THE POULTRY INDUSTRY IN SRI LANKA

Athula Chandrasiri
Asoka Sepala

Research Study No. 41

OCTOBER 1980

AGRARIAN RESEARCH AND TRAINING INSTITUTE
P. O. Box 1522
Colombo 7
Sri Lanka

41

THE POULTRY INDUSTRY IN SRI LANKA

(WITH SPECIAL REFERENCE TO EGG PRODUCTION & MARKETING)

ATHULA CHANDRASIRI
ASOKĀ SEPALA

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114, WIJERAMA MAWATHA, P.O.BOX-1522
COLOMBO 7.
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FOREWORD

Production of eggs plays a very important role in the supply of protective food for the nation. Eggs are a good source of proteins, minerals and vitamins. According to the Consumer Finance Survey of 1973, conducted by the Central Bank of Ceylon, the average per capita consumption of eggs in Sri Lanka was 2.4 for 2 months. This figure is very low when compared with the consumption in developed countries where, on the average, a person consumes about 250 eggs annually.

Not much reliable information is available about the poultry industry in this country. However, according to the available figures, there has not been an appreciable increase in the production of eggs over the last several years although the country's changing economic structure and the increase in the population may have had some influence on the demand for this commodity. An interesting feature in poultry industry is that unlike in the case of most agricultural products, the production of eggs could be increased within a short period if the necessary inputs such as chicks, feed and drugs are made available to poultry farmers in good time. This study, therefore, was undertaken by the ARTI as a pioneering attempt to examine the present status of the poultry industry with special reference to egg production and marketing with an idea of making some suggestions and recommendations for the improvement of the industry.

In this study, an attempt is made to make an overall examination of the entire process of supply from the breeding of chicks to the production and marketing of eggs. The contribution made by each component of the production and distribution process, in the final determination of the price to the consumer is carefully examined. It is hoped that this report will be useful to the policy makers and administrators who are interested in developing this industry as a source of supplying a food which is of high nutritive value.

Mr.Athula Chandrasiri and Mrs.Asoka Sepala, Research and Training Officers of the Institute were responsible for this study. In the absence of much written or published material on this subject, the researchers had to visit several major producing areas and meet the small and medium size farmers in their attempt to make the study comprehensive and valuable. The co-operation received by them from the producers as well as from large scale consumers like hotels is commendable. The major part of the writing and the preparation of the report for final publicati was done by Mr.Chandrasiri who was the Co-ordinator of the study. Mrs.Sepala,after helping in the field work concentrated on preparing the chapters on marketing aspects of eggs.

I thank the researchers for their effort and also the others who assisted to make this study possible. Our thanks are also due to the respondents who supplied the researchers with valuable information, some of which are normally treated as confidential.

T.B.SUBASINGHE - DIRECTOR (ARTI)

A_C_K_N_O_W_L_E_D_G_E_M_E_N_T_S

The authors are greatly indebted to a large number of individuals, farmers and organisations connected to the poultry industry of the country for invaluable assistance extended by them in innumerable ways in completion of this study. They are far too numerous to mention by name. We owe our gratitude to them.

Our colleagues at the ARTI Research Staff; Mr.A.S.Ranathunga proposed the research topic and encouraged us, Miss. T.Sarmugam helped to draw the sample and to decide the methodology, Mr.M.P. Perera gave the intellectual stimulation, Messrs P.J.Gunawardena, U.L.J.Perera, W.A.T.Abeysekare and J.Farrington (ARTI/Colombo Plan Advisor)& Dr.Black Michaud (ARTI/Colombo Plan Advisor) were dedicated enough to read through the entire draft report and make a number of useful suggestions and sharp comments. Mr.P.J.Gunawardena also most cheerfully sacrificed many hours of his valuable time on academic discussions and collection of information; we profoundly express our deep appreciativeness to all of them. This type of intellectual companionship helped us to widen the scope of our study.

Dr.S.B.Dhanapala(Director, Department of Animal Production & Health) unassumingly sent his constructive criticisms and comments on an earlier draft. We appreciate his intellectual generosity.

Messrs. G.Jayasenthu, A. Gamage and E.G. Kularatne assisted in conducting the survey, collecting the data and in tabulation. Our sincere thanks are due to them for their excellent job.

Professor F.R.Jayasuriya (Ex.Professor and Head of the Department of Economics of the then Vidyalankara campus of the University of Sri Lanka and now the University of Kelaniya) added to the many debts of gratitude that we already owe him by reading the draft report and making constructive comments and assisting us with his unrivalled intellecting . We respectfully endorse his unequivocal and inspiring advice at all stages of the work, despite his numerous public involvements.

A special word of appreciation to Mr.H.A.Siriwardena (Information and Publication Officer, ARTI) for his readily given editorial assistance.

We also wish to place on record the valuable services of our secretaries. A number of them have typed parts of succeeding drafts of this report, Mrs. N.N.Bawa and Miss. J.P. Ratnayake prepared the initial drafts, but particular mention should be made of Mrs.W.P.S.Wijewardena -for untiring job in typing of a number of drafts and of Miss Anne Fernando for speedy preparation of the final script for publication.

At different stages of the study, the staffs of Programming, Administration and Printing divisions of the ARTI contributed a lot in making our task a success. We thank them.

Finally, we gratefully acknowledge the encouragement and watchful guidance received from Mr.T.B.Subasinghe, the Director of the Institute.

However , in the final analysis of course, the responsibility for all statements made in this study and for any of the errors and obscurities that may still remain are entirely to be attributed to the authors.

A.C
A.S

AGRICULTURAL ECONOMICS AND EXTENSION UNIT,
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OCTOBER 1980.

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IMPORTANT TO THE READER.....

Between the time of release of the first draft of this report and the time of final printing, several policy measures have been announced by the government from time to time which affect the poultry industry directly or indirectly. However, these are not expected to have a substantial or instant effect on the findings and several conclusions of the study.

THESE POLICY ANNOUNCEMENTS ARE PRESENTED IN PART I OF THE ADDENDUM.

Nevertheless, a major change which would considerably affect the entire poultry industry has occured with the policy decision to increase the feed prices substantially by the Ceylon Oils and Fats Corporation (by about 50%) with effect from 22nd September 1980, just before the release of this report. Even though, an attempt is made to re-calculate the cost of production of eggs on the basis of new feed prices.

THIS IS SHOWN IN PART II OF THE ADDENDUM.

However, it is not practicable to reformulate or recast the entire study at this stage.

The reader is therefore, kindly requested to view the analysis and interpretations of relevant sections of this report with due respect to this above feed price revision .

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A B B R E V I A T I O N S

THE FOLLOWING ARE THE MAIN ABBREVIATIONS USED IN THE REPORT.

OFC	=	Ceylon Oils and Fats Corporation
BCC	=	British Ceylon Corporation(Government of Sri Lanka (Ceylon)Successor to the business undertaking of British Ceylon Corporation)
MD	=	Department of Marketing Development (Marketing Department)
NLDB	=	National Livestock Development Board
CFC	=	Ceylon Fisheries Corporation
FTZ	=	Free Trade Zone
FIAC	=	Foreign Investment Advisory Committee
GCEC	=	Greater Colombo Economic Commission
VRI	=	Veterinary Research Institute
CISIR	=	Ceylon Institute for Scientific and Industrial Research
FAO	=	Food and Agriculture Organization of the United Nations
CARE	=	Cooperative American Remittance Everywhere
UNICEF	=	United Nations International Children's Educational Fund
CWE	=	Cooperative Wholesale Establishment
CMC	=	Colombo Municipal Council
BMC	=	Building Materials Corporation
SAPDA	=	Silk and Allied Products Development Authority
DA	=	Department of Agriculture
AIB	=	Agricultural Insurance Board
ADA	=	Agricultural Development Authority
ASC	=	Agrarian Service Centre
D/AP & H	=	Department of Animal Production & Health
M/AD & R	=	Ministry of Agricultural Development and Research
M/RID	=	Ministry of Rural Industrial Development
M/PI	=	Ministry of Plan Implementation
CEMMA	=	Council of the Egg Marketing Authorities of Australia
KVS	=	*Krushikarma Viyapthi Sevaka*
CO	=	Cultivation Officer
VS	=	Veterinary Surgeon
AI	=	Agriculture Instructor
GSO	=	*Grama Seva Officer*
SMO	=	Subject Matter Officer
AO	=	Agriculture Officer

SUMMARY

This study attempts to analyse every possible aspect of the poultry industry (specially egg production) with the main objective of seeking ways and means to provide, a scientifically and nutritionally adequate food item to the people of this country.

The availability of eggs in the country at present is a below the minimum requirements. In the context of the recommended dietary levels the situation is very much worse. It is therefore necesssary to mobilise the interest in poultry keeping already prevailing in the country, if our object is to increase egg production several fold.

In connection with the development of egg production, two factors of the utmost importance are, adequate supply of quality feed, and the issue of quality hy-brid day old pullets in time.

CONSUMPTION

Nutritionists are generally agreed that protein of animal origin is superior to vegetable protein. It has been the poor quality of the average Sri Lankan diet is largely due to the low intake of the protein of animal origin.

Out of all the foods of animal origin eggs are the easiest to produce within a comparatively short period of time. Excepting fish, poultry, counts as the livestock having the shortest life-cycle, and is much more prolific in breeding than larger livestock. A poultry enterprise can begin producing meat in a 9 to 11 weeks time period, and eggs in 20-24 weeks. Furthermore, eggs have a high biological value, and contain most of the high quality vitamins, proteins and minerals that the human body needs.The poultry industry is thus, rapidly qualifying to be one of the most dynamic areas in the agricultural sector of the country.

It may be said that over the past 15 to 20 years the food consumption pattern of the country has not noticeably changed. Although the nutritionists have repeatedly stressed the importance of intake of food of

animal origin, production in this sector has not kept pace with the population growth of the country.

The importance of poultry keeping as a factor contributing to a nutritionally balanced diet and its impact in raising income have received less recognition. Considerable efforts will have to be made in order to fill the ever-widening gap between animal protein availability and requirements. It is now generally realised that the quickest way to fill this "protein gap" is by increasing the supply of poultry products, viz., eggs and meat.

When compared with Western countries and some of the Asian countries, Sri Lanka's per capita consumption of eggs is -very low. For e.g. a person in a Western country consumes about 20 to 25 times more eggs in their diet than is consumed by an average Sri Lankan .

It is noteworthy that even the egg producers themselves consume only a very small amount of eggs as part of their food. This may be due not only to the economic factor, but also to lack of knowledge of its value. When compared with the expenditure figures on animal protein food items as given in the 1953 and 1973 Consumer Finance Surveys expenditure on egg consumption has increased only from 1.0% to 1.2%. In other words, during a period of twenty years the recorded increase is only 0.2%. On the other hand some 15.1% of the population who receive an income exceeding Rs.800/- per month, consumed 91.2% of the total quantity of eggs which were available for consumption.

A clear disinclination to poultry keeping based on religious grounds is indent in this case as shown by a comparison with the areas where poultry keeping is more popular and widespread.

Production and consumption figures on eggs recorded by the Department of Census and Statistics, seem to be unreliable and inaccurate, when compared with the published figures relating to the overall laying hen population and total poultry feed production obtainable from other sources, as well as information disclosed by the Consumer Finance Surveys and the Socio-Economic Surveys. From 1972 onwards there was a

gradual decrease in egg production in the country except during the years 1977 & 1979. At the end of a seven year period (1972 - 1979) there had been an overall decrease of 152 million of eggs. When compared with the parallel growth of population registered, the real decline is even greater.

According to the recommended standard of nutritional requirements, the country needs about 2000 million eggs yearly which means the need for a 8.4 fold increase in the present output of 13.5% of the entire requirements. At the same time feed production would have to increase almost eight fold (7.7) and laying hen population over six fold. Under these circumstances any proposal to export eggs seems to be irrational.

Although the tourist industry presently absorbs only about 3% of the total egg production of the country it is likely however, in the light of the rapid and steady increase in tourist inflow that this figure will accelerate considerably during the next few years. This quantity, though relatively small in comparison with the total egg consumption of the country, nevertheless exerts a considerable influence in keeping egg prices high owing to the fact that the tourist centres are located mainly, in the chief cities, which are also sales points determining egg prices generally.

The total poultry population and laying hen population of the domestic sector are estimated at 2.2 and 1.2 million respectively. Their annual rate of lay is 60-80 eggs per hen (20%), and hence, the total contribution to the country's annual egg production from this source is about 96 million eggs. The cost of production in the indigenous sector as we have pointed out, is practically negligible. The average laying percentage of the intensive sector lies between 55% and 65%.

When compared with Western countries the average laying percentage in Sri Lanka is low.

Poultry raising fits very well into the general mixed farming pattern of agriculture which predominates in Sri Lanka. This kind of farming can easily be combined with other kinds of agriculture, especially in circumstances where soils of high fertility are not needed.

FRANCHISE AGENTS & ISSUE OF CHICKS

There are 18 leading private franchise agents operating throughout the country. Most of them sell day old pullets at the rate of Rs.4.75 each. The country's incubator capacity has been estimated at 1.1 million, of which the shares of the private sector and state sector can be put at as 2/3 and 1/3 respectively. At present however, the incubator capacity is not used to the full. These franchise agents import 1 to 4 parent stocks a year. Generally,a hen gives an average of 100 pullets in its life time. It has been estimated that a single hen could yield a net profit of Rs.278.50 in 18 months, or Rs.15.46 per month.

Regarding the private franchise agents' activities, there are no governing rules whatever. Farmers have to wait for at least 2 to 3 months to get their 'day old' requirements after paying half the value in advance. In so doing franchise agents are enjoying the benefits of their somewhat monopolistic situation, and each of them receives a profit in the range of 55% - 75%. but if we calculate in terms of net receipts they would be getting a massive profit of about 200% each. These profit margins clearly show the extent of exploitation of the poor poultry farmer by franchise agents. Issuing of 'day old' chicks by the state sector (i.e. mainly from Karandagolla Government Farm) has not been properly organised to compete with the private sector.

POULTRY FEED

Over 80% of the farmers are presently using the poultry feed manufactured by the Oils and Fats Corporation. At present (1979) the poultry feed production of the country is estimated at 70,000 metric tonnes, of which abo : 80% is produced by the Oils and Fats Corporation, B.C.C. produces about 8%, and the rest is manufactured by the private sector, especially Moosajees Ltd. and the dealers at Wolfendhal Street. Public sector feed manufacturers work at under capacity and there is scope to increase their production.

Farmers' complaints on feed supply were mainly focussed on the following points:-

i) Inconsistency
ii) Using of sub-standard substitutes
iii) Improper mixing
iv) Non-availability (in the required quantities)
v) Bottlenecks in delivery at Seeduwa
vi) Poor quality.

There is a set of people who engage in adulterating of poultry feed, but so far nothing had been done to safeguard the poor poultry farmer from these unscrupulous elements.

The reduction of animal feed prices in November 1978 was highly praised by the 'animal breeding community' and it has led to a marked revival of the poultry industry. 1979 egg production figures and feed production figures are ample proof.

Wolfendhal Street is the hub of the private sector's poultry feed supply. Some of the dealers have manufactured feed according to their own feed formulae under separate brand names. There are no controls, regulations, or tests regarding prices or manufacturing standards.

The major ingredient in poultry mash is coconut poonac. Due to recent drastic declines in coconut yields,the question of finding substitutes has become important. The most important single constraint in feed supply is the non-availability of raw materials throughout the year, in sufficient quantities.

The feed cost component of an egg which amounts to over 70% of the total cost, proves to be the most important and decisive factor in the egg production. To attain the proposed egg production targets, feed supply should be increased dramatically. All this call for a planned programme to cover all aspects of the poultry feed industry.

It is a fact, however, that even the available raw material resources are not being properly collected or used. For example kitchen waste ('polkudu') and slaughter house waste, (blood, bones) have not been used to derive optimum benefits.

DISEASES & DRUGS

The most commonly experienced poultry diseases in the country are Coccidiosis, Pullorum and Ranikhet (Newcastle disease). In poultry keeping 'prevention is better than cure' to a greater degree than in most other situations. For here it is a most noticeable fact that if one carefully cleans the cages, provides enough sunlight, supplies adequate space for the birds, gives them a balanced ration and maintains privacy, disease can be minimised and maximum production achived.

The prices of poultry drugs, additives and building materials (needed for construction of poultry houses) respectively have risen by about 200%, 150% and 150% or more during the past two or three years. Since, the additives, and some of the drugs most frequently demanded, have now been confirmed as 'a permanent feature' of poultry keeping, this continuous and rapid price increase has adversely affected the development of the industry.

MANAGEMENT PRACTICES

Layer breeding is far more popular than breeding of broilers. The difference being in ratio of 4:1, i.e 80% of the farmers are engaged in breeding layers, while only the remaining 20% rear broilers. The majority (76%) of the poultry farmers breed 1 to 500 birds, and can be identified as small or middle scale farmers. Only about 20% could be regarded as large scale poultry farmers. In broiler breeding there appears to exist a niticeable and pronounced propensity to concentration in particular areas, based evidently on grounds of religion.

There appears to be much scope for popularising poultry keeping as a cottage industry. This is made especially feasible since, the use of family labour enters heavily into its routine of management. 80% of the labour employed falls into the category of family labour, the remaining 20% being hired labour. 60% of the farmers do poultry keeping as a part-time job. In poultry keeping too, good yields depend largely on sound

management practices. The deep litter system has spread throughout the country. For a rapid development in the poultry industry, and to achieve the expected production goals, it is very essential to introduce and popularise scientific poultry management practices.

At present there are a number of new schemes being formulated and organized to develop the poultry industry in different districts. The experiences gained from these schemes as well as from earlier projects, can be utilized to prepare a consolidated common plan for a rapid development of the poultry industry in the entire country.

COST OF PRODUCTION & INCOME

Cost of production per egg is calculated on the basis of a division into three categories according to the area of production, namely:urban, semi-urban, and rural. Our calculations show the cost of production per egg for these areas is 58 cts. 46 cts. and 38 cts.respectively.

In villages a 100 bird poultry farm can be started with a capital of about Rs.1500, by using cheap raw materials such as wattle and daub for the walls, cadjan thatch for roof covering, and arecanut strips for the roof frame. The land and capital investments to start a poultry enterprise are not very large. If the farmer can sell an egg at 65 cts. he will be assured a profit of at least 20 cts. per egg, which will enable him to get a profit of about Rs.250-300 per month. At present (second quarter of 1980) generally farmers can get a farm gate price of .75 - .80 cts. per egg.

The farmer family as the unit of production providing themselves with the required capital and labour can set up a small scale poultry yard to supplement the income from other sources.

Sale of deep litter as manure is another sideline income for the poultry farmer. If he rears 100 birds he can meet the full fertilizer needs for an area of 2½ acres. Otherwise he can sell and get an income. This means an additional income to the farmer of more than Rs.15/- from each

bird, making his small farm an integrated self-supporting unit. For a farmer who is also cultivating paddy or other subsidiary crops, deep litter manure becomes a major balancing factor, which saves him a considerable sum of money on fertilizer. The deep litter is a very valuable fertilizer at the end of the year. It averages 3% Nitrogen (N), 2% Phosphorus ($P_2 O_5$), 2% Potash (K_2O) and 90% organic matter.

CREDIT

Despite its importance, bank credit has not played a decisive part in poultry keeping. The majority of farmers have started poultries using their savings. The general belief in banking circles is that in poultry keeping the risk element is very high. In actual fact, however, the importance of credit facilities in poultry industry cannot be over-emphasise The state-owned Commercial Banks are operating credit schemes for poultry keepers of whom only a few are benefitted.

Today, without considerable capital it is difficult to run a poultry farm (particularly a middle-scale farm in an urban or a semi-urban area).

TRAINING, RESEARCH & EXTENSION

Roughly, it may be said that only about 1% of the poultry farmers have had some kind of a previous training in poultry keeping. When compared with Western countries or with India the research work presently being done in Sri Lanka on poultry science is far from adequate.

In considering the future progress of the poultry industry, the role which could be played by extension workers cannot be overemphasised. Although in some areas the assistance rendered by field staff does not measure up to the full requirement, in other areas the success is largely due to their efforts. The Department of Animal Production and Health is responsible for all livestock extension activities of the country. But now in certain areas Department of Agriculture is also doing the extension work.

The popularising of poultry keeping among villagers and success of the new schemes that are being carried out in different parts of the country mainly depend on the efficiency, devotion and dynamism of the extension workers.

MARKETING

Egg marketing includes, handling eggs at the farm, transportation to the wholesale and retail markets, storage, grading, packing, and distribution to the consumers.

Price determination: In pure economic theory the demand and supply are considered as the chief factors independently contributing to the determination of the price. But in the monopolistic or oligopolistic conditions as prevailing in the case of eggs the suppliers (traders) can influence these factors and manipulate the price of the commodity through the control of stocks.

Regarding eggs, determination of final prices is done by the Colombo (Wellawatta and Pettah) wholesale egg traders, who manipulate and dominate the egg market. In the final analysis, it can be concluded that one particular wholesaler at Wellawatta is almost solely instrumental in deciding the day to day egg prices at which eggs are sold. Furthermore, most of the poultry farmers in different areas have grown accustomed to consider and call this dealer's price indicator board as the 'Colombo Board Price'. In other words, poultry farmers have come to recognize the price list exhibited by this trader as the general and ruling 'Colombo Price'.

Even the Department of Marketing Development with all the resources of the State at its disposal bases its daily Price Quotation on the prices dictated by the small handful of private traders. The share of market sales enjoyed by the Pettah and Wellawatta dealers and the Department of Marketing Development respectively are 60%, 24% and 16%.

The demand for eggs being always in excess of the supply, the present total collection of the Marketing Department may appear insufficient to build up an effective stockpile.

Seasonal price variations occur in a cyclical fashion. It is evident that apart from poultry feed prices, there are also certain other factors which influence the market price of eggs. As we pointed out in the body of the report, when price rose to high levels the egg monopolists at Wellawatte and Pettah were quick to complain that this was due to the high prices of feed. But the lowering of feed prices did not bring about any corresponding reductinn in egg prices.

The principal channels of marketing for eggs are the State sector which is the Marketing Department, and the private sector organizations including both the wholesale and retail traders. The small farmers suffer more because of poor bargaining and inadequate marketing facilities.

The growing number of middle-men who have entered the egg trade has resulted in high prices being charged from the consumer. The egg collections of the private sector are mainly handled by the itinerant collectors, boutique keepers, and wholesale and retail dealers.

The reluctance of most producers to sell their eggs to the Marketing Department is due to its insistance on grading prior to purchase with delay both in acceptance as well as in the procedure of payment. The inadequacy and the irregularity of the transport arrangements provided by the Marketing Department, together with the relatively low prices offered have contributed in no small measure in building up an antipathy on the part of the farmers towards the Marketing Department.

The private sector by contrast collects the eggs at the farm gate without subjecting the small farmer to the delay and annoyance of grading and the payment is made on the spot.

The actual fact is that the private wholesale dealer appropriates the major share of the total marketing cost. According to the calculations

of this report, details are as follows. These margins vary depending on various conditions.

Cost of production	72.5%		.58 cts.	
Profit of the producer	12.5%	85%	.10 cts.	.68 cts.
Marketing cost	15.0%		.12 cts.	
Selling price considered as			.80 cts.	

transport, handling, packing etc.	.04 cts. (5%)
wholesaler's & retailer's margin	.08 cts.(10%)
most probably	.06 cts.(7.5%)& .02 cts. (2.5%) respectively.

When the prices move in an upward direction a larger proportion of the marketing change is absorbed by the wholesaler, very little of the increase being passed on to the farmer. On the other hand, when prices move in a downward direction the large part of the decline will have to be borne by the producer.

Producers of poultry products are very ill organized and suffer from several handicaps for marketing their produce profitably. Firstly, the individual units of production, viz., the family holdings are very small and maintained at a subsistence level. Secondly, poultry keeping is mere popular as a subsidiary employment. There are only a few farmers entirely engaged in poultry keeping as an independent occupation.

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CONCLUSIONS AND POLICY IMPLICATIONS

In considering an appropriate strategy for the development of egg production and marketing it is fundamental that the highest attention should be paid to measures adopted to increase the incomes of the small farmers who constitute the overwhelming majority totalling about 70% of the entire populatinn of the country. It is above all the improvement of their living standards that we refer to, when we speak of economic development or economic growth and modernization.

Livestock production in general and poultry production in particular holds immense potential for improving the economy of the small farmer through increased productivity of his farm and putting higher incomes into their pockets. If offers greater opportunities for rural employment and utilization of land and resources all the year round and enables the farmer to spread his risk between crop and livestock production thereby giving him greater degree of self-reliance and freedom from exploitation.

PRODUCTION, PLANNING AND DEVELOPMENT

a) For the development planning of the livestock industry one of the first and basic requirements is a system of collection of comprehensive and accurate data covering all aspects of the industry. The importance, therefore, of organising a system of collecting reliable and useful data pertaining to the livestock industry, to be published regularly cannot be too greatly stressed. The A.D.A and C.00 could be linked successfully in this connection.

b) From the experience gathered during the survey it is strongly recommended that poultry keeping should be encouraged as an additional or supplementary income source, on the lines of a cottage industry. In semi-urban and rural areas, unemployed youths and small farmers who cultivate paddy and subsidiary crops should be encouraged to rear at least 100 layers each. Since these two categories of low income recipients, in particular also have the necessary time to spare a plan of this

magnitude could be operated without excessive effort or exertion and with a minimum of additional cost and expenditure, by calling in the help of family labour.

c) We strongly urge that 'producer co-operatives' be formed in every important poultry farming area with a view to facilitating the assembling, grading, etc., thus,attracting more buyers and making selling easier. This would lead to a reduction of the purchase price so far as the buyers are concerned and at the same time reduce the marketing expenses of the producers. A striking example of the immense benefits which could be secured by these means has been provided by the energetic producers' association at Marawila which has very successfully overcome many of their problems through organization. The existing associations in the poultry industry should, be converted into producer co-operative societies, and new ones set up where necessary, thus creating a powerful organization which could greatly increase the bargaining power of the producers.

Generally, the small producer is in an exceedingly weak bargaining position vis-a-vis the dealer and the buyer, and cannot therefore obtain a fair price for his produce. It is well known that, in countries like New Zealand, Denmark and Sweden Co-operative Societies have emerged as efficient marketing agents for the sale of their members' livestock products. In this country itself, in certain popular vegetable growing areas, producer co-operatives have functioned successfully. e.g. Welimada, Keppetipola. Furthermore, 'Markfed' stands out as an example of a producer co-operative system which operating among the betel producers at Veyangoda and Pugoda, has successfully competed with middlemen and increased producers' incomes by more than 110%, besides securing numerous other benefits for its members.

d) A second part of such a development programme would be an intensive programme of upgrading of the village poultry organisation by the introduction of new blood lines through improved types of crossbred males, withdrawing at the same time all local male birds. This programme has to be carried out carefully and continously over a long period of time. As a consequence it

could even be expected that the present poor yields in the indigenous sector could actually be doubled.

e) We would also suggest that importation of broiler chicken should be banned with immediate effect, and protection given to local farmers engaged in broiler production enables them to gradually increase the output to meet the country's needs. Chicken being not an immediate consumer need, the intervening periods of scarcity would not create serious hardships to the public.

f) A floor price scheme for eggs and especially for broilers may also be regarded as a feasible and desirable objective of a development policy and programme for the poultry industry. The Market Research Unit of the Agrarian Research & Training Institute (ARTI) could undertake this task of preparing a suitable floor price scheme as was recently done in respect of certain varieties of subsidiary food crops.

g) An overall poultry industry development plan should embody as a fundemental principle of its administration the decentralisation and devolution of authority district-wise. (See Chapter 2). A livestock development plan should be drawn up in accordance with the special needs and conditions of the respective areas, and this could be incorporated in the general District Development Plans.

h) It is suggested that in each and every district, the government (the Department of Animal Production and Health or National Livestock Development Board) should set up at least one pilot project in poultry keeping. It can be the model and apex farm for the particular district. Three categories of plans are needed, applicable to the following conditions and requirements, namely:-

i. urban,

ii. semi-urban , and

iii. rural

(sub-divided again into commercial units, side line farmer units, and backyard poultry units.)

i) During the next 5 to 10 years the Dry Zone (with massive irrigation schemes) together with other area schemes, such as the special Integrated Rural Development Schemes(Kurunegala,

Matara, Hambantota, Puttalam, Monaragala, Mannar, Nuwara-eliya, Matale etc.) will be the venue and object of a great deal of development. We stress that poultry development schemes should also be incorporated in those general development plans showing clearly the role earmarked for the livestock industry. If these plans are to be truly successful one cannot over emphasise the importance of having the groundwork for these plans prepared well in advance, of the proposed time of their implementation.

j) In the realisation of the district livestock production targets, Agrarian Service Centres (A.S.C.) and the proposed district pilot projects should be assigned key roles and positions. We suggest that apart from the veterinary surgeon two or three (depending on each situation) livestock Extension officers (L.E.O) with sufficient training and basic knowledge of handling and treating livestock, should be appointed and attached to each A.S.C. They can function as livestock extension officers at village level. All Development Officers and Cultivation Officers should be given a proper training in livestock farming too, especially in poultry-keeping, so that the village level supervision can be streamlined.

k) An important point to note in this connection is that the functions of the Department of Animal Production & Health which is responsible for Animal Husbandry in the country, preparation of district development plans, and the other agricultural activities are distributed among three different Ministries. A proper co-ordination of such functions is an indispensable condition in the achievement of desired objectives of a planned poultry development programme. The next important step is the need for those responsible to agree upon the objectives to be achieved over the next 5 or 10 years with regard to the production of eggs. The figures given in this Report could be taken as broadly indicative of the levels and goals that could be reasonably aimed at in this respect.

CONSUMPTION

a) One of the easiest and economical methods of achieving an increased intake of animal protein foods is to popularise the consumption of poultry products. For example, most people are unaware of the existence of 'infertile' eggs('vegetarian eggs') while there are some who are ignorant of the high food value of eggs. An island-wide publicity drive to popularise and to inculcate the idea of 'vegetarian egg' or 'farm egg' and a nutrition education programme should simultaneously get under way. But fact remains that so long as the standard of living of the majority of the people remains as low as at present, any programme aimed at pushing up the consumption of animal products, faces and initial obstacle of a very inhibiting character.

SUPPLY OF INPUTS

a) The authors of this Report are strongly of the view that the State sector should play a more positive role in supplying 'day old' chicks to poultry farmers. For this purpose a complete reorganisation of the activities of the Karanadagolla Farm, so as to enable it to compete successfully with the private franchise agents would be necessary. To attain the estimated production targets, the hen population of the country should be increased by 550% within the next five years or so. Idling incubator machines of the government farms must be immediately repaired and brought into working order. It is suggested that a comprehensive programme should be launched to issue one month old pullets instead of 'day olds'. This will be a real encouragement to poultry farmers since it would eliminate at least one half of the risk involved.

b) It is pertinent to explore the possibilities of upgrading the quality of the local incubators. The State can arrange for assistance to provide a proper scientific knowledge and training to the local incubator manufactures whose industry has a wider scope in a planned poultry development programme.

c) The activities of the private franchise agents as well as private hatchery-men (non-franchise agents) should be regulated in order to check the large scale exploitation of the poor poultry farmer. This is one way of ensuring the supply of quality chicks at a reasonable price.

d) Every effort should be made to increase the poultry feed supply. This has to be increased by 675% or eight fold within the next five or six years to meet the projected production levels. O.F.C., B.C.C. and the officers of the relevant ministries must prepare a strategy or a long-term programme for increasing the feed supply.

d) A major constraint facing the supply of feed is the unavailability of ingredients in the required quantities throughout the year. Large quantities of maize, soyabeans, fish meal etc., are needed for the development of the feed industry. Schemes should be incorporated in district development plans to grow collect and store more of the essential ingredients such as maize, sesame, soyabeans, winged beans (Dambala) etc.

f) The Ministry of Rural Industrial Development has started a new campaign to encourage people to supply animal feed ingredients, such as maize and '*polkudu*'. This should be intensified and systematically organized. What is needed is not only the continuous and repeated advertisements over the radio and in the press, but an implementation of a well organized, practicable and regular system of collection. In this connection a decentralized system of collection, viz. town-wise, could appear to be a feasible arrangement. Under the conditions now prevailing it is impossible for the people to transport '*polkudu*' all the way from their home towns to Seeduwa.

We are also of the view that the local production of fish meal could be increased with the co-operation of officials of the Fisheries Corporation and the authorities of the two mixing plants at Mutwal and Pesalai. In this connection the substitution possibilities of local 'Thiththaya' and other fish varieties for fish meal should be explored.

g) Maximum retail price of the O.F.C. and B.C.C. feeds, and the percentages of the ingredients contained in a bag should be exhibited precisely and clearly on each and every bag. This will help to reduce the undesirable activities of unscrupulous traders and create more confidence in the farmers regarding the quality of O.F.C. abd B.C.C. feed, and also enable farmers to know cleraly what is lacking and needs to be added to the mash.

h) It is proposed that after identifying the main egg producing areas, a number of additional poultry feed retail points be opened. This may be a costly item even though a similar type of supplementary service of this kind seems important. The essential poultry drugs and additives could also be sold at these centres. It is also suggested that a mobile sales service (through a network of lorries) should be operated on fixed and selected days covering different areas, to cater to the small and backyard poultry keepers, especially in village areas.

i) After the necessary feasibility studies have been made, small scale provender plants could be installed in different localities, based on the data indicating the degree of popularity of poultry keeping and the availability and the nature of the prevailing arrangements for the collection of raw materials and other necessary supplies. They can use different raw materials in respective areas in making feed. The following results could also be achieved through the above proposal.

   i) To ease the congestion at Seeduwa.
   ii) To give immediate relief to poultry keepers who encounter transport problem.
   iii) To provide an incentive to new entrants as well as the existing poultry keepers.
   iv) To give a boost to the raw material suppliers.
   v) To popularise poultry raising and increase egg production in the country.

j) Mixing of feed (O.F.C.) should be properly done. It was brought to our notice that the fixed time for one round of mixing has been lately reduced. Not only the quantity, but also quality of feed supplied is a matter of fundamental importance.

k) It is suggested that a detailed study be undertaken of the feasibility of replacing the solvent extraction plant at the Oils and Fats Corporation. It has been said that over the next few years the provender mill at B.C.C. may go out of production. These are matters to be looked into without delay.

l) We are firmly of the view that the prevailing high prices and the continuous and arbitrary price increases of poultry drugs and additives, must be investigated carefully, and some form of regular checking and control of these prices instituted. Formulation of a better system of distribution of drugs and additives so as to bring them within reach of the smaller poultry farmers and ensuring a more regular and systematic delivery of supplies, together with a closer scrutiny of the profit margins being earned by the importers/distributors are suggested as matters requiring early attention.

m) We propose to formulate a procedure for the purchase of essential building materials for the construction of poultry house at concessionary or controlled prices. In consultation with the authorities of the Building Materials Corporation(B.M.C) it would be possible to prepare a scheme with additional incentives for the genuine poultry farmer.

n) It is recommended that a new comprehensive and simplified credit scheme for the poultry industry be inaugurated with the assistance of genuine poultry farmers, Bank personnel, and relevant ministry officials, in order to facilitate credit to poultry farmers. In this regard, two points of special importance to be observed are:-

1. Sufficient publicity on available facilities and the conditions for obtaining loans.
2. Easy access to credit facilities without hard and cumbersome proceedures. By enforcing a close supervising system and linking up the proposed livestock Extension Officers with the scheme a smooth repayment system could be arranged. The majority of the genuine poultry farmers are, we discovered, completely unaware of the nature of the existing credit facilities.

o) The prevailing insurance scheme for the poultry industry must be extended to cover the entire country, and particulars of the scheme given sufficient publicity.

p) The present tender system in vogue at the Colombo Municipal Council for the sale of blood meal, bone meal, and meat meal should be abolished. This system has only led to the conferment of special benefits to a few individuals . We suggest that available supplies of these materials should be sent to O.F.C. at the currently prevailing price thus ensuring a wider and more equitable distribution. It is very urgent and important to prepare and implement an effective scheme for the collection and disposal of the above items.

LEGISLATIVE OR REGULATORY ENACTMENTS

a) It became very clear from our investigations that there should be some regulations for controlling the activities of the franchise agents. Minimum requirements to run hatcheries and sell ' day old ' chicks to farmers and essential sanitary conditions etc., should be clearly laid down. A system of licensing of imports of parent stocks for hatcheries, and registration of approved hatcheries is suggested. Under the present system anyone can import parent stocks from any country and sell 'day olds' by advertising these as the 'best available' at any price they can get. Franchise agents can easily deceive the poor farmer with false information. It is therefore necessary to enact without further delay, suitable legislation to control hatcheries and ensure propagation of disease-free stock, by subjecting the parent stocks to frequent testing and examination by qualified government officers.

b) In the animal feed industry it was found that adulteration of feed was detected. So far no legislation has been passed to stop this type of unscrupulous acts. The almost complete absence of any protective legislation is a very serious matter so far as the development of the livestock industry is concerned.

c) Another social hazard threatening the very existence of the

poultry industry, is the increasing frequency of fowl thefts. It is the duty of the State to frame laws and take other effective measures to protect the farmer.

RESEARCH ACTIVITIES

a) Research work on poultry science should be intensified and identification of new areas for useful research is vital. The Veterinary Research Institute(VRI)should undertake more 'production oriented' research. The assistance and active participation of the C.I.S.I.R. and University also should be sought in the manner described in the body of our Report.

b) It has been said that feeding of chopped up greens (green meal) can reduce the feed cost by about 7½% to 15%, depending on the period over which green feed is provided. This can be a turning point in the poultry industry, if more research could be done on these lines. Similarly a recently published article has concluded that silk worm pupae could be used successfully in poultry feed as a substitute for fish meal. These are areas for further research.

c) Possibilities for upgrading or processing raw materials such as dhal husk, tea waste, rice straw, winged beans (Dambala), dried cassava etc. which have not been traditionally used to any great extent as animal feeds, should be explored. It is recommended that an intensive programme of research and development be constituted at the V.R.I. or probably at C.I.S.I.R. with the intention of evaluating these materials for selected livestock feeding.

EXTENSION WORK AND TRAINING

a) Extension services can play a very valuable role in educating farmers on correct poultry management. An extensive free vaccination programme, whose services are offered without waiting for farmers' requests, is suggested. The cost of

the programme to the governmnet will be amply compensated by the prevention of heavy losses from disease, and the increased length of life and longer laying period of the animals as a result of the treatment.

b) So far as production targets are concerned, the adoption of scientific methods of poultry keeping is of the highest importance. In each poultry keeping area at least a limited number of selected farmers should be given a proper " residential training " in scientific poultry keeping. This training programme should be conducted continously year after year. This is one way we believe, of overcoming the serious inadequacy of knowledge of poultry keeping in the country.

c) A veterinary surgeon should pay periodical visits to the farmers as a routine and give advice, if and when necessary. K.V.SS and C.00 who come in direct contact with the farmers should be given an intensive training in livestock keeping. Through them it would be possible to arrange village level training for small scale farmers. It is suggested that through proposed Livestock Extension Officers a seperate Training & Visit System of extension (T&V) on animal husbandry could be formulated and implemented.

Instructive publicity on poultry keeping in the form of literature, lectures and film shows, and coursework should be given to the public. This is important especially to semi-urban and village areas.

d) It has been said that there is no properly organised system of livestock extension in the true sense of the term as for example in paddy cultivation etc. The services which these officials perform in the name of extension are really field services of particular significance only for their primary duties.[1] If this is ture, the building up of a competent extension service is absolutely essential and urgent.

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1 LIVESTOCK DEVELOPMENT SURVEY, SRI LANKA - Vol: I, U.N.D.P., F.A.O. ROME 1976 pp. 134-136.

a) The egg marketing activities of the Department of Marketing should be reorganised to compete with the private sector and in a manner that is fair and acceptable both to the producer and the consumer. Grading, delays in handling, making payments, and pricing are among the chief factors on which attention should be focussed.

b) We would suggest that all activities of the government in marketing and development, be geared to reconciling the interests of the producer and the consumer and progressively eliminating the area in which the middle-man can operate in an undesirable manner, exploiting both the producer and the consumer to his own advantage.

c) It is suggested that in all popular egg producing areas, egg collecting centres of the M.D. be opened, or in the alternative to have some system whereby the eggs could be collected regularly by the M.D. The number of M.D. collecting centres has increased from 50 in 1978 to 116 today. But all collecting centres do not purchase eggs. We would suggest atleast all collecting centres in operation, should be provided facilities and authorised to collect eggs.

d) A mobile purchasing service is recommended. On one or more fixed days of the week depending on the size and accessibility of the area, a vehicle should cover a particular area to collect the eggs, payment being made on the spot. This could be a real boom to the small farmer, and will certainly cause more farmers to join in the production drive.

e) Greater marketing efficiency should be achieved both by increased operational efficiency i.e. reducing transportation, packing and breakage costs and economic efficiency through elimination of unwanted middlemen and better competition in the market.

f) Eggs should be graded according to their quality and size. For an orderly marketing system it is necessary that national standards of quality be evolved and enforced. The graded eggs being uniform in size look attractive. For instance in Pakistan all consignments of eggs presented for export are inspected under the Egg Grading and Marketing Rules, 1967. Modern grading and candling machines must be supplied to every purchasing point. Even though it might be costly these areas should be gradually developed.

g) Day to day egg prices should be relayed over the air. This will enable producers living at a distance from Colombo to know the current selling prices.Under the present context since, the transport costs are very high, this will substantially benefit the farmer than before because, it is very costly to come to Colombo to know the prices as

frequently or casually as they did earlier.

h) Cold storage facilities should be increased, thus making it possible to store eggs during peak production periods, thereby bringing about a proper adjustment between demand and supply, and causing prices to be even throughout the year. Under the proposed poultry development plan, for every district cold storage facilities should be supplied to the M.D. as an essential requirement.

i) The link between the producers and the consumers must be continuously developed, intensified and shortened. Otherwise production will inevitably be affected adversely. The Department of Marketing Development should be organised effectively in this regard, and the monopoly power of the private sector in price determination be effectively checked. This can be done only through an increase in the market share of the M.D. This would result in a very rapid increase in collection of eggs.

j) Although it may cause some increase in marketing costs we propose as a trial that a new sales system be tried out in neatly packed paperboard cartons containing a dozen or half dozen eggs. In some countries experiments are being carried out on packing systems and designs of packing equipment . We suggest that modern methods and equipments for packing with suitable modifications to suit local conditions be adopted.

GENERAL

a) It is recommended, that a new 'National Poultry Products Authority' (N.P.P.A.) should be set up, to control and co-ordinate all activities connected with the poultry industry on the lines of the Council of the Egg Marketing Authorities of Australia (C.E.M.A.A.). National level co-ordination can be done by this authority. Since the NLDB is not actively engaged in development or promotion activities on an islandwide basis, the proposed organization acquires a special importance. Implementation of district egg development plans and attaining egg production targets could be launched through district organizations of the Central Authority as in the case of the State Egg Marketing Boards in Australia. Gradually the new organization can relieve the M.D. of the burden of looking after the egg

marketing activities. Ultimately this will be the sole authority for the poultry products industry of the country.

b) A seperate special organisation should be established as a subsidiary of the proposed N.P.P.A. to improve the broiler production of the country. It can be either on entirely state sponsored organisation, or partly using private capital, with offices distributed among different districts.

The basic objective would be to ensure an uninterrupted supply of poultry meat at favourable prices through the contract farming system. Under the proposed system farmers would be able to borrow from the Commercial Banks. The organisation will guarantee the loans, provide breed stocks, veterinary services and also the necessary advice and direction. In turn the farmers will sell the chickens exclusively to the organisation at a pre-determined price.

A scheme of this type is being operated successfully in Thailand by the name Charoen Phokphand (C.P.)

c) We suggest that small dressing plants for processing of broiler meat should be opened up by the C.W.E. or the M.D. under the present set up and in future under the proposed (N.P.P.A) in suitable areas. This will create new employment opportunity too. There are large mechanized broiler processing plants in Western countries and Japan where 10,000 chickens (perhaps, now may be more) are killed, sealed, de-feathered, eviscerated and inspected before they are packed in one hour. We of course make a case for intermediate technology in this context.

d) The scheme of village electrification should be speeded up.

e) As the production increases installation of a canning and drying machine could be undertaken to make egg powder.

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THE POULTRY INDUSTRY IN SRI LANKA

(WITH SPECIAL REFERENCE TO EGG PRODUCTION AND MARKETING)

CHAPTER 1

INTRODUCTION

The principal object of this study is to examine comprehensively the factors which would contribute to an effective organization of producing and marketing of eggs, a nutritious and relatively cheap and easily accessible source of animal food protein in the diet of the people of Sri Lanka.

In a detailed study of this nature a discussion of some of the broader aspects of the poultry industry[1] in general is unavoidable. Hence the problems relating to broiler production had also to be considered wherever relevent, since such problems are intimately connected with the subject.

Medical scientistists and nutritionists have repeatedly emphasised the value of animal protein food as an essential part of a complete human diet. According to modern dietetic studies, the protein derived from animal sources has a higher nutritive value than vegetable protein for human beings.

"The quantity of protein depends on its essential amino acid content. The best source of protein is hen's egg which is also taken as standard protein by F.A.O. All other proteins are compared to that of the egg. Roughly speaking vegetable proteins are considered to be 70% as good as animal proteins."[2]

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[1] Poultry keeping is defined to include domesticated birds(chickens, ducks, geese, turkeys and other fowl) raised on a farm for meat or eggs. In this study discussion of poultry rearing is limited to production of chickens and hen eggs.

[2] RAO A.R. & SUKHIJA S.S. - Nutritional Economics of Poultry foods - EASTERN ECONOMIST Vol. 74, No. 8, Feb. 1980, p.389.

Among the commonly available animal protein food items, eggs are the easiest to produce within a shor period of time. A supply of eggs can be produced within 5½ to 6 months and poultry meat within 65 to 75 days. On the other hand, competing substitutes such as beef and mutton take at least 24 to 36 months time from conception to production of slaughterable beast under the best conditions.

One of the more noticeable features associated with egg marketing in the country has been a steady and pronounced tendency for egg prices to register a continually rising trend. In part this was, a result of the general price inflation which almost all countries are experiencing. However, in view of the special importance of eggs as a food of particularly high protein value, there is a need for a convenient, effective and well organised machinery to ensure that prices are not unduly manipulated by middlemen, as well as by monopolistic elements operating at the sources of marketing and distribution.

1.1 *BACKGROUND*

In Sri Lanka, generally, the most popular and commonly available animal protein food for centuries, was dried fish. 'Dry fish' has always been a relished item of food among the rural people. Due to various causes, however, in recent decades there has been a rapid price increase and scarcity of this food item. Local production of dried fish has fallen short of the rapidly increasing demand, while at the same time for a variety of reasons imports failed to bridge the gap. Other animal protein foods such as fish, beef and milk also face similar problems of scarcity, high prices and insufficiency. Furthermore, people in Sri Lanka traditionally have not been in the habit of consuming meat in quantities comparable to the consumption by those in Western countries. Hence, the nutritional quality of the popular diet may be said to have been deficient, and needed correction by increasing the availability of other forms of animal food, that could be produced quickly. Hence, the most convenient and feasible solution would lie in increasing the production of eggs.

The consumption of eggs in Sri Lanka is very low especially in comparison with Western countries. The average quantity of eggs consumed per head for two months is shown below.[1]

All Island	Urban sector	Rural sector	Estate sector
2.39	4.14	1.13	2.80

Table 1 shows that an average person in a Western country consumes about 250 eggs annually, whereas a Sri Lankan consumes only 14.3 eggs. That is to say, a person in a Western country or in Asian countries such as Japan, Thailand etc. consumes about 20-25 times that consumed by an average Sri Lankan.

TABLE 1 :- PER CAPITA CONSUMPTION OF EGGS PER YEAR OF SELECTED COUNTRIES

Denmark	400
U.S.A.	390
U.K.	270
Australia	218
Japan	256
West Germany	288
Austria	250
France	224
[redacted]	[redacted]
Italy	188
Belgium	197
Netherlands	200
U.S.S.R.	140
Israel	392
Pakistan	07
Thailand	314
India	07
Sri Lanka	14.3

Sources:-
i. Hand-book of Animal Husbandry in India.(Council of Agricultural Research) New Delhi.1977.
ii. Food Marketing System in Asian countries (Case Studies of 13 cities in Asia) FAO Bangkok, 1975.
iii. The New Encyclopaedia Britannica (Macropaedia Vol. 6 & 10).

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[1] Survey of Ceylon's Consumer Finances - 1973, Central Bank of Ceylon

A distinct feature of the diet of an average Sri Lankan is the low consumption of foodstuffs of animal origin, viz.eggs, milk, meat and fish.

Until the ban of egg imports in 1963, approximately 25 million eggs were imported from India at a cost of over 4 million rupees annually. Consequent on the ban the internal production of eggs increased substantially. This is shown by the fact that even after the trade liberalisation policies in 1977 no imports had taken place.

After 1977, however, taking advantage of the new trade policy a few organizations exported a small quantity of eggs, to the Maldive Islands.

TABLE 2:- EGG EXPORTS TO MALDIVE ISLANDS

Year	No.of eggs exported
1977	25170
1978	253666
1979	212221
1980 (up to the end of August)	47360

Source: Department of Imports and Exports.

It is significant to note that the entire export is handled by three or four private firms. An average of about two hundred thousand eggs were taken out of the local marketing channels annually for this purpose. The result nevertheless, even on a small scale affects the local consumption and prices.

At present eggs are exported at a price of $60 for 500 eggs. This means that exporters receive as much as 2½ times the price received by the local dealers. Since, the volume of exports at present is only about $\frac{1}{2000}$ of the total production, the impact on domestic

price may not be sufficiently great to warrant state intervention. If however, exports continue to expand in future without any noticeable increase in local production the impact on domestic price may deserve the attention of the state in the interest of consumer protection. The apparent benefit here is only a large gain to a very small number of individuals, since even the amount of foreign exchange that the country gains from this transaction is negligible.

In view of the presence, in high proportion of essential nutrients in eggs and poultry meat, a large increase in poultry production is of topical value in Sri Lanka. Under the prevailing conditions, eggs and poultry meat can be a fitting substitute for other animal protein food. Therefore planners, agriculturists and other decision making authorities concerned, should plan and implement a suitable production programme not only for the development of the industry, but also to bring this valuable food within the reach of the average citizen of this country.

