was calculated on a Central Bank Consumer Survey Report in 1963. They are as follows :—

Milk 2 oz. a day,
Meat 18 lb. per annum, and
18½ eggs per annum.

These consumption rates are low by Western standards where an average person consumes about 20 oz. of milk a day, 250 eggs and 152 lb. of meat annually, and by the levels recommended by medical nutritionists.

There has been difficulty in estimating the per capita consumption and domestic production levels of milk, meat and eggs due to lack of reliable statistics. For purposes of this study, the data supplied in the report of Consumer Finance Survey conducted by the Central Bank in 1963 and the Customs Returns have been used as the basis of estimation. In the year 1963, the domestic production was 144,254,928 pints of milk and 202,019,760 eggs.

*Paper read at the Ceylon Association for Advancement of Science at a Seminar on "Food Resources in relation to population growth in Ceylon" on 25th September, 1965.

A great quantity of foods of animal origin continue to be imported at great expense despite the low levels of consumption. The resources of the country does not permit any further increase in imports as a means to attain higher levels of consumption and meet the requirements of an increasing population. The value of milk and milk products imported amounted to Rs. 93,280,403 and meat was Rs. 5,138,466 in the year 1964. It is indeed a proud record to note that at least self sufficiency has been achieved in eggs to the extent of doing away with imports, even though the desired level of consumption is a long way off. This is an indication of the potentialities for livestock farming although it does not enjoy the benefits of subsidies, guaranteed prices and other measures of inducement so common in agriculture. Probably much more could have been achieved in the production of milk and meat if more reasonable credit facilities were available, schemes of insurance, better marketing facilities and opportunities for short term training courses in the management, feeding and breeding of livestock. In general, it may be said that the economy of Ceylon depends foremost on the diversification within agriculture as is the case of New Zealand and Denmark where the national income is nearly twice that of Ceylon derived from tea, rubber and coconut.

Resources can be broadly classified as :

1. *Livestock*.—The indigenous livestock population can be used as the foundation stock in a programme of improvement. Usually the indigenous females are crossed with improved exotic males as this method is the most economic approach. Numerically there are 1,589,000 cattle, 852,000 buffaloes, 33,000 sheep, 538,000 goats, 106,000 swine, 6,129,000 poultry and 40,000 ducks.

2. *Land*—Available for farming are distributed as follows :—

(a) In the dry zone there are approximately 1.8 million acres ideally suited for unirrigated pasture. At present most of this area is under jungle, which has to be felled, packed and burnt during the dry season. The pastures are established normally during the rains of the North-east monsoon. These pastures are capable of carrying about 1 cow per acre.

- (b) The one million acres under coconut cultivation are suitable for cattle breeding. The cultivation of fodder and pasture is done under coconut. Already this method of farming is becoming popular as it increases the revenue derived from the land and the organic manure of the animals has a beneficial effect on the coconut palms.
- (c) There are natural grasslands to the extent of about 20,000 acres in the dry zone along river basins such as the Mahaweli. These have been the traditional grazing grounds of comparatively large private herds of cattle and buffaloes. These 'villus' are flooded annually during the rainy season and silting occurs to maintain the fertility of the soil.

3. *Pastures*.—The 'pastures' that have been naturally established or artificially cultivated are mainly composed of varieties of grass without the association of a legume.

- (a) The villu or natural grasslands have a species of grass similar to *Bracharia mutica* commonly called water grass, which can be grazed for a period of about 8 months of the year during the dry season. The yield of villu grass is very high.
- (b) A drought resistant grass called *Bracharia brizantha* has been established on highland in the dry zone suitable for grazing cattle. This grass can be grown on elevations up to about 3,000 feet above sea level.
- (c) Areas with a temperate climate at high altitudes in the Nuwara Eliya district are suitable for Kikuyu grass that can be grazed. This can also be considered a weed, because of the difficulty of eliminating it after cultivation.
- (d) Fodder grasses that can be grown in the warm areas are Guinea B and Napier. Paspalum species are grown in the cold climates. The yield from fodder grasses is high and they are cut and fed to cattle and buffaloes.