The annexe 1 shows the cost of one gram of protein in different animal protein foods. Judged by the comparatively higher price of equal weights of protein contained in different kinds of animal foods several other important factors, in the case of eggs, tend to counteract the effect of the cost factor and make it widely popular as a food among a large cross section of the more numerous but less affluent elements in the community. The principal factor for this popularity is the natural convenience of storage of eggs over a fairly long period of time as contrasted with perishable foods such as chicken meat, beef and fish.This enables it to be bought and consumed with equal facility in large or small quantities, whatever part of it which is not immediately required for consumption being held over for use at a later date without the cumbersome and costly aid of refrigeration processess.

A second cost reducing factor is the additional cost of cookery in the form of condiments, fuel and time consumed in preparation, most of which are unnecessary or negligible in the case of eggs.

The progress in the production of eggs over the last few years in general is far short of expectation. (Vide, Table 6). The peak production was in 1972, and from that year onwards there has been a gradual decrease, except in 1977 and 1979. Normally, one would have expected an increasing trend in output. Instead, egg production was moving more in the opposite direction. The official egg production figures in 1979 as compared with 1971, 72 and 73 figures show decreases of 10.6%, 35.1% and 8.1% respectively, resulting in an overall decrease of 152 million eggs over a period of seven years (1972-1979).

1.2 *NUTRITIVE VALUE OF EGG*

Eggs contain most of the known vitamins and a good assortment of mineral elements, that the human body needs. It is generally accepted that a meal comprising two eggs makes a substantial contribution to a person's daily nutritional needs. Proteins of animal origin have a higher biological value than those of vegetable origin. The biological value of eggs is rated at 95%, that of milk 85%, pork 74%, beef and fish 68% each. The adequacy of essential amino acid content of various foods is borne out as chemical score. The value of egg is rated at 100.

"Thus, if the composition of an "ideal protein", i.e. one containing all the essential amino acids in sufficient amounts to meet requirements without any excess, were known then it should be possible to compute the nutritive quality of a protein by calculating the deficit of each essential amino acids from the amount in the 'ideal protein'. The 'most limiting amino acid', i.e. the one in greatest deficit, would presumably determine the nutritive value. *In practice they suggested the protein of whole egg as the 'ideal', since, this was known to have a biological value closely approaching 100."*[1]

In the light of above, eggs and milk have been recognized as 'foods for the next generation.'

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[1] Energy and Protein Requirements - Report of a joint FAO/WHO Ad Hoc Expert Committee - published by FAO and WHO Geneva, 1973, pp. 62 & 63.

According to nutritionists, the following classification of nutritional factors has been recognised. (Vide, Tables 3 & 4).

TABLE 3:- NUTRITIONAL CONTENTS OF EGG AND AVERAGE REQUIREMENTS OF A PERSON PER DAY.

	2 Eggs contain	Average man requires	2 Eggs supply
Calories	160 - 180	2500 - 3000	5.3%
Protein	12 gr.	82 gr.	18.6%
Calcium	56 mg.	800 mg.	7%
Iron	2.54 mg.	12 mg.	21.1%
Vitamin A & Carotene	1000 I.U.	5000 I.U.	20%
Thiamine B_1	0.10 mg.	1.2 mg.	8.3%
Riboflavin B_2	0.35 mg.	1.8 mg.	19.4%

Source: E.E.C. Marketing Standards for Eggs
(more about eggs - Issued by Golden Eggs U.K. Ltd.)

TABLE 4:- THE NUTRIENT COMPONENTS OF AN EGG

	Egg Yolk %	Egg White %
Protein	16.6	10.6
Fat	32.6	0.3
Minerals	01.1	0.6
Carbohydrate	01.0	0.9
Water	48.7	87.6
Vitamins	A.D.E.K. & B Group	B. Group
Minerals	Iron, Calcium Phosphorus	Sulphur, Chlorine, Magnesium, Potassium, Socium, Copper.

Source: E.E.C. Marketing Standards for Eggs
(more about eggs - Issued by Golden Eggs U.K. Ltd)

A standard sized egg weighs between 1 7/8 ozs. and 2 3/16 ozs.

Hence, an average sized standard egg weighs approximately 56.7 grams, or 2 ozs, and is made up of:-

25% yolk or 14.2 gr. or ½ oz. approx.
62½% white or 35.5 gr. or 1¼ oz. approx.
12½% shell or 7.1 gr. or ¼ oz. approx.

Accordingly the edible portion of an egg is generally considered as 88%.

1.3 *PROBLEM*

Malnutrition remains one of the main hidden constraints inhibiting the implementation of development programmes.[1] While on the one hand development of man power is of vital importance to Sri Lanka, the seemingly widespread inadequacy and defficiencies in the quality of the people's food particularly the insufficient proteins, vitamins and minerals in the diet, result in inactiveness, less stamina for intensive and prolonged work, and also lower resistence to disease on the other hand.[2]

Sri Lanka imported 661, 000 lbs. or a little over 295 metric tonnes of broiler chicken from the People's Republic of China during the last quarter of 1978, at a cost of about $325,000. The importing agency, viz, The Cooperative Wholesale Establishment ((C.W.E.) again imported another consignment of 200 metric tonnes of chicken from China, followed up by another consignment of five hundred thousand lbs. of 'Chinese' chicken for the 1979 Christmas season. Implementation of a suitable poultry development programme would help to eliminate such expenditure of valuable foreign exchange.

As stated earlier,unlike some types of other agricultural commodities, broiler chicken can be produced in a very short period (65-75 days) without much risk or exposure to natural calamities, such as unusual seasonal changes, or climatic accidents. Researchers have strongly emphasised that if the right protection, and opportunities are provided, local broiler producers are more than capable of supplying the country's entire requirements in this respect. As more producers enter the industry the price of chicken would automatically (given that other factors remain unchanged) fall. Furthermore, even if a temporary scarcity in broiler supply occurs it would not affect the consuming public,as

[1] Sri Lanka Nutrition Status Survey (September 1975-March 1976) prepared by U.S.Department of Health, Education and Welfare Public Health Service, Center for Disease Control(C.D.C.) in Cooperation with, Ministry of Health, Government of Sri Lanka.
CARE / Sri Lanka and U.S.Agency for International Development, June 1976 "Protein - energy undernutrition level for Sri Lanka is a general problem.... ...." page 53.

[2] '49% sick ' - "A nutrition survey carried out in eight districts has revealed that 49.6% of pre-school children in the estate sector suffer from chronic under-nutrition. The survey carried out by the Food and Nutrition Policy Planning Division of the Ministry of Plan Implementation"- 'Sun' 17th November, 1980.

factors remain unchanged) fall. Further,even if a temporary scarcity in broiler supply occurs it would not affect the consuming public, as in the case of such commodities as chillies or onions which are essential ingredients of daily use. Viewed in this light a need for sudden importation would not arise even during a period of scarcity.

If on the other hand, the importation of broiler chickens continue to prevail especially the local small and middle-scale broiler producer will find himself periodically stranded and the local broiler industry will ultimately suffer total collapse, except perhaps for a few large scale producers.Due to scale of economies these well placed enterpreneurs could survive and even earn exorbitant profits, due to the monopolistic position they occupy in the market. This is the exact situation which has arisen in the market today, and a very few producers control the entire broiler production and distribution.

At the time of the present survey, however, all the broiler farmers were expressing grave discontent over the importation of 'broiler' chicken; They were of the opinion that under the prevailing conditions (mid 1979) if they could get a farm gate price of Rs.9.00 per lb. continously,they would be in a position to increase the supply sufficiently to meet the whole of Sri Lanka's requirements. At present the price of the local broilers had gone up to Rs.12.00 to 13.00 per lb., only because of the artificial scarcity created and maintained by the monopolistic power of a few large-scale broiler producers who had continued to exist when the weaker ones had gone to the wall as a result of the operation of the law of the 'survival of the fittest'. Again this scarcity which brought them to a situation of monopolistic control over the local broiler market, originated firstly from the doubling or 100% price increase of poultry feed in the latter part of 1977, and secondly the importation by the C.W.E. and other importers of broiler chicken in 1978 and 1979.

The benefit, if any realised at all through this importation is temporary and is at the cost of the entire broiler industry of the country. This can be a very short-sighted policy in view of the

rapidity with which a poultry industr can be built up, provided it is planned and conducted on sound lines. This policy accordingly overlooks the long-term objectives from which the country could benefit in general. One could even believe that if free market forces had been permitted to operate without any intervention, the industry would have been able to achieve self sufficiency by this time. The real test of this proposal may be judged by putting costs and benefits on the two sides of the scale.

Available statistics show that the supply of poultry products has not proportionately increased to cope with the increasing demand. Even though the production of eggs has increased by 20% during the year 1979[1] the desired increase in the level of consumption is still a very long way off.

> "Sri Lanka's per capita consumption of fish dropped drastically from 32 lbs. in 1972 to 23 lbs. last year (1978). This is far below the nutritional requirements. According to the Medical Research Institute, the annual nutritional requirement is 37 lbs. per head".[2]

The recent ban on female cattle slaughtering, the drastic decline in the per capita consumption of fish due to short supply, scarcity of dried fish and the country - wide propaganda against beef eating etc. have given a topical and timely perspective to the study. In the present context, it is likely that a fall in the consumption of beef could be offset by an increase in the consumption of eggs and poultry meat.

Viewed in this light, as a means of correcting the protein deficiency in the dietary pattern of the general public, egg production or the poultry industry in general, calls for a careful, and overall investigation.

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[1] Annual Report of the Central Bank of Ceylon 1979 p. 32.

[2] "Ceylon Daily News", 7th May, 1979. Quoting official Statistics.

1.4 OBJECTIVES OF THE STUDY

Broadly stated, as mentioned at the begining, the principal object of this study is to examine the production and marketing of eggs with a view to seeking ways and means to increase the egg production of the country. Specifically the study seeks:-

i. To identify the relationship between cost of production and profitability at the prevailing prices.

ii. To examine the process of price determination, the nature and degree of price fluctuations, and the principal factors influencing these;

iii. To ascertain the problems of the producers and the marketing system.

1.5 METHODOLOGY

The survey comprised the following:-

i) Review of Published literature.

ii) Interviews with officials, Farm managers, Feed manufacturers, Incubator manufacturers, Franchise agents, Tourist hotel managers, Egg dealers etc.

iii) Survey of poultry farmers

iv) Indepth interviews with large scale farmers

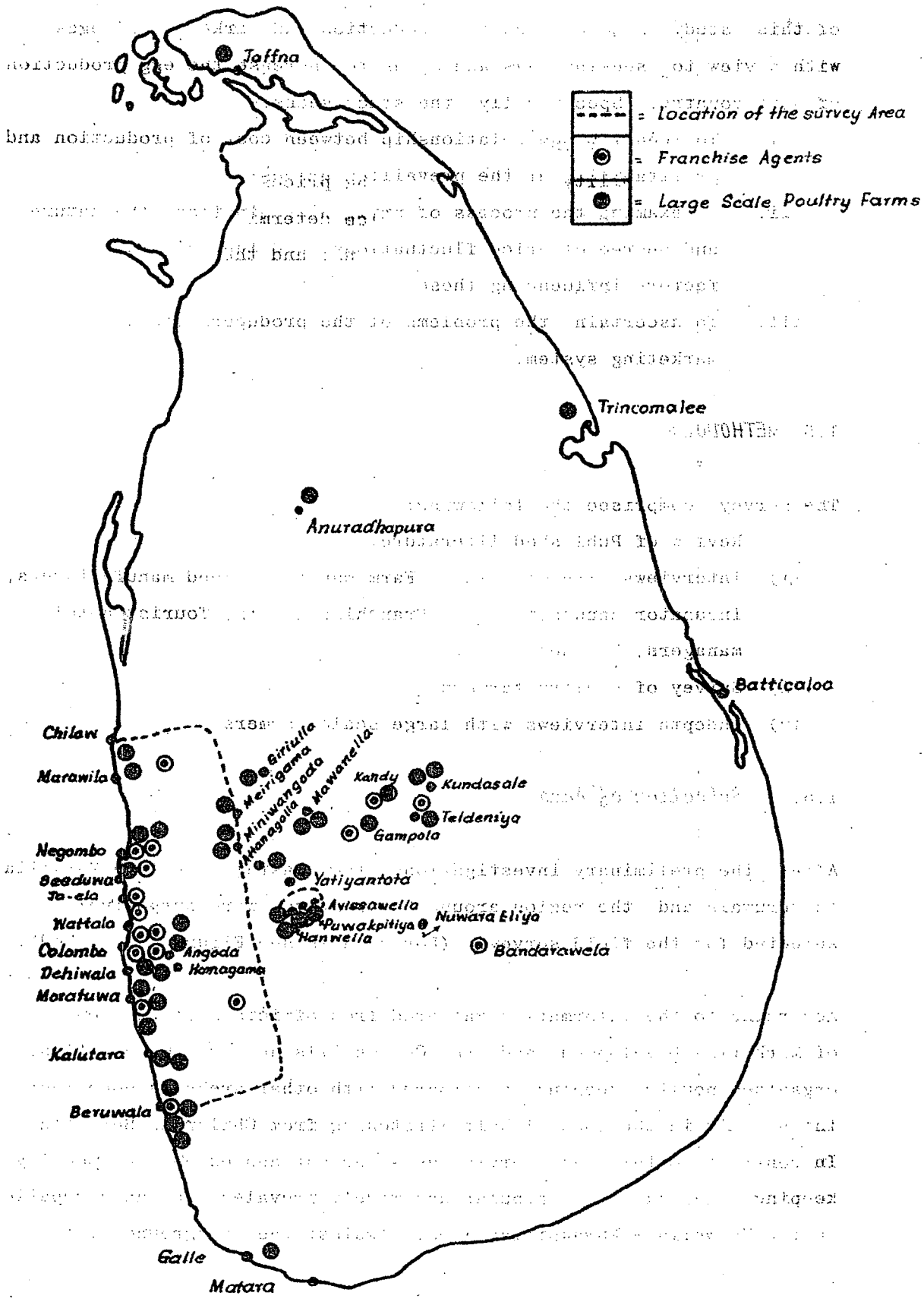
1.5.1 Selection of Area

After the preliminary investigations, the coastal area form Marawila to Beruwala and the region around Puwakpitiya, were purposively selected for the field survey. (For details see Figure 1 attached).

According to the information gathered from officials of the Department of Marketing Development and the Ceylon Oils and Fats Corporation, organised poultry keeping as compared with other areas is done most intensively in the coastal belt stretching from Chilaw to Beruwela. In contrast to this, and serving as a variant and exception, poultry keeping is very popular and widely prevalent as an occupation in the Hanwella - Puwakpitiya area. Against the background of the

Figure : 1

LOCATION OF THE AREA SURVEYED AND FRANCHISE AGENTS AND LARGE SCALE FARMS VISITED



interests of the population in these areas, there would appear to be a fairly high degree of correlation between the provincial bias in favour of poultry keeping and religious beliefs. For example, at the Marketing Department's regional collecting centres, the heaviest egg collection came from Negombo, Kalutara and Marawila. Similarly, according to the statistics of Oils and Fats Corporation the bulk of the poultry mash sales was disposed of in this area.

1.5.2 *Sampling procedure*

For the purpose of the survey, a list of about 1600 poultry farmers was compiled in the Western Province. Next a sample of 10 areas as indicated below, was selectively drawn up with special reference to their location:-

Marawila)
Seeduwa)
Negombo) Most popular egg production areas in the North of
Ja-ela) Colombo.
Wattala)

Dehiwala)
Moratuwa) Most popular egg production areas in the South of
Beruwala) Colombo.

Angoda) Comparatively less Urbanized area close to the City of Colombo.

Puwakpitiya) Interior village, far from the city of Colombo.

The chief poultry feed suppliers in Sri Lanka are the Ceylon Oils and Fats Corporation, The British Ceylon Corporation Ltd.,(B.C.C.). Presently in government ownership and control) and Moosajees Ltd . Lists of poultry feed buyers who were believed to be actually engaged in poultry keeping in the respective areas were obtained from these three organisations. Combining the three lists, a single comprehensive list was prepared consisting of 464 poultry farmers. Thereafter a random sample of 298 farmers were selected for the survey. Of these, our investigators were able to interview 279 farmers, the remainder having either left the area or being omitted since they were not very co-operative. Table 5 shows the detailed breakdown of the sample.

TABLE 5:- DISTRIBUTION OF POULTRY FARMERS IN THE REGISTERED LIST AS SHOWN BY A RANDOM SAMPLE OF SELECTED VILLAGES

Village	Total registered poultry farmers	No. in the sample	No. interviewed
Marawila	40	30	30
Puwakpitiya	38	30	30
Dehiwala	36	30	30
Beruwela	15	15	10
Seeduwa	84	40	40
Wattala	44	30	30
Negombo	97	40	39
Ja-ela	57	30	30
Moratuwa	27	27	20
Angoda	26	26	20
Total	464	298	279

A simple random sample of 30 farmers were selected from each area. In areas where the registered poultry farmers were less than 30 the entirety was surveyed, and in areas where more than 30 farmers were registered, an attempt has been made to raise the number surveyed to 40 farmers.

1.5.3 *Preparation of the Questionnaire and Pre-testing*

Individual visits were made by the researchers to each selected area to collect basic information. Based on this, a draft questionnaire was prepared for small and middle scale farmers. The questionnaire was pretested and revised accordingly after evaluation of the pre-test.

1.6 *DATA COLLECTION*

Data collection was done by using a questionnaire covering all important aspects of the poultry industry. The field survey was carried out by three graduate investigators. The field work was completed during the months of March, April, and May 1979.

Material supplementary to the questionnaire-based data, was collected

from various sources by means of personal interviews with informed individuals possessing special expertise, along with replies received in response to the questionnaire-type letters sent to others. Seperate interviews and discussions were subsequently held with the large scale farmers.

Altogether, apart from the Government Departments, Ministries and Corporations, 77 selected poultry farmers (covering various parts of the country) 18 private franchise agents, officials of 6 government farms, 5 Marketing Department egg collecting centres, about 200 tourist hotels, and 14 leading egg dealers were personally interviewed. (For details see Annex 2). As a result of this somewhat laborious exercise we were able to gather valuable first hand information and experience, giving us a panoramic view of the whole process of production, supply, distribution and consumption of eggs in the country as a whole.

1.7 *ACCURACY OF DATA AND LIMITATIONS OF THE STUDY*

Since about 90% of the egg trade is handled by the semi-organised private sector, data relating to the marketing of eggs cannot be easily cross-checked. Information relating to costs of production may also deviate from the true figure due to a psychologically natural factor namely that farmers generally would tend, however, unconsciously, to over-estimate the expenditure while at the same time under-estimate the income. The actual quantities of the marketed eggs and the incomes received, would also be subject to genuine memory lapses. Apart from the questionnaire--based survey, a large number of informal interviews held with the farmers helped us to overcome these problems to some degree. Constant changes in the price of building materials, poultry drugs, additives and labour etc., efficiency of management and mortality rate of chicks would also be factors affecting the cost calculations relating to egg production, and no precise data could be obtained in respect of these items.

It would therefore be appropriate to point out that in the analysis of data, and in the course of drawing conclusions and making recommendations based on them, the limitation imposed by these factors should be given due consideration.

CHAPTER 2

ESTIMATES OF PRODUCTION, DEMAND AND CONSUMPTION OF EGGS

2.1 *PRODUCTION*

According to the food balance sheet of the Department of Census & Statistics total egg production in the year 1978 was 360 million. In 1977 it had been 380 million. This rose to 432 million in 1979. (For details see, Figure 2).

The Consumer Finance Survey of the Central Bank of Ceylon in 1973 (Latest available) estimated the average yearly consumption of eggs in the country as 14.3 eggs per person. Combining this with the official population figure for 1973, total egg production in the country in 1973 should have been about 190 million, whereas the actual recorded figures of production and per capita consumption in the same year as given in the Government Statistical Abstract[1] are 467 million and 36 respectively. (Vide, Table 6.) Even if we consider items such as consumption by the tourist industry as "leakages" from the main local consumption stream, total production should be somewhere around 200 million.

Further, estimates of available annual food balances of the country as given in the food balance sheets of the Department of Census & Statistics, when compared with the population statistics, similarly show a wide difference from any reasonable computation. Hence, the available data in respect of egg production would appear to be not altogether reliable and must, accordingly be used with a certain degree of caution. The figures given in Table 6 illustrates this point.

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[1] Statistical Abstract of the Democratic Socialist Republic of Sri Lanka 1977, (Dept. of Census and Statistics and Ministry of Plan Implementation 1979).

TABLE 6:- RECORDED TOTAL EGG PRODUCTION & PER CAPITA CONSUMPTION

Year	Total egg production (millions) [i]	Population [ii]	Per capita consumption (units)
1971	478	12,608,000*	37
1972	584	13,022,000	45
1973	467	13,241,000	36
1974	406	13,393,000	31
1975	359	13,603,000	27
1976	365	13,730,000	27
1977	380	13,942,000	28
1978	360	14,184,000**	26
1979	432	14,500,000**	30

Source: i. Department of Census & Statistics
ii. Registrar General's Department

* - Mid year
** - Mid year (Provisional)

These per capita consumption rates do not tally with the figures given either by the Consumer Finance Survey of 1973, or the Socio-economic Survey of the year 1969/70. More recently a nutrition survey conducted in the Colombo city, estimated annual per capita egg consumption at 31.[1] In view of the steadily rising percentage of upper level income groups being permanently located in Colombo, it would appear to be totally incorrect to take this, or even a figure close to this, as the per capita consumption of the whole island. Hence, it would be reasonable to regard the figures pertaining to total egg production and per capita consumption in Table 6 as somewhat exaggerated.

The correctness of this conclusion could also be verified by cross-checking with figures derived from other sources as well, namely, poultry feed production and issue of day old chicks. At present (1979) the annual production of poultry feed is in the range of 70,000 metric tonnes, out of which about 80% comes from the State owned Oils & Fats Corporation. In 1978 it was about 55,000 M.T.

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[1] The Urban Family Budget Survey of 1977. (Department of Census & Statistics.)

RECORDED TOTAL EGG PRODUCTION AND PER CAPITA CONSUMPTION

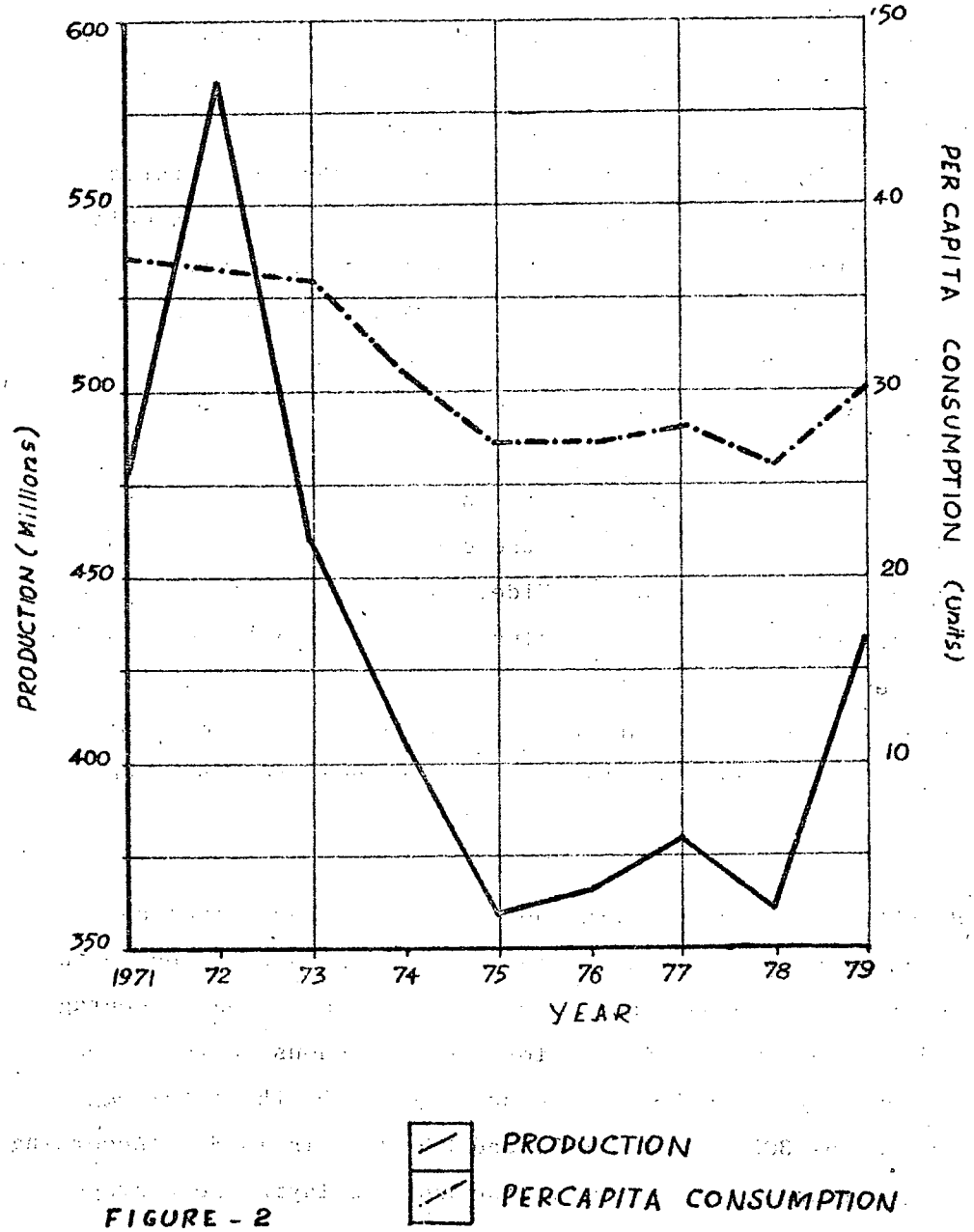

FIGURE - 2

Generally, a poultry bird needs o4 ozs. or 100 grams oi feed per day. According to this calculation the poultry population in the intensive sector in 1977, 1978 and 1979 would have been around 1.39 m. 1.41 m. and 1.7 m respectively. It may be noted, in this connection, that there is no marked difference between the recorded figures showing the 'day old' chick production obtained by franchise agents and the government farms. The number of hens in indigenous village flocks has been estimated at 1.2 m.[1] If we take 60% as laying hens in the intensive sector, the total number of laying hens was about 2.04 m. in 1977 and 1978, and the total poultry population about 3.6 m. Here again, the figures published by the Department of Census & Statistics, differ considerably from the estimates made by others. For example, the Census Departmetn's published figures of the total poultry population as 5.9 million for 1977 and 4.9 million for 1978 cannot be easily reconciled with the figures of poultry feed production, or with figures given by the Consumer Surveys, as pointed out above.

The Report of the Census of Agriculture in 1973 (published by the Departmetn of Census & Statistics) on the other hand, estimates the total poultry population as 3.69 m. (Vide, Annex 3) a figure which substantially agrees with our own conclusion. But even if we consider 60% as laying hens, it comes to 2.69 million, which if we take 50% and 30% (indigenous sector) as the appropriate laying percentages, total egg production should have been 398.5 million whereas the recorded figure was 467 million.

In 1977 and 1978 the recorded laying hen population were given as 2.07 and 1.8 million respectively, out of which 1.2 million belonged to the indigenous sector. If we base our calculations on a laying percentage for the intensive sector, of 55% and for the indigenous sector (treating this more favourably than the sample survey) as 30% the total egg production would be 303.5 m. in 1977, and 266.3 m. in 1978. (According to the findings of the sample survey, the average laying percentage

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[1] TROPICAL PRODUCTS INSTITUTE, A Strategy for the Development of the Livestock Feed Industry in Sri Lanka, Feb. 1979, p.28.

lies between 55%-60% in the intensive sector, and in the indigenous sector only about 16%-23%). But here again a considerable discrepancy appears when compared with the official statistics.viz. in 1977, 380 m. and in 1978, 360 m. of eggs have been recorded.

It is conventionally reckoned that the village type indigenous sector contributes generally a static amount of eggs annually to the total production. The number of laying hens is estimated at 1.2 million, and the total poultry population at 2.2 million. Their annual rate of lay is 60-80 eggs per hen, and total production is about 96 million eggs, at maximum level.

The published production figures for eggs, as well as the estimates of the poultry population, seem thus to be inflated. The Department of Census & Statistics collects the livestock statistics through the Grama Sevaka officers who are not officially under the authority of the Department of Census & Statistics. The manner in which they arrive at the Statistics, is generally by oral verification or, not infrequently, by merely adding or subtracting some percentage to the previous year's figures. In the normal course of his work, a Grama Sevaka officer would not be in a position to do a careful or detailed survey of livestock holdings. This description of the method of collection of the data in itself a sufficient warning against the degree of reliance on the official figures thus provided, unless supported by parallel and independent sources of information.

To draw up any plans for the future from, or to base firm recommendations on acceptance of, these statistics could not only serve to create doubt and distrust in the public mind even about genuine and well conducted official investigations, but may also arouse antipathy and animosity towards the participating individuals and officials, however, honest and well intentioned they might have been. In the light of above it is hardly necessary to say that if any one is truly concerned about development planning of egg production in particular, and the livestock industry in general, securing reliable and sensible data is a first and essential requirement.

Total poultry feed production, the issues of day old chicks, poultry population, exports, consumption by the tourist industry, consumption by the catering industry and per capita consumption rates as computed by the Consumer Finance and Socio-economic Surveys,are probably the most significant items and data to be taken into account in arriving at a true estimate of the total egg production in the country. Thus, the present total egg production of the country would probably be in the region around 275 millions of eggs annually. This figure is about 100 m. less than the amount presently reckoned, or 75% of the officially recorded and recognised figure, as explained below:

1.	Direct consumption 14,500,000 x 18 (1979 mid-year population and per capita consumption as 18 eggs).	= 261,000,000
2.	Consumption of the Tourist Industry (based on 1977/78 figures).	= 8,000,000
3.	Consumption of the local catering Industry (based on 1978 figures of the Colombo leading catering establishments).	= 4,000,000
4.	Exports (based on 1978 & 1979 figures).	= 300,000
	Total	273,300,000

2.2 DEMAND

Demand and availability which superficially appear to be related, and perhaps even identical concepts, are in fact quite different matters. Demand is a function of a number of economic as well as non-economic factors, while availability is a function of supply. It is generally agreed in Sri Lanka that the demand for eggs exceeds the available supply. It is difficult to arrive at an accurate figure representing the current demand for eggs in Sri Lanka, due to non-availability of the required accurate data.

> "The demand for livestock products is conventionally determined by using either cross-sectional data such as consumer surveys of household expen-

diture , or by using time series data relating to the quantities of a food consumed at correspondingly varying prices. Often the two types of data are used simultaneously to provide a cross check. In Sri Lanka it is not possible to use time series data, because it is not available".[1]

Nevertheless, if we use the figures of the latest available Consumer Finance Survey, (i.e., in 1973) per capita consumption in the urban sector is 24.8. Assuming that this consumption rate (after the lapse of 6 years) is still valid in its applicability to the consumption habits of the people, it is possible to arrive at an approximate average estimate of present demand. Taking the 1979 mid-year population as the base, it could be roughly estimated that the current demand for eggs is in the region of 380 million per annum. (This excludes the requirements of the tourist industry, and exports.).

This can by no means be considered an optimum figure, or a demand that conforms to recommended nutritional standatds or to demand theoretically concluded as practicable. It is useful only in so far as it enables us to have a clear general picture of the situation, and since demand as a function is basically price related and its calculation involves estimation of a number of complicated, and simultaneously varying parameters, and the use of sophisticated methodological techniques.

Eggs are a ready source of high quality animal protein and also possessing some of the essential vitamins, it has been recommended that, "For a balanced diet each person should eat half an egg a day."[2]

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1 TROPICAL PRODUCTS INSTITUTE, A Strategy for the Development of the Livestock Feed Industry in Sri Lanka - Feb. 1979,p.10.

2 Hand book of Animal Husbandry in India. (Council of Agricultural Research)New Delhi, 1977, p. 107.

According to the nutritional standard recommended above, even assuming that one quarter of the present population is set aside as non-egg eaters due to religuous reasons, (Buddhists 67.4% & Hindus 17.6%) food habits etc. (apart form economic reasons), it would appear that, even on this basis, an output of about 2000 million eggs would be needed every year. In other words production will have to mount up to over 5.4 million eggs per day. Current production however, according to the official census records is only .98 million, and according to the calculations made in this study .69 million, per day. Hence, to reach this proposed ideal or projected figure of production, an approximately eight-fold increase in present egg production would be necessary. In other words, only about 13.5% of the estimated requirement is achieved by the present total supply.

When the general nutritional standards of the people as a whole are also taken into account, it is obviously desirable that the development of egg production should be planned on a district basis. The present government policy has been declared to be development and administration through District Ministry System, and the District Council System. The idea of district-wise planning of egg production happens to conincide with the broad government policy of decentralised administration. Unlike in the case of other agricultural products, egg production can be promoted in nearly every district throughout the country with almost equal facility unhindered by considerations of soil, climatic conditions, or rainfall. A properly planned programme could invariably attract the potential markets particularly in the West Asia, Gulf and Arab States. But in an endeavour of this nature the main constraint will be the feed supply. It has to be increased at least 8-fold, as compared with present production.

Taking into consideration the recommended nutritional standards, the mid-year population figures for 1979 and egg consumption figures of the tourist industry, as well as the local catering industry, together with the figures of exports, the following projections for egg production, poultry feed production and laying hen population, have been formulated. (Vide, Table 7).

Projections for agricultural commodities may be made in several ways. Here, we used a mixture basically compounded of the following data:-

i. Extrapolation of past production data
ii. Estimates of future demand based on specific nutritional standards.
iii. Admittedly arbitrary and subjectively chosen preferences or choices.

Even taking into account the fact that the figures given in Table 7 have been computed on a somewhat, conservative basis these figures are still considerably high when compared with the exceedingly low figures of current productinn as given by the Department of Census & Statistics.

Table 7 clearly shows that, to reach the recommended nutritional standards, there should be roughly an eightfold, and sixfold, increase in egg production and laying hen population, respectively, with due emphasis on the poultry feed supply. When compared with the present total feed production, there should be a 7.7 fold or 670% increase in the year 1984. Although the projections appear excessively high and too unrealistic nevertheless it would serve as a yardstick to measure properly and set in its true perspective, where Sri Lanka stands when compared with other countries.

"Projections thus, serve as a valuable tool in target setting and are in fact a first step in setting targets.....Projections and targets are conceptually and operationally two distinctly different things. Projections constitute a way of exploring different variants. Thus, the target is a result arrived at after a variety of projections have been considered. It follows, therefore, that operationally the preparation of projections precedes the setting of targets."[1]

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[1] Waterston Albert - Preparing a program for Agriculture - Seminar paper series, Economic Development Institute International Bank for Reconstruction and Development - 1973 p.31.

DISTRICT-WISE CLASSIFICATION OF THE PROJECTED EGG, POULTRY FEED AND LAYING HEN REQUIREMENTS OF THE COUNTRY

Table 7.

	1 Projected Mid Year Population ('000)					2 Projected Egg requirements of the Tourist Industry (Egg numbers) '00					3 Projected Egg Exports (numbers '00				
	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984
1. *Colombo	3099	3161	3221	3279	3335	41217	50168	63604	73778	88392	3069	3376	3713	4085	4493
2. Kalutara	842	859	872	888	903	10075	12553	16396	19179	23315					
3. Kandy	1340	1367	1397	1422	1446	9038*	11106	12207	14540	18004					
4. Matale	369	376	383	390	397	-	-	-	-	-					
5. N°Eliya	488	498	507	516	525	3952	4467	5256	5836	6689					
6. Galle	849	866	882	898	913	4066	5346	7491	8884	11139					
7. Matara	688	702	715	728	740	168	178	190	203	217					
8. Hambantota	405	413	421	428	435	1725	1913	2123	2356	2610					
9. Jaffna	835	852	868	884	899	811	905	1010	1127	1254					
10. Mannar	94	96	98	100	102	-	-	-	-	-					
11. *Vavunia	116	118	120	122	124	-	-	-	-	-					
12. Batticaloa	313	319	325	331	337	1271+	1660+	2310+	2734+	3417+					
13. Amparai	329	335	341	347	353	-	-	-	-	-					
14. Trincomalee	233	237	242	246	250	3711	4565	5877	6839	8255					
15. Kurunegala	1208	1232	1255	1277	1299	-	-	-	-	-					
16. Puttalam	456	465	474	482	490	-	-	-	-	-					
17. Anuradhapura	477	487	496	505	514	2855	3361	4070	4660	5449					
18. Polonnaruwa	198	202	206	210	214	4112	4785	5681	6478	7493					
19. Badulla	694	708	721	734	746		-	-	-	-					
20. Monaragala	238	243	248	253	257	-	-	-	-	-					
21. Ratnapura	770	785	800	814	828	18720	2101	2358	2643	2953					
22. Kegalle	749	764	779	793	806	-	-	-	-	-					
TOTAL	14790	15085	15371	15647	15913	101721	103108	128573	149257	179187	3069	3376	3713	4085	4493

(1) * Newly created Gampaha and Mullaittive districts included.

(2) Based on Tourist Board estimates.
* Matale included.
+ Arugambay and Inginiyagala of Amparai District included

(3) i. Based on 1978 Export figures (computed on yearly rate of increase of 1%.

ii. Total exports appear under Colombo District.

DISTRICT-WISE CLASSIFICATION OF THE PROJECTED EGG, POULTRY FEED AND LAYING HEN REQUIREMENTS OF THE COUNTRY

	4 Projected Egg requirements of Local Catering Industry '00					5 Projected Egg Consumption (according to nutritional requirements '000					6 Projected total required production (2 + 3 + 4 + 5) '0000				
	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984
1. Colombo	30000	31500	33075	34728	36465	418365	426735	434835	442605	450225	42579	43523	44487	45386	46316
2. Kalutara	8181	8590	9020	9471	9945	113670	115965	117720	119880	121905	11549	11807	12026	12274	12523
3. Kandy	12918	13564	14242	14954	15902	180900	184545	188595	191970	195210	18309	18701	19124	19491	19860
4. Matale	3588	3767	3956	4154	4361	49815	50760	51705	52650	53595	5017	5113	5210	5306	5403
5. N'Eliya	4736	4973	5222	5483	5757	65880	67230	68445	69660	70875	6674	6817	6949	7079	7211
6. Galle	8181	8590	9020	9471	9945	114615	116910	119070	121230	123255	11583	11830	12072	12306	12536
7. Matara	6602	6933	7279	7643	8025	92880	94770	96525	98280	99900	9355	9548	9727	9906	10072
8. Hambantota	3875	4069	4272	4486	4710	54675	55755	56835	57780	58725	5523	5635	5747	5846	5945
9. Jaffna	8038	8440	8862	9305	9770	112725	115020	115180	119340	121365	11360	11595	11616	12038	12246
10. Mannar	918	964	1012	1063	1116	12690	12960	13230	13500	13770	1278	1305	1333	1360	1388
11. Vavunia	1133	1190	1250	1312	1378	15660	15930	16200	16470	16740	1577	1604	1632	1660	1687
12. Batticaloa	3014	3165	3323	3489	3663	42255	43065	43875	44685	45495	4268	4354	4443	4530	4620
13. Amparai	3157	3315	3481	3655	3838	44415	45225	46035	46845	47655	4473	4555	4638	4721	4803
14. Trincomalee	2153	2260	2373	2492	2617	31455	31995	32670	33210	33750	3204	3267	3349	3414	3483
15. Kurunegala	11626	12208	12818	13459	14132	163080	166320	169425	172395	175365	16424	16754	17070	17374	17677
16. Puttalam	4306	4521	4747	4984	5231	61560	62775	63990	65070	66150	6199	6322	6446	6556	6667
17. Anuradhapura	4593	4822	5064	5317	5583	64395	65745	66960	68175	69390	6513	6656	6787	6917	7049
18. Polonnaruwa	1866	1959	2057	2160	2268	26730	27270	27810	28350	28890	2732	2794	2858	2921	2986
19. Badulla	6602	6933	7279	7643	8025	93690	95580	97335	99090	100710	9435	9627	9806	9985	10151
20. Monaragala	2296	2411	2532	2658	2791	32130	32805	33480	34155	34695	3235	3304	3373	3442	3497
21. Ratnapura	7464	7837	8229	8640	9072	103950	105975	108000	109890	111780	10488	10696	10703	11101	11298
22. Kegalle	7177	7535	7912	8308	8723	101115	103140	105165	107055	108810	10183	10389	10595	10788	10968
TOTAL	142424	149546	157025	164875	173320	1996650	2036475	2073085	2112285	2148255	201958	206196	209991	214401	218386

(4) i. Based on a survey of egg consumption by the leading catering establishment in Colombo Districts, projections were made of likely consumption in other districts assuming a similar ration of egg consumption to population tO prevail there.

ii. These estimates were extended to cover future consumption for a 5 year period, assuming annual increase of 5% for all districts.

(5) i. Nutritional requirement taken as $O\frac{1}{2}$ an egg per head per day.

ii. One quarter of the population being considered as non-egg eaters .

iii. Includes only direct egg consumption. (exclusively of use in pastry and confectionery making etc.)

DISTRICT-WISE CLASSIFICATION OF THE PROJECTED EGG, POULTRY FEED AND LAYING HEN REQUIREMENTS OF THE COUNTRY

	7 Projected (possible) consumption (according to past records) '0000					8 Projected total (possible) Egg Production according to past records (2+3+4+7) '000					9 Difference between projected (recommended) production and estimated (possible) production of eggs. (6-8) '000				
	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984
1. Colombo	6136	6985	7891	8820	9571	68788	78362	88953	99464	108649	357004	356876	355920	354399	354510
2. Kalutara	1667	1898	2136	2388	2591	18497	21098	23905	26752	29242	96998	96981	96356	95992	95988
3. Kandy	2653	3021	3422	3825	4150	28727	32677	36871	41201	44870	154368	154334	154368	153718	1537[illegible]
4. Matale	730	830	938	1049	1139	7665	8686	9779	10906	11830	42508	42450	42321	42159	42201
5. N'Eliya	966	1100	1242	1388	1506	10531	11949	13469	15012	16312	56217	56224	56023	55779	55807
6. Galle	1681	1913	2160	2415	2620	18035	20532	23260	25991	28311	97804	97771	97461	97073	97051
7. Matara	1362	1551	1751	1958	2123	14299	16225	18264	20367	22062	79257	79255	79007	78696	78662
8. Hambantota	801	912	1031	1151	1248	8579	9725	10954	12197	13216	46656	46627	46520	46266	46240
9. Jaffna	1653	1882	2126	2377	2580	17417	19763	22253	24822	26903	96192	96190	93914	95560	95563
10. Mannar	186	212	240	269	292	1953	2218	2502	2796	3039	10828	10838	10829	10810	10842
11. Vavunia	229	260	294	328	355	2410	2726	3065	3413	3696	13363	13322	13260	13188	13181
12. Batticaloa	619	704	796	824	967	6625	7532	8525	8864	10380	36057	36015	35912	36443	35823
13. Amparai	651	740	835	933	1013	6829	7735	8702	9699	10514	37900	37821	37680	37510	37523
14. Trincomalee	461	523	592	661	717	5199	5920	6754	7550	8262	26841	26757	26741	26590	26575
15. Kurunegala	2391	2722	3074	3435	3728	25081	28448	32029	35697	38694	139161	139092	138677	138043	138083
16. Puttalam	902	1027	1161	1296	1406	9459	10728	12087	13464	14586	52531	52498	52377	52104	52097
17. Anuradhapura	944	1076	1215	1358	1475	10189	11581	13065	14582	15855	54950	54982	54808	54590	54638
18. Polonnaruwa	392	446	504	564	614	4518	5138	5820	6512	7117	22809	22805	22763	22701	22748
19. Badulla	1374	1564	1766	1974	2141	14401	15740	18392	20508	22212	79948	80533	79670	79345	79299
20. Monaragala	471	537	607	680	737	4942	5611	6329	7071	7655	27417	27434	27404	27349	27319
21. Ratnapura	1524	1734	1960	2189	2376	16179	18342	20658	23025	24966	88704	88626	86375	87993	88[illegible]
22. Kegalle	1483	1688	1908	2133	2313	15547	17637	19876	22162	24004	86284	89330	86079	85723	85677
TOTAL	29276	33265	37649	42015	45662	315870	358373	405512	452055	492375	1703797	1706761	1694465	1692031	1691562

(7) Taken following per capita consumption rates.

1980	1981	1982	1983	1984
19.8	22.1	24.5	26.9	28.7

DISTRICT-WISE CLASSIFICATION OF THE PROJECTED EGG, POULTRY FEED AND LAYING HEN REQUIREMENTS OF THE COUNTRY

	10 Projected Poultry Feed requirements (metric tonnes) produce recommended amount of eggs as indicated in column (6) '00					11 Projected required laying hen population to produce recommended amount of eggs as indicated in column (6) '00					12 Projected (possible) poultry feed production (metric tonnes) (according to past records) '00				
	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984
1. Colombo	978	990	1012	1033	1049	23630	23937	24472	24972	25488	I36	I54	I73	I32	20[illegible]
2. Kalutara	255	261	266	272	277	6174	6317	6438	6576	6714	44	48	53	59	63
3. Kandy	411	420	427	438	446	9929	10147	10382	10586	10790	62	70	I7	85	92
4. Matale	105	107	109	111	114	2545	2598	2652	2705	2759	24	25	27	30	3I
5. N'Eliya	143	146	149	152	155	3465	3545	3618	3690	3764	29	3I	34	37	40
6. Galle	256	262	267	272	278	6193	6330	6464	6594	6722	43	47	52	57	62
7. Matara	205	209	213	217	221	4955	5062	5161	5261	5353	36	39	43	47	50
8. Hambantota	116	119	122	124	126	2826	2888	2950	3005	3060	25	27	30	32	34
9. Jaffna	251	256	257	266	271	6069	6199	6211	6445	6561	42	4I	50	5I	53
10. Mannar	19	19	20	21	21	467	482	498	513	528	I3	I4	I4	I5	I5
11. Vavunia	26	26	27	28	28	633	649	664	679	695	I4	I5	I5	I6	I6
12. Batticaloa	88	90	92	94	96	2128	2176	2226	2274	2324	22	23	25	26	29
13. Amparai	92	94	96	98	100	2242	2288	2334	2380	2426	22	24	26	27	29
14. Trincomalee	63	65	66	68	700	1537	1573	1618	1654	1692	I9	20	22	23	25
15. Kurunegala	367	375	382	389	396	8882	9065	9241	9409	9578	56	62	68	25	8I
16. Puttalam	132	135	138	140	143	3201	3270	3338	3400	3461	27	29	32	34	36
17. Anuradhapura	139	143	146	149	152	3376	3455	3528	3600	3673	24	3I	34	36	39
18. Polonnaruwa	52	54	55	57	58	1275	1310	1345	1380	1416	I8	I9	20	2I	23
19. Badulla	206	211	215	219	223	4999	5106	5205	5305	5397	36	38	43	42	50
20. Monaragala	64	65	67	69	70	1555	1593	1631	1669	1700	I9	20	2I	23	24
21. Ratnapura	231	235	236	245	249	5584	5700	5703	5925	6034	39	43	40	52	55
22. Kegalle	224	228	233	238	242	5414	5529	5644	5751	5851	38	42	46	50	54
TOTAL	4423	4510	4597	4700	5415	107079	109219	111323	II3773	115986	799	967	953	I039	III6

(10) i. Taken as 04 ozs. per bird per day.
ii. Laying hen population of the rural sector taken as 1.2 million birds and average production as 80 eggs per bird per annum.

(11) i. Average laying percentage taken as 50%.
ii. Only intensive sector is included.
iii. Estimated total production of the rural sector has been apportioned equally among 22 districts.

(12) i. Based on the assumption that 20% of the total estimated production of eggs comes from the rural sector.

DISTRICT-WISE CLASSIFICATION OF THE PROJECTED EGG, POULTRY FEED AND LAYING HEN REQUIREMENTS OF THE COUNTRY

	13 Projected (possible) laying hen population (according to past records) '00					14 Difference between projected (recommended) feed requirements and projected (possible) feed production (Metric tonnes) (10-12) '00					15 Difference between projected required laying hen population and projected (possible) laying hen population (11-13) '00				
	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984
1. Colombo	3057	3482	3953	4420	4828	842	836	839	841	840	20573	20454	20519	20551	20659
2. Kalutara	822	937	1062	1188	1299	211	213	213	213	214	5351	5379	5376	5387	5415
3. Kandy	1276	1452	1638	1831	1994	348	349	351	352	354	8652	8694	8743	8755	8796
4. Matale	340	386	434	484	525	81	81	81	81	82	2204	2212	2217	2220	2233
5. N'Eliya	468	531	598	667	724	114	114	114	115	115	2997	3013	3019	3023	3039
6. Galle	801	912	1033	1155	1258	213	214	214	215	216	5391	5417	5430	5439	5463
7. Matara	635	721	811	905	980	168	169	170	170	170	4319	4340	4349	4355	4372
8. Hambantota	381	432	486	542	587	91	91	91	91	92	2444	2456	2463	2463	2473
9. Jaffna	774	878	989	1103	1195	209	210	206	211	212	5295	5321	5222	5342	5365
10. Mannar	86	98	111	124	135	5	5	6	6	6	380	384	386	389	393
11. Vavunia	107	121	136	151	164	12	11	11	11	11	526	527	528	528	530
12. Batticaloa	294	334	378	393	461	65	66	66	67	67	1834	1842	1847	1880	1863
13. Amparai	303	343	386	431	467	70	70	70	70	71	1939	1944	1947	1949	1959
14. Trincomalee	231	263	300	335	367	44	44	44	44	44	1306	1309	1318	1318	1325
15. Kurunegala	1114	1264	1423	1586	1719	311	312	313	313	315	7767	7801	7817	7823	7858
16. Puttalam	420	476	537	598	648	105	105	105	105	106	2781	2793	2801	2801	2813
17. Anuradhapura	452	514	580	648	704	111	111	112	112	112	2923	2940	2947	2952	2969
18. Polonnaruwa	200	228	258	289	316	34	34	34	35	35	1074	1081	1086	1091	1100
19. Badulla	640	699	817	911	987	170	172	171	171	172	4359	4436	4388	4393	4409
20. Monaragala	219	249	281	314	340	45	45	45	46	46	1335	1344	1350	1355	1360
21. Ratnapura	719	815	918	1023	1109	191	192	188	192	193	4865	4885	4785	4901	4924
22. Kegalle	691	783	883	985	1066	185	186	187	187	188	4723	4745	4760	4766	4784
TOTAL	14030	15918	19012	20083	21873	3625	3630	3631	3648	3661	93038	93317	93298	93681	94102

(13) i. Only intensive sector is included.

Required increase of egg production, poultry feed production & laying hen population to meet the Projections indicated in columns (6), (IO) and (II).

SUMMARY

1980	(1) Required Egg Production (increase) %	Proportionate increase
	1980 - 676.5% (as compared with calculated figures for 1979).	7.8 (fold)
1984	1984 - 739.6% (as compared with calculated figures for 1979, it should be 1.7 fold yearly average increase)	8.4 (fold)
1980	(2) Required Poultry Feed Production (increase)	Proportionate increase
	1980 - 53I.8% (as compared with calculated figures for 1979).	6.3 (fold)
1984	1984 - 673.5% (as compared with calculated figures for 1979, it should be I.54 fold yearly average increase.	7.7 (fold)
1980	(3) Required Total Laying Hen Population (increase)	Proportionate increase
	1980 - 494.4 % (as compared with recorded figures for 1978)	5.9 (fold)
1984	1984 - 538.8% (as compared with recorded figures for 1978, it should be 1.3 fold yearly average increase.	6.4 (fold)

Required amounts of increase in poultry feed production

(I979)
(Present annual feed production of 70,000 tonnes taken as constant throughout the period.)

Year	Metric Tonnes	(%)
1980	372300	53I.8
1981	38I000	544.2
1982	389700	556.7
1983	400000	57I.4
1984	47I500	673.5

(17) i. Shows the amounts that should be produced yearly over the 70,000 Metric Tonnes to reach the anticipated (estimated) egg production targets.

Columns (9), (14) and (15) of Table 7 indicate the possible and likely gaps between the estimated theoretical future projection figures set, and the more realistically possible and attainable levels of egg production, feed production, and laying hen population respectively, based on experience in the recent past. The proposed programme of achieving estimated egg production targets is set out in figure 3 and in the more detailed diagrammatic representation of Table 7 in figure 4.

This exercise has been undertaken with a view to constructing a comprehensive and realistically presented statistical Table, (Table 7) embodying an extensive range of the parameters entering into and determining the present and future limits of output of the industry. It should be understood that the need for this, will be most keenly felt with the programme of district development activities under the District Ministry System. (This is explained in greater detail in figures (5), (6) and in Table (8).

TABLE 8:- PERCENTAGE INCREASES REQUIRED TO MEET 1984 PROJECTIONS (Table 7) (FROM 1979)

	Egg production	Laying hen population	Feed production
	%	%	%
1. Colombo	449	425	
2. Kalutara	425	575	
3. Galle	887	1119	
4. Matara	1556	1599	
5. Hambantota	1098	1278	
6. Ratnapura	1212	1268	
7. Kegalle	594	787	
8. Kandy	685	758	
9. Nuwara Eliya	2107	1283	
10. Badulla	593	678	
11. Matale	373	388	
12. Kurunegala	390	537	675
13. Puttalam	167	175	
14. Anuradhapura	463	555	
15. Mannar	190	59	
16. Vavuniya	119	80	
17. Jaffna	667	453	
18. Trincomalee	292	271	
19. Polonnaruwa	117	202	
20. Batticaloa	257	228	
21. Ampara	548	437	
22. Monaragala	521	626	

(The figures used for this Table are based on 1978 Statistics of the Department of Census & Statistics)

Figure: 3

PROPOSED PROGRAMME OF ATTAINING THE ESTIMATED EGG PRODUCTION TARGETS

(REQUIRED YEARLY PERCENTAGE INCREASE)

1980	1981	1982	1983	1984
133%	57%	32%	24%	21%

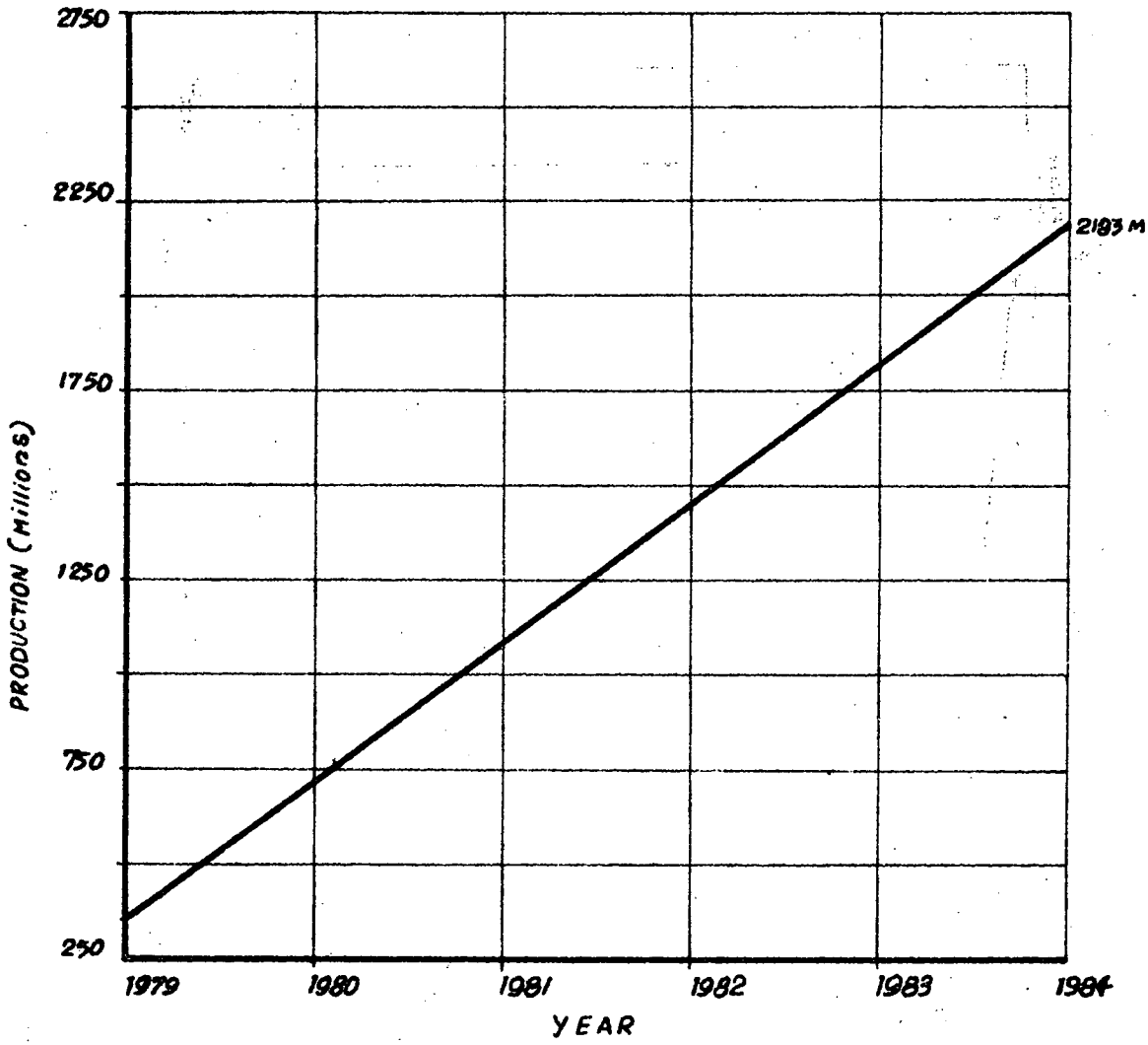


Figure 4

PROPOSED EGG PRODUCTION PROJECTIONS FOR THE COUNTRY (IN MORE DETAILS).
(1980-1984)

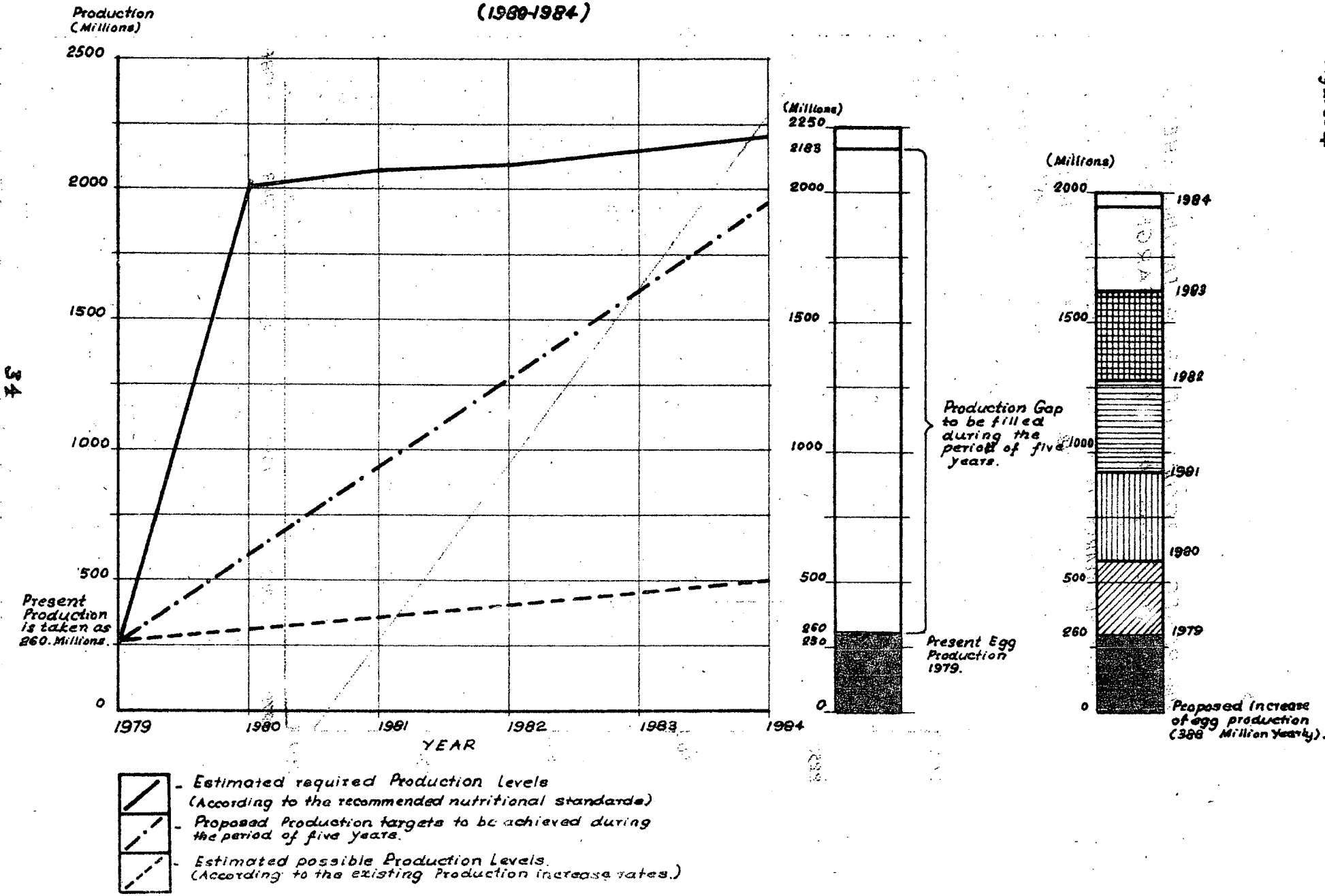


Figure-4

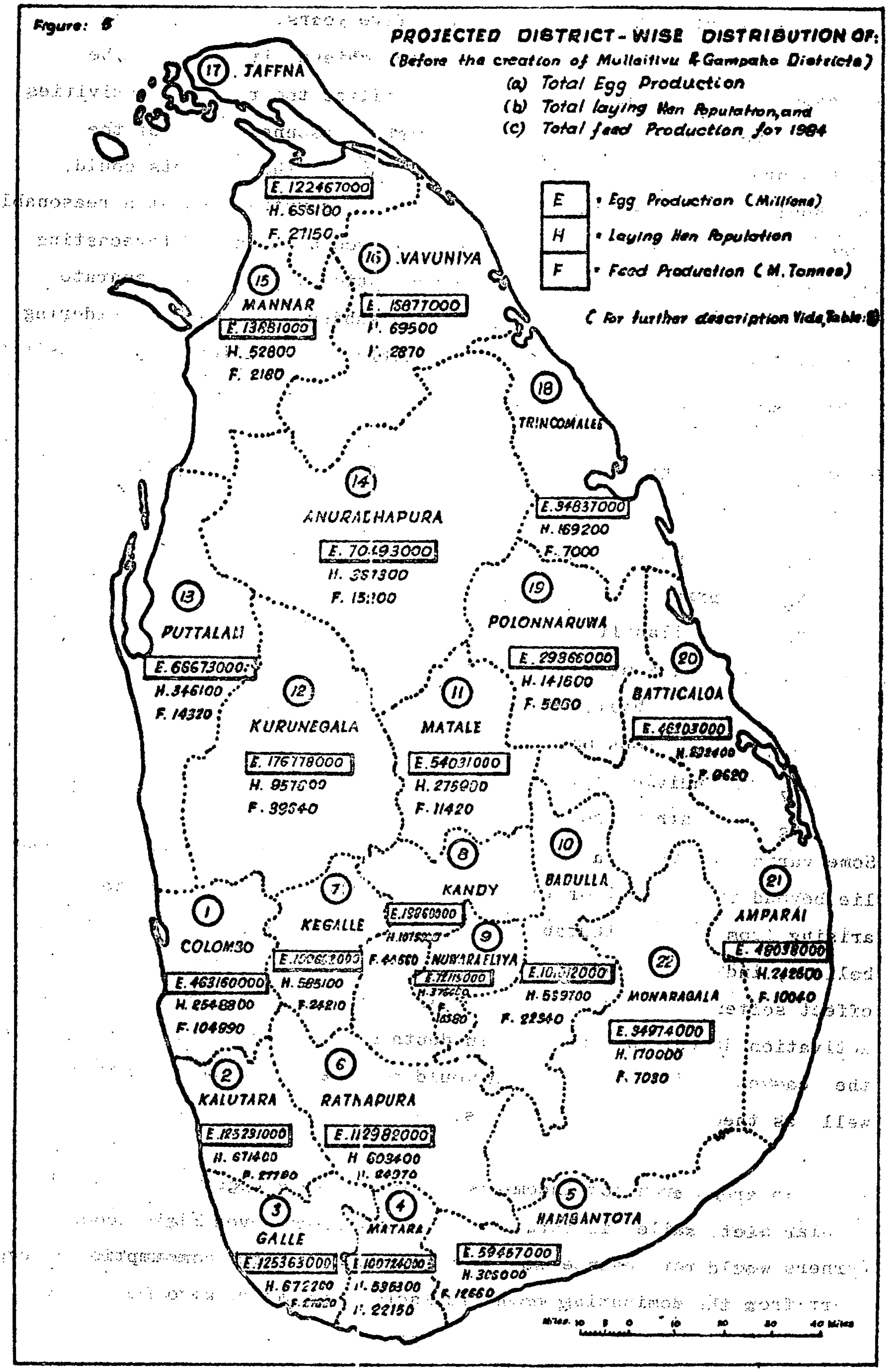


Figure: 6
PROJECTED DISTRICT-WISE DISTRIBUTION OF:
(Before the creation of Mullaitivu & Gampaha Districts)
(a) Total Egg Production
(b) Total laying Hen Population, and
(c) Total feed Production for 1984
E = Egg Production (Millions)
H = Laying Hen Population
F = Feed Production (M. Tonnes)
(For further description Vide Table: 6)
(17) JAFFNA
E. 122467000
H. 656100
F. 27150
(16) VAVUNIYA
E. 15877000
H. 69500
F. 2870
(15) MANNAR
E. 13881000
H. 52800
F. 2180
(18) TRINCOMALEE
E. 34837000
H. 169200
F. 7000
(14) ANURADHAPURA
E. 70493000
H. 381300
F. 15100
(13) PUTTALAM
E. 66673000
H. 346100
F. 14320
(19) POLONNARUWA
E. 29366000
H. 141600
F. 5860
(20) BATTICALOA
(12) KURUNEGALA
E. 176778000
H. 957600
F. 39540
(11) MATALE
E. 54031000
H. 275900
F. 11420
(8) KANDY
(10) BADULLA
(21) AMPARAI
E. 48038000
H. 242600
F. 10040
(1) COLOMBO
E. 463160000
H. 2548800
F. 104890
(7) KEGALLE
H. 585100
F. 24210
(9) NUWARA ELIYA
H. 539700
F. 22340
(22) MONARAGALA
E. 34974000
H. 170000
F. 7030
(2) KALUTARA
E. 125231000
H. 671400
F. 27790
(6) RATNAPURA
E. 112982000
H. 603400
F. 24970
(5) HAMBANTOTA
E. 59457000
H. 305000
F. 12660
(3) GALLE
E. 125363000
H. 672200
(4) MATARA
E. 100724000
H. 536300
F. 22150

This shows a complete picture, from which planners could design a production strategy to cover the next five years. Although the projections set would seem to be hard to achieve, it must also be emphasised that if the object is to re-utilize the relevant activities suitably, vest responsibility on the right personnel, and set the targets properly and correctly it is essential that targets could, and should be achieved in a fast developing country even at a reasonably longer date. These projections may be viewed as a way of forecasting the future on the basis of certain assumptions. Since a separate Ministry has been created to handle the subject, and also considering the importance and urgency, of the situation, the nation expect positive results without resting on ambiguities .

Demand is a function of a number of variables, as given below:

$$D = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, \ldots\ldots\ldots\ldots\ldots x_n)$$

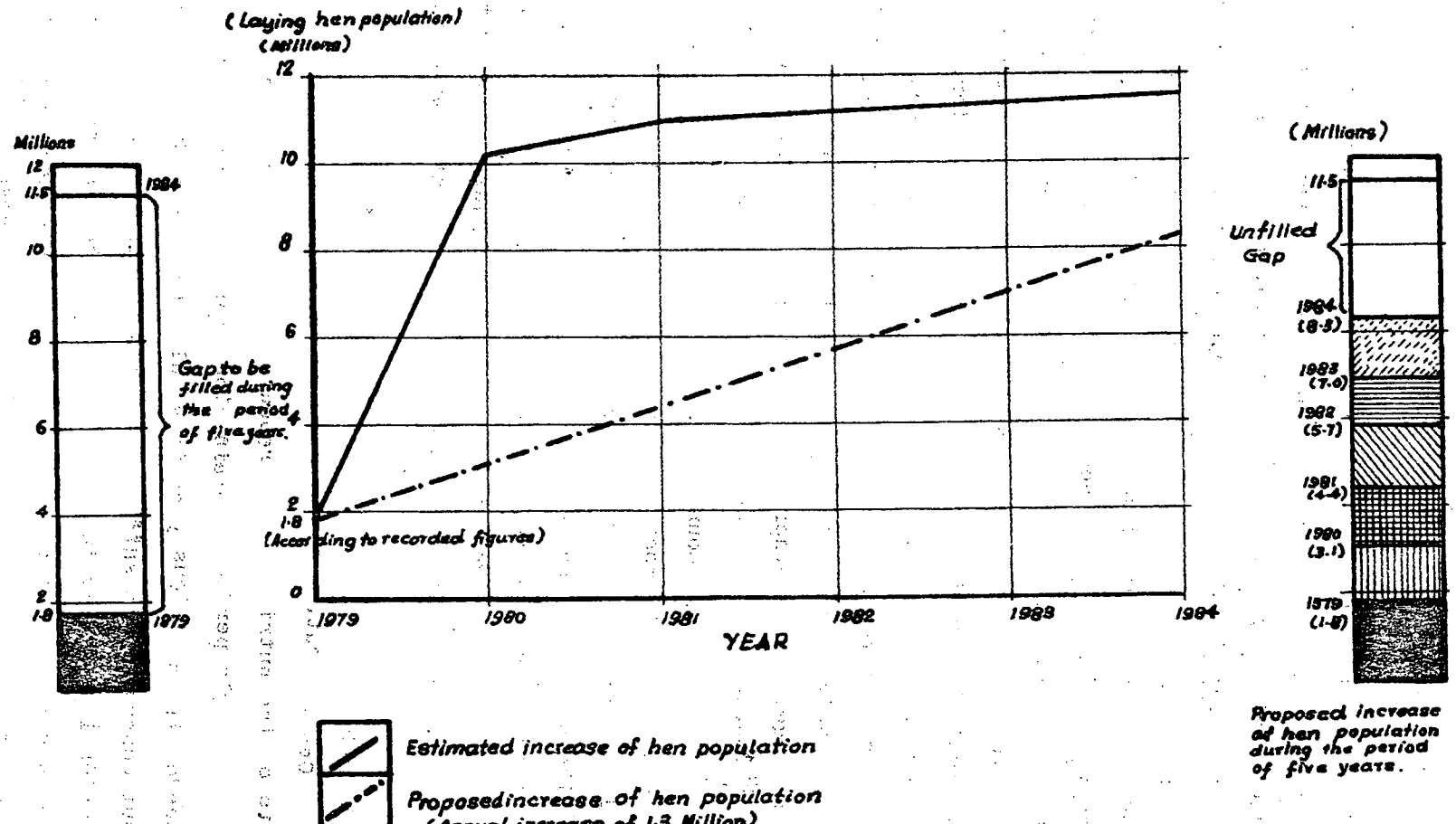
x_1 = disposable income
x_2 = price
x_3 = availability
x_4 = prices of the substitutes
x_5 = availability of the substitutes
x_6 = religious beliefs
x_7 = individual tastes and habits
x_8 = weather conditions

Some variables are of a more permanent and fundamental character, and lie beyond the control of the seller. On the other hand, variables arising from and attributable to, prejudices or bias, such as religious beliefs, individual tastes, habits, etc., can be overcome of their effect softened and reduced by a successful and well organised demand activation drive. A separate in-depth study to understand and analyse the causes of demand variation would be a help from both practical as well as theoretical view points.

In urban areas even low income receivers consume eggs as part of their regular diet, while in rural and estate sectors even high income earners would not evince such a high preference for consumption of eggs. Apart from the dominating economic factor this might also be partly

Figure: 6

ESTIMATED INCREASE OF HEN POPULATION (INTENSIVE SECTOR) NEEDED TO ATTAIN THE EGG PRODUCTION TARGETS INDICATED IN TABLE-7.



due to their unawareness of the importance and value of eggs as an article of food, and partly to general apathy and indifference. (Vide, Tables (9) & (10).

With regard to actual consumption of eggs it was evident that there is a pronounced preference, and hence a keener demand, for "village" poultry eggs as compared to commercially produced eggs. This is probably due partly to the deeper colour of the yolk, a natural preference for its tastier 'falvour', and also a common and generally held but often undeclared belief in its greater nutrient value. It is, however, a fairly well-known fact that some hens lay brown eggs, and that the yellowish colour of the yolk can be obtained even in farm eggs by giving 'green' meals. On the other hand, it has been scientifically proved that there is absolutely no difference between the different varieties as far as nutritive value is concerned. The only tangible difference is that crafty traders are able to fleece their more naive and simple customers, and charge about five extra cents per egg, for no other reason except the appearance of greater strength presented by the brown colour of the shell. In actual fact if the brown eggs are 'country eggs', then their prices should be much less, because for the most part their costs of production are virtually negligible. When the birds are raised by the 'free method' they move about like scavangers and collect food from the homeyards and fields, and in this way get themselves fed. Occasionally small quantities of broken rice are given to them. Sanitary requirements or the need for vaccination against disease, hardly enter into consideration.

2.3 CONSUMPTION

2.3.1 General Pattern

Inspite of the nutritionists' repeated stressing of the importance of eggs as a nearly perfect protein food for human beings, people have not heeded it as seriously as it should have been. Even the producers, without consuming in sufficient quantity a most valuable nutritional food which is actually in their hands, for the most part sell their product and with the proceeds sometimes, buy food of poorer quality, both in terms of nutritional value as well as freshness.

TABLE 9 :- CONSUMPTION OF EGGS (FEBRUARY 1979)

1 Name of the surveyed area	2 No. of farmers	3 Total production	4 Fresh	5 %	6 Damaged	7 %	8 Total	9 %	10 Per household	11 Per capita consumption (taken family size as 5)	12 Per capita consumption (fresh eggs)
Seeduwa	40	75000	654	0.8	834	1.1	1488	1.9	37.2	7.4	3.2
Negombo	39	128000	741	0.5	506	0.3	1247	0.9	31.9	6.3	3.8
Ja-ela	30	78400	562	0.7	506	0.6	1068	1.3	35.6	7.1	3.7
Wattala	30	48400	576	1.1	556	1.1	1132	2.3	37.3	7.5	3.8
Marawila	30	98000	657	0.6	718	0.7	1375	1.4	45.8	9.1	4.3
Puwakpitiya	30	247200	120	0.04	1985	0.8	2105	0.8	70.1	14.0	0.8
Dehiwala	30	195400	996	0.5	1073	0.5	2069	1.0	68.9	13.7	6.6
Moratuwa	20	77800	423	0.5	366	0.4	789	1.0	39.4	7.8	4.2
Angoda	20	27200	357	1.3	389	1.4	746	2.7	37.3	7.4	3.5
Beruwala	10	84600	186	0.2	315	0.3	501	0.5	50.1	10.0	3.7
Total/average	279	1060000	5272	0.5	7248	0.6	12520	1.1	44.8	8.9	3.7

Source : Based on survey findings

In most villages, farmers do 'irrational selling' of their backyard produce without consuming any part of it. According to our field survey 279 farmer households had consumed only 1.1% of one months' egg production of their own farms, i.e. 0.5% fresh eggs and 0.6% damaged eggs. As shown in Table 9 a household consumes less than 50 eggs and the per capita consumption of fresh eggs is about 3.7 eggs per month. Undoubtedly this also includes the share offered to visiting relatives and friends. In that case, real per capita consumption may be even less.

It was also revealed in the course of the investigation, that most of the producers even sell their damaged eggs at a lower price without retaining them for their own use. The data given in Table 9, however, does not show the exact situation, since due to a common human weakness in the desire to 'show off', suppliers evinced a tendency to give the interviewers a somewhat exaggerated figure of their own consumption of eggs. The correctness of this conclusion could also be verified by an examination of the household expenditure pattern with special reference to expenditure on animal food products, as in the Table 10 below:-

TABLE 10:- SRI LANKA HOUSEHOLD EXPENDITURE PATTERN ON ANIMAL PROTEIN FOOD ITEMS.

	Ceylon Consumer Finance Surveys			Ceylon Socio-Economic Survey 1969/70			
	1953	1963	1973	All Island	Urban	Rural	Estate
	%	%	%	%	%	%	%
Animal products	15.0	20.7	1.4	9.8	26.6	18.3	15.8
Fish	7.8	8.4	3.4	1.8	13.3	11.1	7.7
Meat	2.3	5.4	1.9	3.0	5.5	2.3	3.2
Eggs	1.0	1.9	1.2	1.2	2.0	1.0	1.0
Milk	3.9	5.0	3.0	4.1	5.8	3.6	4.0

Source : Socio-Economic Survey of Sri Lanka 1969/70 special report on food and nutritional levels in Sri Lanka, Department of Census and Statistics.

It is a matter of common knowledge that malnutrition prevails particularly amongst those in the income classes below the Rs.600/- (per month) household income group. This category constitutes at least one half of the entire population of the country. While accepting the importance of the price factor looked at from the point of view of its nutritive value, increased consumption of eggs should be popularised among the lower income earners.

In this connection, it is of importance to realise that the dietetic composition of the peoples' food is influenced and determined not only by economic factors, but often and to an even greater degree by non-economic factors such as agro-ecological, sociological and religious considerations as well as by individual tastes, and eating and culinary habits. In the case of Sri Lanka, where religion plays such a predominant part in the daily life of the people, it would in the first instance be necessary to convince the people, and in particular the rural peasantry, that there is in reality no religious bar to eating of eggs since 'Vegetarian eggs' in particular do not involve the taking of life in any form, being biologically totally unproductive and infertile. Hence, a campaign to promote and popularise the habit of using 'vegetarian eggs' as food should take high priority in such a programme.

In India, an immense publicity campaign was carried out to popularise egg eating, as a result of which people were made aware of the protein value of eggs and the existence of "vegetarian" eggs. The per capita consumption which was barely 7 about hight years back is now 19. In Sri Lanka, too, where the vast majority of the population believe that eggs contain potential life and hence, eating eggs is a sinful act, a valuable lesson can be learned from the Indian experience.

It has to be recognised however, that it is likely to take a considerable amount of time before consumers are persuaded to adopt a new egg consumption pattern, since old habits die hard. Nevertheless it will be necessary even at the cost of a special effort to convince particularly the more 'conservative' type of consumers that this is a wrong notion. Such a campaign would, in the long run, help to make the poultry industry

a popular and paying enterprise throughout the country.

The prevailing trend in the egg consumption pattern of the country emphasises the enormous predominance of the upper income group as almost the only consumers of eggs. Virtually any real egg consumption is seen only after the Rs.800/- (monthly income) threshold is crossed, that is to say among less than 15% of the population. (According to today's prices and living conditions this income level would be at least Rs.1000/-- per month) Table 11 illustrates this very clearly.

In 1973 per capita egg consumption in the urban sector was 24.8.[1] The urban Family Budget Survey of 1977[2] indicates for Colombo city, an average annual per capita consumption of 31 eggs, which is fairly comparable, and consistent, with the estimate in the earlier study. (Consumer Finance Survey 1973).

If this same 25% increase of egg consumption in the urban sector can be considered as a true indicator for the whole island, it would seem quite reasonable to take 18 eggs as the present per capita consumption of the country. But the official figures show a consumption rate of 30,which seems difficult to reconcile with the available cross-sectional data (See figure 2).

TABLE 11:- CONSUMPTION OF EGGS (INCOME AND POPULATION-WISE)

Income group	% of the population	% of the egg consumption
0/ 400	49.3	4.5
401/ 800	35.2	4.5
801/2000	13.4	32.5
2001/3000	01.1	24.1
3000/	0.6	34.6
Income group	**% of the population**	**% of the egg consumption**
2000/	1.7	58.7
800/1999	13.4	32.5
800/	84.5	08.5

Source: Consumer Finance Survey - 1973 (Central Bank of Ceylon).

[1] Consumer Finance Survey 1973, part II (Central Bank of Ceylon).

[2] The urban Family Budget Survey of 1977 (Dept. of Census & Statistics.

The Table shows that 15.1% of the population i.e. those who receive an income of over Rs.800/-, consume 91.2% of the total available supply. In other words 84.5% of the entire population account for only 8.5% of the total consumption of eggs. This income-wise maldistribution of egg consumption, emphasises sufficiently the urgent need for a re-constitution of the consumption pattern, in order to contribute towards the building up of a healthier nation. Table 12 below illustrates more vividly the character of this maldistribution.

TABLE 12:- ABSTRACT OF BALANCED DIET TABLES (M.R.I. 1969) SHOWING ESTIMATED ANIMAL PRODUCT REQUIREMENTS

Age(Yrs.)	Children			Men			Women			
	1-3	4-6	7-9	10-12	13-19	20+	13-15	16-29	29+	Pregnant/ lactating
Animal foods (g/day)	28	42	56	84	84	84	56	84	84	84
Milk equivalent (g/day)	280	224	224	140	140	84	140	140	84	280

Source:- Medical Research Institute, Colombo.

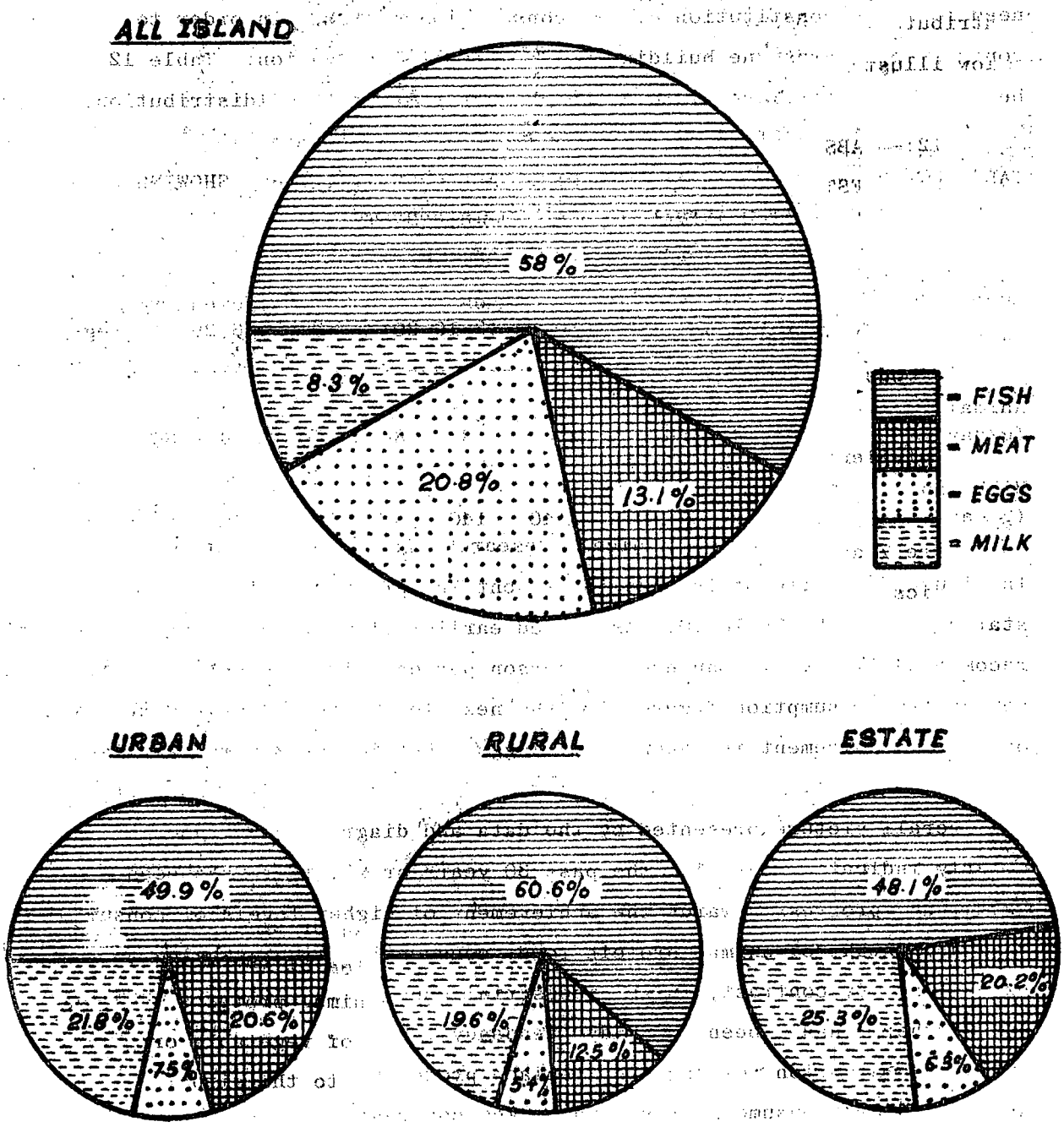
In figure 7 an attempt is made to present in greater relief the statistics of the Table 10. As stated earlier if we take the nutritionists' recommendation viz. ½ an egg per person per day, it is possible to estimate per capita consumption figures for the next few years. Yearly per capita optimum requirement is taken as 180 eggs. Details are shown in figure 8.

The overall picture presented by the data and diagrams given above clearly indicate that, for the past 30 years or so, there has been hardly any progress towards the achievement of higher levels of consumption and intake of animal protein food, consumption of eggs being no exception. By contrast, in the industrial countries of the West and in Japan, there has been a steady tendency for animal proteins, particularly consumption of eggs, to replace proteins of vegetable origin, as incomes of consumers rose, in marked contrast to the situation in Sri Lanka.

Figure: 7.

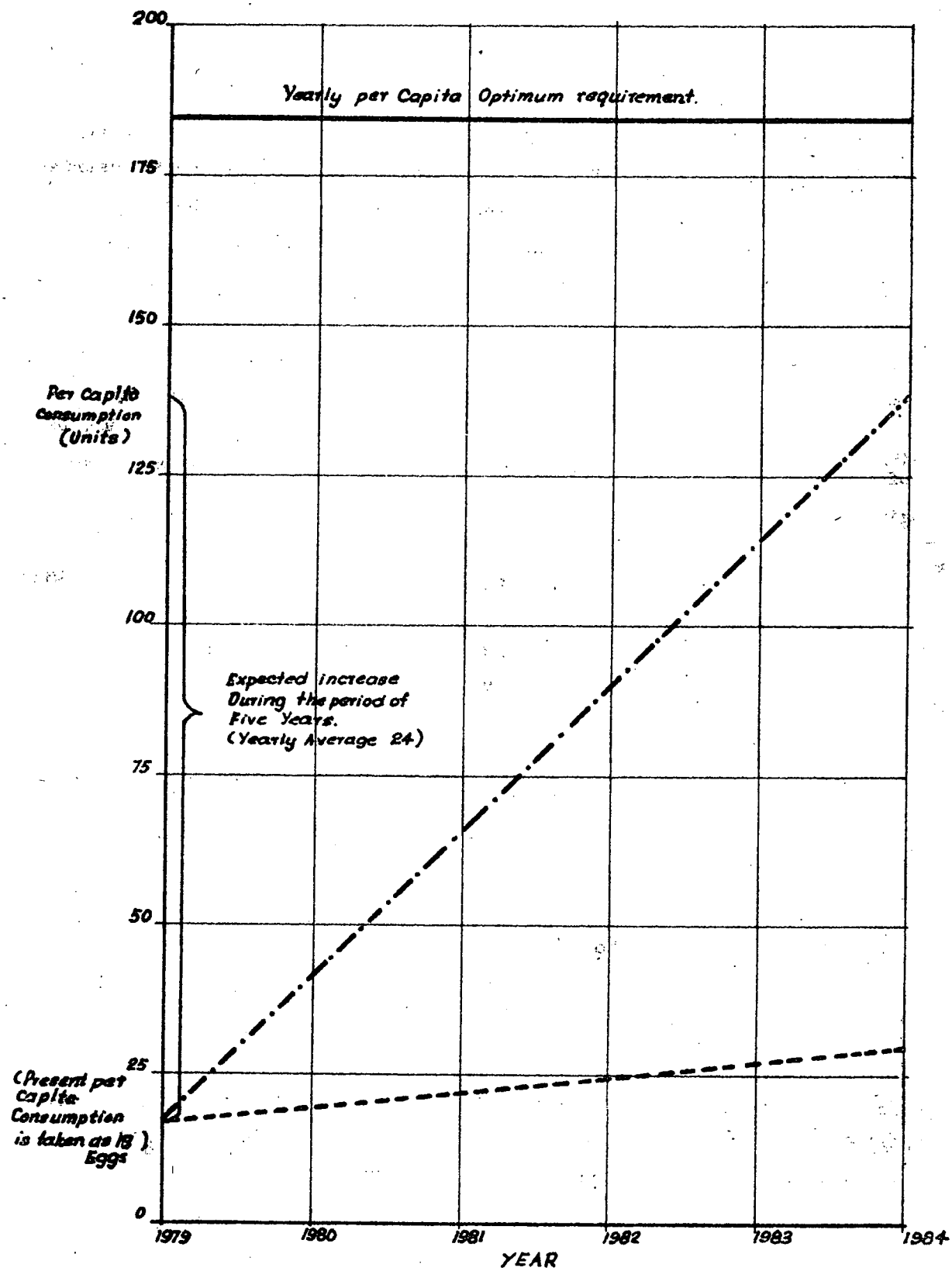
DISTRIBUTION OF THE TOTAL EXPENDITURE ON ANIMAL PROTEIN FOODS

(TOTAL EXPENDITURE ON ANIMAL FOODS TAKEN AS 100)



SOURCE :- Based on consumer Finance Survey of 1973 (Central Bank of Ceylon.) and Socio Economic Survey of 1969/70 (Dept. of Census & Statistics).

ESTIMATED PER CAPITA CONSUMPTION RATES OF EGGS (1980 - 1984)



- Optimum per Capita requirement (According to recommended Nutritional Standards.)
- Proposed per Capita Consumption increase (According to estimates of Table. 7)
- Estimated per Capita Consumption (According to past records. i.e. assuming normal rate of increase

2.3.2 *Catering industry*

There remains to eb considered a sub-section of the poultry industry none-the-less namely the local catering industry. Taking the industrial sector of the entire country as a whole, while it is true that the catering industry handles only about 1% of the total production and disposal of the output of eggs in the country, its impact on demand and prices cannot be measured by this fact alone. Particularly in the principal towns, the catering industry contributes significantly towards the consumption of eggs, and hence exercises a marked influence on the general price-level of eggs throughout the country. The figures of egg consumption of the leading caterers in Colombo and the suburbs given below in Table 13, examined along with figures of total consumption, also show that in the chief towns a not inconsiderable proportion of the total egg consumption of the area is handled by the catering industry.

TABLE 13: QUANTITIES OF EGGS USED BY LEADING CATERING INSTITUTIONS, FOR THE YEAR 1978, (COLOMBO AND SUBURBS)

Name	No. of eggs
Perera & Sons, Colombo 3.	739,200
Elephant House, Colombo 2.	737,000
Green Cabin, Colombo 3	492,000
Bake House, Colombo 10	396,000
Grossvenor Caterers, Colombo 3	300,000
New Lanka Caterers, Nawala	168,000
Ceylon Biscuits Ltd., Pannipitiya	36,905
Bistro Caterers, Colombo 11	27,200
William Confectionary Ltd. Dehiwala	15,375
	2,911,680

Incidentally, it may be mentioned that, taking the above figures as a base, the consumption of eggs by the catering industry of the country could be roughly estimated at 4 million annually.

2.4 *ADDITIONAL FACTORS INFLUENCING DEMAND AND PRICES*

2.4.1 *Tourist Industry*

Tourism, in recent years, has become a fast developing area of the economy of Sri Lanka. Tourist arrivals for the year 1979 were estimated to reach the quarter million mark. When compared with the figure for the same period of the previous year this indicates a 30% increase . Apart from a number of newly proposed star class tourist complexes awaiting construction, almost all the existing tourist hotels are launching their own expansion programmes under the stimulus of the enormous profits being earned by these establishments. The government for its part, has planned for a target of approximately 500,000 (Half a million) tourists by 1984.

Against this almost phenomenal rate of expansion, one is tempted at first sight to imagine that the result would be a very big increase of egg consumption. The fact is, however, that as a whole the tourist industry absorbs only about 3% of the total egg production of the country. (Vide, Table 14 below).

TABLE 14:- CONSUMPTION OF EGGS BY THE TOURIST INDUSTRY (1977/78)

Name of the town	No. of eggs consumed	%
1. Colombo	2410407	33.1
2. Beruwala (Bentota)	882495	12.1
3. Kandy	768958	10.5
4. Negombo	615405	08.4
5. Mt. Lavinia	509670	07.0
6. Polonnaruwa	361601	04.9
7. Hikkaduwa	333865	04.5
8. Trincomalee	319452	04.3
9. Anuradhapura	246150	03.3
10. Nuwara-Eliya	195600	02.6
11. Ratnapura	164280	02.2
12. Bandarawela	143875	01.9
13. Tangalle, Tissa	135430	01.8
14. Batticaloa	101840	01.4
15. Jaffna	69600	0.9
16. Matara	10900	0.1
	7269528	100.0

If the large number of registered and unregistered tourist guest houses that are being presently operated are also included, total egg consumption in the tourist industry can be put at about 8 million.

The breakdown of figures of egg consumption by the tourist industry, presented as a percentage of the total egg production of the country is therefore:-

i. According to the estimates of this study = 2.8%

ii. According to the Official Statistics = 2.02%

The mere smallness of this percentage is by itself, however, no index to, or measure of, the influence which the tourist industry exercises on egg consumption as a whole, since the popular tourist areas such as Colombo, Bentota, Kandy, Negombo, Mr.Lavinia, Nilaveli etc., exert a highly disproportionate pressure on the demand for eggs within these areas, causing its price to rise abnormally. In so far as this rise in egg prices, cannot be confined to the tourist demand only, the resulting scarcity of eggs in the area will raise prices similarly to the local population. With the rapid spread of tourist centres throughout the country, the high price of eggs which tourist hotels can easily afford to pay will also come to be imposed on the local population. It was also found in the course of the survey, that some producers had come to pre-arranged agreements with tourist hotels to supply eggs at a fixed higher price for specified periods of time irrespective of the prices prevailing in the outside market. This type of agreements definitely interferes with the normal demand and supply reactions and behaviour of the price mechanism. Naturally, the higher prices affect the demand and supply situation.

If the target of tourist inflow as planned is in fact achieved, egg consumption in the tourist industry may increase two-fold and perhaps even more during the next few years, and bring about a corresponding increase in both demand and price.

2.4.2 *Liberalised Trade Policy*

After the present government came into power in 1977 nearly all import restrictions have been removed, and a "liberal" import-export policy has followed. The Central Bank Report explained and elaborated this policy in greater detail:-

> "As a corollary of the exchange rate reform a comprehensive trade and payments liberalisation was implemented simultaneously. Imports were liberalised except in the case of a few items....."[1].

With the introduction of this new policy, a major expectation was that foreign investments would flow in on a big scale. The Free Trade Zone, (F.T.Z) Mahaweli Ganga Development Scheme and Integrated District Rural Development Projects are the principal areas in which this policy has been applied most freely. Even outside F.T.Z. a considerable volume of foreign investment has been reported to be taking place.[2]

Under the stimulus of this new economic environment, a vast amount of foreign capital as well as personnel in different capacities, are to be brought in, generating wider social and economic changes. Circulation of money will increase rapidly. Undoubtedly this state of affairs will be felt directly or indirectly in the demand for eggs, and then in the price as well. If the planners and authorities concerned fail to evaluate and forecast the future correctly and in time, it is perhaps not unlikely that eggs will once again become a "luxury food" item, or else the country may even have to return to the pre 1963 'import era' of eggs.

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1 Review of the economy - 1977 - Central Bank of Ceylon, p.3.

2 'Private foreign investments in Sri Lanka outside the Free Trade Zone has increased phenomenally with 66 projects representing a total investment of Rs.2095.5 million.....within the first six months this year....." - Ceylon Daily News, 2nd Sept. 1980, p. 1.

2.4.3 *High Prices and Scarcities of Substitutes*

Closest and most competitive animal protein substitutes for eggs are fresh fish, meat (beef), milk and dried fish. One feature common to all these items is their general scarcity. Of all the foods of animal origin the only freely purchasable item, which also came within the reach of the average income earner was eggs. In the light of the recent rapid price increases and fluctuations it could perhaps, be argued that vegetables, too, may figure as a competing substitute, and high prices of vegetables could bring a corresponding pressure to bear on the demand for and price of eggs.[1] Over and above the high prices arising from the general scarcity, open market prices of foods of animal origin having a special significance on demand due to their possession of a high protein content, have registered high price increases during the past five years or so, as shown in Table 15 below:

TABLE 15:- OPEN MARKET PRICE CHANGES IN ANIMAL ORIGIN FOODS

Item	Unit	1974	1980	Percentage of price increase
Fresh fish	1 lb.	3.00	10.00	233%
Dried fish	1 lb.	4.00	15.00	275%
Beef	1 lb.	3.00	7.50	150%
Milk	1 pint	.70	2.00	186%
Eggs	unit	.50	.80	60%

(Prepared on current average prices)

The statistics given above show that the rise in egg prices is low when compared with the other price increases. During the past five year period the prices of nearly all animal proteins rose by 150% to 200% or more, with the sole exception of eggs.

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[1] For a detailed description about seasonal variations in supply and prices of vegetables, see, "Factors Influencing Vegetable Prices" (A study of the vegetable economy in Sri Lanka) by P.J.Gunawardena & Athula Chandrasiri. (1980), ARTI, Colombo.

With regard to beef, the government has recently banned the slaughter of female cattle, while simultaneously a strong and insistent anti-beef consumption campaign is spreading across the country. Realistically speaking the present production of fish is insufficient to meet the increased demand arising from general population growth. To add to the complexity of the problem came the cyclone.

> ".....which ravaged the coastal areas in the Eastern Province destroying some 6000 boats - 1/6 th of Sri Lanka's fishing fleet. This meant a loss of an annual 30,000 tons of fish which constitutes 1/8 th of the total annual catch."[1]

Furthermore, it was reported that major dried fish producing countries have reduced or stopped its production, with the inevitable result of scarcity and high prices. In the case of milk, production in Sri Lanka declined in 1978, and the Milk Board's collection alao dropped[2], correspondingly. Even in 1979 milk production has dropped further by 7% from the 1978 level.[3]

It was a natural result of these factors affecting the nearest substitutes, that the demand for eggs has registered an appreciable increase.

2.4.4 *Seasonal Variations*

The influence of seasonal variations also makes its impact felt on the demand for and price of eggs. Particularly, in festive seasons such as Christmas, the Sinhala, and Tamil New Year, Ramazan and Hadji, an exceptional new demand had been experienced. This sharp increase of demand was naturally reflected in price. High prices may sometimes be more due to a manipulated or artificial demand created and promoted

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1 'Sun' 13th September 1979, p. 7, article on 'My critics on more flights of fancy' by Festus Perera (Minister of Fisheries).

2 Annual Report of the Central Bank of Ceylon, 1978, p.28.

3 Annual Report of the Central Bank of Ceylon 1979, p.31.

by a few dealers rather than a 'real' demand. Table 17 tries to illustrate this aspect of seasonal change. Another factor is the weather. During times of rough seas and squally weather, fishermen are able to get only a 'poor catch'. The supply of fish consequently falls and the shortage will influence the demand for eggs as a seasonal effect. This is the substitution effect on the demand for eggs. Fish supplies were estimated by the Central Bank as having dropped by 6 percent during the first five months of 1979 when compared with the same period in 1978.[1]

TABLE 16:- FLUCTUATION OF EGG PRICES (CTS.)(DURING FESTIVAL SEASONS)

	1976	1977	1978	1979
Sinhala & Tamil New Year	.53-.66	.55-.62	.65-.76	.68-.69
Christmas	.65-.72	.67-.74	.78-.85	.78-.90
Hadji	.65-.68	.58-.67	.61-.75	.66-.70
Ramazan	.60-.68	.56-.60	.61-.75	.72-.75
Average price	.62	.57	.70	.72

Source: Department of Marketing Development

Table 16 above , is based on the prices which prevailed at the Tripoli Market. Price fluctuations in the open market are, however, likely to be sharper. The Department of Marketing Development has tried to stabilise egg prices during festive times by stockpiling. But the attempt was not a complete success mainly due to insufficiency of the stock.

Since, generally price elasticities of demand for agricultural products are less than unity, it follows that, ceteris paribus, an increase in supply will cause total revenue and hence prices or average revenue also to fall. Thus, the resulting restriction of supply would benefit producers at the expense of consumers. Because the price elasticity of demand is low, the potential price fluctuations tend to be fairly high and constitute a strong temptation to speculative traders to wreck any price stabilization scheme. However, in 1979 the price fluctuation factor appears to have played a less important role.

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1 'Sun' - 28th September 1979, p.8.