4. *Tree Fodder*.—Is available throughout the year in plenty in the natural forests. This is used for feeding mainly sheep and goats. Leafy trees producing high yields can also be grown in cultivated areas.

5. *Feed*.—Ingredients are usually the by-products containing proteins, carbohydrates and other nutrients that can be assimilated by livestock and converted into milk, meat or eggs.

- (a) *Coconut Poonac*—which is widely used as a livestock feed is available in large quantities. This is especially useful for feeding cattle, sheep and goats as they are able to digest the fibre. The demand for this feedstuff in the world market is so high, that there is a partial ban on its export. Expeller poonoc has a high oil content as much as 10 per cent. but solvent extracted coconut meal has only a very low oil content of about 1 per cent. Solvent extraction of oil improves the keeping quality of poonac. If the export of copra is discouraged due to the fact that it is a crude product, larger quantities of poonac will be made available. The present production is about 60,000 to 70,000 tons per year. Usually about 16,000 tons are exported annually which earns an income of nearly Rs. 5 million.
- (b) *Rice bran*—is available in small quantities but the quality is variable. With the use of improved hullers the quality can be improved by separation of the paddy husk. It is probable that larger quantities will be available with the increase in domestic production of rice. Rice bran is a valuable component of livestock feed.
- (c) *Gingelly poonac*—This is a high quality feed rich in protein, but it is available in limited quantities. The production of solvent extracted meal is about 400 tons annually.
- (d) *Cereals*—The cereals such as maize, sorghum and kurakkan which are produced as chena crops in the dry zone are inadequate to meet the needs of the poultry population. However, there is scope for cultivation of large tracts in the dry zone with improved varieties on a commercial basis.
- (e) *Fish Meal*.—There is a great potentiality for the production of good quality fish meal as Ceylon is an island with its waters extending as far as the South Pole. It is hoped that when the Fisheries Corporation functions, modern fishing vessels and equipment will

be used to increase the catch. All varieties of fish unsuitable for human consumption could be diverted for the preparation of fish meal. Fish meal is the most expensive but essential form of animal protein necessary for livestock feeds, especially in poultry rations.

- (f) *Cotton Seed* is used for extracting oil and the remaining meal is useful for feeding livestock. The quantity available at present is small. This quantity is likely to increase with the large-scale cultivation of cotton by the National Textile Corporation.
- (g) *Molasses* is a by-product of the sugar industry. At present most of it is issued for the production of alcohol. However any surplus can be always used for feeding livestock.

6. *Climate*.—Ceylon possesses a wide variety of climates ranging from the temperate type found in the hills to the tropical type found at low elevations. In this respect the country is very fortunate to possess a region climatically comparable with the natural environment of European breeds of livestock. This is of special importance in cattle breeding as European cattle are otherwise susceptible to heat stress under tropical conditions and will fail to thrive.

MILK

Milk is a balanced food suitable for all groups of the human population but is of special importance to infants and children. The problem of increasing the consumption of milk is prevented by the lack of supply. This in turn is due to the fact that the large majority of the cows which belong to the Sinhala breed are extremely poor milk producers and are not milked at all. The local buffalo cow is no better than the Sinhala cow in this respect. Besides this, there is also a prejudice against the consumption of liquid buffalo milk except in the form of curd. This may probably be due to the high level of fat, which could be 'toned down' to the legal standard of 3.5% with advantage and the excess fat used for the manufacture of butter. The incentive for the improvement of Sinhala cattle can be provided by organizing marketing facilities for milk and ensuring a reasonable margin of profit. The task of storage and marketing of milk by the National Milk Board under tropical climates is

certainly more difficult than in temperate countries. Refrigeration facilities are also not found in the average home so that the daily requirement of milk cannot be purchased at one time. This invariably limits the market for fresh or pasteurised liquid milk. The only alternative is to produce either sterilised milk, full cream powdered milk or condensed milk because of the superior keeping quality. During the last year 11,896,957 lb. of full cream milk powder and 21,444,121 lb. of full cream condensed milk were imported at a cost of Rs. 26,897,502 and Rs. 18,965,968 respectively. In terms of liquid milk these quantities of full cream milk powder and full cream condensed milk are equivalent to 73,212,042 pints and 23,588,532 pints respectively. In order to manufacture these products locally the National Milk Board has ventured on a condensed milk project at Polonnaruwa in conjunction with aid received from the Government of New Zealand and has plans for the establishment of a spray drying plant at Ambewela. The condensed milk factory is expected to commence production in the year 1967. The milk produced at the Central livestock Research Station, Polonnaruwa, the Tamankaduwa Livestock Project and by farmers in this locality will be utilized for this purpose. Since the milk yields of the Sindhi and Tharparkar herds that are maintained at these farms are comparatively low and the Sinhala herds are uneconomical for milking, the Department of Agriculture has undertaken to evolve a more productive milch cow. Experiments are now in progress to crossbreed Sindhi and Sinhala cows with Jersey bulls by both natural and artificial means with the objective of combining the higher milk yields of the Jersey breed with the heat tolerance and disease resistance factors of the Zebu cattle. The best known example of a good dairy breed evolved in this manner is the Jamaica-Hope, a cross between the Sahiwal and Jersey breed. The herd average of the Jamaica Hope is 760 gallons, while the Sindhi and Tharparkar average in Ceylon is about 250 gallons and the Sinhala is about 100 gallons. The preliminary cattle breeding trial conducted at Karagoda-Uyangoda by the Department of Agriculture revealed that the Sinhala-Jersey (F1) first cross herd average was 297 gallons of milk with 5.7% fat. This result was very encouraging because the milk yields of the Sinhala crossbred was even higher than the purebred Indian dairy breeds in Ceylon. This could be increased in the subsequent generations by genetic selection, provided the herds are large. For this reason there are over 5,000 cattle at the Tamankaduwa

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project and 2,000 cattle at the Central Livestock Research Station, Polonnaruwa. These herds will form the nucleus for the development of the dry zone by private farmers. Experience has also shown that buffaloes are eminently suited to the villu grasslands as they are capable of grazing them even during minor floods. A buffalo unit has been established at the Tamankaduwa Livestock Project to supply milk for the condensary and investigations are being made to import more milch buffaloes such as the Murrah, Surti and Mehsana breeds. The production of milk for the spray dried full cream milk plant to be located in Nuwara Eliya is more straightforward. The large herds of purebred Ayrshire, Friesian, Jersey and Dairy Shorthorn cattle at Ambewela and Bopatalawa Government Farms and private herds of Cape cattle will meet the requirements of the factory. The Cape or Hatton breed form the bulk of the milch cows of Ceylon. They can be graded up to any of the European dairy breeds, but the choice should be the Ayrshire or the Friesian breed. The dairy industry is best developed in this district because of the income derived from high yielding cows. Maximum utilization of land for dairy farming should be made in this region for the above reason. However the availability of land in this zone is limited because of the extensive tea estates. Past experience has demonstrated at Bopatalawa that even infertile land such as the patnas with highly acidic soils can be reclaimed by dairy farming. For this reason all the idle land in tea estates may be utilized for cattle breeding by the private sector. This will also help in reclaiming the fertility of the soil.

Another practice worthy of recommendation is rearing milking goats in the backyards where facilities are available for feeding and housing. A good milking goat of the Saanen, Toggenberg, Anglonubian or Jamnapari breed is capable of producing about 3 pints of milk daily which ought to suffice for a household.