It is a clear fact that year after year the same pattern of price fluctuations is repeated with hardly any change. In 1978 during Ramazan, Hadji and Sinhala & Tamil New Year periods the range of price fluctuation has amounted to 14 cts., 14 cts., and 11 cts. respectively.

A deviation of 15 cts., from the average price for the year, could be seen at Christmas time. It is to be noted that generally the biggest fluctuation gap occurs during Christmas time. Under the prevailing inflationary price situation there is little doubt that unusually high price variations can be expected to prevail during future festive seasons.

TABLE 17: VARIATION OF EGG PRICES BY VARIATION IN THE PRICE OF FISH ACCORDING TO MONSOONS 1978/79

PERIOD	FISH PRICE (variation)	%	EGG PRICE (variation)	%
South West Monsoon(April-July)				
Seer	6.50-8.60	32.3	.65-.74	13.8
Paraw	5.00-7.50	50.0		
Mullet	3.90-5.90	51.2		
Balaya	4.65-6.40	37.6		
Kelawalla	5.10-6.80	33.3		
Hurulla	2.50-4.25	70.0		
Salaya	2.00-2.50	25.0		
North East Monsoon(Nov.-Feb.)				
Seer	7.90-9.00	13.9	.61-.80	31.1
Paraw	6.50-7.25	11.5		
Mullet	4.70-5.35	13.8		
Balaya	4.85-5.80	24.6		
Kelawalla	5.35-6.40	19.6		
Hurulla	2.00-3.00	50.0		
Salaya	2.00-2.25	12.5		

Source: 1. Ceylon Fisheries Corporation.
2. Department of Marketing Development.

In this analysis calculating of cross-elasticity of demand between fish and eggs is most appropriate.

$$\eta_x = \frac{\text{Percentage change in quantity demanded of commodity } x}{\text{Percentage change in price of commodity } y}$$

Generally, substitute goods will always have positive cross elasticities. Since, fish and eggs seem to be close substitutes, a rise in fish prices leads to an increase in the consumption of eggs. The closer the relation of substitutability the larger is the numerical value of the cross-elasticity and vice-versa. If the inter-relationship of the two goods concerned is small, it could be expected that their cross-elasticities would be close to zero.

The following computation indicates that a close relationship prevails between the variation of fish prices and consumption of or demand for eggs.

SOUTH WEST MONSOON (APRIL-JULY) 1978

	old amount	New amount	Change in amount	Average amount	Percentage change	Cross-elasticity
Fish - price (per lb. average)	4.32	5.99	+ 1.76	5.11	34.44	5.58
Eggs - quantity	329945	350969	21024	340457	6.17	

NORTH EAST MONSOON (NOV.1978-FEB. 1979)

	old amount	New amount	Change in amount	Average amount	Percentage change	Cross-elasticity
Fish - price (per lb. average)	4.75	5.58	+ .83	5.16	16.08	6.35
Eggs - quantity	309382	317312	7930	313347	2.53	

(Monthly total sales of the Department of Marketing (M.D) is taken as an index to the trend of the demand. Although the M.D. handles only a small percentage of the total supply of the country, the fact that its sales are widely distributed in the country, makes it possible to consider the figures of sales given by the M.D. as an indicator of

general trend. In the absence of more accurate data the indications given by the final figures therefore, throw sufficient light to enable the prevailing position to be analysed with precision so sufficient as far as the present study is concerned).

Although day to day variations in fish prices are not reflected with any kind of precision such as could be found in the daily quotations of egg prices as reported by the Marketing Department, the steady upward trend in both demand and price is nevertheless shown in the department's recorded figures of demand as reflected by its sales figures. Hence, while the Marketing Department's quoted prices do not always indicate and, in fact sometimes tend to obscure and conceal, the true picture of the open market price fluctuations, they nevertheless constitute a valuable parameter and index, recording the actual impact of price and income changes on consumer demand thus illustrating the resulting "practical" market situation, and prove, in our opinion, the essential correctness of the view which we have sought to present and elaborate in the course of this study.

CHAPTER 3

SUPPLY AND PRICES OF INPUTS

In the poultry industry very often, the supply of quality inputs at the correct time and in the requisite quantities is of great importance, since in the absence of the regular inflow of inputs production cannot be carried on continuously.

3.1 *FRANCHISE AGENTS AND THEIR ACTIVITIES*

At present there are about 18 leading franchise agents operating throughout the country. They sell day old chicks from parent stocks imported regularly each year, some of these being also used to build up and expand poultry farms of their own. Apart from these private franchise agents, the government also undertakes the production and sale of stocks of crossbred lines directly from its own principal breeding station at Karandagolla Farm, besides distributing supplies through the net work of government farms and veterinary officers. Details of these activities are given in Tables 18 (a) 18 (b), and 18 (c).

Some of the less well known hatcherymen (non-franchise agents) sell their 'day olds' at lower price than the more reputed franchise agents. A number of complaints have been made by poultry keepers that these smaller poultry businessmen have frequently cheated their customers by selling male chicks as pullets and other such ruses. Furthermore, it is a fact that most of these poulterers do not maintain the places of their incubator operations and even the actual cages under sufficiently clean and hygienic conditions. Hatcherymen, in particular, should be especially careful in respect of these matters. Since poultry are more susceptible to disease than most other farm breeds, a few selfish businessmen by their carelessness and indifference on this account can easily ruin the industry of an entire area by selling a few infected birds.

TABLE 18(a) CLASSIFICATION OF NAME, BRAND NAMES USED AND INCUBATOR CAPACITY OF CHIEF FRANCHISE AGENTS

PRIVATE SECTOR

	NAME	IMPORTING COUNTRY	BRAND NAME		INCUBATOR CAPACITY
			LAYER	BROILER	
1.	Nell Farm & Hatchery(Walahapitiya)	U.S.A.	H & N	H & N	37,000
2.	Three Acre Farms (Meegoda)	U.S.A. & Japan	Hyline	Reckhorns	140,000
3.	Bairaha Farms (Katana)	Holland	Hisex	Hybro	23,000
4.	Starling Poultry Products (Battaramulla)	U.K.	Ross Ranger II	Ross I	67,000
5.	Nagahawatta Farms (Dalugama)	U.S.A.	Garber	G 200 -	22,400
6.	Dalugama Hatcheries (Dalugama)	U.S.A.	Welp-line	Welp-rock	26,300
7.	Shetna Farm (Gampola)	U.K. & Thailand	BABCOCK	Arboracres	20,000
8.	Maris Brothers' FArm (Ja-ela)	U.S.A. & Holland	Arbor-Acres	Acres Hypeco	67,000
9.	Mahaberiyatenna Farm (Teldeniya)(N.L.D.B.)	U.S.A.	-	Cobbs	79,200
10.	Goto (Ceylon)Poultry Farm (Moratuwa)	Japan	Goto	Goto	25,000
11.	River Valley Farm (Bandarawela)	U.K. & France	Shaver	Starbro	42,000
12.	K. & K. Poultry Farm (Negombo)	Holland & Spain	Rosella	Andersons	14,500
13.	Aluthwatta Farm (Negombo)	U.S.A.	Parks-Keystones	Parks Meat Makers	22,400
14.	Kandy Farms (Kandy)	U.S.A.	Mini	-	15,000
15.	Star Farm & Hatchery (Beruwala)	Japan	-	PILCK	30,000
16.	Diyagala Boys' Town Farm (Ja-ela)	U.S.A.	IDEAL	IDEAL	8,000
17.	Christhombu Farm (Bulathsinhala)	U.S.A.	-	Hubbard	32,000
18.	St.Xavier's Farm (Ja-ela)	Israel	-	Kabir	2,000
				TOTAL	672.800

(Prepared on information gathered from the interviews with the franchise agents)

TABLE 18 (b)

State Sector

NAME	IMPORTING COUNTRY	BRAND NAME	INCUBATOR CAPACITY
Karandagolla Govt. Farm	U.K.	Light Sussex R.I.R. White & Brown leghorns Australorp RHO White	188,000
Govt, Farm, Walpita		--do--	15,000
Govt. Farm, Ambepussa		--do--	9,000
Sri Lanka School of Agriculture (Kundasale)		--do--	4,200
University of Peradeniya (Faculty of Agriculture)		--do--	10,000
Govt. Farm, Marawila		--do--	39,000
		Total	265,200

TABLE 18 (c)

NAME	INCUBATOR CAPACITY
1. Halpe Hatcheries, Kandana	7664
2. St.Xaviers' Farm, Ja-ela	2000
3. Aruni Poultry Farm, Kandana	4500
4. Mount Hatcheries, Mount Lavinia	1500
5. St. Anthoney's Farm, Negombo	18000
6. Silver Land Poultry Farm, Negombo	15000
7. Burmans - Ratmalana	30000
8. Trinity College Farm, Pallekele	2800
	81464

At present, no guarantee or assurance whatsoever is expected from the franchise agents. For example, the loss of about Rs.500/--incurred on the purchase of 100 day old chicks is by no means a simple matter from the point of view of a poor farmer. On the contrary the additional cost of ensuring clean and healthy breeding condition is a negligible

factor to a franchise agent who gathers in a total net profit margin of about 100%. If either an abnormally high rate of baby chicks mortality, or incorrect sexing occurs as a result of wilful negligence, or due to some accidental circumstance, farmers will, in either case have to suffer in almost complete silence, no matter how large the amount of the loss might be. Under these circumstances, it is surprising that no regulation or arrangement has so far been made to protect the farmer.

The Tables given above show clearly the existence at present of an incubator capacity within the country of somewhere around 1.1 million. The removal of import restriction and exchange controls will attract a number of new comers to the industry soon, while those already in it will expand their enterprises.

Another connected aspect is the manufacture of incubators. Three local manufacturers were interviewed. It was felt that, by giving proper assistance, and some sophisticated training, there is a real possibility of assuring the manufacture of high quality incubators. The manufacturers were mechanically skilled and needed only some little instruction in giving a better finish to their product, to enable them to compete with the imported incubators. The most noteworthy and encouraging feature of their 'set up' is that they are all, without exception, "Self made engineers". About 40 to 50 (kerosene) incubators have been sold yearly by each of them priced at Rs.350/- and Rs.640/- for a capacity of 150 and 300 eggs respectively.

Incubator capacities of this type were not included in the earlier figures, in the absence of complete data on them.

3.1.1 *Prices and Supply of Chicks*

Generally, the price of a day old pullet varies between Rs.4.00 and Rs.4.75. More than 80% of the farmers in our sample had bought 'day olds' at this price. Poultry keepers have to wait about 2 to 5 months to get their requirements after making an advance payment. 75.6% of the farmers in our sample have declared that they had experienced the above time lag in procuring 'day olds'.

At the interviews most of the more highly advertised names among the franchise agents informed us that they had been fully booked up to the next 3 or 4 months. This state of affairs has permitted and encouraged a monopolistic attitude and outlook to grow up among a few franchise agents, since it is clear that there is a fast growing demand for day old pullets. According to the farmers, the mortality rate of the baby chicks was generally in the range of 1% to 10%. Hylines and Babcocks are the most popular varieties. Third was Hisex. The following Table gives a more detailed breakdown of the figures:-

TABLE 19:- FARMERS' PREFERENCES FOR VARIETIES OF PULLETS

Name of the variety	no. of farmers	%
1. Hyline	58	20.7
2. Babcock	57	20.4
3. Hisex	48	17.2
4. White Leghorn, R.I.R.(Govt, farms)	37	13.2
5. ARBOR ACRES	36	12.9
6. H & N	17	6.0
7. SHAVER	9	3.2
8. WELP-LINE	8	2.8
9. Other	9	3.2
	279	100.0

Source:- Based on Field Survey Findings.

The chief centres of the Hylines are Colombo and Meegoda. Out of 58 farmers who declared a special preference to them, 45 were from Dehiwala, and Puwakpitiya. Hisex, Arbor-Acres, and H & N issuing centres were found mainly at Katana, Ja-ela and Nattandiya respectively. More than 80% of the demand came from the Marawila-Wattala area. The distance between the farm and franchise agents (issuing centre) has evidently played a more important part than other factors in determining the demand for a particular variety of pullets.

Some franchise agents import parent stocks from their foreign principals thrice or four times a year. Every one of them was found to have imported at least one parent stock a year. The only exception was the government farm at Karandagolla, which bred its own parent stocks.

3.1.2 *Profitability*

We were informed, and were subsequently able to verify, the basic correctness of the claim, that almost every franchise agent is planning to expand his business by importing new parent stocks, modern incubators, dressing plants and opening up new commercial sections etc., a fact that reflects the high profitability and the bright prospects facing the industry.

An attempt has been made below to calculate the cost of production of a day old pullet with the aid of some recent figures taken from data relating to transactions which have lately materialised between Kandy Farms and Colonial Poultry Farms, Missouri, U.S.A. Details are given below:

COLONIAL POULTRY FARMS INC. MISSOURI

June 7th 1978.

500 Colonial Trueline "MINI' parent stock females (day old) $3.00 each	-	$ 1500.00
50 Colonial Trueline 'MINI' parent stock males (day old) $3.00 each	-	$ 150.00
Shipping Charges	-	$ 271.35
Insurance	-	$ 6.60
	-	$ 1927.95
At 26th September 1979 exchange rate	-	$ = Rs.15.65
	-	$ 1500 =Rs.23475.00
	-	$ 271.35 =Rs. 4246.62
	-	$ 06.60 =Rs. 103.29
		Total =Rs.27824.91
Landing Cost per day old pullet $\frac{27824.91}{550}$	-	=Rs. 50.59

When we interviewed franchise agents, we were supplied with the following information regarding the landing cost of a day old parent pullet of the particular variety:-

	Rs.Cts.		Rs.Cts.
SHAVER	50.00	HARCO (Brown)	68.85
PARKS (Keystones)	45.00	HYPECO	50.00
ROSELLA	76.00	COBBS	48.00
ROSS RANGER II	80.00		
HY-LINE	78.00		
WELP-LINE	60.44		

On the basis of above information our calculations are as follows:-

COST OF PRODUCTION PER PULLET

1.	Landing cost per pullat (including shipping & insurance charges) (Allowing a margin for the floating rate of exchange).	78.00
2.	Feed cost (first 6 months 3 ozs. per day) Breeder Mash Rs.2020/- per M.T.)(34 lbs x.91 cts.)	30.94
3.	Feed cost (second 12 months 4 ozs. per day) (90 lbs. x .91 cts.)	81.90
4.	Housing (including water supply and electricity)	06.00
5.	Additives & Medication (allowing a big margin for emergency expenses).	15.00
6.	Labour including administrative work	25.00
7.	Incubator installation, electricity, interest on capital, packing, litter, sexing, equipments, transport etc.,	26.16
	Total cost	263.00

(For a cross checking see annex 4)

Assuming a very moderate laying percentage of 60% (70% peak and 50% slack), total production will be 216 eggs at the end of the laying period of 12 months. Taking a reasonable hatchability rate of 80%, total production would thus be 172 chicks. (Normally most breeders achieve an average laying percentage of 75% and a hatchability rate

of over 90%. Assuming a sex ratio of 1:1 there will accordingly be 86 pullets. The franchise agents themselves however, informed the researchers that a hen generally gives 100 pullets. Normally franchise agents sell cockerels at the average price of Rs.1.25 to Rs.2/00 each. At the price of Rs.1/25 each, they will be earning an income of Rs.107.50 from the sale of cockerels.

Cost of Production per Pullet is $\frac{263.00}{86} = 3.06$

(This calculation is made without taking into account the income obtained by selling cockerels, empty bags and used litter. If those are also reckoned in estimating, the cost of production would be appreciably less).

In our view, this is quite a probable estimate of the cost of production even on the most conservative assumptions. Normally most of the franchise agents sell the day old pullets at Rs.4.75 each. It is thus obvious that the profitability ranges from 55-75%. In order to calculate net cost, the above income should be subtracted from total cost. Then only will it be possible to arrive at the ex-post situation and the real cost of production. The following calculations reveal a vastly different picture about the activities of the franchise agents.

1) By selling cockerals (Rs.1.25 x 86)	107.50
2) By selling empty bags (Rs.1.00 x 3)	3.00
3) By selling the culled bird	15.00
4) By selling the litter manure (75 lbs. x .10)	7.50
Total sundry income	133.00
Total cost	263.00
Sundry income	133.00
Total net cost	130.00

Net cost of production per pullet is : $\frac{130.00}{86}$ = Rs.1.51

Thus, assuming that the franchise agents actually receive the items of income as postulated above, the fact emerges that they do receive a very high net profit of 215% or about 3 fold their capital outlay annually. This shows the ex-post situation of the performance of one breeding hen. If we pursue the calculation a little further, we get the following income-expenditure description for a single breeding hen:

Income		Expenditure	
Sale of day old pullets(4.75x86)	408.50	Total cost	263.00
Sale of day old cockerals (1.25x86)	107.50		
Sundry sales	25.50	Profit	278.50
Total	541.50		541.50

The above calculations show that a single hen brings a net profit of Rs.278.50 in 18 months or Rs.15.46 per month. Generally franchise agents import 1 to 3 parent stocks annually. Some of these stocks are in batches of 1000 and others of 500. If it is assumed that a franchise agent has imported a parent stock of 1000 chicks(which is the usual practice) in one year he should get a net profit of Rs.278,500/- during a period of 18 months or Rs.15,460/- per month. Even if an error margin of the Rs.78,000/-is indicated one is left with the figure of Rs.200,000/- as the net profit earned by the large poultry breeders in 18 months, or Rs.11,100/- per month . If the poultry breeder has imported 500 chicks only,his profit would still be in the region of Rs.139,250/- for 18 months or Rs.7,730/- per month. It is to be expected that, when incubator capacity increases the cost of production would fall dramatically, since most of the other cost items, the supply of which is highly elastic are likely to decrease as much as production increases. The consequent result would, therefore, be an increase of the possibility of marketing day old chicks at much lower prices. What has happened in real terms is to the contrary. Farmers have complained that all the franchise agents increased the price of 'day olds' when poultry mash prices rose in 1977, but never lowered these prices when mash prices came down once again in 1978. Another important point to be noted with regard to the above calculations is that they relate to prices and costs which a new comer to the industry would have to face. But the

costs applying to hatcherymen who have already been in business for the past decade or so should quite obviously be much lower.

(The selling price per 'day old' pullet indicated in the report and the discussions that follow on that price basis, have to be viewed now (Nov. 1980) against the new pullet price of the private franchise agents. i.e. Rs.6.75 per pullet. (from Rs.4.75 to 6.75, an increase of about 42%) The price rise has been conditioned by the varying exchange rate ($:Rs.) and other allied factors connected with the general inflation. It can be expected quite positively, that the franchise agents will encounter no greater changes in their profit margin).

3.1.3. *Government Farms*

An important problem that has kept on recurring in the course of this study, and has continued without any serious attempt at a solution still is the failure on the part of the Govt. farms to play a much more active and effective role in issuing 'day old' chicks to the farmers. They have the ability, knowledge, and the capacity to do it. For example Karanadagolla government farm has a modern incubator with an issuing capacity of 188, 000 chicks, per month, and a staff of highly trained personnel to operate it.

There were no incentives for innovations, no desire for creativeness, or improvement. For instance, even though, on their own testimony, there is no problem of disposal of an increased output of day old chicks, two incubators with a capacity of 4200 each, had been out of action for months at the Government Farm at Walpita. At Ambepussa Government Farm, two imported incubators with a capacity of 4500 each have been lying idle for the last three years. No sufficient attention had been paid to see these things aright even though the country is passing through a period of searching for ways and means to boost up its egg production as part of a scheme of general and overall development of livestock industry.

Karandagolla government farm has not imported a parent stock for many years. They have been experimenting to create new breeds by crossing the existing varieties, with each other. This, it is hardly necessary to point out, that it involves more advanced scientific research on poultry genetics. By contrast, the private franchie agents import new parent stock at least once a year and reap enormous profits largely because their principals being foreign specialists, do the needed research into the most efficient

breeding techniques currently known, and carry out concentrated breeding programmes the results of which they keep constantly under review. It is only after evaluating the results of hundreds and thousands of genetic crossings that they settle down to draw their inferences and present the best varieties for commercial uses.

It is strongly felt that obviously the government farms are in a better position to cater to the needs of the poultry raiser than the private franchise agents. They can sell day old chicks even at cost price. Such Govt. intervention can bring down the massive profit margin of the franchise agents and correct their monopolistic attitude towards the poultry keepers. This will help to solve not only one of the main issues affecting the rearing of poultry, but will also be a fillip to the entire industry of the country as a whole.

Even the available incubator capacity is not being used in full. Some of the private agents also are not operating at full capacity, due to various reasons. This is a matter which needs to be looked into without delay. To achieve the projected targets of egg production (vide, Table 7) not only should there be 100% use of the present incubator capacity, this has also to be increased two-fold annually.

3.2. Feed Supply

Maintaining an adeaquate supply of quality feed thus seems to constitute the life-line of the poultry industry,since feed represents about 70% of the cost of production of an egg. Hence, free availability of good quality feed at a reasonably low price is the prime consideration to which attention must be paid in any poultry production plan.

The implications of this very important component of the poultry industry are dealt at length in Chapter 4.

3.3 Diseases and Supply of Drugs and Additives

Disease is the single greatest hazard in intensive poultry production. Imported hybrid varieties, particularly baby chicks, are highly susceptible

to disease. In commercial poultry production, individual treatments are out of consideration. The golden rule that 'prevention is better than cure' applies to the poultry industry more than to any other type of livestock breeding. The most dangerous situation arises when a disease like Mareks or Fowl-Cholera breaks out in acute form sometimes necessitating destruction of the entire flock. Sound and adequate nutrition, and proper management practices, are the key to successful poultry keeping.

The more common poultry diseases in Sri Lanka are Pullorum, Ranikhet(New Castle) Coccidiosis, Coliform infections and Fowl-Pox. (vide, Table 20).

An examination of the occurrence of poultry disease would seem to indicate that densely populated and highly congested areas of human settlement are more susceptible to poultry disease than more sparsely populated ones. This is borne out by the figures of incidence of disease in Seeduwa, Negombo, Wattala, Dehiwala and Moratuwa. As against this,comparatively few cases have been reported from, Marawila and Beruwala, while no break out of disease has been reported from the Puwakpitiya area where poultry raising has spread to the interior villages as a popular cottage industry. It was a noticeable fact that when cages are carefully cleaned and sufficiently airy, admitting enough sunlight and at the same providing necessary privacy, occurrence of disease drops to a minimum.

3.3.1 Common Diseases

Among poultry diseases Pullorum, a disease of enormous deleterious and destructive powers, had in the past plagued the poultry population very frequency. Morbidity in the infected animal, resulting in a high rate of mortality is the chief characteristic of the disease. The most popularly used drug for treatment of Pullorum is Furazolidone.

Ranikhet disease (New Castle disease) and Coccidiosis have also been lately found to be occurring with increasing frequency. Ranikhet is a fatal and highly contagious disease caused by a virus. An outbreak of this virus may have the ability to wipe out completely the poultry population of an entire area. Prevention is effected mainly by vaccination. The Department of Animal Production and Health provides a free-

TABLE 20: COMMON POULTRY DISEASES

Name of the Disease	AREA AND NUMBER OF EXPERIENCES										Total	%
	See-duwa	Neg-ombo	Ja-ela	Wat-tala	Mara-vila	Puwak-pitiya	Dehi-wala	Morat-uwa	Ango-da	Beru-wala		
Pullorum	31	15	9	8	1	-	3	15	6	2	90	32.1
Ranikhet	23	-	1	4	5	-	2	9	1	1	46	16.4
Cocoidiosis	1	6	5	14	4	-	4	-	4	2	40	14.3
Coliform Infections	-	3	-	8	-	-	6	-	2	-	19	6.8
Fowl Pox	1	3	-	1	1	-	4	4	1	-	15	5.3

Source : Based on sruvey findings.

of-cost service of Ranikhet vaccination throughout the country. Surveys conducted by the Veterinary Research Institute at Gannoruwa, on major poultry diseases in the country between 1960 and 1974 shows a higher incidence of Coccidiosis each year. Hence, it appears that this infection is one of the most costly of the poultry diseases. The affected chicks appear dull and listless, with ruffled feathers. Mortality is often heavy. Coccidiosis is a disease resulting mainly from bad sanitation, avoidance of which depends on cleanliness.

The treatment consists of the administration of a suitable coccidiostat. The most frequently used varieties of drugs, are Darvisul, Agribon, Coyden, Amprolium and Sulfaquinoxaline.

Annex 5 (issued by the Veterinary Research Institute, Gannoruwa) provides a better understanding of the recommended remedies for the more common poultry diseases.

3.3.2 Prices of Drugs

Veterinary drugs are imported chiefly by 11 private companies, and are completely free of all import duties and tariffs. The major complaint of the poultry breeders was the increasing prices of poultry feed and other allied requirements of the industry. Drugs and additives are no exception.

Some of the companies dealing with these, enjoy a near-monopoly power regarding some of the drugs and protein supplements. Farmers complain that these druggists and companies engaged in supplying their requirements continually increase prices without proper cause in the absence of price control regulations. Furthermore, even retailers are free to sell at any price they wish, and farmers are compelled to buy from them since no other alternative is left to them for the simple reason that in the event of these dealers resorting to measures of reprisal such as refusal to sell, the farmers would be exposed to risk of total loss and closure of their entire poultry business. We are, therefore, firmly of the view that the authorities concerned should keep a most vigilant eye on the imports

of poultry farm requirements and exercise an effective controlling power over price changes of the poultry drugs and additives. It would, in our view, seriously undermine and defeat the very objectives of the government if the poor poultry farmers are left to the mercy of the dealers and businessmen.

The pace of price increases of drugs and additives needed by poultry farmers is illustrated in Table 21 and 22.

Looking at Table 21 it will be seen that the prices of the most widely used coccidiostats and wormers have gone up by approximately 150% and 200% respectively during the last five years. The best illustration of rapid price increase, is to be seen in pfizer piperazine (a wormer). The price of 60 m. of this drug was Rs.3.80 in 1977, within one year it had risen up to Rs.17.50 an increase of 360%. A wormer in even greater demand, Coopane, was sold at Ts.43.35 per ½ kilo in 1976. In less than two years its price had shot up to Rs.127.50, in 1978, representing an increase of 194%.

3.3.3 Prices of Additives

The efficiency of the feed conversion will depend to a large extent on the type of feed given to the fowls. When intensively reared in closed cages, birds, unlike other livestock, have no access to any other supplementary source for their diet, except the given ration. Certain feeds contain a very large percentage of one group of nutrients, but may be almost whooly lacking in some other. For e.g. a growing chick requires more protein while a laying hen would need more calcium. Hence, it is particularly necessary that a well balanced and highly nutritious ration is given to birds kept in confinement, if the expected production goals are to be attained.

Q.F.C., B.C.C. and Moosajees manufacture their feed by using the raw materials available at the particular time or season, and try to maintain only the minimum recommended standards. It is a widely known fact that nearly all formulae are relatively poor in energy supplying food. Therefore,

TABLE 21: PRICE CHANGES OF POULTRY DRUGS (1973 - 1978/'79)

NAME OF THE DRUG	IMPORTER/ DISTRIBUTOR	TYPE	UNIT	PRICE 1973	1974	1975	1976	1977	1978	1979	% increase 1974-78/79	% increase 1976-78/79
Darvisul	Cargils Ltd.	A Coccidiostat	½ kilo	38.15	38.15	38.15	38.15	55.25	95.00	-	149	149
Agribon	A Baur & Co.	- do -	100 gms.	-	25.75	25.75	59.00	81.00	81.00	81.00	214	37
Coyden	Harrisons & Crossfield Ltd.	- do -	1 Lb.	-	-	-	-	74.50	74.50	-	-	-
Sulfaquinoxaline	Pfizer Ltd.	- do -	60 ml.	-	-	-	-	3.30	-	3.80	-	-
Amprolium	J.L.Morrison, Son & Jones(Ceylon)Ltd	- do -	25 kgs.	-	-	-	-	-	-	2975.00	-	-
Piperazine	Haleys Ltd.	A Vermifuge	1 Lb.	-	-	-	-	-	-	55.00	-	-
Coopane	Cargills Ltd.	- do -	½ kilo	43.35	43.35	43.35	43.35	97.75	127.50	-	194	194
Dowzene	Harrisons & Crossfield Ltd.	- do -	8 oz.	-	-	19.50	19.50	24.50	24.50	-	26	26
Pfizer Piperazine	Pfizer Ltd.	- do -	60 ml.	-	-	-	-	3.80	17.50	17.50	-	360
Furazolidone	Colombo Apothecaries Co.Ltd.	A Bacteriocidal										
		- do -	1 Lb.	27.00	-	-	39.50	-	35.00	-	30	-
Furazolidone	A Baur & Co.,	- do -	1 Lb.	-	35.00	35.00	37.00	31.00	41.00	41.00	17	11
Santoquin	Harrisons & Crossfield Ltd.	- do -	8 oz.	-	-	12.00	16.50	20.50	20.50	-	71	24
Rancidity	De Zoysa & Co.	(prevents Rancidity)	1 Lb.	12.00	-	-	-	-	27.00	-	125	-
Terremycin	Pfizer Ltd.	A Germ Killer	30 gms.	-	5.90	-	6.90	7.20	-	8.60	46	25
Terremycin (injectable) solution)	Pfizer Ltd.	An antibiotic	10 cc.	-	5.85	-	-	-	-	7.60	30	-

Source: Based on the information sent by the above respective Institutions.

TABLE 22: PRICE CHANGES OF POULTRY FEED ADDITIVES (1972 - 1978/79)

NAME OF THE ADDITIVE	IMPORTER/ DISTRIBUTOR	TYPE	UNIT	PRICE							% increase 1974 —78/79	% increase 1976 —78/79
				1973	1974	1975	1976	1977	1978	1979		
Nutrikem	Colombo Apothecaries Co. Ltd.	Layer Premix	1 lb.	7.65	-	-	-	13.50	17.50	-	128	30
D.L.Methionine	Colombo Apothecaries Co.,Ltd	Protein Supplement	8 ozs.	32.00	-	-	29.50	40.00	35.00	-	9	17
Nutrikem	Colombo Apothecaries Co., Ltd.	Starter Premix	1 lb.	9.25	-	-	-	-	22.50	-	143	-
Rovimix A+B2+ D3+E	A Baur & Co.,	Vitamin	1 kg.	-	82.25	82.25	180.00	210.00	367.00	367.00	346	104
Rovimix, E25	A Baur & Co.,	Vitamin	1 kg.	-	-	-	135.00	153.00	260.10	260.10	-	93
Zoodry VM1	A Baur & Co.,	Growers Premix	1 kg.	-	16.75	16.75	33.00	47.00	47.00	47.00	180	42
Zoodry VM3	A.Baur & Co.,	Layer Premix	1 lb.	-	14.50	14.50	28.00	40.00	40.00	40.00	176	43
D.L.Methionine	Harrisons & Crossfield Ltd.	Protein Supplement	8 oz.	-	-	11.00	18.00	23.00	25.00	-	127	39
Multivitamin Concentrate	Harrisons & Crossfield Ltd.	Vitamin	1 kg.	-	-	14.75	16.50	34.50	34.50	-	133	109
Layer Premix	Millers Ltd.	Premix	1 lb.	-	-	-	-	-	-	18.80	-	-
Chick Premix	Millers Ltd.	Premix	1 lb.	-	-	-	-	-	-	11.50	-	-
M.H.A.(Methionine Hydroxy Analogue)	De Zoysa & Co.,	Protein Supplement	1 lb.	15.50	20.00	-	-	-	78.00	-	94	-
L-Lysinemono-Hydrocloride	De Zoysa & Co.	Protein Supplement	1 lb.	-	-	-	-	-	37.00	-	-	-
Vitastress	Pfizer Ltd.	Vitamin	90 gms	-	10.80	-	-	13.50	-	24.30	125	80
Starter Premix 'B'	Pfizer Ltd.	Premix	50 lbs.	-	430.00	-	620.00	-	-	705.00	64	14
Layer Premix 'B'	Pfizer Ltd.	Premix	50 lbs.	-	460.00	-	585.00	-	-	735.00	58	26

Source: Based on the information sent by the above respective Institutions.

almost all the intensive sector poultry farmers are accustomed to use protein supplements, vitamins, minerals, etc., as additives to the normal feed ration. According to our survey more than 98% of the farmers are using one or more of a range of additives. As a result of the published material by research workers and the experience of practical farmers, feed ingredients that up to recent times had been considered 'Extras' have now come to be incorporated as a "permanent feature" of poultry feeds.

Here again, the main issue is high prices. (Vide, Table 22)on an average the prices of protein and vitamin supplements have increased by about 150% during the last five years or so. For example, the price of Rovimix, a vitamin supplement distributed by A.Baur & Co., has gone up by 346% from 1974 to 1979, and by 104% from 1976 to 1979. Another popularly used vitamin supplement, namely Vitastress (pfizers) was sold at Rs.10.80 in 1974. Its present price is Rs.24.30 which amounts to a 125% increase. For the period 1977 to 1979, a price increase of 80% was recorded.

3.4 Housing for Poultry (Building materials)

In intensive poultry keeping chickens have to be kept confined in the poultry pens at all times during the day and night. The birds will give the results expected by the farmers only if they are kept comfortable. Thus, housing of the poultry becomes an important factor to be considered. For commercial poultry production the environmental conditions in which the poultry houses are located assume special importance. Diseases of viral origin can be controlled effectively when the poultry houses are properly ventilated.

It is, however, questionable whether even if one is proposing to take up poultry farming as a permanent occupation, it is desirable or essential that he should begin by constructing a durable poultry house. It is, in fact, arguable that there may be distinct advantages in building, at the outset, a comparatively cheap temporary, or semi-permanent, structure out of wattle and daub, with cadjan thatch for roof, and plain wood, like bamboo or arecanut for pillers and posts. Construction of more permanent cages could come later, after some income had been earned from the first sales, and valuable experience gained in the first trials.

Others may hold that although the initial cost of a permanent structure is high, it is nevertheless advisable to begin by constructing a stable poultry house for many reasons. For, besides the prevention of disease, there is also the problem of fowl thieves. If the poultry house is not predator proof at least to a reasonable degree the end result might well be a complete loss to the farmer and perhaps also the end of his projected new career. In some places protection against rodents and carnivorous animals like polecats may be a vital requirement for success. All this is much more than a mere academic question. When compared with the situation of a few years back, present construction cost of a durable poultry house has become an important matter to be considered, since it now constitutes a major item of expenditure to be incurred in establishing the poultry. Table 23 indicates the expenditure incurred by farmers on the construction of poultry houses.

The capital investment in the construction of poultry houses by the majority of the farmers does not exceed Rs.5000/-. Roughly about 50% of the farmers may be said to have spent Rs.2000/- or less for this purpose. In other words more than 75% of all poultry farmers may be classified as medium or small scale farmers whose flocks number less than 500 birds.

Table 24 has been prepared to show, for selected areas, the number of poultry houses constructed by each farmer. 25% of the farmers had only one poultry house. Most farmers had two poultry houses,whilst about7% had 5 or more houses . Taken as a whole, therefore, more than 75% of poultry farmers had between 1 and 3 poultry houses. The mode is 2 and the mean is 2.6. (They are shown by the two broken lines in figure 9). This again shows that, the bulk of the poultry farmers belong to the small or middle level categories.

The graph - (attached figure 9) shows the asymmetrical distribution of the number of poultry houses maintained by each farmer. In the moderately asymmetrical or skewed frequency curves the tail of the curve to one side of the central maximum is longer than to the other. If the longer tail occurs to the right as shown in figure 9 the curve is said to be skewed to the right or to have positive skewness.

Figure: 9

DISTRIBUTION OF POULTRY FARMERS ACCORDING TO THE NUMBER OF POULTRY HOUSES THEY POSSESS

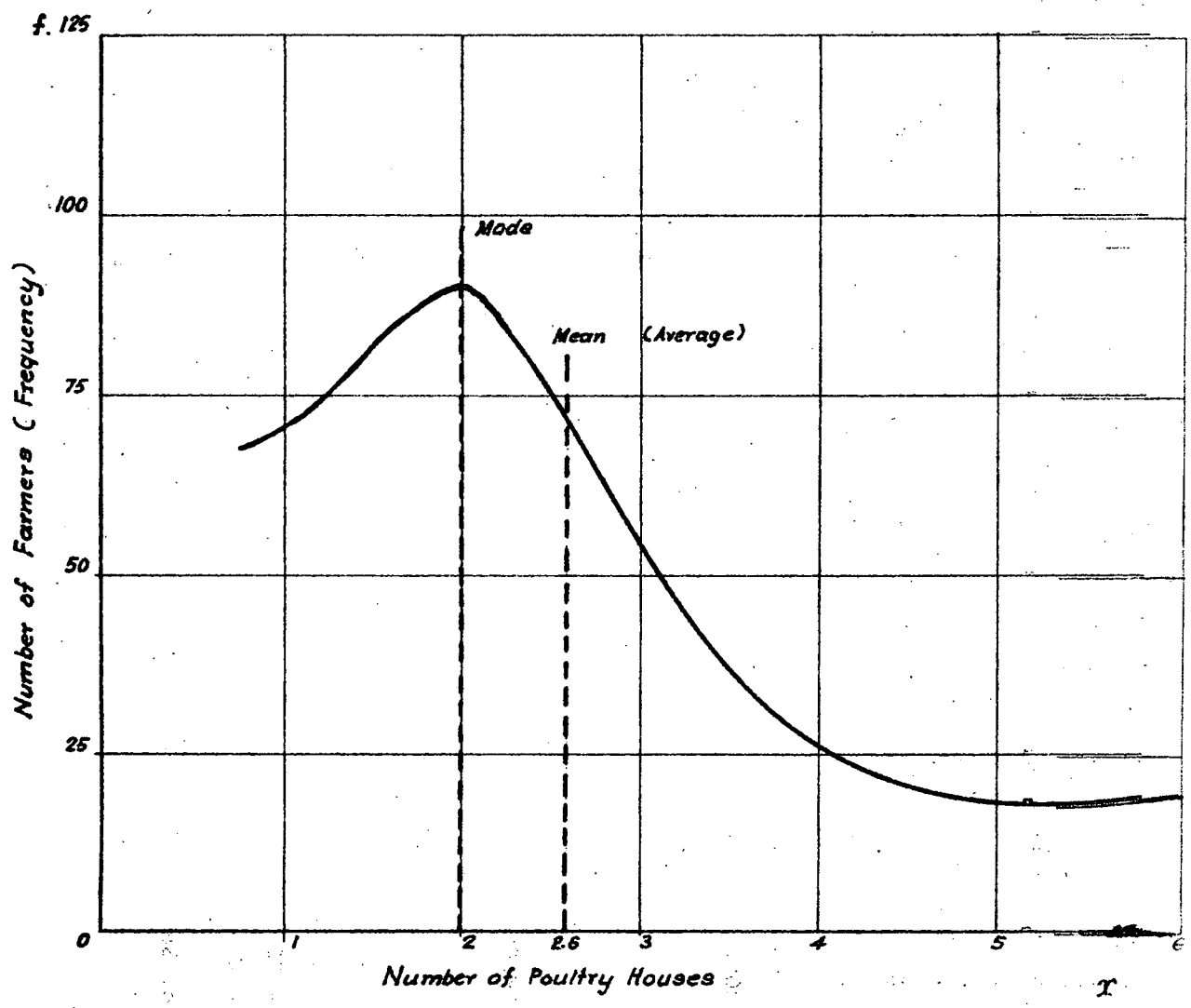

TABLE 23: EXPENDITURE OF CONSTRUCTION OF POULTRY HOUSES

Amount Rs.	Seed-uwa	Negom-bo	Ja-ela	Wat-tala	Mara-vila	Puwak-pitiya	Dehi-wala	Mora-tuwa	Ango-da	Beru-wala	Total	%
1. 1-1000	15	6	6	10	5	-	6	1	1	1	51	18.2
2. 1001-2000	14	15	13	7	7	3	7	4	5	1	76	27.2
3. 2001-3000	7	4	5	6	7	4	4	5	6	1	49	17.5
4. 3001-4000	1	5	2	4	6	3	2	3	5	3	34	12.1
5. 4001-5000	1	4	2	3	3	7	3	3	1	-	27	9.6
6. 5001-10000	1	3	2	-	-	11	3	4	2	-	26	9.3
7. 10001-20000	1	2	-	-	2	1	3	-	-	2	11	3.9
8. 20000/	-	-	-	-	-	1	2	-2	-	2	5	1.7
Total	40	39	30	30	30	30	30	20	20	10	279	100.0

Rs.1 - 2000 = 45.4%

Rs.2 - 3000 = 62.9%

Rs.3 - 5000 = 84.6%

Source: Same as for Table 19.

TABLE 24: SHOWING THE NUMBER OF POULTRY HOUSES CONSTRUCTED BY FARMERS

No. of poultry houses	Seed-uwa	Neg-ombo	Ja-ela	Wat-tala	Mara-vila	Puwak-pitiya	Dehi-wala	Mora-tuwa	An-goda	Beru-wala	Total	%	
1	17	11	10	3	4	2	4	4	14	2	71	25.4	)
2	16	16	9	7	10	7	8	10	5	2	92	32.9	)77.2
3	5	7	5	7	8	10	9	1	1	2	53	18.9	)
4	-	1	3	5	4	5	3	2	-	1	24	8.6	)
5	1	3	1	6	1	3	2	2	-	1	20	7.1	
6	1	1	2	2	3	3	4	1	-	2	19	6.8	
Total	40	39	30	30	30	30	30	20	20	10	279	100.0	

1 = 25.4 %

2 = 58.3 %

3 = 77.2 %

Source: Same as for Table 19.

3.4.1 Prices of Building Materials

Prices of building materials have increased at alarming rates coupled with shortages. Table 25, shows tha bizarre and unruly character of the price changes of building materials needed for poultry business and indicates how hazardous and enterprise poultry keeping had become.

To start a poultry farm with 100 chicks a person would have to spend about Rs.5500/- (Vide, Annexure 6) for the poultry house alone, whereas he could have constructed the same in 1970 for about Rs.1250/- and in 1977 for Rs.3000/-. Generally, expenditure has risen approximately five-fold within 8 or 9 years. Similarly labour charges also have risen five fold or by 400% during this period.

Prices of buildng materials have soared alarmingly. Price changes of essential items for a poultry house such as bricks, sand, wirenetting, galvanized sheets, timber and cement are beyond the ability of a small farmer to afford. For example, prices of the more essential of these materials namely bricks, sand, cadjan and cement have gone up by 146%, 114%, 114% and 295% respectively in the course of only three years (1977-1980). Thus, the initial cost of investment in poultry rearing has gone up considerably.

TABLE 25: PRICE CHANGES IN BUILDING MATERIALS (REQUIRED FOR THE CONSTRUCTION OF POULTRY HOUSES).

ITEM	UNIT	1970	1977	1979	1980	% increase (1970-'79)	% increase (1977-'79)	% increase (1977-'80)
1.Cement(Ex-factory)	1 Bag	12.00	18.50	45.00	73.00	275.0	143.2	294.5
2.Bricks	1000	60.00	130.00	260.00	320.00	333.3	100.0	146.1
3.Sand	1 Cube	20.00	70.00	140.00	150.00	600.0	100.0	114.2
4.Metal 3/4"	1 Cube	-	260.00	560.00	590.00	-	115.3	126.9
5.Cadjan	100	7.00	35.00	60.00	75.00	757.1	71.4	114.2
6.G.I.Corrugated Sheets 6'x28 gauge	per sheet	17.90	42.85	48.00	168.1	12.0		
6'x28 gauge	per sheet	18.90	56.70	58.00		206.8	2.2	
10'x28 gauge	per sheet	20.00	72.65	74.00		270.0	1.8	
7.Asbestos Corrugated Sheets 6'x43	per sheet	-	50.74	62.65		-	23.4	
8'x43	per sheet	-	67.76	83.53		-	23.2	
10'x43	per sheet	-	84.56	104.42		-	23.4	
8.G.I.Wire Netting ½'x22 gauge	per meter	5.75	-	23.52		-	309.0	
3/4"x20 gauge	per meter	8.50	-	27.47		-	223.1	
9.1"x2" reepers	1 foot	-.20	-	.60		-	200.0	
2"x2" rafters	1 foot	-.70	-	2.00		-	185.7	
2"x4" rafters	1 foot	-1.00	-	4.50		-	350.00	
½" planks	1 foot	-.50	-	1.40		-	180.0	
1" planks	1 foot	-1.10	-	3.00		-	172.7	

Continued....

ITEM	UNIT	1970	1977	1979	1980	% increase (1970-79')	% increase (1977-79')	% increase (1977-80')
10. Labour Charges (for a Mason)	per day	8.00	12.00	35.00- 40.00	45.00	400.0	233.3	275.0
Labour Charges (for a Carpenter)	per day	8.00	12.00	35.00- 40.00	45.00	400.0	233.3	275.0
Labour Charges (for a helper)	per day	4.00	5.00	15.00	20.00	275.0	200.0	300.0

*Source: i. Building Materials Corporation

ii. Sri Lanka Cement Corporation

iii. Based on information collected from leading Building Material Merchants.

* (It is to be noted that some of the above figures represent ex-factory/Corporation prices. Hence it is likely that the free market prices are much higher. For example the present market price of cement varies between Rs. 73.00 and Rs.78.00 while the Cement Corporation price is Rs.68.00 and the Building Materials Corporation price is Rs.70.00.

CHAPTER 4

POULTRY FEED INDUSTRY

The following observations made, from the point of view of poultry feed suppliers, will nevertheless help to clarify counsiderably the present position of the poultry breeding industry of the country.

> "The poultry industry did not expand as planned and although productivity parameters could be improved, it nevertheless remains a fact that the expansion of the poultry industry has been and remains constrained by a lack of availability of good quality feed".[1]

The Government is susbsidising the poultry feed industry in a very large way; both directly and indirectly through the subsidies given to the O.F.C. and B.C.C. When the government removed all these subsidies in April 1978 feed prices shot up by almost 100%. For instance O.F.C. Chick mash and Layer's mash prices rose from Rs.1129 to 2340 and Rs.1300 to 1990 per M.T.Respectively.In November 1978 feed prices were reduced by the government by Rs.400/- per M.T. Apart from this, at present the Government supplies some of the ingredients exclusively to the O.F.C. on very attractive terms. The most important ingredient in poultry feed, namely, coconut poonac is supplied to the O.F.C and B.C.C. at a constant price of Rs.800/-per M.T. In the eventuality of price increases beyond this range the Govt. pays the difference. In addition all food materials condemned as unfit for human consumption such as milk powder, rice, flour, dhal etc. are sent exclusively to the O.F.C., the wheat bran, damaged flour and rice bran being supplied at a fixed nominal price to the O.F.C. and B.C.C.

It is thus evident that the poultry feed industry presently enjoys a very heavy subsidy. Hence in all calculations of prices, cost of production etc, due weightage should be given to this fact and the resulting conclusions and inferences treated with a certain degree of caution.

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[1] "Tropical Products Institute. A Strategy for the Development of the Livestock Feed Industry in Sri Lanka", Feb. 1979, p.49.

4.1. FEED EFFICIENCY

Taking as our standard of comparison Western levels of production, namely 260-280 eggs per bird per year, and generally a feed efficiency of 2.2 kg., feed per kg., liveweight, it is evident that Sri Lanka will have a long way to go before it can achieve comparable results. The present strain of hybrid layers in Sri Lanka when fed with properly compounded feed is estimated to lay 180-240 eggs per year, and current conversion rates in the broiler industry are calculated to be about 3.5:1.0. This it has been pointed out, is a relatively poor performance in comparison with Western countries.

> " These deficiencies in essential amino acid, high calcium content and less than adequate energy levels may be directly related to the current poor conversion ration of 3.5:1.0 found in the broiler industry."[1]

In America broilers go to the processing plants at about 56 days weighing 3.86 to 4 pounds (1.74 to 1.8 kilograms). Feed conversion averages about 1.9:1.0.

Feeding has become a specialized science in those countries. Since feed represents the biggest cost in the production of broilers and eggs, feed formulations are tailored to meet specific nutritional requirements for optimum production at the lowest cost. To achieve the required protein level therefore, the organised poultry farmers would have to spend an extra amount of money themselves for the enrichment of mash.

4.2. PRODUCTION

At present the poultry feed production of the country is estimated at 70,000 metric tonnes, registering a 28% increase in 1979 over the production in 1978. The increased production was a response to satisfy the expanding demand arising from better producer margins in the poultry industry. Af far as production increase is concerned scarcity of poultry feed raw materials is the most important single constraint. About 88%

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[1] ibid, p. 96.

of the total poultry feed production of the country is provided by the two state owned and managed institutions. Viz; The Oils and Fats Corporation (80.6%) and the British Ceylon Corporatinn Ltd., (8.1%). The rest is filled up by the private sector, namely Moosajees Ltd., and the smaller forage dealers down Wolfendhal Street. (In 1978 it was 73.5% by Oils and Fats Corporation and 9.5% by B.C.C) Each institution has a solvent extraction plant, which in each case is more than 25 years old.

To achieve the egg production targets indicated in Table 7, production of poultry feed should be increased sharply. At the present rate of increase an annual output of 1.54 times that of the preceding year adding up to 7.7 times by 1984 is necessary. If feed efficiency can be improved during the coming years the required amount of feed will become progressively smaller, and the egg/feed cost ratio will fall.

The quality of poultry feed is another factor that deserves attention. Only quality of feed and consequent better performance of the laying birds, can create and sustain the necessary confidence amongst poultry raisers.

4.3. ADULTERATION OF FEED

Another important question affecting the poultry feed industry is the adulteration of compound feed. Many farmers have suffered considerable loss in this context and the situation warrants the urgent attention of the authorities concerned.

> " Many farmers are suffering at the hands of unscrupulous and errant feed suppliers who are engaged in the antisocial act of feed adulteration. The Food and Drugs Act does not seem to cover the importation, manufacture and sale of animal feeds. It is the duty of our legislators to safeguard the livestock farmer and to ensure that the animal feeds are worth exactly what the farmer bargains for."[1]

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[1] Animal Production and Health Bulletin - Editorial - Jan./Dec. 1978,Vol.II.

4.4. TRANSPORT

Transport is a major problem with which the poultry farmer is faced. Some private dealers provide limited free transport facilities to deliver feed to the farm gates. According to the survey findings, 243 farmers out of 279, i.e. 87%, are having their feed requirements transported by hiring private vehicles. Only 7.8% are using vehicles of their own.

This is an area of the poultry business, where the public sector can intervene to provide an efficient service. On selected fixed days the operation of a mobile sales service can be a booster for the small scale poultry farmer.

4.5 SUPPLY AND PRICE CHANGES

Broadly there are two key components in mash:

i. Energy components.
ii. Protein components.