In the field of milk marketing it is unfortunate that the National Milk Board Act has disqualified producers from being appointed as members of the Board of Directors. This has resulted in a great deal of criticism of the activities of the Board. The Act should therefore be amended to include representation of both producer and consumer interests.

Schedule I gives the quantity and value of imports of milk and milk products in 1964.

MEAT

There have always been prejudices against the consumption of beef and pork by different religious groups in Ceylon and for this reason the consumption of meat in the past was low. According to the Central Bank's Sample Survey of consumer finances the meat consumption per capita annually was 5.42 lb. in 1953. In recent years however the consumption of meat increased probably due to a scarcity and high price of fish. The Central Bank Consumer Survey of 1963 revealed that an average Ceylonese ate 6.8 lb. of beef, 1.9 lb. of mutton, 7 oz. chicken and 9.2 lb. of other meat. The consumption of pig meat such as pork, ham, bacon and sausages could not be determined as it was included under the classification of 'other meat'. The comparable consumption figures in the United Kingdom in 1963 were 53 lb. beef, 23 lb. mutton, 47 lb. pig meat and 15 lb. chicken. The production of meat animals has not been undertaken in an organized manner as the consumer demand has not been selective for particular 'cuts' so familiar in the Western hemisphere, for which varying prices prevail. The consumer preference in Ceylon is mostly for lean meat without bones. The abattoirs of Ceylon appear to be primitive by modern standards. This inevitably leads to a low standard of meat hygiene and does not provide for the ideal supervision of carcasses. In most instances valuable by-products for animal feeding such as blood meal, meat meal and bone meal are wasted due to lack of facilities for collection and processing. The inspection of meat by Veterinarians prior to human consumption is undertaken in a few large Municipalities. The quantity and value of imports of meat in 1964 is given in Schedule II.

BEEF

There are no special beef breeds of cattle in Ceylon or India. Beef is provided mainly by the Sinhala cattle that graze the road sides, and the jungles, and the culled dairy cattle and draught bulls. The price of beef is considerably low in comparison to other types of meat unlike in European countries. It may therefore be uneconomic to raise beef cattle by supplementary feeding of concentrates. The average liveweight of an adult Sinhala animal is considerably low being about 250 lb. in comparison to European breeds that weigh about 1,000 lb. The age of maturity is also high in comparison to beef breeds. The dressing out percentage of a Sinhala animal is about 45 when about 60 is obtained on beef breeds. Breeding of Sinhala cattle

has also been most indiscriminate. Very often the best animals that should normally be kept for breeding are sold for slaughter for immediate gain. There has been a shortage of cattle for slaughter and this was overcome by the slaughter of buffaloes. The buffalo meat is usually fraudulently sold as beef because there is a prejudice against the consumption of it. Very often the slaughter of buffaloes is done illicitly in suburban areas and the meat is surreptitiously transported to towns. In view of the large number of buffaloes that were being slaughtered, the Government introduced the Buffalo Protection Ordinance to ensure that there will be sufficient animals for work in the rice fields. This has recently been incorporated in the Animals Act of 1957. Preference for the buffalo by the butcher is probably due to the larger carcass and the cheaper price of the adult animal. There is great scope for meat production with larger exotic breeds such as the Murrah, which is the best known dairy breed in India. The adult animal usually attains a weight of about 1,000 lb. and this has been recorded at the Tamankaduwa Livestock Project and the Ridiyagama farm. The males can be fattened for slaughter and used for the manufacture of corned beef in view of the prevailing prejudice for fresh meat. The Department of Agriculture has imported a few Aberdeen Angus cattle from Britain to investigate the possibilities of cross-breeding with the Black Sinhala and evolve a type of beef animal suitable for conditions in the dry zone. Such a breed called the Santa Gertrudis has been evolved in the King Ranch of Texas containing 5/8th Shorthorn and 3/8th Brahman 'blood'. All Indian breeds imported to U. S. A. were designated 'Brahman'. The need has arisen now in Ceylon for a beef breed of cattle with a high rate of growth, good adult weight and dressing percentage to meet the increasing demand for good quality beef.

MUTTON

Mutton is about the most expensive meat in Ceylon costing about Rs. 3 per lb. There are no religious prejudices against consumption of mutton. A large number of live goats and sheep have to be imported annually from India to meet the domestic requirements, as the carcass weights of these animals are nearly double that of the indigenous breeds. The indigenous breeds have a live-weight of about 40 lb. and a dressed weight of about 20 lb. These figures are low in comparison to meat animals of other countries. Therefore the problem is to improve the body size of

the sheep and goats bred for meat. This could be achieved by (a) importing a good meat breed of sheep and goats that will thrive under conditions in Ceylon, (b) improving the meat qualities of the indigenous animals by crossbreeding with exotic stock, and (c) selecting within the existing local breeds. Experience has shown that importing foreign breeds from regions not comparable to Ceylon has not been very successful in past. The Jamnapari and the Australian wild goats succumbed to the enzootic diseases such as goat paralysis and worm infestations. To avoid a recurrence of these problems, the most recent importation of mutton goats by the Department of Agriculture was from South India with the hope that they would be acclimatized to Ceylon and resistant to enzootic diseases. The preliminary results are however encouraging, though it is too early to judge the final outcome. Sheep and goat breeding have been traditionally a nomadic enterprise, probably to avoid the dangers of worm infestation of the pastures. The task now is to stabilize it so that the same pasture could be used rotationally with the help of modern scientific knowledge in the control of parasitism. Crossbreeding of local stock with imported breeds is always a means to harmonize the best qualities of both breeds so that mortality will be low. This is still the most popular system of breeding in tropical regions where the productivity of the indigenous animal is low.

Selecting the best animals within the indigenous breeds and breeding from them has scope where the heritability of characters are high. This is so in most carcass characters such as body size, growth rate, etc., but yet this should be done in a scientific manner as far as possible with the assistance of reliable records. Goat breeding for meat should be undertaken in the arid tracts along the costal belt at Puttalam, Mannar and Hambantota districts where there is scrub jungle available for grazing. There is also the possibility of cultivating tree fodder which can produce a good yield, as goats prefer browsing to grazing. The most commonly used trees are jak, and dadap. The indigenous sheep

are found mainly in the Northern and Eastern provinces and are a breed that is of no value for the production of wool. These animals have to be improved for the production of meat by crossbreeding. A British breed of woolless sheep called the Wiltshire Horn was very recently imported by the Department of Agriculture for the production of mutton. It is probable that temperate sheep may thrive in the dry patnas of the upcountry such as those in Welimada. Sheep have distinct meat breeds unlike goats, and it is therefore possible to produce a good carcass for mutton or lamb with a greater margin of profit. The prospects for sheep breeding therefore are quite favourable in Ceylon though this has not yet been undertaken commercially.

PORK

Pig meat is consumed in Ceylon mainly as pork though there is a small market for cured pig meat in the form of ham and bacon, and pig products as sausages. The limiting factor for cured pig meat appears to be the high price rather than consumer preferences or palatability. Pig production has good opportunities in Ceylon because the country is fortunately free of infectious and contagious diseases that are a threat to the industry in developed countries and there is also a good market for pork. The local pig, as was the case with all other indigenous livestock, is small in size and uneconomical to rear on a commercial scale. This animal can, however, be replaced by other exotic pork breeds such as the Berkshire and Middle White, and the bacon breeds such as the Landrace, Large White and Large Black breeds. All these breeds have been thriving well under Ceylon conditions. The Landrace breed was imported only very recently. Experiments are also in progress to crossbreed the Wild Boar with exotic breeds for pork production because of the higher percentage of lean meat and the special consumer preference for it. Pigs are usually reared in countries where there is a surplus of feed such as grain in the U. S. A. and skimmed milk and whey in New Zealand so that they may be converted into meat. Though cereals and milk are not available in Ceylon, they can