The most important objective then of poultry feed suppliers should be to maintain the requisite protein and energy contents in the mash. For instance, there is a possibility of using many substitutes with relatively high protein content. But the presence of other harmful or less desirable components might negate the beneficial results which could otherwise have been expected. Feeding rations deficient in salt (sodium chloride) can result in a decline in egg production and decline in feed intake and body weight of layers according to a Colorado Study.[1]

Using a high-fibre-containing protein source is bad for poultry rations, since it adversely affects the efficiency of the feed. The most abundantly available protein containing ingredient in the country is coconut poonac, and hence it has necessarily to be used, in spite of its comparatively high fibre content. However, in the prevailing conditions, due to the unavailability of the required raw materials throughout the year, manufactures are forced to utilise each and every available substitute, even when it is below optimal levels, in order to increase production.

Out of the 279 farmers interviewed 261, (93.5%) farmers are using Oils and Fats Corporation feed, 4 farmers (1.4%) B.C.C. mash, 5 (1.7%) are using Moosajee's mash, 3(1.07%) persons get C.F.S.(Ceylon Forage Stores) mash

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1 Asian Livestock - Monthly Publication of FAO Animal Production and Health Commission for Asia. The Far East and South-West Pacific Vol.V NO.5 May '80.

and 2 (0.7%) farmers mix their own feed requirements.

There were numerous complaints by the farmers of unsatisfactory performance on compounded rations, inconsistency of feed, using of sub-standard substitutes, improper mixing etc. Farmers were complaining that when unmixed chunks are present in chick mash, chicks cannot consume at all. Particularly when rubber seed poonac was substituted, farmers were experiencing poor returns, and in some cases even hen and chick mortalities due to the indigestion of feed. It is suggested that the complaints like inconsistency, improper mixing, and weaknesses in issuing procedures, can be overcome by more effective supervision, regular checks and by streamlining the work.

In 1971/72 the People's Bank inaugurated a credit scheme for the prospective poultry breeders, which generated a very positive reaction. In the following years egg production shot up, and eggs were available plentifully. However, in 1973 one of the major ingredients of mash namely coconut poonac, was in short supply due to the serious decline in coconut production, and prices of feed rose in consequence , after 1st February, from Rs.540/- (per ton) to Rs.780/-. In August 1974 prices were again raised to Rs.1260/-. But the egg prices remained comparatively static. All the small and medium scale poultry keepers were compelled to close down their newly started farms.

Egg production and the laying hen population has declined at an alarming rate. According to Corporation sources (1977) the Corporation was selling poultry feed with a subsidy of Rs.700 per ton, after the floating exchange rates came into operation. In April 1978 the government withdrew all subsidies that were in operation and the feed prices went up by almost 100% and most of the remaining small and medium scale poultry keeprs also had to close down their farms. After the formation of the new Ministry for Rural Industrial Development the Government has reduced feed prices by Rs.400/- per metric ton from 1st November 1978, giving an impetus to the poultry industry. Once again very recently (from 22nd September 1980) feed prices have increased by about 50% . The real impact of this decision is yet to be seen.

STATE SECTOR

4.5.1 Ceylon Oils and Fats Corporation (O.F.C.)

The inauguration of the Ceylon Oils and Fats Corporation took place in 1955. Although it had been set up with different objectives and purposes, provender feed production has gradually become the main activity of the Corporation.

C.F.C. is the main supplier of poultry mash in the country. It has supplied about 80.0%, 73.5% and 80.6% of the total feed production in 1977, 1978 and 1979 respectively. (Vide, Table 26 below).

TABLE 26: TOTAL POULTRY FEED PRODUCTION OF CEYLON OILS AND FATS CORPORATION

Year	Production (Metric Tonnes)
1973	47475
1974	40195.2
1975	31943.8
1976	36375.2
1977	41901.5
1978	40447
1979	56438

Source: The Ceylon Oils and Fats Corporation

The production statistics given above, bear out conclusively the correctness of our earlier comments regarding the impact of the price increase of mash. The year 1973 marked the peak period of egg production and poultry feed production.

Apart from total output, and quality of feed production, another important aspect of the industry is the issue and distribution of poultry mash to the large numbers of scattered buyers and users. Numerous complaints were made to our investigators regarding the unsatisfactory state of the distribution of poultry mash. Recently, the O.F.C. has opened up four new retail outlets at Negombo, Kandy, Seeduwa and Colombo. When considering the industry as a whole it is hardly necessary to point out the extreme inadequacy of this arrangement. The need for opening more retail outlets will have the two-fold effect of increasing egg production and providing

much needed relief and encouragement to the poultry raisers. For example, in areas like Hanwella, Puwakpitiya and Marawila, this type of facility is not only badly needed, but long overdue. The Puwakpitiya area alone requires about 150-175 tonnes of poultry feed per month. The cost of maintaining such independent outlets may be high, but it is high time to think and devise a viable system to provide such relief even with the collaboration of similar institutions.

A number of poultry farmers complained of the waste of time involved in getting their feed quotas. Sometimes after waiting for hours they had to turn back empty handed, having paid the lorry owner the full hire. But it is learnt that now, the situation has improved considerably after the reorganisation activities of the present management.

The Corporation issued feed on the basis of a quota system. No buyer can get poultry mash direct from the Corporation without first getting registered and becoming a quota holder. Thus, on the one hand the quota system ensures distribution of feed only to genuine poultry raisers, on the other hand it prevents expansion of the existing poultries, because of the difficulty of getting increased quotas. The result is that a considerable number of poultry keepers are discouraged from undertaking any expansion and some are even being driven to use adulterated mash.

Ultimately, the crux of the matter rests on the adequacy of production. As far as egg production targets are concerned, the moral to be drawn is that feed production should be increased rapidly and urgently, by every means possible.

A recent newspaper supplement[1] describing the work of the Ministry of Rural Industrial Development carried the following observations:

" *Future Plans and Projects: Oils and Fats Corporation.*

1) Modernizing of the existing provender plant to produce better quality animal feed.
2) Setting up of a stores complex in the maize growing areas for

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[1] "The Ceylon Daily News", 7th September 1979, p.11.

collection of annual requirements.

3) Offering an incentive price of Rs.2000/- per metric ton of maize.

4) Establishing of a 20 metric tons per hour feed mill."

This statement indicates that the Ministry of Rural Industrial Development has been giving some thought to the problem. O.F.C. also has proposed to actively participate in agricultural activities with a view to producing its requirements of subsidiary crops such as Maize, Sorghum and Cassava required for animal feed manufacture.[1] The really crucial point however, is implementation. For no matter, how good or viable the plans are, if their implementation is unnecessarily delayed it may totally fail to get off the ground. This is the very costly lesson which past experience has abundantly taught us.

Presently the O.F.C. works almost at full capacity. Normally it operated only one shift earlier, but now(1979/80)it operates three shifts. Working at full strength and under present conditions it should be able to produce an output of 85,000 M.T. per year. In the year 1973 it produced 47475 M.T. and in 1979, 56438 M.T. This amply demonstrates the O.F.C's capacity and ability to achieve these aims, if and when the necessity arises.

Although we have drawn attention to some of the criticisms of O.F.C. voiced by farmers, it must also be stated that almost all of them preferred the quality of its mash to other varieties:-

> "The Oils and Fats Corporation is able to produce better quality poultry feeds as judged by the metabolisable energy value and amino acid composition compared with those of the British Ceylon Corporation."[2]

Table 27 given details of the poultry formulations followed by the O.F.C. and figures 10(a) and 10(b) show the variations in the feed production.

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1 'An Assessment of two years' Progress ' - (The Ministry of Rural Industrial Development) Ceylon Daily News 8th September, 1980. p.17.

2 Tropical Products Institute. A strategy for the.....p. 93.

TABLE 27 SPECIMEN FEED FORMULATIONS USED BY THE OILS AND FATS CORPORATION (Second Half of 1978)

F E E D	Chick Mash	Grower Mash	Layers Mash	Broiler Starter	Broiler Finisher	Breeder Mash
Raw Material (Percentage inclusion rate)						
Coconut Poonac	30	30	29	35	35	11
Rice Bran No.1	8	10	8	8	8	5
Rice Bran No.2	-	-	-	-	-	-
Maize	10	10	10	10	10	35
Wheat Bran	10	10	10	5	3	27
Wheat Flour	10	14	10	10	15	5
Ground Paddy	12	12	8	10	10	-
Damaged Rice	-	-	-	-	-	-
Gingelly poonac	6	-	1	-	-	-
Dried fish	2	3	3	2	3	3
Meat meal	5	5	4	12	8	10
Milk powder	5	-	2	5	5	-
Soya milk powder	-	4	-	-	-	-
Rubber seed meal	-	-	-	-	-	-
Dhal/gram husk	-	-	-	-	-	-
Kapok cake	-	-	2	-	-	-
Filter press cake	-	-	-	-	-	-
Flour residue	-	-	-	-	-	-
Oyster shell	1.5	1.5	3	2	2	3
Bone meal	0.5	0.5	1	1	1	1
Mineral mixture	-	-	-	-	-	-
Vitamins	+	+	+	+	+	+

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Raw Material Cost (Rs./tonne)	1,660	1,546	1,494	1,942	1,755	1,952
Calculated analysis (percentage unless otherwise stated)						
Metabolisable energy (MJ/kg as fed)	10.5	10.4	10.3	10.4	10.5	10.7
Protein	19.8	18.3	17.2	20.7	19.5	17.8
Oil	7.5	7.0	6.4	8.0	7.9	5.6
Fibre	7.4	7.5	7.2	7.2	7.1	5.9
Ash	8.7	8.4	10.2	10.7	9.8	10.4
Methionine	0.37	0.29	0.20	0.34	0.33	0.26
Lysine	0.76	0.70	0.64	0.88	0.82	0.7
Calcium	1.6	1.5	2.2	2.4	2.1	2.6
Phosphorus	0.7	0.7	0.7	0.9	0.8	0.8
Salt	0.2	0.2	0.2	0.3	0.3	0.3

Source: O.F.C.

TABLE 28: SPECIMEN POULTRY FEED FORMULATIONS USED BY THE BRITISH CEYLON CORPORATION
(SECOND HALF OF 1978.)

Feed	Chick Starter	Grower Mash	Layer Mash	Broiler Starter	Broiler Finisher
Coconut poonac	35	35	30	34	35
Rice Bran No.1	13	15.5	15.5	18	15.5
Rice Bran No.2	-	-	-	-	-
Maize	14	15	20	15	15
Wheat Bran	10	10	10	10	10
Wheat flour	14	14	11	6.5	9.5
Meat meal	11.5	8	7.5	13.5	9.5
Bone meal	0.5	0.5	1	1	1
Oyster shell	2	2	5	2	2
Mineral mixture	-	-	--	-	-
Dhal husk	-	-	-	-	-
Vitamin	+	+	+	+	+
Raw material cost (Rs./tonne)	1,746	1,551	1,535	1,847	1,636
Calculated analysis	(Percentage unless otherwise stated)				
Metabolisable energy (MJ/kg as fed)	9.9	10.0	10.0	9.7	9.9
Protein	10.6	18.5	17.3	20.5	19.1
Oil	7.3	7.4	7.0	8.0	7.5
Fibre	7.5	7.6	7.1	7.7	7.6
Ash	10.2	9.6	12.5	11.4	10.3
Methionine	0.29	0.27	0.25	0.29	0.28
Lysine	0.70	0.6	0.58	0.75	0.65
Calcium	2.0	1.7	3.1	2.4	2.0
Phosphorus	0.8	0.7	0.7	0.9	0.8
Salt	0.2	0.2	0.2	0.3	0.2

Source : B.C.C.

PRESENT TOTAL POULTRY FEED PRODUCTION OF THE THREE PRINCIPAL MANUFACTURERS

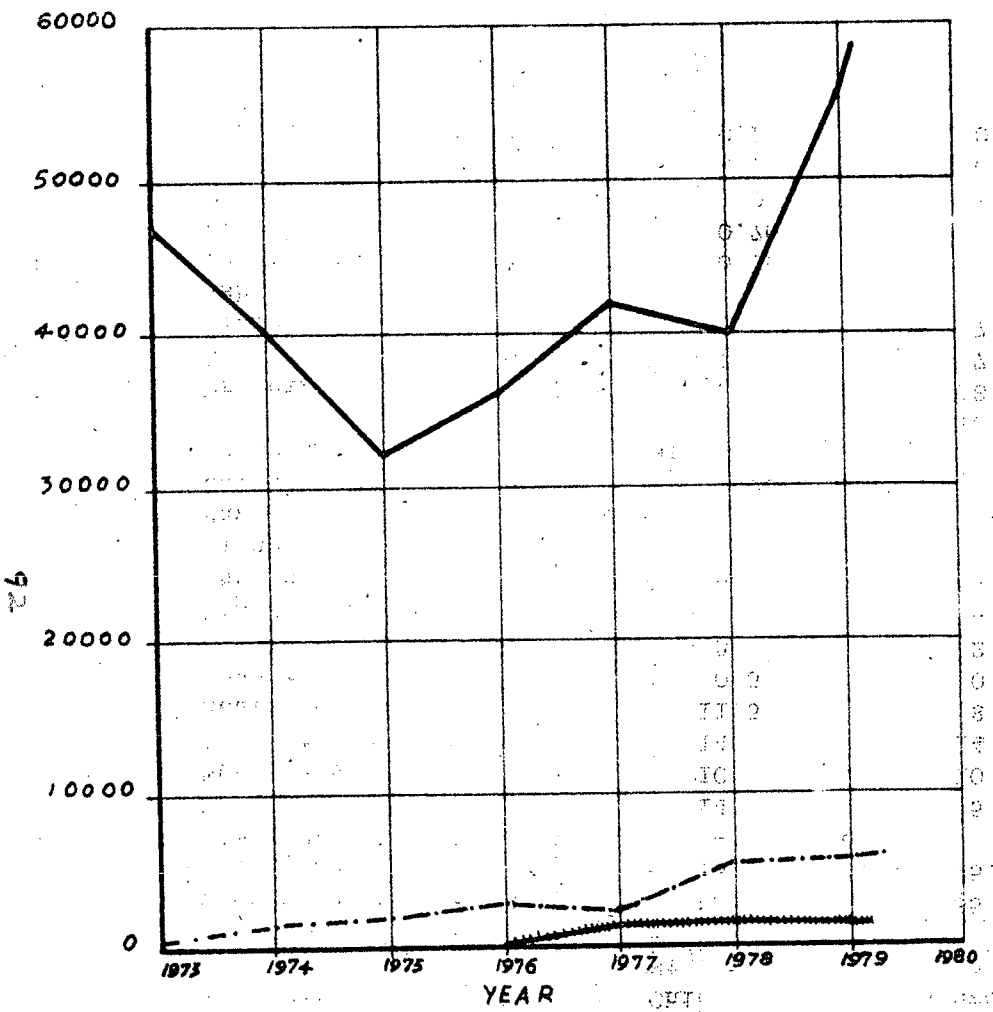

Figure: 10 (a)

ESTIMATED FEED PRODUCTION TARGETS

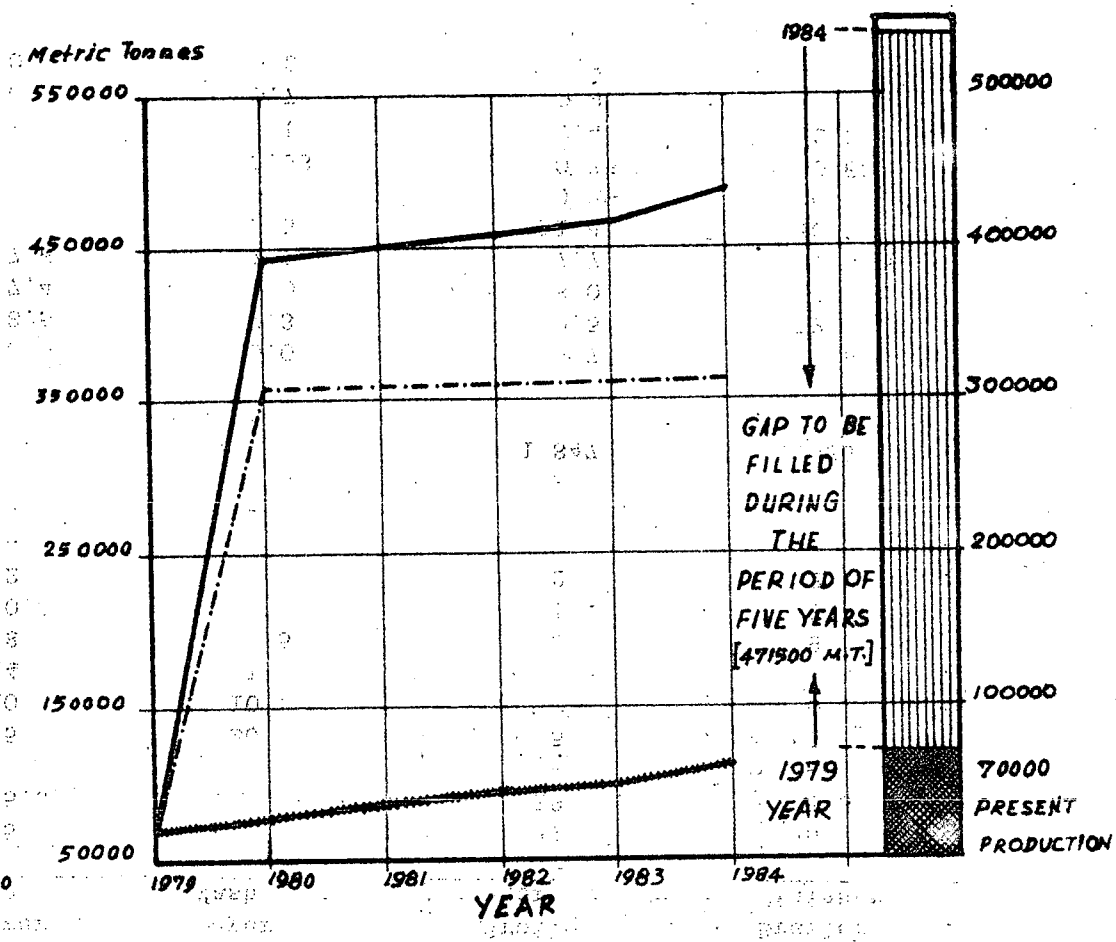

Figure: 10 (A)

4.5.2 Governmnet of Sri Lanka (Ceylon), Successor to the Business Undertaking of British Ceylon Corporation (B.C.C.)

Manufacture of poultry feed was begun by the British Ceylon Corporation in 1967. At present it produces about 35 tonnes a day, and is operating under capacity. It produced 4.6%, 4.5% and 8.1% of the total feed production in 1977, 1978 and 1979 respectively. Instead of 3 shifts each, working at full capacity, it works only one shift. The details of the poultry formulations that have been followed are shown in Table 28. More recently, however, there has been a considerable increase in production as reflected in the statistics given below: (Vide, Table 29 and Figure 10(a).

TABLE 29: YEARLY TOTAL FEED PRODUCTION OF B.C.C

Year	Metric Tonnes
1967	204
1968	1059
1969	4037
1970	4652
1971	10960
1972	5811
1973	703
1974	1560
1975	2035
1976	2861
1977	2433
1978	5238
1979	5635

Source: B.C.C.

It is quite clear that the B.C.C. is in a position to increase its production very substantially, if the occasion demands and the necessary arrangements are made. In 1978 they were able to double the production as compared with the year preceding. As far back as eight years ago it produced an output which exceeded twice the production of 1978. This means that the production of 1977 is only one fifth that of the production of 1971.

4.5.3 Moosajees Ltd.

The firm of Moosajees Ltd. seems to have been the pioneers of poultry feed production in Sri Lanka, having started the manufacture in the 19th Century, and opened the retail section in 1920. Before the establishment of the O.F.C., Moosajees enjoyed all the monopolistic benefits. Immediately after the O.F.C. commenced business, sales and production at Moosajees declined by 30%. Nevertheless it is the claim of Moosajees that they have succeeded in keeping pace with the B.C.C. The relevant production figures of Moosajees are as follows:

Year	Metric tonnes
1977	1578.9
1978	1307.6
1979	1416

Out of the total production of the country, Moosajees have supplied about 3% 2.3% & 2.5% in 1979, 1978 and 1979 respectively. Moosajee's cater mainly for the market in Colombo and its suburbs, and the coastal belt up to Negombo. Within a radious of 20 miles of Colombo they deliver mash up to the farm gate in their vehicles, adding for this service, a charge of .75 cts. per bag of 25 kg. This service immensely benefit the small scale farmers who are thus relieved of the difficulty of making their own transport arrangements.

A major complaint of the private feed suppliers was that access to most of the ingredients required for making poultry mash was exclusively reserved for the O.F.C. Damaged wheat, flour swepings, dried fish waste, milk powder waste - all these items are being sent by the respective government Departments and Corporations dealing with them, only to the O.F.C. The Corporation also gets coconut poonac at a subsidised rate.

4.5.4 Wolfendhal Street

Wolfendhal Street is the hub of the private sector's poultry feed supply industry. There are about 30 forage dealers down Wolfendhal Street.

Some have been in the forage business for the last 50 years or so. Broadly, two categories of operators in this line of business can be distinguished:

1. Dealers in manufactured feed and various types of ingredients, drugs, vitamins, livestock appliances etc.,
2. Additional and supplementary to them are the dealers selling their own feed mixtures along with others engaged in the feed mixing business.

Category No.2 consists of dealers who specialise in selling the separate ingredients, but also undertake on payment the mixing in their own mixing plants. Some of these dealers sell their own mixtures of feed under a variety of brand names, such as C. F. S. (Colombo Forage Stores). The strange and significant feature about these activities is that no guarantee or assurance whatsoever of the quality or genuineness of the product thus supplied, is demanded from or offered by, the so-called manufacturers of the feed. Anyone is free not only to manufacture on his own formula and sell to the public, but also to advertise it without any infringement of the law, as the best available forage mix. Owing to non-availability of the necessary data and the difficulty of collecting, we were compelled to take a somewhat arbitrarily computed amount of 5000 metric tonnes as the annual production of 'Wolfendhal Street'. This figure was mainly based on such data and information as could be gathered by our personal interviews, investigations and literature reviews.

Each dealer in Wolfendhal Street has his own set of regular customers. It is their practice to deliver mash to the farm on credit for these regular customers whose produce is purchased in return. By rendering this "service" they are able to get a three cornered profit at the expense of the farmer. Through this credit-cum-delivery service system, they have been able to build up a steady and regular clientele who sustain the project by a chain of mutually assisted cycle of activity. Looked at from the social angle the scheme may also be regarded and described as a particular type of "disguised" or 'pseudo' - exploitation of either the poultry farmers, or the consuming public, or both, by an organised group of traders.

The procedure for getting quota permits is oftan of a highly dubious and suspicious character. Many people have succeeded in getting quota permits by supplying false information with the object thereafter of selling those permits at substantial profit to persons actually engaged in the feed business, when it would ultimately reach the "hands of Wolfendhal Street".

In Wolfendhal Street itself, after passing through several other hands there, they would be finally exchanged for the Corporation manufactured feed or B.C.C. feed, at prices well above the official rate. There is a general belief that a considerable amount of poultry feed goes through the above channel thus defeating the original and primary intention of supplying poultry mash at the lowest possible price to the actual farmer.

Any dealer is free to sell corporation or B.C.C. feed at any price that he pleases. There is no control or prohibition whatever regulating the price of poultry feed . In an acute scarcity, or a lean period in feed production these dealers can exploit the situation to maximum advnatage.

4.5.5 Comparison of Prices

A comparative study of the prices of the three main suppliers is worth attempting now. (Vide Table 30).

Table 30 shows that even with all the above privileges the prices of C.F.C. are the highest and Moosajee's are the lowest. For this, there can be multiple reasons and these have to be dealt separately.

4.6 INGREDIENTS

It has been pointed out previously that all formulae presently in use for the preparation of a satisfactory poultry food, suffer from the very serious defect that they are of relatively low energy content. A Study made by the Tropical Products Institute states:-

> " The primary problem in formulating feeds is a lack of knowledge of the nutritive value of the ingredients in common usage in Sri Lanka. Chemical analysis rarely gives an accurate picture of the

nutritive value of a feed which is often only revealed by exhaustive feeding trials. The lack of adequate data on this basis means that for the foreseeable future, the formulation of feeds in Sri Lanka will continue to be based on professional judgement rather than scientific fact; unless greater use is made of important feed ingredients e.g. soya bean meal, fish and maize meal for which more accurate information is available."[1]

TABLE 30: A COMPARISON OF FEED PRICES OF THE MAIN SUPPLIERS

(per metric ton)

O.F.C.		B.C.C		MOOSAJEES	
Name of the Variety	Price	Name of the Variety	Price	Name of the Variety	Price
Baby chick mash	1940.00 (2600.00) *	Chicbes	1800.00 (2600.00)*	Chick mash	1696.00 (2460.00)*
Growers' mash	1860.00 (2700.00) *	Grobes	1800.00 (2500.00)*	Growers' mash	1660.00 (2380.00)*
Custom mix	1590.00 (2500.00) *	Leybes	1550.00 (2400.00)*	Layers' mash	1540.00 (2300.00)*
Broiler starter mash	2090.00 (3000.00) *	Broiler starter	1950.00 (2900.00)*	Broiler starter	1744.00 (2700.00)*
Broiler finisher mash	1940.00 (3000.00) *	Broiler finisher	1900.00 (2900.00)*	Broiler finisher	1694.00 (2600.00)*
Breeder mash	2020.00	-		Breeders' mash	1722.00
-		-		Special Broiler Starter	2500.00
		-		Special Broiler Finisher	2340.80

Source: Based on the displayed price lists of the three organisations (1979)

* Revised prevailing prices

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[1] Tropical Products Institute, A Strategy for the Development of the Livestock Feed Industry in Sri Lanka, February 1979, p. 96.

This explanation is itself, however, neither wholly correct nor altogether satisfactory. Our own Veterinary Research Institute at Gannoruwa (V.R.I) has been actively engaged in experimenting with, and analysing a number of feed formulae. In fact, the O.F.C. prepares the feed formulae under the V.R.I.'s instructions and supervision. We feel that the V.R.I. has the necessary expertise to carry out further research on these lines. Moreover the C.I.S.I.R. is in a position to undertake some of the more specialised areas of the research if so requested.

In Sri Lanka, with the limited resources available for a project of this nature, it is not possible to import all the desirable ingredients by reference to quality alone, or to considerations dictated by pure analysis only. Optimum benefits will accrue to the country when we utilize our own resources to the maximum, and endeavour at the same time to find out local substitutes of equal or greater efficiency.

In developing countries like Sri Lanka it is of the utmost importance in formulating poultry rations, that we do not include any items which compete directly with human feeds. Tables 27 and 28 show that one of the ingredients used most plentifully in the preparation of poultry feed is coconut poonac. In the most sought poultry feed (O.F.C. and B.C.C.) it is estimated that about 35% consists of coconut poonac. (For details see Tables 27 and 28).

4.6.1 Coconut Poonac

Before 1972, it was possible to get coconut poonac at reasonably low prices. But to-day no feed manufacturer could think of securing supplies of coconut poonac either in the required quantity, or at a sufficiently low price. During the period of 1972 and 1978, coconut poonac prices rose by 28%. Production of coconut poonac on the other hand, declined by about 8000 metric tonnes in 1978, when compared with 1970. These figures reflect the bleak future in prospect so far as the supply of one of the major components of the poultry feed industry, namely, coconut poonac, is concerned.

The present market price of poonac which the Oils and Fats Corporation and the B.C.C. use for manufacture of livestock feed stands at over Rs.1300/-

per metric ton. The present coconut poonac shortage is mainly a result of the decreased production of coconuts in the country since 1972/'73 which was due to a number of causes. But the manufacturers of poultry feed are compelled to use coconut poonac, because it is the principal component of the feed mixture, and no suitable substitute has still been found or recommended.

However, considered purely as a valuable protein ingredient, coconut poonac ranks fairly low.In view of the scarcity of other substitutes there seems to be no other alternative but to device ways and means to increase the poonac output.

'Polkudu' (coconut residue) is a home waste and a new source of an additional, and effortlessly procurable,free income for the house-wife. If the arrangements for collection are more efficiently and thoughtfully devised, it could be gathered in appreciably larger quantities than are obtained by the present haphazard methods of collection.

4.6.2 Rice Bran

Ranking next in importance to coconut poonac is the other major ingredient of the poultry feed mix, rice bran. Since rice is the staple food of the country, rice bran is available as a by-product of paddy milling. The supply of bran thus depends entirely on the quantity of paddy produced. Fortunately, there is a visible upward trend in paddy production. The rapid progress of the major irrigation projects now being carried out, in particular the accelerated Mahaweli Ganga Development Scheme, holds out a bright prospect for rice productinn in the future. Hence, the important problems, towards whose solution the attention of researchers must be directed are:

1. The amount of quality rice bran that can be produced,
2. Sufficiency of the rice bran production to cater to the estimated poultry feed production, and
3. Time-scales of the irrigation projects and the period which must elapse before the full effects on paddy production are likely to be realised.

All the existing rice hullers are not capable of producing good quantity rice bran. Most of the hullers, that is to say the older type of hulling operators, produce a mixed by-product of hull and bran. It has been recommended that only No.1 quality, which is largely free from hulls should be used in the poultry feed mix. No.2 and No.3 quality, with hulls, it is said, should not be permitted to enter the mix, because it can cause damage to the digestive tract of the birds.

4.6.3 Wheat Bran

The Livestock Industry receives a small quantity of wheat bran supplied by the Sri Lanka State Flour Milling Corporation. The Corporation handles only about 20% of the country's flour requirements, the rest being imported directly in the form of flour. Since Sri Lanka is not a wheat growing country, it is not realistic to expect any increase of supplies of wheat bran in the future.

The construction of a large-scale flour mill has been completed at Trincomalee. However, according to the terms of the agreement, 175,000 tons of wheat bran and pollards annually are to be supplied to Singapore. Hence, the planners with respect to egg production have discounted the possibility of getting any measurable benefit to the feed industry from this source.

4.6.4 Oil Seeds

In Sri Lanka there are a number of oilseeds such as sesame (gingelly) groundnuts, cotton seed, soya beans and rubber seeds, which leave behind after extraction a cake or pulp which can be used as poultry feed ingredients. It is now reported that rubber seed poonac is no longer used as an ingredient in poultry feed manufacture due to the complaints of the poultry farmers.

Sesame seed meal (gingelly poonac) on the other hand, is a valuable and useful component with high energy value. Hence, it is desirable that the cultivation of sesame should be encouraged, and its production increased, through a guaranteed price scheme. Since sesame oil also has a good

export market there has lately been renewed interest in introducing improved seed varieties and production techniques, and expanding the area under cultivation. The proposal has been made for setting up a joint export-oriented venture between Sri Lanka and an American firm to grow sesame and set up a cleansing plant. Once this project materialises it could be expected that the poultry feed industry would have a new and valuable source of supply of a much needed ingredient for its manufacture:

> " A joint export-oriented venture between Sri Lanka and the U.S., this pioneering project involving MC-Cormick Inc. of U.S., The Mahaweli Authority and Ceylon Tobacco Company will undertake large-scale vegetable cultivation for export and the setting up of a cleansing plant for sesame seeds. The project envisages the opening of a 20,000 acre farm for cultivation of sesame seed, onions and garlic."[1]

The poultry feed industry does not get any appreciable support from groundnut production. This is due to the fact that almost the entirety of the production is used directly for human consumption in the form of shelled nuts. A very small amount of peanut butter is produced, but is far too little to exercise any influence on the poultry feed industry.

Soya bean meal has come to be generally acknowledged as a rich source of protein content. It has a very short history in Sri Lanka. Cultivation of the plant is desirable because of its two fold value, not only as animal feed, but also as an article of food of high quality for human beings as well. There is presently a joint programme planned by FAO/CARE/UNICEF and the Ministry of Agricultural Development & Research to promote soya bean cultivation in this country. However, the success of such a project has yet to be seen and tested.

At present, a small amount of soya bean derivatives are being produced, satisfying only a fraction of the requirements of the poultry feed

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[1] "Week end" - 7th October, 1979, p. 3.

industry, where it can be used to very good effect as a useful substitute for scarce components of high protein content, such as fish meal and meat meal.

Cotton seed meal is not used by our poultry feed manufacturers, as a regular ingredient, and when used it is considered as a protein containing element. The importance of cotton seed as a poultry feed ingredient will become a reality only after the proposed expansion of the cotton production itself takes effect.

4.6.5 Maize

Thus, maize remains as the main source of energy left to be used by feed manufacturers. B.C.C. uses about 15%-20% and O.F.C. about 10% for normal feed, and 35% for breeder mash. A considerable amount of maize is also consumed by the inhabitants of the producing areas themselves, for their own food. Its significance therefore both as part of the human diet and as a principal component of poultry feed makes it one of the chief props in the economy of the areas where soil and climate conditions render maize a suitable agricultural crop.

The new Ministry for Rural Industrial Development has identified the problem and has embarked on an energetic programme to stimulate maize production. It has raised the guaranteed price for maize up to Rs.2000/- per metric ton. A plan has also been drawn up to construct a stores complex in the maize growing areas for the collection of maize.

This may prove to be a right and timely effort, if the implementation side of it is also carefully and efficiently carried out. It would be possible for the Ministry of Agricultural Development and Research to supplement the plan with a parallel crash programme to grow more maize to coincide with the Rural Industrial Development Ministry's proposal.

What is certain however, is that an increase in maize production will facilitate very greatly the attainment of the egg production targets set.

4.6.6 Animal By-products

Animal by-products such as blood, bones, and carcass, can be converted into valuable poultry feed of high protein content, and labelled as blood meal, bone meal, and meat meal. In particular, blood is a most valuable slaughter house offal that can be processed into animal feed, and is far too valuable an article to be allowed to flow freely down the slaughterhouse drains. There are over 155 abbatoirs throughout the island. Within the Colombo Municipality limits alone, 17 markets and some 152 meat stalls have been built. But there is only one by-product unit controlled by the Colombo Municipal Council. The council has the necessary equipment and capacity to produce the above-mentioned ingredients to be incorporated in compound poultry feed.

The C.M.C. produces about 45-50 tonnes of blood meal, meat meal and bone meal (15 tonnes each) annually. Their main problem is removal of the offal and the bones back to the processing unit from the meat stalls. The C.M.C. offers the meat vendors the very low price of 13 cts. per pound, which also includes delivery by the meat vendors back to the processing unit, while outside buyers pay a higher price of about 30-35 cts. per pound and remove them. If the C.M .C.goes about this task more realistically than they do now, they can produce probably as much as 10 times their present output . Out of the 17 markets, only one market is supplying back bones regularly. This fact is itself sufficient to indicate the magnitude of the available potential.

The practice of the C.M.C. is to call for tenders at the end of each year for the following year's supplies. The highest bidder will get the contract for the full year at the agreed price. It hardly needs saying that thereafter, the successful tenderer is able to make large profits in various ways. For the year 1980, bone meal and blood meal tenders were taken by the National Livestock Development Board while the tender for bone meal went to a private dealer.

If the authorities of the C.M.C. and O.F.C. could jointly plan out a programme to collect bones and offal systematically throughout the country, to be thereafter processed by the C.M.C. on behalf of the O.F.C.

they would not only be averting a sizeable economic loss to the country but also helping to conserve much needed foreign exchange, since all these by-products have a substitution value (for fish meal or soya bean meal).

4.6.7 Fish Meal

By far the most extensively used protein item is fish meal. Almost all poultry farmers fill up their "protein gap" by adding some quantity of fish meal to the normal feed. Dry fish waste, and those quantities of dry fish condemned by the food and health authorities as unfit for human consumption, are sent to C.F.C. by C.W.E. However, the demand originating from the Poultry industry for fish meal for use as an additive to the poultry mix is very high. The amount of fish meal supplied by the Fisheries Corporation falls short of the quantity needed to meet the continually rising demands of the poultry industry.

Prices of fish meal sold by the Fisheries Corporation shot up by 337.5% from 1972, and by 75% from 1975 to 1979. This is shown in Table 31.

TABLE 31: LOCAL FISH MEAL (NO.1) PRICES . (PER TON.).

Date	Price
11.05.1972	1600.00
14.12.1972	1800.00
02.02.1973	1600.00
06.08.1973	1800.00
28.10.1973	2500.00
11.02.1974	3000.00
11.01.1975	4000.00
31.03.1977	6120.00
01.06.1977	7000.00

(No change in price during 1978 and 1979)

Source-: Ceylon Fisheries Corporation.

It is now well known that fish meal is being used as an essential ingredient in the feed mixtures of all the intensive poultry keepers. Private poultry feed dealers are importing fish meal from India and Pakistan. The prices however, are substantially higher than those paid for local fish meal.

Fisheries Corporation's fish meal is being manufactured at two places, namely Colombo and Pesalai. In the year 1978, the Corporation produced 241;07 tonnes of fish meal (Colombo 75.48 + Pesalai 125.59) an output which considerably short of actual requirements.

4.6.8. Additives

Various types of vitamin premixes, antioxidants, coccidiostats and cod-liver oil are imported by the local agents. Due to the imbalance of local feeds, poultry farmers have become accustomed to add premixes to the normal feed ration. Prices of additives have risen very rapidly particularly after the floating rupee exchange rate came into force. (For further observations on price increases see the section on poultry drugs, Chapter 3 - 3.3.3.)

4.6.9 Food Materials Condemned as Unfit for Human Consumption

A number of items fall into this category. Materials such as damaged rice, wheat flour, dried milk etc., rejected by the Food Commissioner's Department as being unsuitable for human consumption are sent direct to the O.F.C. Milk powder sweepings, flour sweepings, dhal husk and ground paddy are also despatched to the O.F.C. It could be expected that the arrangements for the supply of these items will continue without serious change or interruption.

4.6.10 Unconventional Raw Materials

Two aspects of this problem are to be considered, viz:

1. Those items which could be improved or made available by industrial processing,
2. New materials that can be moulded and processed for use in feed mixtures

"Little work has been done in Sri Lanka to replace the traditional animal protein supplements in animal feed with by-products of agro-industrial origin."[1]

1 Use of Silk worm (Bombyx Mori L.) Pupae as a protein supplement in Poultry Rations - By M.S. Wijeyasinghe and A.S.B.Rajaguru, Department of Animal Husbandry, Faculty of Agriculture, University of Peradeniya, Journal of the National Science Council of Sri Lanka, Volume 5 No. 2., December 1977 p. 95.

Availability of poultry feed could be enhanced in a very large measure through intensive research. Experiments and studies on the utilization of agricultural and industrial by-products, such as new varieties of animal feed, fall into this class. This would provide a welcome stimulus to the poultry industry.

For instance it has been found that cassava (manioc) can be used as an energy source for poultry feed. Cassava is found to be a profitable crop to grow on land that is virtually incapable of growing any other useful crop without irrigation facilities. It could also be cultivated as an intercrop on coconut plantations. Sor far there has been no proper feasibility study with respect to the cultivation of cassava for use as animal feed. However, it has been suggested that with suitable treatment it could be used as a substitute for maize.

In India a considerable volume of research has done on unconventional raw materials. Similarly the veterinary nutritionists in Sri Lanka could also find alternative sources of food substitutes for inclusion in the feed rations. Indian poultry nutritionists have discovered a number of items such as groundnut cake, mango seed kernel, cane molasses, brewery grains, guar meal, bajra, kodan, sawan, tapioca, silk worm pupae meal (extracted/unextracted) as substitutes for maize. In India one of the latest findings is 'Sal' fruit, which are available in large quantities in the forests of Orissa. This has been proposed as a replacement substitute for grain.

Research has shown that silk worm pupae has a high protein content of 51.3% and is an excellent fish-meal substitute.

> " An investigation was conducted to find the effect of various - levels of replacement of local fish meal with silk worm pupae (S.W.P.) on the performance of broiler starters, broiler finishers and laying hens. The results indicate that S.W.P. could successfully replace local fish meal in poultry rations."[1]

The Silk and Allied Products Development Authority (SAPDA)is planning to develop the silk cloth industry. It is expected that a large quantity of silk worm pupae would be available as a by-product with the intended rapid expansion of the sericulture industry in Sri Lanka.

[1]Ibid, pp. 75-96

"The Silk and Allied Products Development Authority (SAPDA) will go into commercial production of silk cloth next year with an initial output of ten thousand meters."[1]

The SAPDA has increased the extent of Mulbery Cultivation during the year 1979 upto 1330 acres as against 420 acres in 1977. This acreage is expected to be extended to 2500 during the year 1980. Hence, though it is in a small way as a side line, the poultry feed industry also will be benefitted. It must, however, be pointed out that use of silk worm cocoons as a poultry feed mix could incur storing resentment and opposition from the Buddhist section of the population.

In the Course of a discussion one of the participating poultry farmers informed us that local 'Thiththaya' fish is a very good substitute for ordinary fish meal and that in fact he had been using it and found its protein content to be comparatively high, (about 40%-48%). Its market price was around Rs.125 to 140/- per cwt. Like-wise there may be various other unconventional items of raw materials yet to be discovered and developed. The attention of poultry researchers should in our opinion, be directed towards these .

Another important suggestion is that the possibility of producing a high quality grass meal would seem to merit investigation . It has been said that by growing a kind of high protein grass and processing it on scientific lines, it could be made to bring down substantially the present price of poultry feed.

Fish silage could also emerge as a feasible and a hopeful proposal. Fish, condemned as unfit for human consumption and fish waste could be converted for poultry feed through processes of fermentation. The problem would be to make suitable arrangements for regular collection. A research programme has been jointly undertaken recently by the V.R.I.Peradeniya and Institute of Fish Technology, (I.F.T)Colombo, to study the feasibility of fish silage production for animal feeding. The I.F.T. has succeeded in producing good quality dry silage. There is great potential in the country for the large scale production of fish silage.[2]

1 "Ceylon Daily News" 12th October 1979, p.3.

2 Asian Livestock - Vol.IV No.1 January 1979 p.2.

CHAPTER 5

ECONOMICS OF EGG PRODUCTION[1]

5.1 SIZE OF THE FARM

From the data given in Table 32, it will be seen that for the large majority (76.5%) of farms the number of poultry birds being reared does not exceed 500. In the remaining (23.5%) farms the flocks number between 500 and 5000 birds. According to our sample survey these large scale farms are confined to four major areas namely Marawila, Puwakpitiya, Dehiwala and Beruwala. A very small number of farms in Dehiwala and Beruwala, have flocks of over 5000.

Taking the figures as a whole it may be said that the majority of poultry farmers are small or middle scale operators. Poultry breeders with less than 100 birds can be classified as backyard poultry keepers, the poultry being reared in open pens, instead of a poultry house, as a result of which costs of production and maintenance are held down very close to the minimum.

Birds are generally reared as (i) layers and (ii) broilers. Layers are poultry birds which, in the first instance, are reared for the production of eggs. The pullets are bred for a period of approximately six months before they begin to lay, and continue to lay for about 12-15 months. After this their laying capacity rapidly declines, and it becomes uneconomical to maintain them any longer as layers. They are then withdrawn from the flock and sold as culled birds for meat.

Pullets reared for sale as broilers are fattened for 65 to 75 days before they are despatched to the market. The poultry ration per day for broilers is roughly double that for laying hens, during their growing period. Further feeding of the birds after the 65 to 75 day period does not result in any

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[1] Since the supply and prices of inputs and the economics of egg production are closely interrelated, this Chapter does not call for the presentation of additional description about inputs again.

TABLE 32: SHOWING THE SIZE AND COMPOSITION OF POULTRIES

Chicken Number	Seeduwa		Negombo		Ja-ela		Wattala		Maraw wila		Puwak- pitiya		Dehiwala		Moratuwa		Angoda		Beruwala		Total		%
	L	B	L	B	L	B	L	B	L	B	L	B	L	B	L	B	L	B	L	B	L	B	
100	10	8	12	3	11	1	8	2	4	4	1	-	7	-	3	1	10	1	1	-	67	20	26.0
101-250	17	3	12	8	10	2	12	2	10	3	2	-	8	-	4	1	6	1	1	1	82	21	30.8
251-500	4	1	8	6	3	3	7	1	7	3	6	-	5	-	5	2	1	1	3	1	49	18	19.7
501-750	1	-	3	-	2	-	1	-	7	3	6	-	2	-	1	-	1	-	-	1	24	04	8.4
751-1000	1	-	2	-	2	1	1	-	-	-	2	-	1	-	2	-	-	-	-	-	11	01	3.5
1001-2500	1	-	1	-	1	-	-	-	-	-	11	-	2	-	2	-	-	-	2	2	20	02	6.5
2501-5000	-	-	-	1	-	-	-	-	2	2	2	-	3	-	-	-	-	-	1	1	08	04	3.5
5000/	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	1	-	03	-	0.8
Total	34	12	38	18	29	7	29	5	30	15	30	-	30	-	17	4	18	3	9	6	264	70	100.0

L = Layers

B = Broilers

1 - 100 = 26.0%

1 - 250 = 56.8%

1 - 500 = 76.5%

1 - 1000 = 88.4%

Source: Based on field survey data

further increase of weight, and is therefore considered uneconomical.

Raising of layers is more popular among poultry keepers than broilers. The layer/broiler ratio is 4:1. That is to say 80% of the farmers are raising layers, while only 20% are rearing broilers for producing poultry meat. Here too, the number of farmers who rear only broilers are comparatively small in number.

A pronounced area bias on religious grounds is also visible regarding the rearing of broilers. In the area from Wattla to Marawila broiler farmers outnumber the rest. Out of the total of 'broiler farmers' 81.4% belong to the above area, out of which 21.4% comes from Marawila alone. Not a single 'broiler farmer' has been recorded from the Puwakpitiya and Dehiwala areas. Among other reasons for this area bias, would be the availability of well organized marketing facilities, and the size of the demand for poultry products within the producing area itself. On the other side of the account, is the fact that breeding of layers and production of eggs, happens to provide a steady and continuing source of income throughout the year, unlike broiler production, where at the end of the fattening period of 65 to 75 days, the matured birds are taken to the market. The money, thus realized is used partly as an initial investment for bringing up a new flock of broiler or layer pullets.

5.2 USE OF LABOUR

Use of both family labour and hired labour was investigated. An attempt was also made to classify family labour, with a view to ascertaining its distribution between poultry farm work, and other off-farm work. Table 33 shows that poultry keeping is popular as a part-time job. While the householder is engaged in his regular employment, other members of the family can maintain the poultry yard. As far as the poultry industry is concerned the share of the females is almost equal to that contributed by males. The share of the females with the assistance of children is 26% whereas males only, contribute 25%. It could therefore be reasonably concluded that by using family labour alone an average family has the ability to open up and maintain a poultry economically. This is shown in greater detail in Table 35.

Out of the total labour involved, 81.4% is family labour, and only 18.3% is accounted for by hired labour, of which again 8.3% falls into the part time category. Therefore, only about 10% of the total labour employed can be regarded as full time hired labour. In Sri Lanka poultry keeping is thus very largely a small scale, self-employment generating industry. On the other hand, there are a small number of full time labourers with a few middle level employees carrying out the supervisory and administrative functions who between them manage large flocks of poultry. In other words large scale poultry farming is a capital intensive industrial activity, and its employment generating contribution to national economic development is virtually negligible.

Compared with other agricultural and livestock industries, poultry farming bears the character of an 'indoor' occupation to which housewives are able to contribute in a larger measure than would be generally expected. Tables 33 and 34 below illustrate this special characteristic of poultry keeping. Hence, poultry keeping carried out as a cottage industry and largerly operated by the use of family labour, offers large scope for development in Sri Lanka.

TABLE 33: AREA-WISE DISTRIBUTION OF LABOUR IN THE POULTRY INDUSTRY

Farm Work	See-duwa	Nego-mbo	Ja-ela	Watt-ala	Mara-wila	Puwak-pitiya	Dehi-wala	Morat-uwa	Angoda	Beru-wala	Total	%
Full time	22	15	10	9	18	12	16	6	-	5	113	40.5
Part time	18	24	20	21	12	18	17	14	20	5	166	59.4
Total	40	39	30	30	30	30	30	20	20	10	179	100.0

Source: Same as for Table 32

In all the areas investigated, family labour contributed more than 75% to the total amount of labour used, except in Negombo, Beruwala and Moratuwa. Table 35 shows that the highest rate of employment of family labour occurs in Ja-els and Seeduwa i.e. 93.2% and 91.1% respectively. In Moratuwa, Dehiwala, and Negombo, in particular, poultry keepers operate their business as a part time job. This explains why more hired labour has been used by them.

TABLE 34: DETAILED BREAKDOWN OF EMPLOYMENT (FAMILY LABOUR) DISTRIBUTION IN POULTRY FARMING

Category	See-duwa	Nego-mbo	Ja-ela	Watt-ala	Mara-wila	Puwakp-itiya	Dehi-wala	Morat-uwa	Ango-da	Beru-wala	Total	%
1.Males only	9	10	3	4	4	17	12	4	6	4	70	25.0
2.Females only	13	5	14	3	2	2	1	11	5	2	58	20.7
3.Males & Females	16	13	11	8	8	8	11	4	1	4	84	30.1
4.Children only	-	-	-	-	2	-	-	-	4	-	06	2.1
5.Males & Children	1	6	-	3	1	4	3	-	-	-	18	6.4
6.Females & Children	1	-	-	1	8	1	1	-	3	-	15	5.3
7.Males Females & Children	-	3	-	9	5	1	2	-	1	-	21	7.5
8.Non Family (direct) members	-	2	2	2	-	-	-	1	-	-	07	2.5
Total	40	39	30	30	30	30	30	20	20	10	279	100.0

Source: Same as for Table 32.

Except in 'pure' commercial type poultries i.e. on large scale farms in which a vast amount of money has been invested, all other types of poultry farms are conducted with 80% of family labour and 20% hired labour (Vide, Table 35). Another important characteristic of the labour utilized, is that more female labour is used where family labour undertakes the work. Whenever hired labour is employed the preference is for males and children, to females. Out of the total of hired labour employed 51.9% is made up of males, 33.8% of children and the share of the females is 14.2%. This may be also due to relative availability of labour and type of the job.

5.3 COSTS OF PRODUCTION

To arrive at an accurate estimate of the cost of production of eggs from the data of the field survey, presented some difficulty, as farmers were naturally prone to inflate their costs, and to deflate their incomes.