yet be replaced by other feeds such as coconut poonac and rice bran in combination with a few other supplements to constitute a balanced ration. Fattening pigs are however mainly fed with swill, the waste feed from hotels and institutions. Rearing of pigs for commercial purposes should therefore be undertaken in close proximity to towns. Pigs are efficient converters of feed into meat and also have a high dressing out percentage of about 80, in comparison to 50 for cattle and sheep, and 70 for poultry. Extension activities along the Western coast from about Chilaw to Paiyagala have great possibilities because there is no religious objection and there are already the foundations of such a practice.

POULTRY MEAT

Most of this meat is contributed by culled laying hens and cockerels of egg laying breeds such as the White Leghorn and dual purpose breeds such as the Rhode Island Red, Australorp, Light Sussex, New Hampshire and country fowls. A small proportion of poultry meat is also contributed by turkeys and ducks. The poultry industry is now specialising itself into egg and meat strains of birds. Commercial broiler production is just in its infancy in Ceylon but it is rapidly developing to meet the increasing demand. Already poultry franchise rights have been obtained by Ceylonese for some of the well known strains of broiler parents in the world. Broilers are meat birds that are capable of attaining about 4 lb. liveweight at about 10 weeks of age. They have a high feed conversion efficiency and could convert about 2 lb. of high energy feed into 1 lb. of bodyweight. This is probably the best conversion rate obtained for any type of livestock. This was possible because of the large investments made on research in poultry nutrition. The carcass has a high proportion of meat to bone and fleshing is in desirable quarters such as the thighs and chest. Commercial broiler production is done on a large scale as the profit derived from an individual bird is small. The average broiler house had space for about 10,000 birds in developed countries in the past, but today it is double. The mortality is low being about 3 per cent. Best use has been made

of automation for feeding and watering to reduce the cost of labour. There is yet another possibility of breeding ducks in fresh water tanks so abundant in the North-Western Province and North-Central Province. The cost of production should be very small because they could feed on the small fish and snails. Breeding ducks for meat is quite popular in South-East Asian countries such as Thailand and the Philippines. The potentialities for poultry meat are good in Ceylon because the present level of consumption is very low. There are possibilities of even replacing mutton, because it is slightly less expensive and there is no religious prohibition against consumption.

VENISON

Wild life such as deer, elk, and wild pig, etc., can be successfully raised for meat as practised in the game reserves of Africa. This is a recent development of the meat resources. These wild animals have been subjected to natural selection for over centuries so that the survivors are well adapted to the environmental conditions in which they live. The game reserves of Ceylon at present lack sufficient feed to maintain more than a limited number of animals. However, if good pastures are established especially around water sources, minerals provided for growing stock and supplementary feeding and water provided during the drought, it will be possible to raise a much larger number of animals for meat. The excess stock and unthrifty animals can be culled annually to provide a good supply of meat such as venison and pork that are now considered delicacies.

EGGS

The achievements of the poultry industry are noteworthy because it has made a definite impact on domestic production and consumption within a comparatively short period, and helped in achieving self sufficiency in eggs since the year 1963. This has resulted in a saving of over Rs. 4 million in foreign exchange that was spent for the import of eggs, besides offering avenues of employment and income to some of our farmers. The

consumption levels have increased from 12 eggs in 1954 to about 18 eggs in 1963 according to the consumer surveys conducted by the Central Bank. This success was attained due to probably many reasons.