TABLE 35: CLASSIFICATION BY AREA OF LABOUR USED IN POULTRY KEEPING

	% Seeduwa		% Negombo		% Ja-ela		% Wattala		% Mariwila		% Puwakpitiya		% Dehiwala		% Moratuwa		% Angoda		% Beruwala		% Total	
	F.L.	H.L	F.L.	H.L	F.L.	H.L	F.L.	H.L	F.L.	H.L	F.L	H.L	F.L.	H.L.	F.L.	H.L	F.L.	H.L	F.L.	H.L	F.L.	H.L
Males	40.5	1.4	40.6	13.5	31.6	3.3	50.0	13.3	37.5	8.3	45.6	12.2	28.4	12.3	21.0	13.1	25.5	2.3	40.0	-	38.0	9.5
Females	49.2	1.4	32.2	5.2	61.6	1.6	21.6	-	30.5	1.3	22.8	3.5	23.0	3.0	42.1	6.3	32.3	-	26.6	26.6	34.6	2.6
Children	1.4	5.7	1.0	7.2	-	1.6	11.6	3.3	18.0	4.1	10.5	5.2	13.8	9.2	-	15.7	30.2	9.3	6.6	-	8.8	6.2
Total	91.1	8.5	73.8	25.7	93.2	6.5	83.2	16.6	86.0	13.7	78.4	20.9	75.2	24.5	63.1	35.1	88.0	11.6	73.2	26.6	81.4	18.3*

F.L. = Family Labour

H.L. = Hired Labour

* = 8.3% part time labour

Source: Same as for Table 32.

A very valuable cross checking was, however, provided by the numerous interviews which the authors held with the poultry farmers covering a large area. The Veterinary Research Institute, Gannoruwa, and the National Livestock Board also readily extended their assistance for this purpose.

Cost of production depends on such variables as:

1. System of management adopted.
2. Quality and supply of feed.
3. Scale of production.
4. Quality and supply of chicks
5. Availability and price of necessary facilities (Marketing, transport, electricity, additives, drugs, building materials etc.)

However, assuming that the basic requirements are satisfactorily available at relatively stable prices, and management activities and functions operate at a reasonable level of efficiency , it is possible to calculate an average cost of production per egg in the manner proposed below:- (See,category I)

The figures of cost as calculated have followed the conventionally adopted pattern of estimating the costs of production of poultry farmers. The experience gained during the survey revealed that the actual conditions under which production, was carried on, differred very substantially from these hitherto, recognised and accepted and called for reconsideration. For example, we found that the majority of the poultry men(about 80%) had started their poultries with their own savings. Furthermore, most of the middle and small scale farmers (more than 75%) use only family labour. (Vide, Table 35). In that case although in 'pure' costing it is usual to add such an expenditure, in reality the labour component as we discovered is negligible as a cost item. Particularly would this be true in poultries rearing 100 birds or less, when it will be generally agreed that it is absolutely unnecessary to employ hired labour. If, say, the number of birds exceeded 300, it would be reasonable to add one unit of hired labour. Even this, however, would depend on the degree to which family labour would be readily available.

COSTS AND RETURNS PER 100 BIRDS

Category 1 (Estimate arrived at on basis of conventional costing practice, as will be seen from the description of the items for which costs are estimated, the undeclared underlying assumption is that the enterprise is located in highly urbanised area).

1.	**Capital Cost**	Rs. 7400.00
	i) Buildings- 5400.00	
	ii) Laying Boxes & other equipments-2000.00	
2.	**Recurrent Cost**	Rs.13800.00
	i) Cost of raising from day old to point of lay (4 months) - 2400.00	
	ii) Cost for the laying period from 4 months to 18 months - 7800.00	
	iii) Labour cost (200 x 18 months) (part time) - 3600.00 (Transport & other miscellaneous expenses are included)	
	Total cost	Rs.21200.00
3.	**Income** for 12 months	
	i) Sale of eggs (at 60% lay/-21600 eggs) at the rate of 70 cts. per egg	Rs.15120.00
	ii) Sale of culled birds (Rs.20.00 per bird)	2000.00
	iii) Sale of empty feed bags (Rs.1/-per bag)	225.00
	iv) Sale of litter (40 birds give one ton per year)	350.00
	Total income	Rs.17695.00
4.	**Cost of Production**	
	i) Recurrent	Rs.13800.00
	ii) Depreciation on capital($7\frac{1}{2}$%)	555.00
	iii) Interest on capital(a loan of 5000/-)	840.00
	Total cost	Rs.15195.00

Cost of production per egg 15195.00 - 2575.00 (Sundry income)

Net cost = 12620.00

$$= \frac{12620.00}{21600} = .58 \text{ cts.}$$

5.	**Summary**	
	i) Total income	Rs.17695.00
	ii) Total expenditure	Rs.15195.00
	iii) Profit(for 18 months)	Rs. 2500.00
	iv) Monthly profit	Rs. 138.88
	v) Feed cost component(including drugs & additives)	67.1%
	vi) Cost of production per egg - (at 60% lay)	-.58 cts.

(For details vide, Annex 6)

As earlier pointed out, until a permanent poultry house is built, a semi-permanent structure able to last from 5 to 7 years could very easily be constructed by using cheap raw materials such as cadjan, bamboo or arecanut strips, and wattle and daub. In the villages this has been quite a common practice.[1]

Another matter which needs review, is that costing has been done on the basis of Colombo prices and labour charges. These costs would be a great deal less at the places where the actual poultries are situated. The price of building materials such as bricks, sand, timber, and also labour charges is an example. Taking the above factors into consideration, it is felt that different calculations of cost, based on different assumptions, would be useful, at least for the purpose of comparison.

(In all cases it is assumed that current (before the recent change) feed prices remain unchanged).

Costing in Category 1 has been done in respect of enterprises such as opening up a new poultry farm in major towns, or their suburbs. The capital cost of construction of poultry houses and other structures, and equipping them in such cases would be fairly high. (For details see Annex 6). Another factor to be taken into account is that the above calculations have been made at current prices, and hence apply only to new entrants into the field. The costs applicable to those already engaged in poultry farming are obviously much less, since their initial capital outlays would have been made several years previously when construction costs of poultry houses and appliances, together with the first investments on pullets, would have been made at much lower prices, perhaps as low as half the present costs, if the investment had been made 3 years previously, and a quarter of present costs if investment was done 8 years back.

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[1] "As part of the training Programme these volunteers are also taken to the government farm at Nikaweratiya and given a practical training in rearing poultry, pigs and cattle, A model of a low cost poultry house at the farm is shown for their benefit. This model house is of wattle and daub has a cadjan roof, and instead of the usual wirenetting, arecanut strips are used for economy. The cost of making such a poultry house which can accommodate 200 birds is estimated at Rs.750" "Sunday Observer" 21st October, 1979, p.7 ("Old Hometruths in New Packages' by Chitra Weerasinghe).

COST AND RETURNS PER 100 BIRDS

Category 2

(Estimate arrived at assuming the use of own savings, family labour, and self reliance. The costing here adopted would be chiefly applicable to a project located in a semi-urbanised area)

1.	**Capital cost**	Rs. 6500.00
	i) Buildings - 4500.00	
	ii) Laying boxes & other equipments - 2000.00	
2.	**Recurrent cost**	
	(Same as category 1, except labour cost, Labour considered as family labour).	Rs.10200.00
	(Transport & other miscellaneous expenses are included)	
	Total cost	Rs.16700.00
3.	**Income**	
	i) Sale of eggs at (55% lay-for 12 months 19800 eggs) (at the rate of 65 cts. per egg)	Rs.12870.00
	ii) Sale of culled birds (Rs.20.00 per bird)	Rs. 2000.00
	iii) Sale of empty feed bags (Rs.1/- per bag)	Rs. 225.00
	iv) Sale of litter (40 birds give one ton per year)	Rs. 350.00
	Total income	Rs.15440.00
4.	**Cost of Production**	
	i) Recurrent	Rs.10200.00
	ii) Depreciation on capital (10%)	Rs. 650.00
	iii) Interest on capital (a loan of Rs.5000 /-)	Rs. 840.00
	Total cost	Rs.11690.00

Cost of production per egg 11690 - 2575 (sundry income)
Net cost = Rs.9115.00

$$\frac{9115}{19800} = .46 \text{ cts.}$$

5. **Summary**

i)	Total income	Rs.15440.00
ii)	Total expenditure	Rs.11690.00
iii)	Profit (for 18 months)	Rs. 3750.00
iv)	Monthly profit	Rs. 208.33
v)	Feed cost component 87.2% (including drugs & additives)	
vi)	Cost of production per egg .46 cts. (at 55% lay)	

COST AND RETURNS PER 100 BIRDS

Category 3 (Estimate arrived at assuming/use of own savings, family labour and cheapest raw materials - A structure eminently suitable for village conditions).

		Rs.Cts.
1.	**Capital cost**	3000.00
	i) Buildings - 1500.00	
	ii) Laying boxes and other equipments-1500.00	
2.	**Recurrent cost**	9700.00
	(Same as for category 2. But can be saved some amount on drugs and additives by supplying enough sunlight, ventilation, green meal etc., Labour considered as family labour.) (Transport & other miscellaneous expenses are included.)	
	Total cost	12900.00
3.	**Income**	
	i) Sale of eggs(at the rate of .65 cts. per egg .55% lay-19800 eggs)	12870.00
	ii) Sale of culled birds (Rs.20/- per bird)	2000.00
	iii) Sale of empty bags (Rs.1/-per bag)	225.00
	iv) Sale of litter (40 birds give one ton per year)	350.00
	Total income	15440.00
4.	**Cost of Production**	
	i) Recurrent	9700.00
	ii) Depreciation on capital (15%)	450.00
	Total cost	10150.00

Cost of production per egg 10150 - 2575 (sundry income)
Net cost = Rs.7575

$$\frac{7575}{19800} = .38 \text{ cts.}$$

5.	**Summary**	
	i) Total income	15440.00
	ii) Total expenditure	10150.00
	iii) Profit (for 18 months)	5290.00
	iv) Monthly profit	293.88
	v) Feed cost component (including drugs & additives) 95%	
	vi) Cost of production per egg - .38 cts. (at 55% lay)	

Poultries in Category 2 and 3 are of more common occurrence. The capital cost is less, and no significant labour cost is visible, since family labour is used. In the first Category the cost of production of an egg works out to 58 cts., whereas in categories 2 and 3 the cost per egg is 46 cts and 38 cts. respectively. When the three categories are compared the feed cost component of an egg would be about 70%-80%. (cost components are shown in Figure 11). An attempt has been made to calculate the cost of production at different laying percentages. This is shown in Annex 7. In all categories it is clearly seen that the most crucial role is played by the cost of poultry feed.

Since the feed cost component of an egg is over 70% in intensive poultry keeping, feed cost, opening stock of pullets and depreciation on capital taken together, could be considered as a fixed cost component. Any significant change is possible only in respect of the variable cost components whose value is about 25%. In other words, if one considers 58 cts. as cost of production of an egg, 41 cts.will fall into fixed cost components and only 17 cts. (variable cost components) could be the subject of any change. The decisive influence of feed cost became clearly evident in the course of the survey. Most of the small and middle scale poultry farmers abondoned their poultries when the price of poultry feed was increased in 1977. They started farming again only after the reduction of feed prices in November 1978. This might well be the reason for our finding that 26% of the farmers were rearing less than 100 birds, at the time of this investigation.

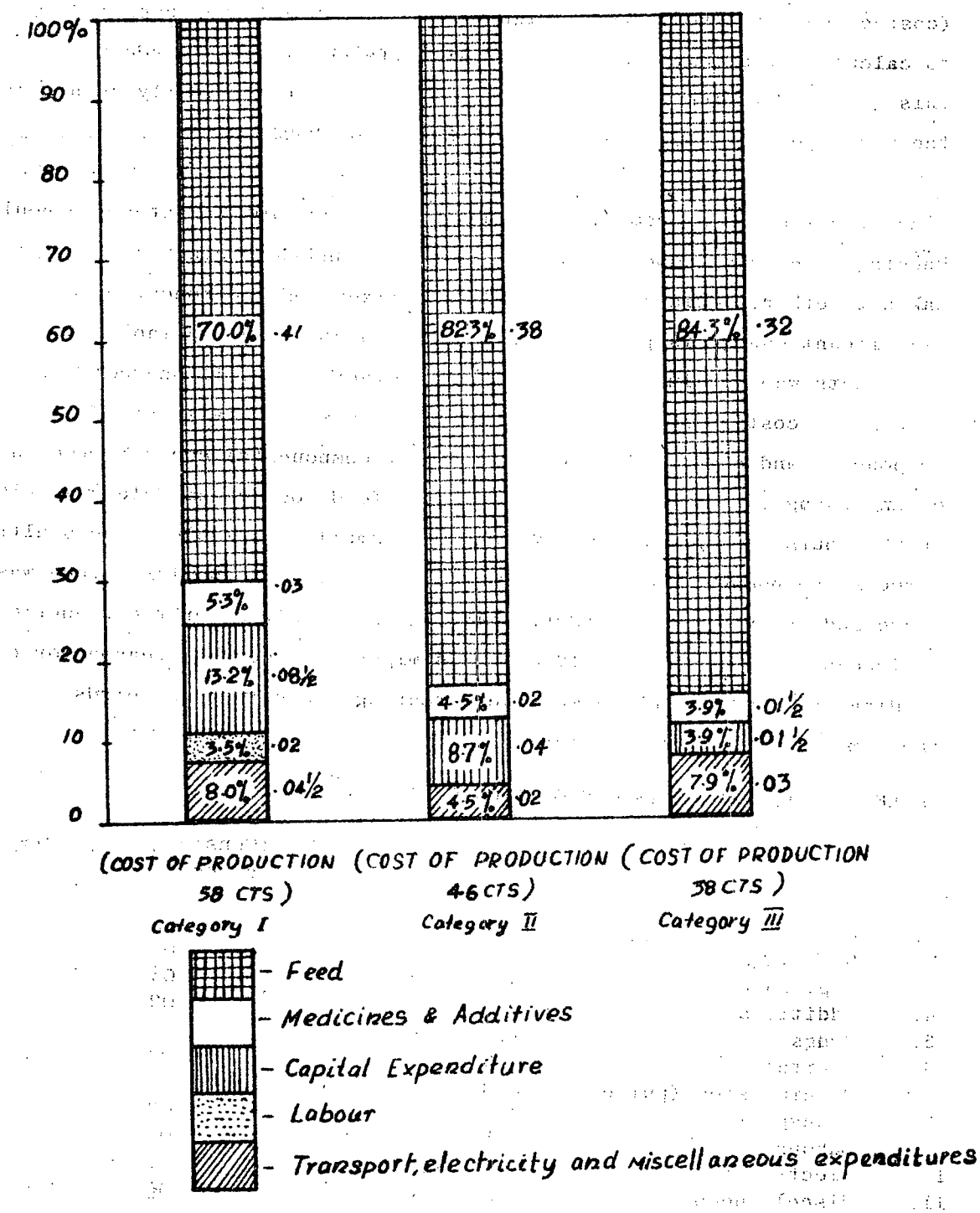
TABLE 36: GENERAL COSTS COMPOSITION OF AN EGG

	Item	%	Cts.(Considered .58 cts. as cost per egg)
1.	Feed	70.0	41
2.	Buildings	1.7	01
3.	Appliances	0.9	0½
4.	Additives	3.5	02
5.	Drugs	1.7	01
6.	Capital	5.3	03
7.	Opening stock(pullets)	5.3	03
8.	Transport	5.3	03
9.	Labour	3.5	02
10.	Electricity	1.7	01
11.	Miscellaneous	0.9	0½
		100.0	58

Figure. 11

AVERAGE PRODUCTION

COST COMPONENTS OF AN EGG



In the present context, assuming the prevailing feed prices to remain constant, the only possible way to reduce cost is by improving the quality of the mash. If a producer can depend entirely on the feed that he gives to the birds, he does not need to go after additives which are very costly. If a supply of high quality feed is assured, he will be able cut down cost by a minimum amount of about 4%. Another possible item of cost reduction is in the cost of the opening stock (day old pullets). As explained in Chapter 2 an improved variety of day old pullets at a cheaper rate, or at a concessionary rate, could be supplied by the Central Poultry Research Station of the Department of Animal Production and Health. If so, the cost could come down by another 2%-3%. Another cost aspect which could be considered is transport. Again, as suggested elsewhere in this report, by opening up new retail centres to sell poultry feed additives and drugs, and by persuading the O.F.C. and M.D. to operate a mobile sales service, and a purchasing service, respectively the transport cost component of the farmer could be brought down considerably. (See Chapters 7 and 8).

5.4 INCOME

The memory lapses of the farmers and their inclination very often to under-estimate their income are factors that should be kept in mind when data relating to farm income are examined. As stated above, about 60% of the farmers do poultry raising as a subsidiary source of income, and only 40% have selected poultry keeping as their principal means of livelihood. Off-farm income is shown in Table 37.

TABLE 37

Rupees	OFF FARM INCOME											
	See duwa	Negombo	Jaela	Wattala	Marawila	Puwakpitiya	Dehiwela	Moratuwa	Angoda	Beruwela	Total	%
1. 1-100	-	-	-	-	-	-	-	-	-	-	-	-
2. 101-500	12	13	11	14	5	9	5	8	13	-	90	32.2
3. 501-1000	4	11	9	7	7	9	9	6	4	2	68	24.3
4.1001/	2	-	-	-	-	-	-	-	3	3	08	2.8
5.Non-income receivers (off farm)	22	15	10	9	18	12	16	6	-	5	113	40.5
Total	40	39	30	30	30	30	30	20	20	10	279	100.0

Source: Same as for Table 32

40% of the farmers (indicated as non-income (off farm) receivers in Table 37) are full-time poultry keepers; that is to say, they derive their entire income from poultry rearing. Apart from the income from the poultry, 60% of them are also enjoying off-farm income amounting to nearly Rs.1000/- per month. As many as 2.8% of the farmers are receiving off-farm incomes exceeding Rs.1000/- per month. This means that the majority of them are employed elsewhere. On the basis of income received, poultry farmers could be categorised into two distrinct groups. viz., one group with higher incomes, who also receive a handsome off-farm income, and the other group who depend for their income solely on their poultry business. The latter group, that is the full-time poultry farmers, are naturally more sensitive even to small changes (i.e. egg prices, feed prices, supply and prices of chicks etc.) in the poultry industry. On the other hand, the part-time poultry farmer has the advantage of being able to meet any additional cash requirements from other income sources either for expansion of the business or for the day to day maintenance work.

It was stated earlier, that by raising 100 hybrid pullets of good quality, using only family labour and cheap raw materials, one could easily earn about Rs.250/- to Rs.350/- per month while providing at the same time a valuable protein food to the family members. If 250 to 300 pullets are reared, with a fair degree of efficiency, a young farmer can earn a

sufficient, income to maintain a family. (See 5.3). As far as the poultry industry (majority middle and small scale farmers) is concerned it is difficult to calculate the net cash farm return. The information collected by us does not show, with a sufficient degree of precision, the value of the parameters necessary to achieve this purpose, such as value of the produce retained for family consumption, sales figures, and prices and the cost of family labour contribution to poultry work.

5.4.1 Poultry meat

Besides the main income source viz. sale of eggs, after about 12 to 14 months lay, the birds are sold for poultry meat. Some farmers sell by live weight, and others by dressed weight. At some village centres they sell even by number of birds, regardless of weight. According to the records made by us, farmers are able, at the present time(1979) to sell poultry meat at the rate of about Rs.8.00 to Rs.8.50 per lb.(dressed weight), or about Rs.6.50 to Rs.7.50 per lb. (live weight), and about Rs.15 to Rs.20 per bird. In fact, by these sales of the birds, at the end of the laying period, the farmer provides himself with the necessary means to get his new stocks of birds.

5.4.2 Poultry manure

From the sale of deep litter manure, a poultry farmer is able to get another subsidiary income. Chicken feathers and heads are also frequently used as fertilizer. It has been calculated that 40 birds kept on deep litter for about a year, produce one ton of manure which will meet the full fertilizer requirements of one acre of paddy/maize, two acres of sorghum, or half an acre of intensive vegetable cultivation. According to the calculations made in Chapter 2, of this report, the present poultry population of the intensive sector is about 1.45 million. This 1.45 million chickens produce about 35,000 tons of deep litter manure per year, which is worth about Rs.7 million at present prices. This quantity of used litter can be utilized as fertilizer to cultivate 35,000 acres of paddy, or 17,500 acres of some other intensive type of cultivation. However, in Sri Lanka, poultry farmers do not use the deep litter manure as a direct source of income but instead use it for their own cultivation.

This is illustrated in Table 38.

TABLE 38

SHOWING USE OF DEEP LITTER MANURE BY POULTRY FARMERS

Type	See-duwa	Nego-mbo	Ja-ela	Watt-ala	Mara-wila	Puwak-pitiya	Dehi-wela	Mora-tuwa	Ango-da	Beru-wela	Total	%
1. Own use	36	24	19	15	22	15	9	11	10	10	171	61.3
2. As an exch-ange system	2	7	5	10	5	10	13	5	8	-	65	23.2
3. Direct sale	2	8	6	5	3	5	8	4	2	-	43	15.4
Total	40	39	30	30	30	30	30	20	20	10	279	100.0

Source: Same as for Table 32.

In the litter exchange system , farmers hand over the used litter free of charge to a neighbouring farmer who in turn, undertakes to fill the container with fresh litter free of charge.

Litter is not popular as an article of direct sale. Generally, farmers can sell at the rate of Rs.125/- to Rs.200/- per ton of litter manure, depending on the special conditions or characteristics of the area. A farmer rearing 100 birds will be able to get 3 tons of manure at the end of 18 months. In some countries the use of litter has been carried further, even to the point of using deep litter manure for cattle feed and in pig breeding as a protein supplement after putting it through some kind of processing. Recently in Sri Lanka, too, the possibility of its use as a protein supplement for pigs has been suggested.[1] In this way it is said it would be on the one hand, an additional income for the poultry farmers, and on the other hand a cheap alternative source of protein for pig breeding.

> "Results of two feeding trials conducted with growing swine indicated that dried poultry litter could be used in swine rations upto 20% level as a replacement of coconut meal."[1]

[1] "Use of Poultry Litter As a Protein Supplement in Swine Rations" By A.S.B. Rajaguru, V.Ravindran, N.Sriskandarajah and W.V.D.A.Gunawardena, Department of Animal Husbandry, Faculty of Agriculture, University of Peradeniya - Journal of the National Agricultural Society of Ceylon. Vol.15, 1978, p. 20.

5.4.3 Empty bags

Another supporting source of income is the sale of empty bags (feed). Previously prices had soared up to Rs.2.50 a bag. Presently the price is in the range of .75 cts. to Rs.1.50 a bag, and the average price can be put at Rs.1.00 per bag. Thus the buyer of a metric ton of poultry feed can expect to get an income of Rs.40/- by selling the empty bags. The survey also revealed that 71.3% of the farmers had sold their empties at the rate of between .75 cts. and Rs.150, while the rest had sold at the rate of .75 cts. per bag.

5.4.4 Egg Prices[1]

During the last few months (last quarter of 1979 and first six months of 1980) egg price has generally remained steady between .75 cts. and .85 cts. This is certainly a welcome sign so far as egg production is concerned. If the dynamism of the market can play an effective role in bringing together the variables involved to produce an equilibrium market price which satisfied both the producer and consumer, it will create a most healthy atmosphere for the growth of the industry. According to information gathered during the survey, under the prevailing Wellawatte market price domination, the poultry farmer is assured of getting a farm gate price of 65 to 75 cts. per egg. For instance, poultry farmers in the Puwakpitiya-Hanwella area sell their eggs to the egg collectors (wholesale dealers) who come to the village, at a price which is 5 to 10 cts. less than the Wellawatte Market price on that particular day depending on the alertness of the farmer and the efficiency of the market information. In effecting these sales there is hardly any attempt by dealers to cheat the customers, since the moment, one such incident comes to be known in the village it may well be the last trip to the village which that dealer would be able to make. There is a keen competition for the purchase of eggs and the farmers can instantly change their dealer. This does not mean however, that the opportunities for cheating the farmers, and getting undue profits at their expense, have been completely ruled out and eliminated. In areas where market information is lacking traders get their 'trading ambitions' satisfied without any difficulty. Marketing Department buys grade I eggs

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[1] For details see Chapters 7 & 8.

4 to 5 cts. less than their selling price.

5.4.5 Return on Capital

If a farmer gets a mimimum farm gate price of.68 cts. per egg, he is assured of a minimum profit of 10 to.25 cts. from an egg, depending on the existence of various other conditions as described earlier. An attempt has been made to calculate the return on capital based on the analysis of cost of production data which appears early in this Chapter.[1] This is shown in Table 39.

TABLE 39: RETURN ON CAPITAL

	(1) Gross income per 100 chicks for 18 months (Rs.)	(2) Cash expenses per 100 chicks for 18 months (Rs.)	(3) Capital cost per 100 chicks for 18 months (Rs.)	(4) Net cash income per 100 chicks for 18 months (Rs.)	(5) Return on capital (cash return per rupee spent) (Rs.Cts.)
Production category I	17695	15195	11595	2500	1.53
Production category II	15440	11690	11690	3750	1.32
Production category III	15440	10150	10150	5290	1.52

What, then, should be the 'ideal' farm size that a farmer, desirous of obtaining a fairly reasonable income to live on, should try to achieve? At this juncture, concepts like diminishing returns, income maximization, profit maximization, and economies of scale enter the analysis.

5.5. ECONOMIES OF SCALE IN POULTRY KEEPING

The best size of the poultry unit for any breeder would be that which maximizes the difference between his total income and total cost. This point of maximum profit would occur when his 'marginal revenue' equals 'marginal cost'. This is termed the equilibrium, or optimum, size of the enterprise. So long as 'marginal revenue" exceeds "marginal cost", it would pay the poultry farmer to go on increasing output. If, on the other hand, marginal revenue is less than marginal cost his business would result in loss, and he would be forced to reduce output. In the

1 See, 5.3 costs of production.

language of pure economic theory, the former is said to be a situation of increasing returns, and the latter of diminishing returns.

Costs do not always increase *pari passu* with size. For instance, the cost of rearing 100 chicks would not be exactly double the cost of rearing 200 chicks, given of course, the availability of a poultry house. In the latter case, the total cost will be distributed among more(200) birds, resulting in a lower cost of production per egg. However, if raw materials such as day-old pullets, drugs, additives, labour and feed are continuously injected into the business, an optimum situation will be reached. If, however, one goes beyond this optimum point, in increasing production, then cost of production will once again, begin to increase, resulting in diminishing returns or diseconomies of scale.

Through empirical evidence, it is possible to say that in Sri Lanka, since nearly all the principal factors necessary for the raising of poultry, namely suitable land, ingredients required for production of poultry feed, building materials for construction of poultry houses and an intelligent peasantry able to acquire the technical know-how easily,are to be found, economies of scale in poultry farming could be readily achieved. During our interviews with farmers, they frequently expressed their desire to expand their enterprise if only they could be helped to obtain the technical know-how, the necessary feed supply, and the requisite credit facilities. Hence, it is very evident that there is ample scope for further development and expansion of the activities of existing poultries.

(For a detailed theoritical analysis see Appendix 1)

5.6 PROVISION OF CREDIT FACILITIES

An attempt was made to ascertain more precisely, the state of indebtedness of the poultry farmers. The following statistics show that the majority of them had started their poultries with their own savings, and not with borrowed capital (Vide, Table 40). Therefore, the degree of indebtedness of the poultry husbandry of the agricultural sector

cannot be considered excessive, and likewise the interest rates charged by private lenders also, have been reasonably moderate:-

TABLE 40:

SOURCES FROM WHICH THE POULTRY FARMERS OBTAINED THEIR INITIAL CAPITAL

SOURCE	See-duwa	Neg-ombo	Ja-ela	Wat-tala	Mara-wila	Puwa-kpitiya	Dehi-wela	Mora-tuwa	Ango-da	Beru-wela	Total	%
1.Relatives and neighbours	1	6	3	4	3	4	3	2	2	1	29	10.3
2.Commercial banks	6	3	8	1	5	3	3	1	-	1	31	11.1
3.Own savings	33	30	39	25	22	33	24	17	18	8	219	78.4
Total	40	39	30	30	30	30	30	20	20	10	279	100.0

Source: Same as for Table 33.

As we pointed out elsewhere in the report, repayment of the loans has also not been unduly burdensome, because expected returns from sales constitute a continuing and assured income, which can moreover be obtained at regular intervals.

However, the importance of credit facilities in the poultry industry cannot be over-emphasised. Particularly under the conditions presently prevailing, owing to the abnormally high prices of raw materials, it is virtually impossible for a farmer, without a considerable initial capital, to commence a new poultry business, particularly in an urban or suburban area.

5.6.1 'Vicious Circle' of Credit

In the course of the survey, it was revealed that some of the poultry farmers were caught up in a "vicious circle" in the marketing of their produce. It had become a general practice for the egg dealers to come to the village and buy the farmers' production. Whenever the dealers found that the farmer was in acute need of money they were only too ready to supply him

with credit unconditionally or alternately would offer to supply the poultry mash on credit and deliver it at the farm gate . If it was necessary, they were even ready to give advances on a mere verbal agreement to repay the loan in kind (most probably from the next sale).The moment a farmer entered this 'vicious circle' of accepting an "advance" or a "loan" of this kind, or else agreed to take advantage of the dealer's offer of feed supply it would be exceedingly difficult for the farmer, thereafter, to release himself from the dealer's clutches. The farmer is now under obligation to sell his produce exclusively to the same dealer, and the cycle of lending and borrowing operates alternately, until finally it becomes a process of exploiting the farmer, bringing satisfactory profits to the dealer permanently.

Credit "facilities" of this kind have been in existence over the years. What is important, however, is that the credit should be of a reasonable kind nad easily obtainable. If the farmers' access to credit is impeded by enforcing hard conditions, then all his expectations will be nullified. There is thus a close relationship between the supplier of credit and the marketing channel. The farmers must necessarily sell their eggs to a particular person because he provides the credit facilities. From the point of view of the farmer he receives a very valuable service . This has also been one of the main reasons for the farmer's failure and unwillingness to sell their eggs to the Marketing Department. It would be necessary for some careful thinking on these lines to be done when planning to provide credit facilities.

5.6.2 Bank credit

Poultry farming can no longer be considered a risky enterprise, as in earlier days with the adoption of modern techniques of breeding, feeding, marketing and disease control. The major ravages of poultry disease, particularly Ranikhet (New castle disease); and Fowlpox have been brought under control as a result of the production of suitable vaccines, and their effective application. There is no longer any reason for the poultry farmer to fail in his enterprise, provided he manages the undertaking with a minimum of care, and a basic knowledge of the essential requirements of poultry breeding.

In the United States of America the poultry industry contributes about 9 to 10 percent of total agricultural income, and ranks above vegetables, wheat, cotton, fruits, corn etc., largely due to the easy availability of credit facilities through the banks. The story goes even further, for it is a legend of the success of the American banking industry that not the least part of its contribution to America's economic growth has been the role it has played in promoting every kind of agricultural activity in the U.S.A. Also in neighbouring India that credit facilities on an unprecedented scale are being provided through various agencies such as the Refinance Corporation, Commercial Banks, Co-operative Banks etc.

Risk and uncertainty are common characteristics of agricultural activities in general, and livestock rearing is no exception. Hence, if banks are reluctant to extend credit facilities on the plea of the 'risk and uncertainty' to which the loans are exposed, they would never be in a position to provide credit facilities to the agricultural sector in this country.

The Central Bank withdrew the credit guarantee scheme in 1978 which had being in existence since 1967. It is a hard blow for the expansion of Agricultural Credit in this country. The Central Bank itself however, was critical over this decision.

> " The Scheme (The Credit Guarantee Scheme) facilitated the expansion of cultivation loans over the years; The absence of the guarantee will compel the banks to be more cautious about lending, and is likely to cause a significant contraction of Agricultural Credit....."
>
> " But the reaction to such abuse by subjecting agricultural credit to the criterion of normal commercial bank lending, as happened, appears to be too drastic."[1]

It is important to note here, that Sri Lanka is predominantly an agricultural country and about 80% of the population is engaged in agricultural activities, direct or otherwise.

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[1] Review of the Economy 1978, Central Bank of Ceylon, p. 53.

5.6.3 Bank of Ceylon

Since 1973, the Bank of Ceylon has been operating a credit scheme with a view to encouraging the poultry farmers. It is now generally known that the scheme has virtually come to a stand-still. An investigation of the reasons for the failure of the scheme would be illuminating and informative. The mere act of clearing the initial hurdle of the sub-managers' 'appraisal test' is itself generally fatal for almost any ordinary poultry keeper. (Vide, Annexes 8 & 9). The additional conditions laid down, and information required from the applicants, quite clearly show the background of heavy prejudice which the farmer faces even before any consideration takes place as to whether the loan should or should not be given.

The inherent rigidity in the Bank credit system, the procedural, difficulties coupled with the inability in the part of the farmer to provide himself with a guarantee standing up to the requirements of the Banks have always discouraged the poultry breeder from seeking the assistance of the Bank, as far as his loan needs are concerned. Finally there is the practically insurmountable barrier of security or guaranty. For an ordinary villager it is virtually impossible to get two persons with qualifications acceptable to the bank, to stand as guarantors for the loan. The Inter-se Guarantee Scheme for poultry farmers, which was offered to borrowers as providing a less vigorous procedure, permitted a single poultry farmer, to stand as guarantor for the loan sought by another from the bank. This new arrangement, however, has not proved to be much more of a success.

The basic conditions for granting the loans too, have been laid down without considering the actual situation of the ordinary village farmer. It may be that occasionally one or more affluent or 'enlightened' farmers may have been successful in garnering the fruits of these schemes.

Another major reason for the filure of many of these schemes, is that proper and sufficient publicity had not been given regarding the availability of these arrangements. Most of the village farmers interviewed in this survey were totally unaware of the existence of such a credit scheme. But one would have to conclude by recognising the bitter truth, that in too many

cases only a limited group of ' influential' persons benefitted from this type of credit schemes.

5.6.4 People's Bank

The People's Bank, too, was operating a loan scheme for poultry farmers as far back as 1961. It was found on investigation that this scheme had achieved a considerable measure of success. Not only was it the case that a large number of farmers had benefitted from this scheme, but also egg production had increased to such an extent that it paved the way for the subsequent abolition of the import of eggs into the country. Presently however, due to reasons which are not very clear, this scheme is not functioning so well, and not evoking the same enthusiastic response from the farmers. It is possible that this may be partly due to the fault of the farmers themselves. On the other hand, it would appear that an applicant for a loan has to submit a statement of "cash flow" of the project, and the finance committee of the bank had to approve it. This type of sophisticated accounting techniques are well beyond the grasp of the ordinary poultry breeder. When the bank authorities were interviewed they stressed on the risk element of the enterprise. This is a clear statement of the banks attitude towards the poultry industry, for which, viewed purely as a banking institution, it cannot be altogether blamed. The solution lies in some sort of a guarantee to cover the losses of the bank in case of risks.

A comprehensive credit scheme should be formulated with the participation of the relevant ministry officials, genuine poultry farmers from the producing areas, who need credit and the bank authorities. If any credit scheme of this kind is to be a success, it is futile to allow bankers to take shelter behind the latitude that in making any loan 'risk and uncertainty' are the final determinants. Experience of the early sixties shows very clearly the results that can be achieved in egg production through bank credit.

CHAPTER 6

MANAGEMENT PRACTICES AND EXTENSION WORK

Proper management practices and extension work are of the highest importance in the planning of agricultural development programmes. A look back into the past experience and an examination of the newly proposed schemes and their implementation will help to throw light on some of the problems faced by the producers, and re-activate and reconnoitre the base on which future development plans and strategies for the poultry industry are to be laid in order to achieve the estimated production targets.

6.1 MANAGEMENT PRACTICES

Just as in the case of other livestock husbandry, in poultry keeping too, the achievement of good yields depends largely on the adoption of sound management practices. Every aspect of poultry keeping such as feeding, breeding, disease control, housing, lighting, replacing stocks etc., is almost equally important for an efficient poultry industry. 'Management' includes all these aspects taken together. In Western countries poultry management is highly automated. Feeding, watering, as well as egg collection and manure removal, are done mechanically. Even blood spot detectors are included in the egg processing line. By using automated production equipment one individual can take care of a hundred thousand layers or more. In many egg production complexes, the eggs are washed, candled for blood spots, graded for size, and placed in a carton or filler flat without being touched by human hands. Modern feed mill operations are completely computerized. Feed formulae can be changed in a matter of seconds. Some computers even control the light and moniotr feed and water consumption, and some are designed to tell the farmer when to moult or sell a flock.

Formerly the free range system was practically universal throughout the island, and gave very poor yields to the farmer. Hence, it was not popular or paying, as a commercial enterprise. Commencing about 1955, the Department of Agriculture had launched an islandwide campaign to

popularise the deep litter system of poultry raising, in place of the traditional system. The Department has also put into effect a scheme of free immunisation against disease, and also organised the issue of subsidised day-old pure bred chicks of popular breeds. This effort has yielded very good returns. Nevertheless, the "free range" system still continues to prevail in the rural areas of the country .

Intensive production in deep litters is now the normal practice in all the commercial poultries of the country. Hence, poultry keepers are now very largely dependent on reliable and regular supplies of sexed day-old chicks. If replacement stocks cannot be obtained, in time, it would not only result in loss to the individual farmer, but if widespread, would also cause disorganization of market conditions, and create alternating periods of shortages and gluts, with corresponding repercussions on both the producer and the consumer.

The poultry industry is becoming a fast developing and dynamic sector of the country's agricultural organisation. Most poultry diseases could be prevented by proper management, and cleanliness is a key word, in this context. Some farmers have even warned visitors against entering the farm. This is a safety precaution, that all poultry farmers would be wise to take.

6.2. AN INSURANCE SCHEME FOR THE POULTRY INDUSTRY

In most branches of the agricultural sector of the economy, the government has intervened to protect the farmer in one form or another , except in the case of the livestock industry.[1] For instance Rubber, Coconut and Tea plantations as well as almost all the minor export crops get direct subsidies. It is well known that the poultry farmer in particular has to face certain basic risks. These risks may come in the form of inclement weather, disease, epidemics, accidents, poor quality of feed, etc.

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[1] Now, the risks involved in cattle breeding are being covered by an insurance scheme.

some of which may ruin the entire business of the farmer within a very short time, and involve him in losses which, for the majority of poultry farmers may be too great to be borne individually. Since some risks such as inclement weather, and some types of poultry disease are beyond the control of the farmer, a system of insurance coverage would give him a sense of security and restore the losses suffered by him without putting an excessive burden, either on him or the state.

It was reported to use that an insurance scheme for the poultry industry was under preparation by the Agricultural Insurance Board, (A.I.B.)with the cooperation of the Agricultural Development Authority (A.D.A.) and the Bank of Ceylon. Since this scheme is intended to cover only the poultries established under the aegis of the A.D.A., it falls short of being a national undertaking applicable to the whole country.

6.3 TRAINING

For the rapid development of the industry, and to increase overall efficiency, scientific poultry management practices must be introduced and popularised without delay. The survey findings provide plentiful evidence of the neglect of this very important aspect.(See Table 41.)

TABLE 41: REASONS FOR STARTING A POULTRY

Reason	See-duwa	Negombo	Jaela	Wattala	Marawila	Puwakpitiya	Dehiwala	Moratuwa	Angoda	Beruwala	Total	%
1.On his own idea	37	36	26	25	23	24	29	15	16	8	239	85.6
2.On a friend's advice	3	3	3	5	5	5	1	5	4	2	36	12.9
3.On Vet. Surgeon's advice	-	-	1	-	1	-	-	-	-	-	2	0.7
4.On government assistance	-	-	-	-	-	-	-	-	-	-	-	-
5.Others	-	-	-	-	1	1	-	-	-	-	2	0.7
Total	40	39	30	30	30	30	30	20	20	10	279	100.0

Source: Based on Survey Findings.

It was interesting to note that only 5 out of 279 farmers had some previous training whatever, and only 3 out of the 279 had read something about poultry keeping. The statistics themselves point to the importance and priority, that training should receive.

Most of the poultry farmers expressed the view that they should be given the opportunity to acquire proper training in poultry keeping, and were willing to undergo such training if an opportunity was provided. More than half of the farmers had up to 5 years experience in poultry keeping, and 78% of them 1 to 10 years experience. Details are set out in Table 42.

TABLE 42: TABLE SHOWING THE EXPERIENCE OF POULTRY FARMERS

Period (Years)	See-duwa	Nego-mbo	Ja-ela	Watta-la	Mara-wila	Puwak-pitiya	Dehi-wala	Mora-tuwa	Ang-oda	Beru-wela	Total	%
1	-	1	-	1	2	-	-	-	1	1	6	2.1
1-5	30	17	16	8	10	18	16	15	12	4	136	48.7
6-10	6	12	8	14	3	13	11	3	3	3	76	27.2
11-20	4	7	5	6	9	9	3	2	4	2	51	18.2
21/	-	2	1	1	6		-	-		-	10	3.5
Total	40	39	30	30	30	30	30	20	20	10	279	100.0

Source: Same as for Table 41

It was stated by almost all the poultry keepers interviewed that they had started their poultries:-

1) on their own initiative,
2) on a friend's advice,
3) as a continuation of an inherited enterprise.

The Ministry of Rural Industrial Development has announced that, as a part of a multi-million rupee programme for the development of the animal husbandry activities in the country, the establishment of a School of Animal Husbandry. This was started in July 1980 at Welisara. The new school

will fill a void which is long overdue. It should be mentioned here that a farmer training centre was established at Undugoda in 1977. It has also been announced that more of such centres will be established.

6.4 RESEARCH

When compared with Western countries, or even with India, the research work in Sri Lanka on poultry science is far from adequate. In those countries Agricultural Research Institutes, Veterinary Research Institutes, Medical Research Institutes, Standards Institutions, Universities, and private institutes, are researching into this subject. Highly valuable information has been obtained as result of this research work and numerous changes and developments are being made in various fields of the industry. For instance an American firm has carried out a concentrated breeding programme for nearly two decades, and after evaluating 660 genetic crosses they have successfully developed a high yielding strain. It has been announced by a leading breeder in America, according to his research findings that in 1983 four pound broilers will be finished at 42 days of age with a feed conversion of 1.5. The Indian Standards Institute has published a code of standards even in respect of poultry housing. This code deals with construction of poultry houses for birds maintained on free-range, semi-intensive and intensive systems.

Since cereals are needed for human consumption, it is necessary to find out suitable new substitutes that would give comparable efficiency. A very large number of research investigations have been carried out in many countries in this regard. It is suggested that in Sri Lanka, too research in poultry science should be undertaken to exploit untapped sources of supplies for this purpose.

6.5 EXTENSION WORK

management
In Sri Lanka extension work in poultry was formerly carried out by the then Animal Production and Health Division of the Department of Agriculture and is now continued by a separate, department with the same name viz. The Department of Animal Productinn and Health, functioning under the

Ministry of Rural Industrial Development.

In areas where the special Integrated Rural Development projects are being operated, the extension services in connection with animal husbandry are also handled by the Department of Agriculture through their network of extension officers namely Agricultural Officers(A.OO), Agricultural Instructors A.II) Subject Matter Officers(S.M.OO) (Specially trained in respective subjects) and Krushi Karma Viyapthi Sevakas (K.V.SS).

The main extension work is directed to getting down day-old pullets from the governmnet farms and distributing these among those applying for them, making periodical visits to the poultry farms of the respective areas for making diagnoses of reported cases of disease; and carrying out treatment and other control measures. A major part of this work consists in carrying out the free service of preventive inocculations against diseases such as Ranikhet and Mareks.

The farmer has to learn and practice the modern and newly developed husbandry methods, in order to increase production. In this connection, the importance of the extension personnel cannot be over emphasised. To equip the farmer with the weapons of the new know-how, disease eradication methods, efficient management practices etc. is the main duty of the extension worker. Practical poultry raising could be popularised among people as a result of efficient work of the extension officers.

As a result of the survey findings we are able to present the following data regarding the assistance given by the veterinary surgeons of the respective areas (Vide, Table 43).

TABLE 43: SHOWING NATURE OF ASSISTANCE RENDERED BY FIELD STAFF

Category	Seed-duwa	Nego-mbo	Ja-ela	Watta-la	Mara-wila	Puwak-pitiya	Dehi-wala	Mora-tuwa	Ango-da	Beru-wala	Total	%
1.Visits frequently	-	-	-	1	8	29	1	-	-	-	39	13.9
2.Visits when informed	37	33	18	25	-	1	10	20	20	8	172	61.6
3.Difficult to meet	-	1	1	-	-	-	1	-	-	1	4	1.4
4.Not visiting	3	5	11	4	22	-	18	-	-	1	64	22.9
Total	40	39	30	30	30	30	30	20	20	10	279	100.0

Source: Same as for Table 41.

Extension efficiency rests mainly on the industry and application of particular individuals. This is shown clearly by the figures illustrating differences in respect of different areas. In some areas veterinary surgeons visit farms frequently, while in other areas the response is very poor. For instance, in the Puwakpitiya area 29 out of 30 farmers informed us that their veterinary surgeon visited their area very frequently. In the Marawila and Dehiwala areas most farmers complained that veterinary surgeons hardly visited them at all. Apart from this difference in respect of area, it was found that generally 75% of the farmers got some assistance, and only 22.9% of the farmers complained that the veterinary surgeon did not visit their farms. A complaint frequently heard was that the veterinary surgeon was often in the habit of sending a substitute who was not competent. As far as popularization and rapid devlopment are concerned, this is obviously not very satisfactory. In fact only 13.9% are receiving regularly the veterinary assistance and care which should be received by all the farmers. If the veterinary services are not up to satisfactory standard, even those people who have the inclination, the land, money and other facilities to start a poultry business, would lose interest in such an enterprise. In the long run this may affect the productin targets adversely.

Recently the governmnt has increased the veterinary surgeons' cadre by 25% obviously with the intention of providing a better and more efficient service. But, any real development will depend on the honesty,activeness, and devotion to work of the selected individuals. The importance of the above characteristics is clearly shown by a close examination of Table 43.

Another important point in connection with extension is to have a proper coordination among extension officers. Since, now the extension work is being carried out by two sets of officers belonging to two separate departments, under two separate ministries it is possible that this arrangement itself could provide room for them to escape from the responsibilities and to find 'scape-goats'.

Universities, too, can render valuable service in connection with extension work. When extension work is linked up with the universities there results a free flow of information and research findings etc.,directly from university to the field, and vice-versa.. Such a commutation system, functioning in collaboration with the field extension service, could yield most fruitful results in educating and giving assistance and encouragement, to poultry farmers.

In some Agricultural Universities in India there is in operation a scheme called ' earn while you learn'. Whilst studying poultry science, students have to practice poultry keeping and are permitted to receive a share of the profits. In Sri Lanka, too, a similar practice could be adopted and the veterinary students could be used in extension work in the villages as a part of their academic course. In this, way knowledge derived from the latest researches, or the newest experiences, could be readily and directly conveyed to or disseminated among farmers by the extension workers (university) more effectively. This enables the farmer to adopt the latest animal husbandry practices for more production. On the other hand, the problems of the poultry farmers whenever these arise, are easily identified and can be quickly channelled to the right points for their elucidation and solution.

Therefore, extension workers and university research staff and students should work in a joint and closely co-ordinated system to achieve

the common goals. It is useful to record here, that during the period of the survey a university lecturer had put forward, on his own initiative, a scheme of extension work to be carried out with the participation of the university.

6.6 NEW PROPOSALS AND SCHEMES

It has been reported that a number of new schemes relating to the poultry industry are being operated in different parts of the country, under the guidance of the Ministry of Rural Industrial Development. (For a detailed discussion see Appendix 2). ARTI was coordinating a poultry project at Beminiwatte where its field laboratory was operating. Experience gained from that project is also inserted in the same Appendix.

CHAPTER 7

MARKETING AND PRICES

The term Marketing comprises all the operations involved in the movement of goods from the producer to the final consumer, excluding any processing which changes the nature and use of the product. As such, egg marketing includes the handling of eggs at the farm, its transportation to wholesale and retail assembly points, and to storage, cleaning, grading, packing and subsequent distribution to consumers. Selling price determination, and intermediary charges in the shape of marketing cost, help to determine the extent of difference between the price paid by the consumer and that received by the producer.

As poultry products are highly perishable these goods should reach the consumers as quickly as possible. In the supply of eggs, there had been in the past definite periods of gluts and scarcities due largely to certain variances in laying. Difficulties and delays in replacement of stock, as well as feed availability, were among other major reasons for variations in the market supply of eggs. In Chapter 2 we examined the nature of some of the underlying conditions governing the production and supply of eggs. Here we are concerned only with the market supply and effective demand and their impact on prices.

7.1 EFFECTIVE DEMAND

Demand refers to the amount of eggs that a given population will purchase under specific conditions of time and place. It also reflects the volume of disposable income that buyers are prepared to exchange for eggs, bearing in mind the intensity of their wants relative to other items. The Central Bank's statistics reveal that 15% of the population in Sri Lanka with income exceeding Rs.800/- per month consume 90% of the eggs available for local consumption. This simple fact also carries with it the disturbing inference that due to various reasons the habit of consumption of eggs has not reached the average citizen.

The Law of Demand attempts to relate the level of prices to the quantities available in the market. Also the demand referred to here means that quantity which people are able to purchase at the given price, and not the quantity that they need, or would like to purchase if they had the necessary purchasing power. Quantities purchased vary with price at different time periods. Table 44 gives a description of prices and quantities in the year 1976 which prevailed during the respective months at the place specified. (Due to unavailability of accurate data on demand for eggs, sales figures are taken as a 'proxy' of demand).

TABLE 44: RELATIONSHIP BETWEEN PRICE AND SALES (1976) OF EGGS AS REFLECTED IN PRICES RULING IN THE COLOMBO MARKET

Month	Average Price		Effective Demand (sales)	
	Marketing Department	A Private dealer's*	Marketing Department	A Private dealer's*
January	57	63	333,000	253,000
February	53	60	357,000	290,000
March	50	56	361,000	300,000
April	62	65	330,000	280,000
May	59	62	340,000	242,000
June	60	65	328,000	238,000
July	58	60	322,000	245,000
August	59	63	344,000	248,000
September	60	62	298,000	300,000
October	59	60	300,000	310,000
November	67	71	381,000	350,000
December	70	76	298,000	360,000

Source: Based on Survey Findings.

* There are 5-6 dealers controlling the wholesale egg market. The data given above represent the prices as shown in the records of one of the leading egg dealers.

The Marketing Department Eggs have a large demand, because its prices are low in comparison with those of the private traders, especially during festive seasons, when egg prices of private dealers are very high. But in this instance the demand does not depend on price alone. During festive seasons (such as Christmas, Hadji, and Sinhala New Year) the need for eggs (for cake making etc.) forces consumers to purchase more eggs regardless of price. Therefore, putting together these various factors, it may be said that the effective demand for eggs

depends upon,

a) the price of eggs
b) the prices of other competing substitutes and commodities
c) the time or season and the urgency of the need
d) relative tastes and preferences for eggs and other substitutable commodities.