Introduction of Improved poultry.—The country breed of chickens was uneconomical to maintain for egg production as an average hen was incapable of laying more than about 80 eggs annually. They had remained an unselected population and as such broodiness was a marked feature. Replacement of the country bird was possible by importation of egg breeds such as the Leghorn varieties and Minorca, and dual purpose breeds such as the Rhode Island Red, Australorp, New Hampshire and Light Sussex. These imported birds were raised successfully under local conditions because poultry do not suffer from heat stress in the tropics and their performance in Ceylon was comparable to that of their temperate homeland. Advantage was also made use of the faster means of travel by air for the transport of day-old chicks from distant countries. For this reason today the poultry industry is often referred to as the “jet age industry”. Thus the first phase in the development of the poultry industry was the use of pedigree stock. Farmers had their training in the art of incubating eggs and rearing of day-old chicks by artificial methods. It was now possible to raise larger numbers of chicks than by natural means. Very soon it was found that even these pedigree egg breeds were not capable of laying more than a hen housed average of about 225 eggs. The second phase of the industry was the appearance of the ‘hybrid’ chicken that had a superior performance than the pedigree stock. Breed was no longer a consideration in the choice of ‘hybrid’ chickens. The only consideration were economic factors such as egg number, feed consumption, egg quality, egg size and income over feed. Poultry breeding had already become big business where geneticists and other scientists were engaged to evolve new birds capable of higher production than their parents. This followed the success achieved by geneticists in evolving ‘hybrid’ varieties of corn. The performance of these hybrid poultry are now compared by Random Sample Tests conducted

mainly by state organisations, such as the United States Department of Agriculture and the Ministry of Agriculture, Britain. There are today not more than about a dozen reputable poultry breeders in the world because of the intensive specialisation in the art of breeding by geneticists with the use of electronic computers and blood grouping techniques to determine the best combination of lines of poultry. Ceylonese have also been successful in obtaining the franchise rights of most of these reputable egg laying strains of hybrids that are now available in the island such as Hyline, Babcock, Ideal, Ghostley, Shaver, Sykes, Demler, Sterling, etc. Franchise rights have also been obtained for broiler strains such as Cobbs, Chunky, Starbro, Hybro, etc. In view of the fact that it is more economical for the country to import parent stock, a ban was imposed on the import of commercial hybrids into Ceylon. Since then there was a marked increase in the franchise holders.

2. Improvement in Housing.—Housing of birds in Ceylon is comparatively inexpensive because there is no need for a controlled environment as in European countries where the temperature variations are large. In the past, poultry were reared on free range during day and were confined to a cage by night. This system exposed the birds to a great deal of infection though they had sufficient exercise and were able to obtain a little feed. A great deal of space was also required for the birds and hence their numbers had to be limited.

An important change in housing occurred when birds were reared on deep litter. It was possible to rear a larger number of birds in the same area than before because a hen was given only about 3 sq. ft. Theoretically worm infections should not occur because when the deep litter system works satisfactorily ammonia is liberated by the break down of uric acid by bacterial action. This is lethal to worm eggs in the presence of moist heat in the litter. This however does not appear to occur in practice due to faulty litter management. Deep litter is also a rich source of organic manure that could be used as a fertilizer in agriculture. The great majority of birds in Ceylon are on deep litter as this system is labour saving.

A further advance in housing is the battery cage system. This is the most intensive system of housing where minimum space is provided for a laying hen. Thus it is possible to rear a larger number of birds in a small area. This system is also gaining popularity in Ceylon.

3. *Control of Diseases.*—Virus diseases such as Ranikhet or Pseudo Fowl Plague that used to destroy large flocks in the past are no longer a threat to the industry. Potent vaccines have been prepared by the Department of Agriculture for this disease and Fowl Pox. Modern drugs are also available against most of the poultry diseases that used to be feared in the past. Another feature is that most of the modern hybrids have also been bred against diseases such as lymphomatosis.

The poultry population has been increasing very rapidly and so has the size of farm also increased considerably. It is a common feature now to find farms with over 2,000 birds, that have replaced the former backyard farms. The only limiting factor seems to be feed. Cereals are the major component in a poultry mash and constitutes about half of it. Unfortunately the cultivation of maize and other cereals have not kept abreast with the increase in poultry population. The poultry industry in Ceylon can now be valued at about Rs. 30 million, a credit to the combined efforts of the private producer and the Department of Agriculture.