Hence, the demand function representing the effective demand of consumers (z) might be written as:-

$Dn_{(z)} = (P_n, P_1, P_2 : \ldots\ldots\ldots P_n - 1), K(z), Y(z), T(z)$

$P_1, P_2 \ldots\ldots\ldots\ldots P_2 - 1$ represent the price of n commodities

K(z) represent the time and the urgency of the need for the commodity.

Y(z) and T(z) represent the income and taste of the consumer.

Variations in demand and quantity are likely to take place when one of the variables changes and all others remain constant. Ordinarily this would be affected by

1) Changes in the disposable income of the consumer
2) Changes in the supply
3) Changes in the relative prices of products which are substitutable for eggs. (as explained in Chapter 2)
4) Changes in buyers' estimates of anticipated future prices.

Normally, the last factor does not affect the egg market very greatly, due to its comparatively perishable character. The other factors, however, powerfully influence demand, and through demand the price and supply.

7.2 SUPPLY

The supply of eggs, it may be stated, depends on several variable factors, viz:-

1. Variability of output: The quantity of eggs available in the market at any given time depends upon several factors, the most important being the volume of production, which varies from

day to day, depending on the availability of feed, supply of ' day old ' chicks, the health of the farm birds and state of the weather, proper replacement of stocks etc.

2. Seasonality: The seasonal variability of egg supply is not now as acute as it used to be some years ago. Nevertheless, since no effective establishment of a buffer-stock is possible due to the magnitude of the unsatisfied demand, and the poor supply situation, the seasonal variability in egg production still continues to exist, in somewhat less acute form than previously.

3. Transport facilities: Since most egg farms are situated in the coastal areas, the difficulty of moving eggs to consumption areas in and near Colombo, and into the towns in the interior of the country, becomes evident. Therefore, regular and speedy transport from the producing areas to the consuming areas is essential. But eggs need extra care due to their perishable and easily breakable character , giving rise to further additions to cost and hence to supply prices.

4. Perishability: Relatively to other products, eggs by the nature are highly perishable, and cannot be stored for long periods without suffering serious deterioration of quality. Protection against this risk requires speedy handling and special refrigeration, which again raises the cost of marketing.

5. Colour, Palatability and Nutrition Value: Poultry and nutrition experts have found that there is no nutritional difference between white and brown eggs, and hardly any difference in palatability. Yet it is an observed fact that people in certain localities, especially urban folk, prefer brown eggs, believing them to possess a higher nutrient value, while rural folk on the other hand prefer white eggs because of a belief that there is no life present in the white farm eggs.

6. Size: Large sized eggs are sold more quickly and in larger quantities compared to the medium and small sized eggs. Market agencies take advantage of this and try to secure a higher

price for large eggs which are generally scarce.

7. Price: Price being the chief factor influencing supply, merits some special attention. When production is high, prices tend to fall as a result of the excess of supply, in accordance with the operation of the law of Supply and Demand. Consequently the pendulam of egg production swings in the opposite direction as marginal farmers find that the low prices now ruling do not cover their costs, and forcing them to go out of business and causing production to decline. With egg supplies low, prices will once again show a tendency to rise.

TABLE 45: THE RELATIONSHIP BETWEEN THE PRICE AND PURCHASE OF EGGS

Month	Average prices paid to the producer for the year 1976		Quantity received for the year 1976.	
	Marketing Dept. Grade 1 eggs	A Private trader (large eggs)	Marketing Dept. ('000)	A Private trader * ('000)
January	58	55	382	321
February	49	46	361	282
March	46	42	248	272
April	48	44	378	300
May	55	54	356	323
June	56	57	316	340
July	54	56	300	280
August	54	54	340	360
September	55	55	329	368
October	56	57	338	370
November	65	65	358	390
December	66	68	362	390

Source: Same as for Table 44.
* Figures of one particular trader at Wellawatta

When egg prices are compared with the corresponding quantities sold at these prices, the very high degree of correlation which exists between price and the quantity, becomes very evident, the higher the price the larger being the quantity received for sale. This relationship is somewhat observed in the Marketing Department's purchase prices

since the Department seeks to keep prices low and steady even in periods of higher demand in order to protect the consumer.

The quantity supplied to the market is insufficient to build up a stockpile since the demand for eggs is invariably in excess of the quantity which the suppliers can readily meet, with the result that price fluctuations naturally continue to prevail. The sum total of the efforts of the Marketing Department is thus mainly devoted to an endeavour to minimise price fluctuations by stockpiling a limited quantity of eggs, to be released at such special occassions as Christmas.

7.3 PRICE DETERMINATION

In pure economic theory, the demand curves of consumers and supply curves of producers are the chief factors considered as determinants of price. In the diagrammatic presentation of this principle, the point at which the curves representing these two functions intersect determines the market price of the commodity. This is the normal method of price determination under competitive conditions, where demand is regarded and treated as if it was independent of the supply.

Apart from marketing costs, however, the actual cost of productinn of the commodity plays a major and vital role in price formation, and in the case of eggs this contributes about 65% - 75% of the egg prices.

TABLE 46: BREAKDOWN OF DETERMINANTS OF EGG PRICES IN THE COLOMBO MARKET

	1979		1980 (Jan.-July.average market price)	
		As a % of the selling price		As a % of the selling price.
Cost of Production*	0.54 cts.	75%	0.58 cts.	72.5%
Marketing cost (packing, grading, transport, handling etc,)	0.06 cts.	8.3%	0.08 cts.@	10.0%
Profit margin for the producer as well as the trader+	0.12 cts.	16.7%	0.14 cts.	17.5%
Selling price	.72 cts.		.80 cts.**	

P.T.O

+ (Profit margins of the producer and the trader vary for a number of reasons such as area, alertness of the particular farmer, efficiency of the market information, nature of the relationship between the farmer and the trader, distance from the producer to marketing channels etc.)

* The cost of production = 58 cts.
Selling price = 80 cts.
Cost of production as a % of selling price = $\frac{58}{80} \times 100 = 72.5\%$

** 1979/80 average market price.

@ Marketing cost has shot up considerably due to recent rapid increase of fuel cost.

Source: Based on survey findings.

When the selling price of an egg rises above 80 cts. it can generally be assumed that the amount of the increase is a gain which accrues, almost in its entirety, to the dealers, both retail and wholesale, only a bare marginal sum being passed on to the actual farmer in an increase of price at the farm. Although eggs are not strictly a seasonally produced commodity, a kind of seasonal fluctuation can be clearly seen in the pattern of prices- due to demand variations. In the past, the price difference during festive seasons and other slack seasons was very much greater. But now the fluctuations are much smaller, the margin of difference ranging from·1 to·12 cts.(see,Chapter 2, 2.4.4.)

One other factor which influences price is the price and availability of other animal protein substitutes such as milk, fish and meat, (See, Chapter 2).

The egg trade in Sri Lanka is dominated by a few wholesalers at Wellawatte and the Pettah with the result that the egg price in the country is usually influenced and virtually determined by the prices quoted by these traders. Although these dealers claim that they decide their price according to the prevailing supply and demand conditions, their own stock position, and the rate of sales, it was very evident from our investigations that they are able to set effective price controls with a view to creating short term price fluctuations affecting adversely the producer as well as the consumer.

The market share of the marketing organizations in the Colombo egg market is as follows:

Wellawatte dealers	=	24%)	
Pettah dealers	=	60%)	100%
Marketing Department	=	16%)	

The attached graph indicates in greater detail, the market shares of the principal egg dealers. (Vide, Figure 12)

The above statistics show clearly the role played by the private dealers. Among these dealers there were three dealers with market shares of 27.5%, 17.2% and 14.2% at Pettah, Bambalapitiya and Wellawatta respectively. (Dealers No. 1, 6, and 7 in the Figure 12).

These dealers create an oligopolistic situation in the egg market, with the Wellawatte and the Pettah dealers controlling it. Among all these dealers there was one particular dealer at Wellawatte who stood out as exercising a commanding position in the pricing strategy. Most of the dealers in Colombo and the suburbs follow his price leadership. Even the Marketing Department ascertains the prices quoted by these three dealers daily, especially the dealer at Wellawatte, before announcing their own day to day prices.

The reason for the successful building up of this situation of monopoly and domination in price determination by one particular dealer over the others, and over the entire market does not admit of any logical of sensible explanation, and can only be described as unreasoning submission or surrender to superior force, open or concealed.[1] The fact that the

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1 According to information gathered from observation and discussions with 'experienced' personnel, the following historical explanation could be given as to how Wellawatte became the principal centre for the egg trade.

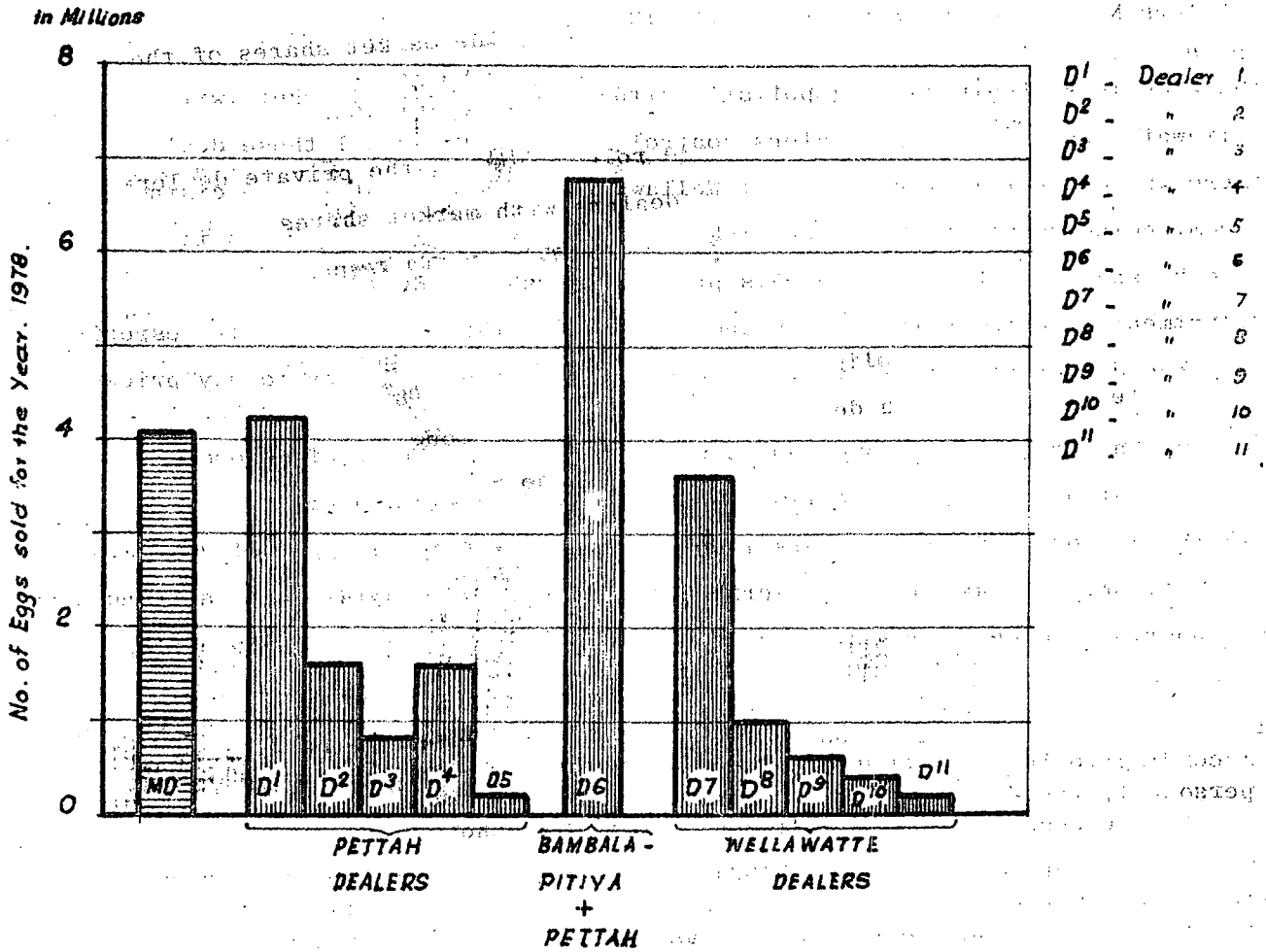
During & after World War II (1943/44) a few persons belonging to the Nadar community started a small egg business at Wellawatte. At first they carried the eggs on their heads in baskets and sold them to customers living on the sales route. At that time there was no local poultry industry as such in existence. These people were importing the hen eggs as well as duck eggs from India for sale. As time went on Wellawatte became the key centre for the egg business. Consumers as well as retail traders used to come to Wellawatte and get their eggs. They followed the Wellawatte price. After that, in the Pettah also the sale of eggs had started, but used to follow Wellawatte prices. After the Nadars left the island, Tamil traders from Jaffna bought the business together with the goodwill and continued in the same way. Since, the ban on imports of eggs a local poultry industry was started and commenced to supply eggs. So the business went on undisturbed over the years and the price fixing power also developed with it and the egg trade centred round the Wellawatta market.

In most recent times the egg market has divided into 2 principal centres namely Pettah and Wellawatta, with a somewhat greater concentration towards Pettah.

Figure: 12

SHARE OF COLOMBO EGG MARKET HANDLED BY LEADING PRIVATE DEALERS AND DEPARTMENT OF MARKETING (1978)

Pettah = 60%
Wellawatta = 23%
Marketing Dept. = 16%



Pettah dealer and the Bambalapitiya dealer who have larger market shares, exercise little influence on the determination of price, would seem to lend support to such a view.

The Marketing Department also claims that their field officers are doing a day to day market survey to determine and maintain reasonable prices. But here again, they merely adopt the Wellawatte or Pettah prices as the base for their pricing. The Marketing Department's Pricing Board meets once a fortnight and they agree on a price based on the above information supplied by the officers in the manner described above. This price is later notified to the Department's collecting centres.

But since the collecting centres receive even this information only a day or so later, any initiating or dynamic effect resulting from any price change proposed by the Board is lost. Strictly speaking, of course, there is no sure or infalliable way of determining what the right prices should be. Normally the Marketing Department fixed its purchase price at 1 or 2 cents above, or at the same price, that the Wellawatte dealers were paying for their purchases. In the end, the final determinant of ruling prices in the egg market is the Colombo wholesale market price which in turn is determined by the Wellawatte wholesaler. He displays his retail price clearly on a board at the store, and the other retailers and the producers fix their selling prices accordingly. In comparing prices we found that there were no sifnificant differences in the prices paid to producers by one marketing organisation, as compared with another.

7.4 WHOLESALE PRICE

Since, as we pointed our earlier, egg wholesalers are in the habit of witholding a part of their stocks from the market, particularly during periods immediately preceding festival times, in order to increase the prices of eggs. It would obviously be difficult to dispute their claim that their inflated prices are the result of equating demand to supply. This is the equivalent in economic theory, of the parallel and familiar logical device of putting one's conclusions into the premises and then drawing the conclusions from the premises. Further when egg

production is high, they are quick to reduce purchase prices drastically, but the prices they charge from the consumer (sales price) are not correspondingly reduced. Hence, no matter by how much egg prices might fall as a result of increased production, the profits of the dealers will suffer no reduction since they would have reduced the prices paid to farmers by an even larger sum.

Although according to the dealers, the cost of feed plays a crucial role in the price determination, it is by no means the only factor responsible for the abnormally high prices. From the year 1974-1977 the feed price was kept steady at Rs.1250/- per ton of layers' mash, but egg price varied from 35-74 cts. per egg during that period. The wholesale dealers tried to attribute this rapid increase in price to the scarcities of feed, but the survey results revealed that only 25% of the producers purchased feed at black market prices.

TABLE 47: PERCENTAGE OF FEED PURCHASED AT CONTROLLED PRICE

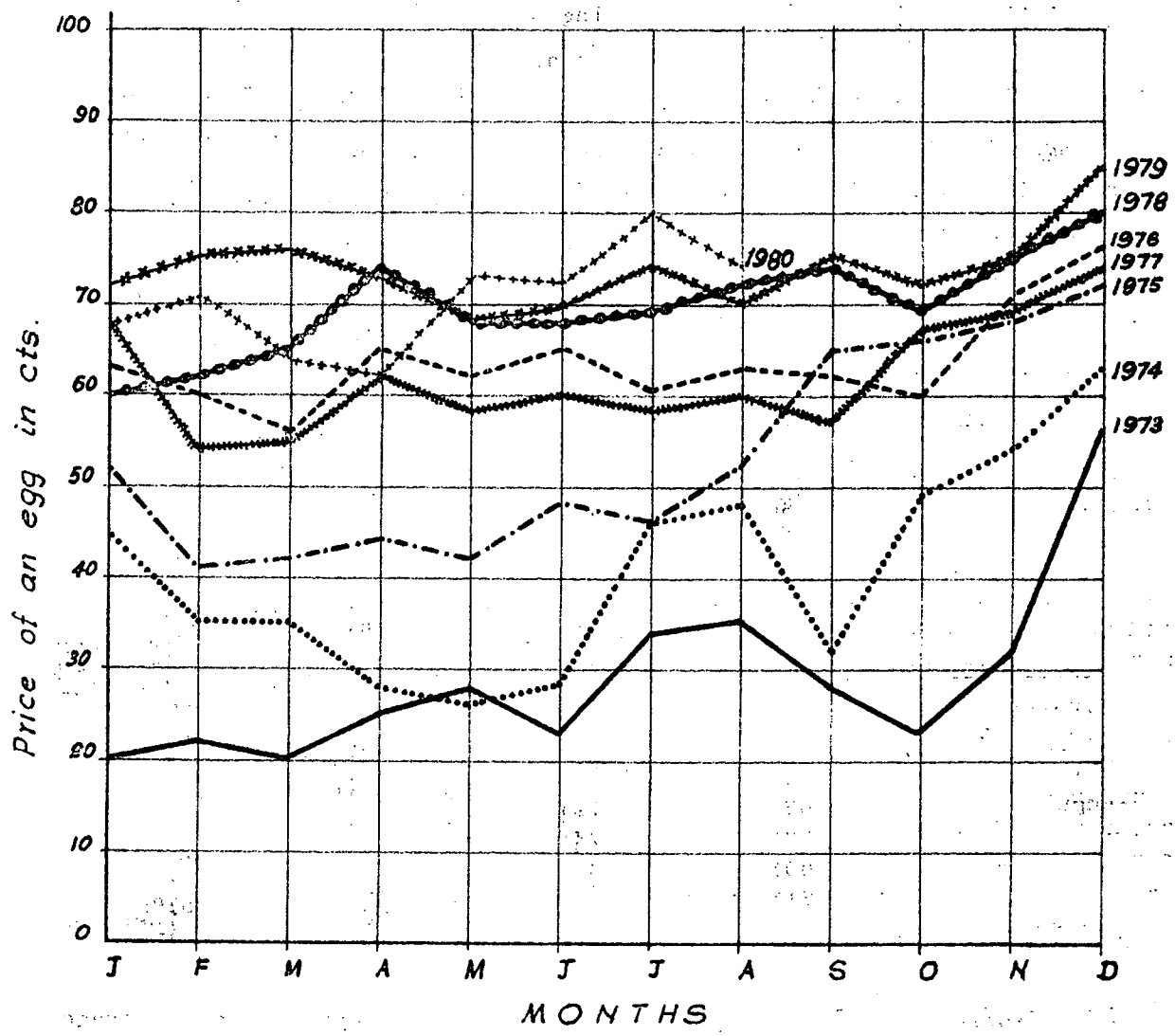
Feed purchase	See-duwa	Nego-mbo	Ja-ela	Watt-ala	Mar-wila	Puwak-pitiya	Dehi-wala	Mora-tuwa	Ango-da	Beru-wala	Total
At controlled price	93%	80%	90%	80%	66%	60%	63%	60%	80%	60%	75%
At black market price	07%	20%	10%	20%	34%	40%	37%	40%	20%	40%	25%

Source: Same as for Table 44

Therefore, the argument attributing the soaring egg prices to high price of poultry feed is hardly tenable. The graph (Vide, Figure 13) also shows that the price fluctuations of eggs are not solely due to variations in feed prices, and that there are various other factors such as availability and price of pullets, prices of drugs and additives, and festival seasons etc. which contribute significantly to the price variations.

Figure 13

RETAIL EGG PRICES
1973 - AUG. 1980



On the other hand, when the government increased the price of mash the producers complained that the cost of production had risen sharply as a result. The poultry breeders' associations complained that most of the small scale poultry farms would not be able to exist in the future, unless the government reduced the feed prices.

The government responded by reducing prices by Rs.400/- per ton subsequently. Hence, if feed prices are the dominating element in price change one would have expected a considerable reduction in price to occur after the reduction in the price of feed. But the following egg prices (Table 48) do not reveal such a situation to have occurred.

TABLE 48: THE RELATIONSHIP BETWEEN EGG AND FEED PRICES

	1977		1978		1979		1980	
	Price per egg (cts.)	Feed price	Price per egg (cts.)	Feed price	Price per egg (cts.)	Feed price	Price per egg (cts.)	Feed price
January	63)		60)		72)		80)	
February	60)		62)	Rs.1300/-	75)		78)	
March	56)		62)	per ton	74)		80)	Rs.1590/-
April	65)		74)		70)		78)	per ton
May	62)		68)		69)		80)	
June	65)		68)		70)		85)	
July	60)	Rs. 1300/-	67)	Rs.1990/-	74)	Rs.1590/-	88)	
August	63)	per ton	72)	per ton	76)	per ton	86)	
September	62)		74)		72)		85)	
October	60)		69)		74)		75)	
November	71)		75)	Rs.1590/-	78)		75)	Rs.2500/-
December	76)		80)	per ton	86)		)	per ton

Sources:
i. Department of Marketing Development (No.1 average prices)
ii. The Oils and Fats Corporation
iii. Records of a leading egg trader.

According to the egg prices given above, the price variation is visible only cyclically in the manner of a seasonal variation. The cost of feed is hardly reflected anywhere in the price variations. Therefore, it is reasonable to conclude that the impact of feed price on the egg price variations is very far, indeed, from being the principal cause of

the changes.

This fact is further illustrated by the data in the following Table.

TABLE 49: DAILY RETAIL PRICE OF EGGS FOR THE MONTHS OF 1977, 1978 AND 1979 DECEMBER

Date	Daily price December 1977 (cts.)	Daily price December 1978 (cts.)	Daily price December 1979 (cts.)
1 -15	70	75	78
16	72	75	80
17	74	77	80
18	76	77	80
19	76	77	78
20	77	79	82
21	78	80	80
22	79	81	82
23	79	84	85
24	80	84	90
25	80	83	85
26	79	81	82
27	75	80	82
28	76	80	85
29-31	78	80	90
Average price	74	82	86

Source: Department of Marketing Development

According to the available data the increase in price starts 2 weeks before Christmas when the demand for eggs is at its highest. The peak price is reached on the day preceding Christmas Day, i.e. on 24th December, after which there is a decline in price. This price determination is not based on the feed price, cost of production, or the supply position.

The egg wholesalers can deliberately create an artificial shortage by hoarding, and thereby increase prices and sell their stored eggs, which had been purchased at much lower prices, thus, raking in a larger profit.

The attached diagram (Figure 14) shows that in 1977 and 1978 December, cost of production had remained static, while the purchase price of the wholesalers also varied to a small degree, but not as much as the selling price. The wholesaler's margin on the other hand, ramained virtually unchanged throughout the year. Since the wholesalers do not perform intermediary services such as cleaning, packing, or grading as such which involves additional marketing costs the whole margin of difference between the price at which they had purchased the eggs and their selling price constitutes for them nearly a net profit.

7.5 PRICE FLUCTUATION

Egg producers continually complain that egg prices are subjected to arbitrary and unreasonable fluctuations, and as a result they are unable to work on a firm farm budget. According to them even some of the more efficient producers have been driven out of business because of these fluctuations.

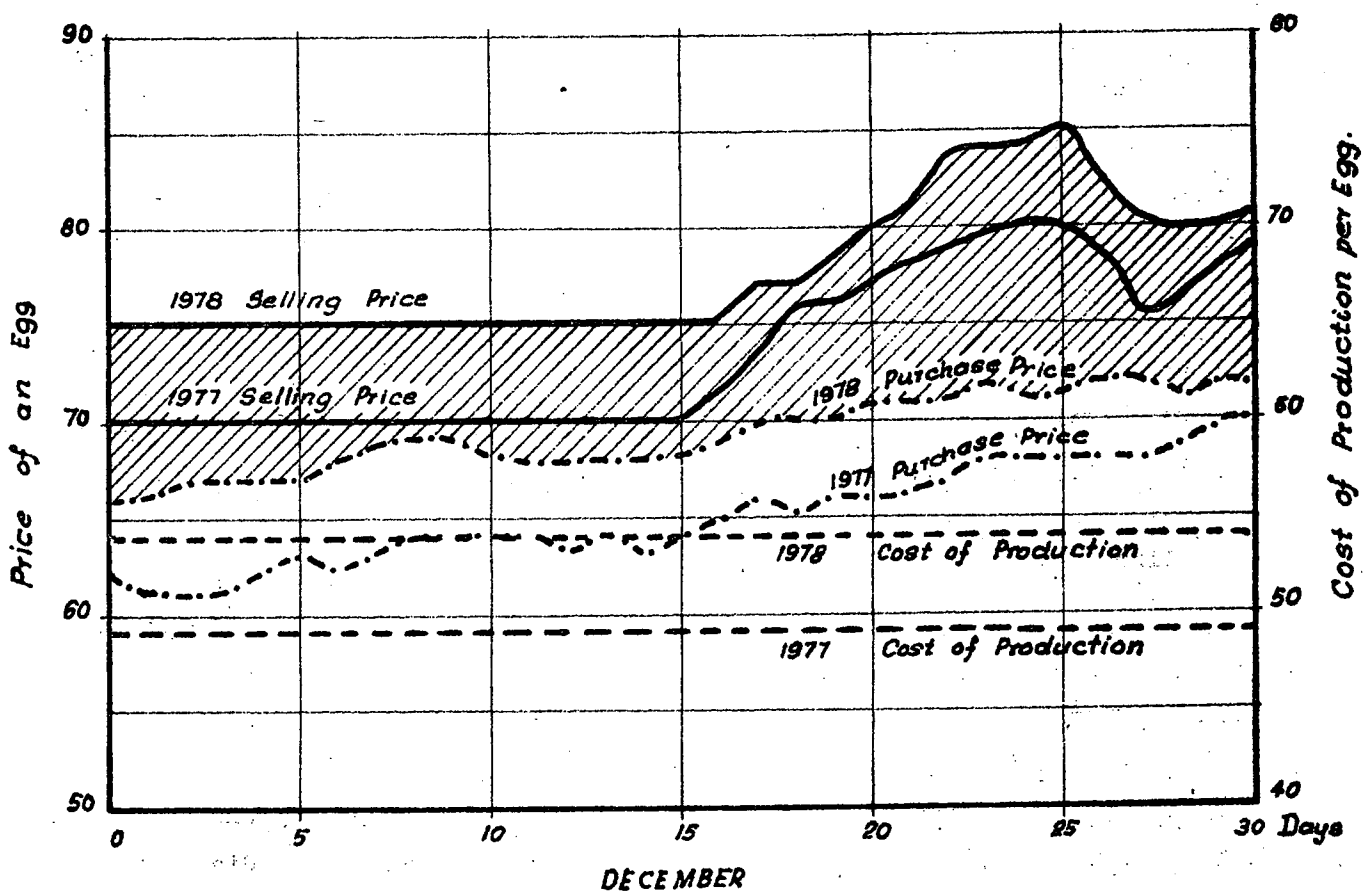
Under the modern system of poultry keeping there should be no seasonality as such in production of eggs. Hatching can be done throughout the year. However, there is a greater demand for chicks from January to April owing to a general belief that chicks hatched during this period achieve optimum laying capacity during the high demand period (December - January) when the egg prices also are at their highest. There is also a general feeling that eggs hatched during this period show better growth and development. Hence, automatically, most of the egg producers operate in the above manner, thus unwittingly contributing by their own-behaviour towards a clear seasonal fluctuation in egg supplies.

Normally, it is the practice to keep hens on the farm for not more than 15 months, because production during the second year is generally 20% to 25% less than in the previous year.

Hence, the moulting period, disposal of the old birds, and replacement with young stocks from the poultry enterprises, all operate at almost

Figure: 14

SELLING AND PURCHASING PRICES OF EGGS FOR THE MONTHS OF DECEMBER 1977 AND 78 COMPARED WITH THE COST OF PRODUCTION



the same time periods, thus creating gluts and shortages in the egg market.

Since the supply of eggs is thus subject to a measure of seasonal fluctuations in this manner, the price also fluctuates similarly. It is a noteworthy fact that recently egg prices have not fluctuated as formerly, giving rise to a belief that for the near future at least, egg prices might remain fairly stable.

On the other hand barring the Marketing Department most of the egg dealers do not have storage facilities. In addition to this, the highly perishable nature of eggs make these cyclical fluctuations more rapid. Hence these fluctuations seem to fit well the deductions of the familiar Cob-web Theorem as applied to agricultural commodities, which previously referred to as the 'hog cycle' phenomenon.

Nevertheless, the Cob-web Theorem is a useful illustration of the potential instability of a competitive industry. There is a fairly regular cycle of fluctuation in prices and supply of some agricultural commodities. The amount currently supplied depends on what the price was at some previous period.[1] This price will tend to converge to an equilibrium level or diverge from an equilibrium level, depending on the slope of the demand and supply curves for the particular commodity.

The special characteristics of price fluctuations and the variations in supply are well illustrated by the pattern of price fluctuations in the market for eggs in Sri Lanka. The movements of prices and quantities when plotted on a conventional supply and demand diagram, follow closely the pattern of lines in the 'Cob-web' diagram.

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[1] Economics - Paul A.Samuelson, Tenth Edition, 1976. pp. 405-407.

TABLE 50: SELLING PRICE OF EGGS FOR FEBRUARY 1979

Price received	No. of producers	%
No sales	17	6
50 - 55 cts.	13	5
56 - 60 cts.	69	24
61 - 65 cts.	148	53
66 - 70 cts.	28	10
71 - 75 cts.	2	1
76 - 80 cts.	2	1
80 + cts.	-	
	279	100

Source : Same as for Table 44.

The above schedule indicates the price received by producers. The average wholesale price in Colombo, for the month of February 1979 was 75 cts. per egg. But only 4 out of 279 producers received prices close to or above that price. The majority received a price in the range of only 61 to 65 cts. per egg.

The feed price for this month was 49.50 per bag of 25 kgs. of custom mix, and according to current prices of inputs etc., the cost of production is .58, .46 and .38 cts respectively depending on different conditions. Most producers had received a price which included a .12 to .20 cts. profit margin above the cost of production.

The statistics which follow, reveal the fact that the increasing profits of the egg trade which emerge from price fluctuations do not in fact reach either the producer or the retailer, but are appropriated by the wholesaler.

TABLE 51: PURCHASES AND SALES FOR THE FIRST TEN DAYS OF THE MONTH OF FEBRUARY 1979

Date	Purchases	Purchase price	Sales	Selling price
1st	10123	64	9224	72
2nd	10827	65	10041	70
3rd	10225	64	8528	74
4th	10321	63	11273	71
5th	9927	64	9824	73
6th	10047	64	10210	72
7th	11002	63	10113	70
8th	9845	64	10134	73
9th	9968	65	10134	73
10th	11256	64	9987	72
Average per day	10354	64	9947	72

Source: Based on the information supplied by a leading dealer.

This Table clearly shows that the daily changes in the prices are entirely a result of the wholesaler's operations as explained earlier.

The purchases, supplies, and the buying and selling prices, do not show an expected relationship with the levels of demand and supply. Therefore, it is evident that some unexplained external mechanism is controlling the prices, and this is obviously the wholesaler's 'invisible hand'.

CHAPTER 8

MARKETING CHANNELS, COSTS AND EFFICIENCY

The ultimate object of all marketing activities is to place goods in the hands of consumers in a satisfactory manner, at a reasonable price, while encouraging producers to produce their maximum output. All efforts in marketing must therefore be organised to accomplish these objectives.

The collection of eggs from individual farms is the first step in the sequence of these operations. Thereafter follows the distribution to consumers, through wholesale and retail channels. Within each of these operations may be observed a number of separate facets or phases of marketing activity. Several private sector, and a few public sector organizations, differing in size, efficiency and objectives share these functions, and in the course of their activity, play a vital role in the egg trade.

8.1 CHANNELS OF MARKETING

The channels of marketing available to the producers are:

i) State sector organizations

   a) Marketing Department

ii) Private sector organizations

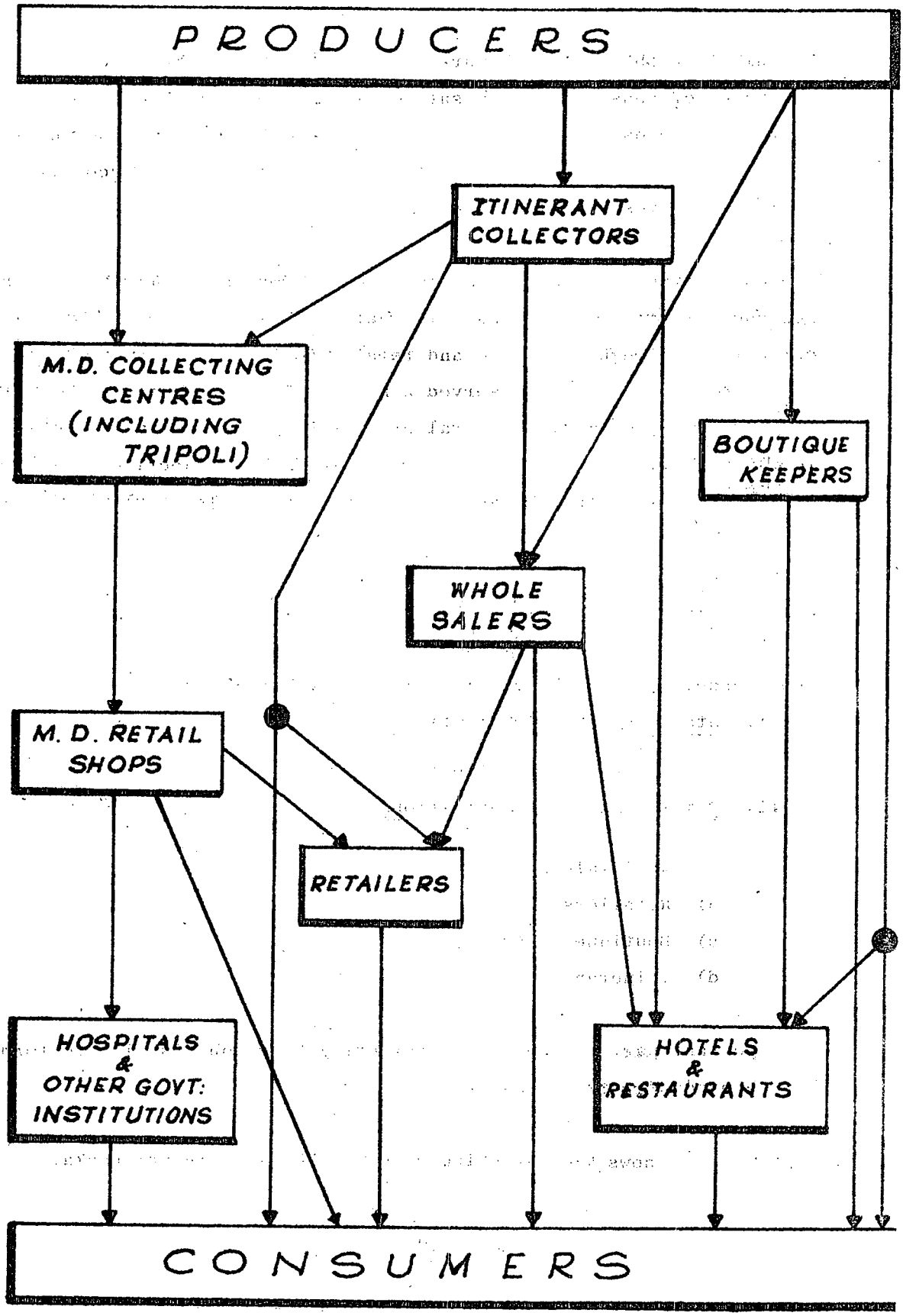
   a) Wholesalers
   b) Retailers
   c) Boutique keepers
   d) Itinerant collectors

An important part of the total marketing function is also performed by the producers and consumers themselves.

Figure 15 shows the marketing channels for eggs in Sri Lanka.

Figure: 15

CHANNELS OF MARKETING EGGS
(AS IDENTIFIED DURING THE SURVEY)



CHAPTER 8

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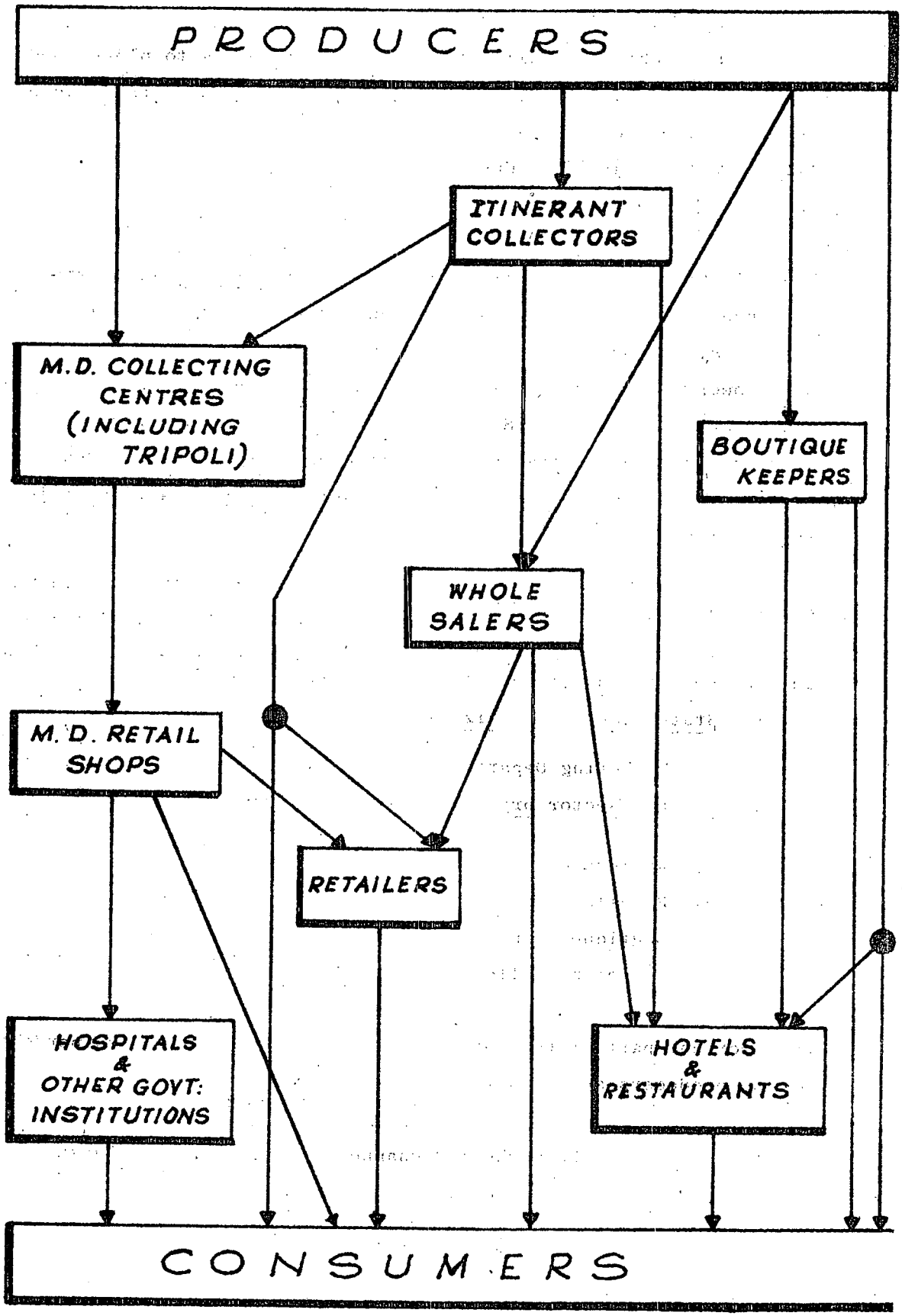

The ultimate result of this multiplicity of middle-men in the egg trade, is a state of continually rising prices from the producer to the consumer. Quite frequently collectors from Colombo and suburbs visit the egg producing areas, and collect the eggs which they in turn transport to the Colombo wholesalers. The Wellawatte or Pettah wholesalers' sales pattern is similar to that of the Marketing Department: that is to say the producer sells his eggs direct to the wholesalers, and the wholesaler in turn disposes of the stock directly or indirectly to the consumer. The most profitable manner of marketing for the producer would, of course, be a sales pattern where he himself decides the final selling price, But according to the survey results, only 10% of the producers sell their eggs direct to the consumer. This, of course, is the most desirable arrangement, since it spontaneously results in low prices to the consumer, bypassing the intervention of middlemen between the producer and the consumer. But it cannot be expected as a common phenomenon.

The survey results have shown that, of the producers interviewed, 78% sold their eggs to private sector organisations. The Marketing Department collected only 13% of the total production. This was clearly evident in the egg sales of Negombo, Dehiwala, Seeduwa, Moratuwa, and Puwakpitiya where 62%, 76%. 86%, 75% and 85% of the producers respectively, sold their eggs to the private sector. The only exception was Marawila, where majority of the poultry keepers sold their eggs to the Marketing Department, due to the presence in the vicinity of a very active producers' cooperative and a M.D. collecting centre.

8.2 THE OPERATIONS OF THE STATE SECTOR

The Marketing Department (M.D.) (The Department of Marketing Development)

a) Collection of Eggs

At present, the Marketing Department handles about 90,000 to 100,000 eggs per week. In 1977 it collected a total of 3.6 million eggs, and in 1978 this was increased to 4.2 million eggs. The Department's activities have been especially useful to the increasing number of

scattered small producers operating some distance away from the urban marketing centres.

The M.D. is not a profit making institution, in the ordinary sense of the term and the government is very heavily subsidising its activities. Therefore, in making charges regarding market margins, profits, services etc. and comparing it with the private traders, due consideration should be given to this factor.

The Marketing Department purchases eggs from collectors and producers for which it maintains several collecting centres in various parts of the island such as Negombo, Kalutara , Marawila, Attangalla etc. Some of these collecting centres send out their vehicles once or twice a week to collect the eggs from village collectors and farms. It was evident however, that the system did not function with any degree of regularity.

b) Grading

The Marketing Department's collecting centres do a certain degree of grading a the time of purchase, and a more thorough candling and grading at its Tripoli market depot. The Tripoli market has a central receiving and storing station, with a conveyor candler and an automatic size grading table. It purchases eggs by size according to three grades. The collecting centres, on the other hand, grade the eggs by hand, on the basis of external appearance. The Tripoli market grades the eggs by weight as follows:

1) Grade I over 1 3/4 ozs.
2) Grade II 1½ - 1 3/4 ozs.
3) Grade III 1¼ - 1½ ozs.

The rejects amounted to 10% - 15%, the chief cause being the presence of interior spots (eggs showing embryo development).

c) Packing

The Marketing Department uses wooden crates with moulded paper pulp

trays to pack the eggs. These cost about Rs.12/- 15/- per crate. A tray costs about Rs.5/-6/. The proportion of eggs broken during packing generally does not exceed 5%.

d) Storage

The Marketing Department has refrigerator storage facilities which it generally utilizes mainly during festival seasons for storing eggs with a view to keeping prices low and steady.

The cost is estimated to about 2.6 cents per egg for one month's cold storage. This is regarded by the private sector as an unnecessarily costly item since there is always a ready market for eggs. It could be kept in the cool room for three months and for 6 - 9 months by spraying or dipping in a preservative called "KLEAROL'. It costs 1 ct. extra per egg.

e) Sales

In the supply of eggs the M.D. gives priority to the state sector institutions such as Hospitals, Prisons, the armed forces, Ports, the Department of Railways, Marketing Department's Bakeries & Canteens etc. The retail selling is done through the Marketing Department's retail shops.

In contrast to the comparatively small collection of the M. D. the demand for eggs from its retail shops is very high because the consumer is assured of a fair price.

The average value of sales, and the quantity of eggs purchased by the Marketing Department increases roughly by about 33% during festival seasons. However, the Department's attempt at price regulation by releasing from its stocks has fallen short of expectations because the stocks have always been inadequate to meet the demand.

f) Transport

The Marketing Department's collecting centres maintain a number of vans and lorries to purchase eggs from the farms. But this is not a regular and permanent feature. The Department's purchase price at the farms is generally 1 to 2 cents less than the daily normal purchase price at the centres, allowing a margin for transport cost. (Under present conditions this has to be considerably more) The collecting centres despatch their collection to the Colombo Tripoli market in the Department's vehicles. The producer has to use his own transport if he is taking his collection to the Tripoli Market.

8.3 THE OPERATIONS OF THE PRIVATE SECTOR

Of the 279 producers interviewed, 78% preferred to sell their eggs to the private sector. This was because the latter paid higher prices, bought the eggs without grading at the producers door-step itself. (i.e. purchased the small and large eggs at the same price). There were some collectors who delivered the poultry feed to the poultry keepers at their door, and bought the eggs from them in return. The itinerant collectors or agents collected the eggs from the producers and sold these to the wholesalers in towns, or to the Marketing Department's collecting centres, generally to the Tripoli market. There are also some collectors who do the retail business on their own account.

These collectors have no specialized equipment for grading the eggs. They judge the quality by appearance, and by the past experience of the suppliers' performance. The two types of grades adopted by them are normal and small. They do not retain the eggs for more than 2-4 days. Most of these traders do not have storage facilities. Some egg producers whose farms are situated in close proximity to heavily populated areas, are often able to sell a considerable proportion of their output directly to buyers or collectors who come to the farm for the purpose.

a) Boutique-keepers

Some urban and rural boutique-keepers act as collectors as well as retailers. These boutique-keepers sell their collection to consumers, to itinerant collectors, or to the wholesalers in town. This is popular because the producers lack transport facilities and generally are in urgent need of immediate cash. Some have very small quantities of eggs which it is not worthwhile to transport to a wholesaler.

b) Whole-salers

The private wholesalers advance credit to collecting agents and to itinerant collectors. Sometimes they provide credit facilities and also poultry feed to the producers who agree to sell their future produce exclusively to them. Normally the leading wholesalers each handles about 70,000 to 80,000 eggs per week. There were two dealers each at Pettah and Wellawatte who sold more than 100,000 eggs per week. As mentioned earlier (Chapter 7) these whole-salers' market share exceeds 80% of the total supply in the Colombo egg market. Other than selling in bulk to the retailers, the wholesalers themselves also do some retail selling direct to consumers.

c) Retailers

Among the egg retailers interviewed, most of them with weekly sales ranging from 8,000 - 10,000 eggs each, there were two retailers, who sold eggs as their principle item of business.

The quantity they handled per week seemed to be fairly steady, except at festival seasons. Most of the retailers handled eggs as a secondry or casual item of business. Although there was no definite record, their egg sales, they claimed, had been generally steady. Retailers buy eggs on their own account for cash from two sources, either from regular collectors, or from producers and wholesalers. Normally these retailers purchase eggs twice or thrice a week according to their own stock practice, and available capital.

d) Quality

The majority of the private sector organizations as well as the producers, have not paid much attention to quality or cleanliness, as they have been able to dispose of their eggs easily at what seemed to be a satisfactory price. Of the producers interviewed 60% stated that they disposed of their eggs once a week, 25% twice a week, and 15% daily. No special steps were taken to keep eggs cool or clean.

There is according to the experience of producers, a fairly definite relationship between the number of spoiled eggs, and the trmperature. They said that the number of spoilt eggs in August-September is comparatively high owing to the high temperatures common at this time of the year. Hence the need for effecting quick sales and resorting to storage under refrigeration during this period.

e) Packing

All egg dealers, use wooden boxes and straw packing. The boxes can be purchased at the price of Rs.10.00 to Rs.12.00 each. The most popular container is the tea chest which is relatively cheap, durable, and easy to handle. Straw was used as packing between the eggs. The egg wholesalers maintain that the proportion of eggs broken is negligible, and is in the region of 2 - 3%.

f) Storage

Most wholesalers did not consider storage of eggs as economically worthwhile. One trader who hired cold storage space to hold eggs for a month during two Christmas seasons as an experiment, found that no additional profit was gained by storing eggs for later sale. Since the costs of refrigeration were comparatively high, the extra profit earned by staggering the sales was hardly compensated.

g) Transport

While a few of the larger wholesale dealers use their own transport for the collection of their supplies, the majority have little or no transport of their own. They buy from the producers and collectors who deliver the eggs to their selling places. Some private egg dealers utilize the railway service, or hire vehicles for their transport. The itinerant collectors use their bicycles or vans hired for the purpose.

8.4. PRODUCERS' RELATIONSHIP WITH THE MARKETING DEPARTMENT

The producers' reluctance to making sales to the Marketing Department was mainly due on the one hand, to the long delay in the arrival of vans to collect the eggs, and on the other to the non-receipt of cash on the spot at the conclusion of the sale.

The following schedule indicates, in order of importance, the main reasons why most of the producers are reluctant to sell eggs to the Marketing Department.

TABLE 52: THE REASONS FOR THE RELUCTANCE OF PRODUCERS TO SELL THEIR EGGS TO THE MARKETING DEPARTMENT

Reason	%	No. of producers who do not sell their eggs to the Marketing Department.
Grading	42%	102
Delay in acceptance	26%	63
Delay in payment	20%	49
Difficulties in transport	6%	15
Low price	4%	10
Others	2%	4
	100%	243

Source: Based on survey findings.