Livestock farming is a recent development in Ceylon as there has been no such tradition in the past. This is a contrast to India where distinct breeds of cattle, buffaloes and goats have been bred for milk and rank among the best tropical breeds. It is therefore necessary to introduce modern practices in Ceylon. Recent extension methods based on audio-visual aids such as films and practical demonstrations will help farmers to gain confidence in animal husbandry techniques. It is pity that a once active organisation such as the Livestock Breeders Association has now become defunct. Organisations such as these have a vital role to play in the development of animal husbandry. The state farms should help in the propagation of good breeding stock for distribution to the public and act as demonstration centres.

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The national investment on animal husbandry has been very small in comparison to the money spent on imports, so that it has not been possible to make an impact in the country. The provisional expenditure has been Rs. 8,301,519 for the year 1963-64, of which only Rs. 3,814,709 has been spent on the development of animal husbandry. The future policy may be guided on the principle that "it is better to import a cow than its milk" as a long-term investment. It was on this principle that self sufficiency in eggs was attained by the import of day-old chicks. Large scale importations should be encouraged by both the Government and private sector if progress is to be made in milk production. European and Indian cattle and buffaloes should be imported to augment the meagre milk supply and contribute in a large measure to improve the health of the nation and increase the fertility of the soil. The task is so formidable that the concerted effort of the Government, private companies and the peasant farmers will be required to make any noteworthy contribution to the development of the livestock industry.

SCHEDULE I

IMPORTS OF MILK AND MILK PRODUCTS

<i>Imports, 1964</i>	<i>Weight in Pounds</i>	<i>Value in Rupees</i>
Milk and Cream ..	153,978 ..	137,683
Full Cream Condensed Milk ..	21,444,121 ..	18,965,968
Milk Foods ..	6,177,459 ..	14,579,067
Full Cream Milk Powder ..	11,896,957 ..	26,897,502
Skimmed Milk ..	1,364,094 ..	1,326,389
Butter ..	3,377,446 ..	6,866,920
Cheese ..	566,457 ..	1,157,741
Malted Milk ..	10,397,682 ..	23,485,675
Re-exports ..	103,808 ..	136,542
	<hr/> 55,274,296 <hr/>	<hr/> 93,280,403 <hr/>

Source : *Ceylon Customs Returns Dec. 1964.*

SCHEDULE II
IMPORTS OF MEAT, 1964

	<i>Quantity</i>	<i>Value in Rupees</i>
Sheep and Lamb (live)	8,216	501,659
Goats and kids (live)	13,846	844,477
Poultry (live)	46,930	241,336
Live animals including turtles chiefly for food ..	158	7,245
Meat of bovine cattle (beef, veal) ..	579 cwt.	133,217
Meat of Sheep or Lambs (mutton, lamb) ..	2,204 cwt.	344,650
Poultry—killed or dressed	382 cwt.	78,304
Game, fresh, frozen or refrigerated ..	8 cwt.	1,455
Meat other (including meat of goats and kids—fresh, frozen or refrigerated)	7,982 cwt.	1,074,157
Bacon, Ham and Salted Pork	906 cwt.	276,799
Smoked, Dried or Salted Beef and Veal ..	87 cwt.	15,862
Smoked, Dried or Salted Meat	31 cwt.	7,501
Beef, tinned, potted or preserved ..	1,332 cwt.	295,001
Mutton, tinned, potted or preserved ..	1,552 cwt.	386,686
Ham and Bacon, tinned or preserved ..	93 cwt.	33,918
Pig Products, tinned or preserved—other ..	302 cwt.	128,266
Meat and Meat Preparations in air tight containers	76 cwt.	9,468
Meat extracts and preparations (not in air tight containers of Meat, n.e.s. (including natural sausage casings)	796 cwt.	758,465
		5,138,466

Source : Ceylon Customs Returns, Dec. 1964.