Out of the total number of producers in the sample, only 26 (9.3%) had sold their eggs regularly to the Marketing Department. This did not, however, prevent them from voicing vigorously their complaints against the shortcomings of the service provided by the M.D.

a) Grading

Most producers complained that the Marketing Department accepted eggs on three grades, as stated earlier. Since the collecting centres with the sole exceptions of Tripoli and Negombo do not possess any grading machines, and even the Negombo machine had been out of order during the preceding months, they had adopted a system of hand grading which is very unsatisfactory, and involves a high degree of bias in the grading. Farmers have no way of contradicting the decisions on grading arrived at by the purchasing officer. The price differences between the three grades seem to lack any basis of logic or reasonableness, leaving the door made open for corruption and favouritism. For example between grade I and II the price differential is only 1 or 2 cents, and between grade II and III it is 12-16 cents. (Vide, Annex 10[1]). Nor is there any reasonable standard for differentiation between grades I and II and III except the external appearance (size) and the purchasing officer's arbitrary decision. As against this, it was found that no private trader grades eggs as M.D. does. They classify only as 'normal' and 'small'.

b) Delay in Acceptance

Due to the laborious and somewhat clumsy weighing and grading procedure, the M.D. has to spend a fair amount of time unnecessarily in grading, especially when they do this manually. Normally, the private dealers accept eggs in two size grades (normal and small, which are clearly visible to the producer), and they perform a skilful job of grading and packing the eggs at the same time. One trader packed 1000 eggs

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[1] 09.11.78 - Egg prices, (Attanagalla collecting centre of the Marketing Department).

in our presence in about five minutes, whereas at the Marketing Department buying centres, the weighing, grading, and ultimate packing are done separately by a number of persons, thus consuming a great deal of time wastefully.

c) Delay in Payment

Unlike the Marketing Department, the private trader pays spot cash as and when they purchase the eggs. The paying procedure of the M.D. is very cumbersome and sometimes the producer has to wait for 2 to 3 days before he gets money for his produce. The M.D. has authorised the collecting centres only to spend a limited sum of money. They have to renew their petty cash imprest every now and then as they spend, resulting in inevitable delays. It is found that some of the collecting centres have cogently reasoned out the insufficiency and asked for an increase in the petty cash imprest, but these attempts have failed, and a bad business practice (as far as the egg trade is concerned) of buying on credit is continuing.

d) Transport difficulties

A very difficult problem of the ordinary farmer is to get transport facilities to bring the eggs to the M.D. collecting centres or to the Tripoli market. In a few areas the collecting centres send their own vehicles to the farm gates. But this is neither a systematic nor regular function. On the other hand, private traders and itinerant collectors, come to the farm gate and buy the produce. Especially at present with the price hike of fuel, transport has become a major barrier.

e) Low Price

Some producers complained of low prices received. This is specially so in festive seasons since the intervention of the M.D. towards consumer protection keep the prices low. This complaint is mainly connected with grading. When one considers the grading practices of the M.D., it is evident that the farmers receive a low price. Because

the private traders buy almost without grading, at a single price.

f) Success of the M.D.

Despite all these impediments the Marketing Department has been successful in achieving, one of its prime objectives, namely the establishment of a base price for the outstation producers and consumers. In some of the areas like Negombo, Marawila, and Attanagalla, the producers depend on the Marketing Department's price for fixing their own base price.

The following Table of sales and price data obtained from the Tripoli market provides convincing evidence of this fact. The M.D.tries to minimise the market price fluctuations as much as possible, sometimes by releasing stocks and maintaining a comparatively stable 'base' price.

TABLE 53: AVERAGE SALES AND PRICES FOR THE YEAR 1977

Month	Quantity('000')	Price
January	382	62
February	361	53
March	248	50
April	378	52
May	356	59
June	316	60
July	300	58
August	340	58
September	329	59
October	338	60
November	358	69
December	362	70

Source: Department of Marketing Development

8.5 MARKETING COSTS

Marketing costs are the sum total of the expenses incurred in bringing the goods from the producer to the final consumer. A number of organizations and activities are involved in this task, as explained above, and each of these organizations tries to maximise its profit by keeping its costs as low as possible.

Marketing costs include handling, cleaning, grading, packing, transport, storage and distribution. The cost of transportation of eggs absorbs a substantial portion of the marketing cost. The magnitude of the burden imposed by transport cost, came to be most acutely felt after the recent sharp increase in oil prices. Among other costs encountered in the marketing of eggs are the losses resulting from breakages and deterioration, which necessarily result in an increase of cost in some degree.

The marketing cost incurred by the private wholesaler and retailer is almost synonymous with their transport cost, and the risk involved. Since they do not perform any other major functions such as grading, weighing, cleaning and packing, their marketing cost is very low when compared with that of the Marketing Department. Storage costs, for example, occur only at certain time periods. Accordingly the average marketing cost amounts up to about 10% of the price. The total cost structure with respect to the production and marketing of an egg has been computed earlier. (See Chapter 7, Table 46).

The risk of price fluctuations, quality deterioration, and physical losses are also important items which contribute towards raising marketing costs. But even though, as a consequence, costs are sometimes increased, rendering an efficient consumer service is an essential and primary requirement. It is, therefore, important to keep in mind the fact that high costs do not always, or necessarily, indicate inefficiency in the marketing system.

8.6 MARKETING MARGINS AND EFFICIENCY

"Efficiency may be defined broadly as the effectiveness or competence with which a marketing structure performs its designed function."[1] Alternatively it can be defined as maximization of consumer satisfaction at minimum cost.

a) Margins

The cost of production, inclusive of the cost of providing marketing services of quality, fluctuates considerably from country to country, and even within countries. The efficiency of the marketing system can, be measured by the smallness of the margin between the price received by the producer and the price paid by the consumers. These marketing margins may be expressed either in cash or as a percentage of the price paid by the consumers.

On the basis of price and cost information obtained, the average margins were estimated as follows:

TABLE 54: MARKETING MARGINS AND EFFICIENCY

	Marketing Dept.	Private dealer		
	Average price for the year 1979	Average price for the year 1979	Maximum average price for the month of December 1979	Minimum average price for the month of June 1979
Price paid to the producer	.67	.68	.70	.59
Collectors' margin	.02	.04	.04	.02
Collectors' selling price to the wholesaler	.69	.72	.74	.61
Wholesalers' margin	.04	.08	.11	.08
Wholesalers' selling price to the retailer	.73	.80	.85	.69

[1] Z.Y.JASDAN WALLA - Marketing Efficiency in Indian Agriculture(1966)

Continued/.....172

	Marketing Dept.	Private dealer		
	Average price for the year '79	Average price for the year '79	Maximum average price for the month of December 1979	Minimum average price for the month of June 1979
Retailers' margin	.01	.01	.01	.01
Price to the consumers	.74	.81	.86	.70
Total marketing margin	.07	.13	.16	.11
Marketing margin as a % of consumer price	10%	16%	19%	15%

(The marketing margins include weighing, packing, grading and transport costs.)

A careful examination of the above margins shows that a fairly high proportion of the consumer price is borne by the producer. It is the general experience of businessmen that retailing takes a larger share out of the price paid by consumers, than any other marketing function. In the egg trade, on the other hand, as our investigation has shown it is the private wholesaler who takes the major share of the total marketing cost. When egg prices reach the maximum level, the wholesalers' marketing margin increases, while the price received by others, mainly producers and retailers, remains constant or changes slightly. On the other hand, when egg prices decline the wholesalers' average margin remains almost unchanged, while the producers and retailers' prices decline.

When compared with Indian experience Sri Lanka's situation is not unsatisfactory. In Sri Lanka the net share of producer in the consumer's rupee lies between 80%-85% whereas in Punjab (India) it is around 77%.[1]

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[1] SIDHU D.S. and RANGI P.S. - Indian Journal of Agricultural Economics Vol. xxxiv conference Number Octo/Dec. 1979, 'PRICE Spreads in Egg Industry in the Punjab'. pp. 168-174.

Technically, when looking at the private wholesaler's side of the account, there should be no marketing margin because there are hardly any marketing costs involved except transport and/handling. And even this does not arise in every transaction. ((In most instances the producer or the collector bears the transport cost)Therefore, the marketing margins they maintain cannot be regarded as small or quite reasonable by any standard since, eggs are marketed in same original form without any change whatsoever, for sale.

But in the case of the Marketing Department, the marketing margin includes costs like transportation, packing, storing, and handling, for all of which it makes a standard charge of about .4 cts. per egg. (Vide, Table 54).

When egg prices reach the minimum level the retailers' marketing margin declines because of their weak position as compared with that of the wholesalers', due to such factors as indebtedness, lack of capital, lack of proper organization etc. Such conditions often allow the wholesaler to capitalize the situation at the expense of the farmer.

8.7 MARKETING INFORMATION

The flow of useful market information is very essential for a competitive and efficient marketing system. This includes the collection, communication, and interpretation of market information. Egg marketing requires data regarding:

i. The character of the market
ii. The number of consumers and the degree of their concentration or dispersal within the area, inhabited by them.
iii. Their purchasing power
iv. Their preferences (white eggs or brown eggs)
v. Their motivations
vi. Various other similar miscellaneous types of information e.g. social customs and habits.

There are other very important psychological factors which influence the price and markets. These are summed up in expressions like market gossip, or market rumours, or market expectations. These may distort

the marketing structure completely, and is a principal source of gathering information in the egg market.

Most of the poultry breeders are aware of the price and the market situation, and receive other relevant information through trade sources. One poultry producer or another from each poultry area comes to Colombo (Wellawatte) daily to ascertain the price which is released to other producers in the area. The producers are of the opinion that, if the M.D. can make arrangements to announce the egg prices over the air, it will help them to acquire a certain degree of bargaining power at the sales points. Once this is done, the producers, even in remote areas, will be kept well informed.

8.8 DEFECTS IN THE PRESENT MARKETING SYSTEM

The potentials, available for increasing both the production and consumption of eggs, make a strong case for the fomulation of a sound and effective marketing system to absorb the whole production efficiently.

a) Lack of Producers' Organizations

The poultry farmers are virtually unorganized at the village level, and have a very poor bargaining capacity as against the traders. The factors responsible are the wide disparities in the size of the poultry farms, thus aggravating their natural physical isolation and lack of communication. The traders, by contrast, are well organised and have a stronger bargaining power . The major remedy is for poultry farmers themselves to form a similar organization of their own, as the Marawila farmers have done. Marawila is the only exceptinn in the egg trade where an effective producer cooperative is in existence, and where the organization has developed on sound lines, demonstrating the strengthened bargaining power of the producers.

b) Forced Sales

The majority of the producers are compelled to dispose of their produce as quickly as possible due to the perishable nature of eggs and the lack of storage and transport facilities. The intermediaries and

wholesalers seize this opportunity to keep egg prices low, thus defeating the natural and reasonable instinct and desire of the farmers to secure a fair and modest income at the very point of production.

c) Superfluous Traders

The eggs are brought by the producers to the wholesalers or to the itinerant collectors for disposal. This starts the chain of middlemen through whose hands the eggs must pass before reaching the final consumer, enabling them to extort a considerable share of the benefit.

The key position of the wholesaler was explained in detail earlier. The whole arrary of middlemen, including the wholesaler, adds little to the cost of eggs, but contributes to raising the price that has to be paid by the final consumer. This is a clear pointer to the fact that if one wants to market eggs cheaply one must begin by reducing the number of these superflous middlemen to a minimum, and bring down the market margin.

On the other hand middlemen play a key role and serve a useful purpose in the present marketing system in which they serve as an important link in the whole chain of activities connecting the producer to his ultimate benefactor and patron, the consumer.

d) Malpractices in the Market

The private dealer has an over-riding bargaining power in the egg trade due to its highly perishable and breakable nature. Even during festival times the producers do not receive the full benefit of the high prices, since the market for eggs happens to be unregulated, with no opportunities for healthy competition. Unwholesome tendencies and malpractices become more frequent.

M.D. collecting centres have no weighing or candling equipments. By resorting to handgrading, the employees are able to introduce bias and unfairness in the assessment of grade and quality.

e) Lack of Information

Absence of market information is another serious defect from which the poultry industry is suffering. Most producers, especially those who live in areas remote from major towns are forced to depend on hearsay from the traders, who come to the village. Under such conditions the producer is placed in the plight of having to sell his eggs to that very trader or wholesaler without knowing the currently prevailing prices.

f) Storage Facilities

The problem of storage is of the highest importance in the egg trade due to the perishability and seasonal variability in the price of eggs. While inadequacy of storage capacity is the real problem, it is a strange fact that there is also serious under-utilization of existing capacity. For example the Marketing Department has several cold rooms at Lotus Road and 'Tripoli' specially designed for storage of eggs. They can store about 2 lakhs of eggs. But the problem is that the Marketing Department collections of eggs cannot provide a sufficient quantity for storing. Further, if the Marketing Department is seriously concerned to protect the consumer as well as the producer, it should start collecting eggs in a more dynamic way during periods of glut by simultaneously offering special incentives to the producers, and competing successfully with the private sector.

g) Transport Facilities and Collecting Centres

Most producers have to suffer due to the absence of transport facilities. They cannot get competitive prices for their produce. Instead they have to accept the price that is offered by the itinerant collector. (This is pointed out earlier in a separate context).

The Marketing Dept. has a very limited number of collecting centres. Even in some highly egg producing areas, collecting centres have not been set up, with the result that the marketing of eggs has become a serious burden for the producers in those areas.

* * * * * *

ADDENDUM

(Part I)

The following is a list of the principal policy announcements that have been made in the poultry industry of the country during the period between finalising draft report and release of the present final report. In fact authors have discussed and given their thoughts to these matters.

(REFER THE PAGES AS INDICATED BELOW)

1. 'Fillip for Poultry' - ".....Ministry of Rural Industrial Development has launched an island-wide programme to give easy bank loans and chicks to enterprising poultry farmers. He has ordered the Department of Animal Production and Health to ensure that this scheme was implemented effectively"[1]

   'The Ceylon Daily News' - 4th June 1979.

2. "Ministry of Rural Industrial Development has decided to set up an additional large-scale animal feed factory to meet the Country's entire requirement of animal feeds. The factory which was an outright grant from the Netherland's Government would cost about Rs. 20 million. It would have a montly production capacity of 12,000 tons".[2]

   'The Ceylon Daily News' - 18th July 1980.

3. 'Government yesterday decided to allow the private sector also to import poultry food. The Minister also said that the decision would also apply to all brands of animal feed".[3]

   'The Ceylon Daily News' - 12th June 1980.

4. 'Rs. 100 million Joint Stock Livestock Project"- "Libiya and Sri Lanka will set up a joint company to invest Rs. 100 million on a livestock development project in the island a Rural Industrial Develooment Ministry spokesman said yesterday. He said negotiations which started sometime back, were finalised yesterday.

   A three-member delegation from the government of Libya now in Sri Lanka, has agreed to invest first in a poultry project. The proposal is to set up large scale poultry farms in rural areas like Anuradhapura[4]. The Joint Company would be set up next month".

   'The Ceylon Daily News' - 19th April 1980.

5. 'Livestock Feed Sales Points' - "A series of sales points will be established throughout the country soon to retail livestock feed manufactured by the Ceylon Oils & Fats Corporation. The Minister ..... has decided on this course of action in view of numerous complaints of adulteration of corporation feedstuffs purchased through private stockists".[5]

'Sunday Observer' - 17th August 1980.

6. 'The Minister ..... looks forward to the inclusion of animal husbandry in the present agriculture syllabus at the G.C.E. (Ordinary Level) Examination ....."

"The introduction of animal husbandry will be on a district basis depending on the geographical conditions. The coastal belt, and the eastern Jaffna District well concentrate on poultry farming with a view to helping youth....."[6]

'Ceylon Daily Mirror' - 18th August 1980.

7. 'Due to high prices of local chicken, Ministry of Trade and Shipping has decided to import a consignment of 100 tonnes of chicken from England with immediate effect. It will be distributed by the C.W.E. and prices will be less than the local chicken".[7]

'Davasa' - 19th August 1980.

8. 'Survey of Highland crops, Livestock'-

"The Department of Census and Statistics in collaboration with the Department of Agrarian Services has launched a programme to collect statistics on highland crops and livestock".

"..... the statistics relating to minor and seasonal crops and livestock have hitherto been confined only to eye estimates owing to the non-availability of well organised procedure to collect such data, states a report from the Department of Census and Statistics."

"..... any project on programme centred on development at grassroots level demands accurate statistics of the village farmer".[8]

'The Ceylon Daily News' - 11th June 1980.

9. "Ceylon Oils and Fats Corporation. (Revision of animal feed prices) The Prices of animal feeds produced by the Corporation have been revised as follows with effect from Monday 22nd September 1980" -

'The Ceylon Daily News' - 24th September 1980.

10. 'Training for Livestock Extension Officers' - "Short-term training courses for livestock extension officers of the Department of Animal Production and Health have been started by the Ministry of Rural Industrial Development'. The courses are sponsored by the Food and Agricultural Organisation (F.A.O.) and are held at the department's training centre at Undugoda".[9]

'The Ceylon Daily News' - 15th October 1980.

11. 'Check on Adulteration of Animal Feed' -

"Strick laws to check adulteration of animal feed will be introduced shortly a spokesman for the Ministry of Rural Industrial Development said yesterday ....."

" ..... The Ministry would take stern action against those found guilty of adulteration of animal feed".[10]

'The Ceylon Daily News' - 16th October 1980.

12. "New Bank Credit Scheme to step up Agriculture"-

"The Bank of Ceylon will shortly effect sweeping changes in its agricultural credit schemes to quicken the pace of agricultural development in the country" ....."Farmers who will be briefed on the Bank's loan schemes will be asked to place their problems before the meeting, which will strive to find on the spot solutions ....."[11]

'The Ceylon Daily News' - 5th December 1980.

13. "Government Vacancies - Department of Animal Production and Health - N. 1236, Applications are invited for the posts of Krushikarma Viyapthi Sevaka - Part I Section (IIA) of the Gazatte of the Democratic Socialist Republic of Sri Lanka No: 118 of 05-12-1980"[12]

'The Ceylon Daily News' - 5th December 1980.

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1. Ref. Page XXXV
2. Ref. Page XXXIV
3. Ref. Page XIX
4. Ref. Page XXX
5. Ref. Page XXXIX
6. Ref. Page XXXVIII
7. Ref. Page XXX
8. Ref. Page XXVIII
9. Ref. Page XXXVIII
10. Ref. Page XXXVI
11. Ref. Page XXXV
12. Ref. Page XXXI

ADDENDUM

(Part II)

A COMPARISON OF NEW AND OLD POULTRY FEED PRICES OF THE OILS AND FATS CORPORATION.

	(per Metric Ton) Old price Rs.	New price Rs.	Amount increase Rs.	% increase
1. Baby chick mash	1940	2600	660	34.0
2. Growers' mash	1860	2700	840	45.1
3. Custom mix	1590	2500	910	57.2
4. Broiler starter mash	2090	3000	910	43.5
5. Broiler finisher mash	1940	3000	1060	54.6

(New prices (Ex-Seeduwa Factory) are effective from 22nd September 1980)

PRICE CHANGE IN POUND AND OUNCE-WISE

	Per Pound		Per Ounce	
	Old Price cts.	New Price Rs. cts.	Old Price cts.	New Price cts.
1. Baby chick mash	.88	1.18	.05½	.07½
2. Growers' mash	.84	1.22	.05	.07½
3. Custom mix	.72	1.13	.04½	.07
4. Broiler starter mash	.95	1.36	.06	.08½
5. Broiler finisher mash	.88	1.36	.05½	.08½

(The relevant section of items 3 & 4 of the annex 6 should be replaced according to the above calculations)

Due to price revision of poultry feed, cost of production per egg will increase by 16 to 25 cts. or 25-40% depending on different conditions. Market price of eggs also will go up by a similar margin or more.

COST AND RETURNS PER 100 BIRDS

(based on revised prices of feed)

These calculations have been done mainly on the basis of the assumption of that all other things except feed prices remain unchanged. But we could easily expect even other things to change subsequently, because the feed prices are so predominent in egg production, (feed cost component of an egg is about 70%) and also will have definite effects on the other variables.

Category 1 (more suited to an urbanised area)

		Rs. Cts.
1.	Capital cost	7400.00
	i. Buildings - 5400.00	
	ii. Laying boxes and other equipments- 2000.00	
2.	Recurrent cost	18250.00
	i. Cost of raising from day old to point of lay (4 months) - 3000.00	
	ii. Cost for the laying period from 4 months to 18 months - 11650.00	
	iii. Labour cost (200x18 months) (part time) 3600.00	
	(Transport and other miscellaneous expenses are included)	
	Total cost	25650.00

3. Assuming production figures and sundry income items remain unchanged as in chapter 5. Cost of production is calculated as follows:-

i.	Recurrent cost	18250.00
ii.	Depreciation on capital (7½%)	555.00
iii.	Interest on capital (a loan of Rs.5000/-)	840.00
	Total cost	19645.00

Cost of production per egg - 19645.00 - 3575.00 (sundry income)
Net cost = 16070.00

Total production of eggs (at 60% lay) = $\frac{16070.00}{21600}$

Cost of production per egg = .74 cts.

4. Summary

i.	Total income (at the rate of.90 cts. per egg & at the rate of Rs.30/- per culled bird)	= 23015.00
ii.	Total Expenditure	19645.00
iii.	Profit for 18 months	3370.00
iv.	Monthly profit	187.22
v.	Feed cost component 63.7%	

NEW PRICES Cost of 100 birds

Drugs and additives		475.00
Feed		12525.00
		13000.00
600 x 1.17 lb.	chick mash	707.80
1080 x 1.22 lb.	growers mash	1323.04
9250 x 1.13 lb.	layers mash	10492.00
		12522.84

COSTS AND RETURNS PER 100 BIRDS
(based on revised prices of feed)

Category 2

(more suited to a semi-urbanised area)

		Rs.Cts.
1. Capital cost		6500.00
i. Buildings	4500.00	
ii. Laying boxes & other equipments	2000.00	
2. Recurrent cost		14650.00
(Same as for Category 1. except labour cost, labour considered as family labour)		
(Transport and other miscellaneous expenses are included)		
Total cost		21150.00

3. Assuming Production figures and sundry income items are remain unchanged as in chapter 5.Cost of production is calculated as follows:-

i. Recurrent cost	14650.00
ii. Depreciation on capital (10%)	650.00
iii. Interest on capital (a loan of Rs.5000)	840.00
Total cost	16140.00

Cost of production per egg 16140.00 (sundry income) - 3575.00
Net cost - 12565.00

$$\frac{12565.00}{19800}$$

Total production of eggs (at 55% lay)

Cost of production per egg = .63 cts.

4. Summary

i.	Total income (at the rate of .85 cts per egg & at the rate of Rs.30/- per culled bird)	20405.00
ii.	Total expenditure	16140.00
iii.	Profit for 18 months	4265.00
iv.	Monthly profit	236.94
v.	Feed cost component 77.6%	

COST AND RETURNS PER 100 BIRDS
(based on revised prices of feed)

Category 3 (more suited to village conditions)

		Rs.Cts.
1.	Capital cost	3000.00
	i. Buildings 1500.00	
	ii. Laying boxes and other equipments 1500.00	
2.	Recurrent cost	
	(Same as for Category 2)	
	(Transport and other miscellenous expenses are included)	
	Total cost	17650.00
3.	Assuming production figures and sundry income items are remain unchanged as in Chapter 5.Cost of production is calculated as follows:-	
	i. Recurrent cost	14650.00
	ii. Depreciation on capital (15%)	450.00
	Total cost	15100.00

Cost of production per egg 15100.00 - 3575.00 (sundry income)

Net cost 11525.00
Total production of eggs 19800 = .58 cts.
(at 55% lay)

Cost of production per egg = .58 cts.

4. Summary

i.	Total income (at the rate of .85 cts per egg & at the rate of Rs.30/- per culled bird)	20405.00
ii.	Total expenditure	15100.00
iii.	Profit for 18 months	5305.00
iv.	Monthly profit	294.72
v.	Feed cost component 82.9%	

In normal economic terms, an increase in the production costs is followed by an increase in price of the final product. But although the feed prices have gone up by about 50% in September 1980, and despite the feed cost being the dominating component in production costs there was an unprecedented reduction in retail price of eggs. The price dropped from .90 cts to 65/70 cts.

This amply proves our statements about the power of the wholesaler in determining the egg prices. (See chapter 7.) It could happen mainly due to three reasons:

1. Reduced demand for 'day old' chicks must have compelled the hatcherymen to send all their eggs to the market.
2. The influence of the powerful wholesaler. It may be a result of the wholesalers' pre-planned piecemeal release of a big stock influenced by an 'outside force' to camouflage the public.
3. Large-scale poultry farmers would have organised themselves into a 'trust' to get monopolistic control over the egg market. Since, retail egg price for the country is determind by the Colombo wholesale market, large-scale poultry farmers may be flooding the wholesale market (without even producing the 'day old' chicks) in such a way as to keep the market price at a lowest possible level, thereby making it impossible for the small-scale farmer to be in production.

Present 'artificial glut' therefore, does not permit the normal market forces to operate. However, this should be positively a temporary phenomena.

APPENDIX 1

(A note on economies of scale)

If the question is asked as to what the optimum size should be for a poultry farm, there is no simple or definite answer possible, since, the total cost of production of broilers, laying hens, or eggs in either joint or separate enterprises would be the result of the combination of several factors of production, namely land, labour, capital and management, and the prices and costs of these in turn would depend not only on their availability but also on the demand for them from competing users in various types of industries. If the enterprise is to be in equilibrium, it is necessary that it should be just covering total costs when it is being operated at the maximum efficiency compatible with the existing conditions. If a poultry farmer is working under conditions of increasing returns it might be possible for him to reduce his average costs of production by constructing more cages or adding more chicks to his poultry. Since, he assumes that he can sell all his produce at the prevailing price, he will see an expansion of the scale of his operations as necessarily resulting in increasing his profits. His activities are motivated by the belief that prices will not fall though output has increased, and likewise that costs of production will not rise either.

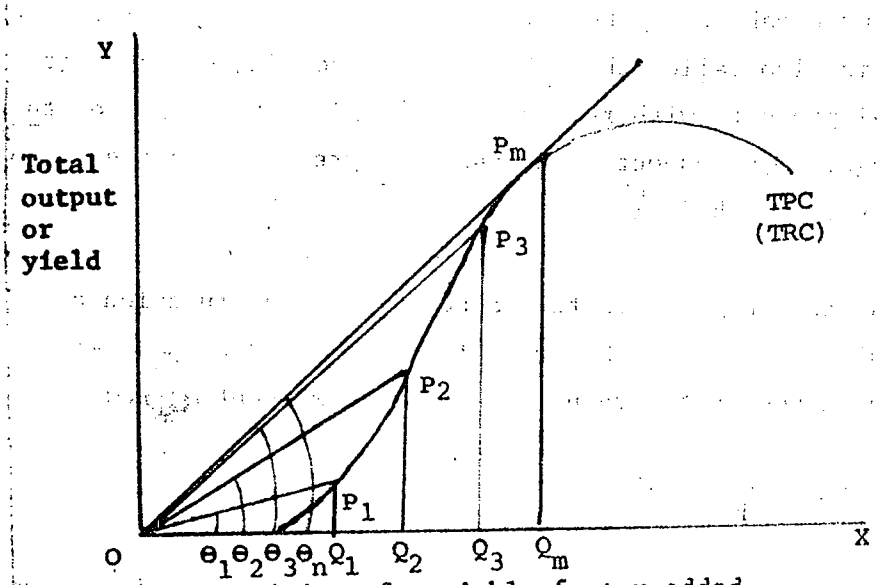
However, it may be said generally that costs of production of any commodity or service would tend to fall as its scale of production is increased. As expansion of production continued to increase still further, and cost of production to decline correspondingly, a point would be reached when further increase of the scale of production would not result in a decline of cost, and instead a period of increasing costs or diseconomies of large scale production would commence. Diminishing costs of production would thus have given place to increasing costs. This principle came to be embodied in a broader proposition of economic theory called the "Law of Variable Proportions or Variable Returns" which may be stated thus:-

"If to a given factor of production (say, an acre of land, a steel, cement or textile factory, a railway line etc.) held constant, an increasing number of units of a variable factor (quantity of fertilizer applied per acre, tons of steel or cement or yards of cloth, the passenger or freight load which the engine can haul etc.) are added, the resulting product tends to increase at first more than proportionately, (the phase of increasing returns or diminishing costs), and then less than proportionately (the phase of diminishing returns or increasing costs)".

This statement of principle could also be derived from the total product curve. The law of Diminishing Returns or Increasing Costs is based upon universal human experience, and does not admit of a strictly "scientific" proof. It could however, be argued in support of its validity in a negative kind of way, as had done by the "classical school" of Economists, that if such a law did not prevail, then it would be theoretically possible to grow all the world's requirements of wheat by the mere application of increasing quantities of fertilizer to a single acre of cultivable land.

In the graph below representing a schedule of total returns or productivity (T.P.C) to given additions of units of the variable factor, the <u>average return</u> per unit of the variable factor added is given by the perpendicular height of the curve at any point on it, divided by the number of units of the variable factor added, to achieve this total return.

FIGURE 16: TOTAL PRODUCT (REVENUE) CURVE



$$\tan \theta_1 = \frac{P_1\ Q_1}{0\ \ Q_1} = AR1 \qquad \tan \theta_3 = \frac{P_3\ \ Q_3}{0\ \ Q_3} = AR3$$

$$\tan \theta_2 = \frac{P_2\ \ Q_2}{0\ \ Q_2} = AR2 \qquad \tan \theta_m = \frac{P_m\ Q_m}{0\ \ Q_m} = ARm$$

This result is also equal to the tangent of the angle (θ), which the line joining any point on the total product curve to the origin makes with the x - axis. This tangent (tan θ) has sometimes been described as the 'angular magnitude'. As we move along the path of the total product curve from the origin upwards a point will be reached at which the line joining this point to the origin is also at the same time tangential to the total product curve. Up to this point (P_m) the angle joining points (P_1, P_2, P_3, etc.) on the total product curve to the origin has been increasing and, therefore, also the values of the tangents of these angles (tan θ_1, tan θ_2, tan θ_3 .....tan θ_m etc). After this point (P_m), the values of the tangent begin to decrease. P_m is therefore, the point of highest average return, or lowest average cost.

Marginal Revenue is defined as the net addition to total revenue resulting from the addition of a further unit of the variable factor, and is given by the tangent of the angle(θ), which tangents to various points on the total product curve make with the axis of x (i.e. tan θ_1, tan θ_2, etc.) This quantity is also called the differential coefficient of Y (total revenue or total product) with respect to X (variable factor) or the rate at which Y changes with respect to X, and is represented in the differential calculus by the symbol $\frac{DY}{DX}$.

It is defined as the increase in the value by which the function changes as the result of a very small change in the value of the x - component divided by the change in the value of the x - component, thus:

$$\frac{dy}{dx} = \frac{f(x + h) - f(x)}{h}$$

where the function is given by the relation $y = f(x)$ and h is the amount by which f (x) changes.

The angles θ_1, θ_2, θ_3.....show a continuous increase as total product increases with increasing applications of the variable factor up to θ_m and thereafter once again diminish. tan θ_m thus, represents the point of highest average revenue or yield. This becomes evident from the trigonometrical proposition that as an angle increases in magnitude the value of its tangent also increases.

Since as we pointed out above, at the point P_m, the tangent to the Total Product Curve passes through the origin, the angular magnitude and the Marginal Cost at the point P_m are equal. ($\theta_m = \phi_m$). It is evident that from the curves of Average Revenue and Average Cost as derived from the Total Product Curve, the Point P_m of the total product curve is represented by the highest and lowest points respectively of the above two curves. Hence, if one draws the Average Revenue curve and Marginal Revenue Curve on the same graph it is found that the Marginal Revenue Curve intersects the Average Revenue Curve at its highest point, and similarly the Average Cost curve intersects the Marginal Cost Curve at its lowest point :

Diagrams showing Curves representating Average Revenue(A.R.)and Marginal Revenue(M.R.) and Average Cost (A.C.) and Marginal Cost (M.C.) respectively.

FIGURE 17: AVERAGE AND MARGINAL REVENUE CURVES

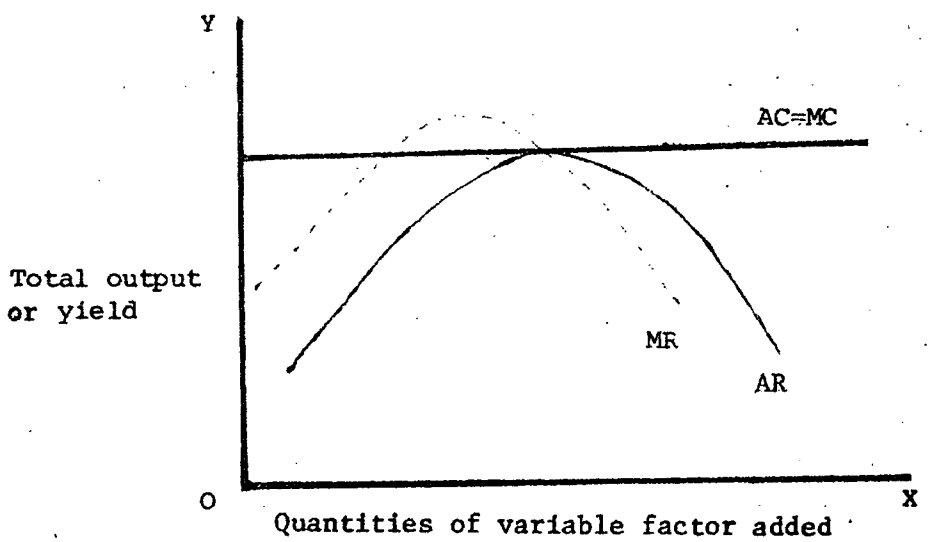
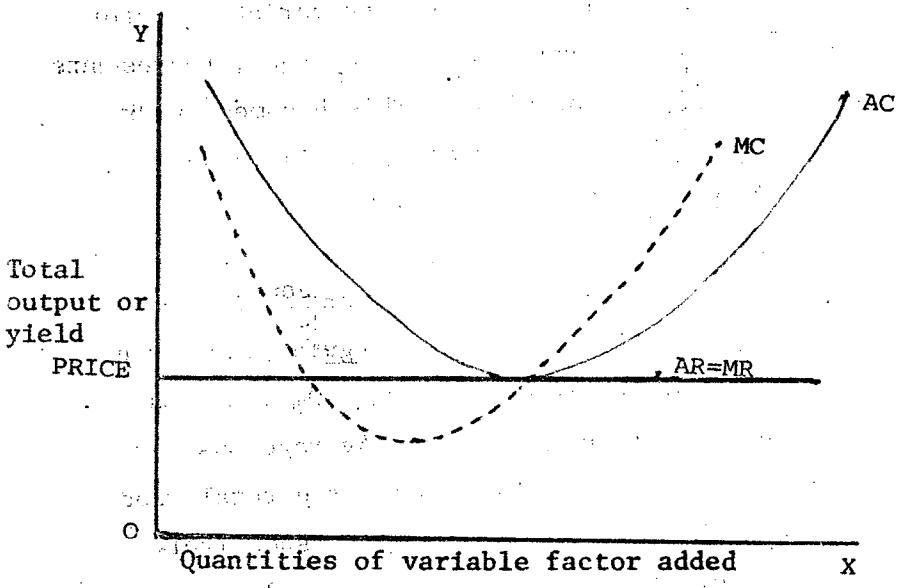


FIGURE 18: AVERAGE AND MARGINAL COST CURVES



APPENDIX 2

NEW PROPOSALS AND SCHEMES IN POULTRY INDUSTRY

ESTATE SECTOR

A scheme is being operated in the estate sector, of distributing 5 Rho-White hens and one cockeral to each labourer's family. This is considered to be an investment within the means of the householder as far as feeding or even total expenditure is concerned .In this way it is thought possible to help increase the level of protein intake of the families concerned while on the other hand, poultry keeping will become popular among the estate labourers thus adding to the increase in egg production of the country.

CYCLONE AFFECTED AREA

Initially, this scheme was limited to 4 areas of the cyclone affected Batticaloa district. Depending on the success of this scheme, the Ministry of Rural Industrial Development hopes to extend it to other areas as well . The Bank of Ceylon has agree to give a loan of Rs.500/- with interest at the rate of 9½% to each poultry raiser. 30, one month-old chicks are to be given to each person with the cost debited to his account. Repayment of the loan will begin after six months, on the ground that the farmer will begin to get an income only after that period. The full repayment period is 2 years. The Bank has also agreed to an inter-se guarantee scheme. The veterinary surgeon and the Assistant Government Agent of the area will supervise the enterprise. Marketing the produce will be through an association of the borrowers. There should be a minimum of 25 borrowers from a village to inaugurate such a scheme. This limitation has been laid down mainly for two reasons. Namely,

1. A veterinary surgeon can have an effective supervision when only 25 farms in a village are involved.
2. Providing extension services and organising a marketing system could be done with much greater ease when both

activities are located at one place or in close proximity to each other.

This comprehensive scheme should be capable of achieving successful results, if properly implemented. The veterinary surgeon and the other extension workers will have to play a very effective and inspiring role in order to obtain real benefits. The above scheme will help the inhabitants of the cyclone affected area, who have lost their hopes and aspirations in life as a result of the ravages of the devastating cyclone, to regain some measure of self-confidence, and look more hopefully to the future.

NUWARA-ELIYA

This scheme may be regarded as an extension of the scheme in operation in the estate sector. Initially 10 birds, made up of one male and nine females, will be given to 200 selected families in a village. The value of the total loan is Rs.225/- per family, with an interest rate of 6%. Repayment has been fixed by the People's Bank to be made in nine monthly instalments. Materials to the value of Rs.25/- are also supplied to each recipient, to construct the cage and the birds are to be raised on the free-range system. The veterinary surgeon of the area is expected to visit each farm at least once a month. At the end of the project period (12 months) those in charge of the project are expected to expand the scheme to cover a further 200 families. Planners have estimated a likely average monthly income of over Rs.75/- to be earned by each family from the fourth month of the project, and also expect the farmers to expand the size of the poultry from the second year onwards. This scheme is being operated initially in the Hangarapitiya Grama Sevaka Division, Maskeliya in the Nuwara-eliya District.

KALUTARA

The proposed scheme for the Kalutara district is to have poultry farms of 100 birds each, under the deep litter system. This has been introduced as a self employment project. It is expected to raise a bank loan of Rs.3000/- for each farmer and day old chicks will be provided by the veterinary

surgeon of the area. Repayment of the loan is from the end of six months, and will go on up to 18 instalments. Once again this arrangement puts a considerable burden on the veterinary surgeon of the area.

KEGALLE

In the scheme prepared for the Kegalle district there are some special features. About 10-15 unemployed youths are to be selected from each Cultivation Officer's division. Initially the scheme is limited to the Kegalle, Rambukkana and Mawanella electorates. The selected youths have to form a society. In selecting the participants, priority will be given to personal qualifications such as a natural liking for poultry work, ability to repay the loan, sincerity etc. The selected persons are given a loan of Rs.1000/- each by the People's Bank , and interest is charged at 12% per annum. They are allowed a grace period of 6 months before commencing repayment of the loan, and are collectively responsible for the repayment of the loan.

The loan will be given, not in cash but in kind. The Bank is also operating an inter-se personal guarantee scheme. In order to inspire more confidence and ensure greater success of the business, they will be supplied with 30 one month old chicks each. The participants can operate a semi-intensive system which will help to cut down feed cost substantially. The veterinary surgeon (V.S.) of the area will give the necessary advice, supply the essential medicines, and supervise the entire scheme closely. On instructions of the V.S. Divisional officer gets feed, medicine,additives etc., down to the Agrarian Service Centre(ASC) and distribute them among the poultry keepers. The planners do not expect a marketing problem as such to arise over the disposal of the eggs, and further propose to introduce the scheme into other electorates after observing the results of the first trials. The special features of the scheme are,

1. The collective responsibility placed on the youth for paying back the loan.
2. Selection of unemployed youth from the villages
3. The loan being given in kind
4. Involvement of the Divisional Officer as a principal supervisor of the scheme.

It is possible that this type of schemes will help to create a new interest in the poultry industry in general. By giving the needed support and the leadership to unemployed youths in the villages, poultry rearing can be made an integral part of the village economy.

EXPERIENCE OF BEMINIWATTA POULTRY PROJECT

(ARTI)

The Agrarian Research and Training Institute# pioneered a project to establish poultry in the Beminiwatta Agricultural Productivity Committee Area (Mawanella) in 1976, where its field laboratory operations were conducted. Seventeen persons were selected from two villages, and were given 100 day old chicks each. The Bank of Ceylon gave a loan of Rs.2500/- per person, but they received it only in kind. The veterinary surgeon of the area was to supervise and give the necessary advice. The A.P.C. was handling the supply of inputs, while coordination work was done by the ARTI. Although some of the persons selected for the project had got the full value of the loan, most of them had taken only Rs.1750/- to Rs.2000/-. This clearly shows that although for a variety of reasons the project ultimately failed, it is possible to raise 100 day old chicks under the intensive method and get an income with a capital expenditure of less than Rs.2000/- (subject to inflationary trends)

By the begining of 1979 only 8 out of the 17 were continuing the poultry keeping while the others had closed down their farms completely. Even, out of the remaining 8 persons, only 3 have reached the 'take off' stage, from the commencement of the project in 1976 or 1977.At one stage the project operations appeared to be going on very smoothly. Despite the lack of any background experience in poultry keeping the trainee farmers used to obtain a laying percentage of 55% - 75%. Due, however, to a number of reasons, the project became a failure with serious detrimental consequences, as far as development of the poultry keeping in that particular area is concerned. However, one important result has emerged. The redeeming factor that emerged from the whole venture was the inspiring spirit it created with the resultant demonstrative effect that poultry is a paying concern.

It is useful in this context, to examine the reasons which led to the

failure of the project because, on the one hand, it may provide guidelines for future planning or implementing similar schemes, and on the other hand it unearths the nature of the problems that poultry farmers have to face.

According to the farmers' explanations, the failure is due mainly to the following reasons.

1. Non-availability of feed
2. Lack of a proper extension service
3. Diseases
4. Fowl thefts
5. Lack of marketing facilities
6. Political disturbances

In addition, the unsuitability of the selectees and the role played by the A.P.C. also have contributed considerably to the failure. In discussions with those who had been selected it became clear that several of these selectees had no real willingness for rearing poultry, and some others had other interests besides poultry keeping, to divert their attention. A few were economically and socially too well off to fit into this type of a pilot project. Since the selectees have had not previous experience of poultry keeping, it was necessary that special care should have been exercised by a duly appointed body of responsible officials. In this respect it is more than doubtful if the A.P.C. or the veterinary surgeon of the area had properly fulfilled its obligations.

The A.P.C. it is true, had to face a very difficult problem with regard to the supply of feed. The cooperative societies had not supplied the feed requirements as and when necessary, and the farmer trainees had to buy feed at black market prices in the later stages of the project. Many of them had often travelled as much as 15-20 miles to buy their feed requirements. They pointed out that, although the cooperatives seemed unable to supply and distribute their mash requirements, in the adjoining private establishments poultry feed was available in large quantities at black market prices. Hence, farmers could not be expected to continue their poultries under these conditions for so long a period

and were compelled to abandon the farms.

In this type of a pilot project, extension services are a *sine qua non* for the success of the undertakings. But the assistance that should have been received had never been provided. Some farmers complained of their inability to get the services of the V.S. when necessary. Consequently the stock of chickens declined and the farmers were compelled to sell the rest of the stock, and close down the poultries. A few incidents of fowl thefts were also recorded. This antisocial activity exists, not only in villages, but has now spread to urban areas also. It is obvious that this is a problem to which the attention of the legislators should be urgently directed.

Political factors too had contributed adversely. A case in point was a successful participant of the project who had raised his stock to 300 birds which were completely destroyed during the post-election disturbances.

ANNEX 1

Cost per Gram of Protein in Different Animal Protein Foods

(At current market prices)

EGGS

100 grams of egg edible contains 13.3 grams of protein.

Present price of an egg taken as 80 cts.

1 gram of egg protein costs 16 cts.

(If the egg price is:

.85 -.17 cts.
.90 -.18 cts.
.95 -.19 cts.
Rs.1/00-.20 cts.
Rs.1/05-.21 cts.)

MILK

100 grams of milk contains 3.2 grams of protein.

Present price of a pint of milk taken as Rs.2.00

1 gram of milk protein costs 11.0 cts.

(Earlier it was 7.7 cts,)

(Milk price has increased from Rs.1.40 - 2.00 after 5th Nov.1980)

FISH

100 grams of fish edible contains 19.1 grams of protein.

Present price of a lb. taken as Rs.10.00.

(1 gram of fish (large sea-fish) protein costs 17.7 cts.)

If the fish price is 12.00 per lb. protein cost will be .21 cts.
" " 14.00 per lb. " " " " .25 cts.
" " 16.00 per lb. " " " " .28 cts.

BEEF

100 grams of beef edible contains 22.6 grams of protein.

Present price of a lb. taken as Rs. 7.50

(1 gram of beef protein costs 9.5 cts.)

(If it is Rs.8.00,per lb. the protein cost will be 10.1 cts)

and if it is Rs.8.50, the protein cost will be 10.7 cts.)

Source: Medical Research Institute, Colombo.

ANNEX 2

Below is a list of the responsible officers or representatives of the Government Departments, State Corporations and Institutes; and Private Sector Firms engaged in activities relating to Poultry Farming in Sri Lanka and poultry farmers who were interviewed personally by the authors of this Report.

NAME OF THE DEPARTMENT/CORPORATION/INSTITUTION	NUMBER OF INSTITUTIONS/PERSONS
1. Ceylon Oils & Fats Corporation	04
i. Chairman	
ii. Commercial Manager	
iii. Management Accountant	
iv. Sales Officer	
2. Department of Marketing Development	02
i. Senior Asst. Commissioner (Marketing)	
ii. Marketing Officer (Wholesale Market)	
3. Tripoli Market	03
i. Asst. Commissioner	
ii. Divisional Marketing Officer	
iii. Marketing Officer (Egg section)	
4. Marketing Dept. Collecting Centres	05
i. Negombo (Marketing Officer or Manager)	
ii. Marawila(" " ")	
iii. Kalutara(" " ")	
iv. Attanagalla(" " ")	
v. Dompe (" " ")	
5. Government Farms	07
i. Karandagolla (Farm Manager)	
ii. Kundasale (" ")	
iii. Marawila (" ")	
iv. Ambepussa (" ")	
v. Walpita (" ")	
vi. Pasyala (" ")	
vii. Pallekele (" ")	
6. Department of Animal Production & Health, Peradeniya	03
i. The Director (A.P.& H.)	
ii. An Assistant Director	
iii. A Veterinary Surgeon	
7. University of Peradeniya (Dept. of Animal Husbandry)	02
i. Head of the Department (Dept. of Veterinary Science)	
ii. A lecturer	
8. Veterinary Research Institute, Gannoruwa	
i. Veterinary Research Officer (Nutrition)	
ii. Veterinary Research Officer (Poultry)	
9. Medical Research Institute, Colombo	02
i. Parasitologist	
ii. Nutritionist	

10.	Registrar General's Office	-
11.	Department of Imports & Exports i. Controller ii. Statistical Officer	02
12.	Co-operative Wholesale Establishment i. Manager (Imports)	01
13.	Department of Census and Statistics i. A Deputy Director ii. An Assistant Director	02
14.	Ministry of Rural Industrial Development i. A Deputy Director	01
15.	Bank of Ceylon i. Credit Manager ii. Agricultural Projects Clerk	02
16.	People's Bank i. Assistant Manager(Cooperatives) ii. Chief Development Officer	
17.	Ceylon Tourist Board i. Director (Research & Planning)	01
18.	Ceylon Fisheries Corporation i. Chairman ii. General Manager iii. Marketing Manager iv. Asst. Manager (Exports)	04
19.	Building Materials Corporation i. Secretary ii. Asst. Sales Manager	02
20.	Agricultural Development Authority i. Director (Marketing)	01
21.	National Livestock Board i. Assistant General Manager	01
22.	Agricultural Insurance Board i. Director (Livestock Insurance)	01
23.	Government Owned Business Undertaking of British Ceylon Milling Company Limited (B.C.C.) i. Provender Manager ii. Asst. Marketing Manager	02
24.	Moosajees Ltd. i. Manager	01
25.	Elephant House i. Manager	01

26. Wolfendhal Street Forage Dealers — 03
    i. Central Forage Stores
    ii. Ceylon Forage Stores
    iii. The Colombo Forage Stores Ltd.,

27. Forage Dealers - Kandy — 02
    i. Island Forage Stores
    ii. Ceylon Forage Stores

28. Local Incubator Manufacturers — 03
    i. Negombo
    ii. Wellampitiya
    iii. Wattala (Pamunugama)

29. Poultry Drug Dealers — 11
    i. C.I.C.
    ii. Hayleys Ltd.,
    iii. Cargills Ltd.
    iv. Colombo Apothecaries
    v. Pfizer Ltd.,
    vi A Baur & Co.,
    vii. J.L.Morrison & Sons
    viii. Harrisons & Crossfield Ltd.,
    ix. Mackwoods Ltd.,
    x. Millers Ltd.,
    xi. De Zoysa & Co.,

30. Leading Catering Establishments — 09
    i. Perera & Sons
    ii. Bake House
    iii. Bistro Caterers
    iv. Green Cabin
    v. New Lanka Caterers
    vi. Grossvenor Caterers
    vii. Elephant House
    viii. Ceylon Biscuits Ltd.,
    ix. William Confectionary Ltd.,

31. Tourist Hotels, Restaurants and Guest Houses — 243

i.	Colombo	54
ii.	Kandy	40
iii.	Negombo	20
iv.	Mt. Lavinia	25
v.	Beruwala	11
vi.	Hikkaduwa	10
vii.	Tangalle	10
viii.	Bandarawela	15
ix.	Trincomalee	10
x.	Polonnaruwa	11
xi.	Anuradhapura	12
xii.	Nuwara Eliya	07
xiii.	Batticaloa	08
xiv.	Jaffna	04
xv.	Ratnapura	03
xvi.	Matara	03

32. Pettah Egg Dealers — 06
   i. Nalliah Nadar (M.Periyannan)
   ii. K.G.E. & Co.
   iii. A.M.Haniffa & Sons
   iv. Ibrahim
   v. T.Selvarajah
   vi. M.Karuppiha (Kanapathi)

33. Wellawatte Egg Dealers — 04
   i. New Colombo Stores
   ii. Ravindra Stores
   iii. New People's Daily Needs
   iv. Wellawatte Groceries

34. Private Franchise Agents — 15
   i. H. & N. Farms
   ii. Three Acre Farms (Hyline)
   iii. Bairaha Farms
   iv. Star line Poultry Products
   v. Nagahawatte Farms
   vi. Dalugama Hatcheries
   vii. Maris Brothers Farm
   ix. Mahaberiyatenna (N.L.D.B.)(At present under the State Control)
   x. Goto (Ceylon)Poultry Farm
   xi. River Valley Farm
   xii. K.& K.Poultry Farm
   xiii. Aluthwatte Farms
   xiv. Kandy Farms
   xv. Star Farm & Hatchery
   xvi. Diyagala Boys Town Farm
   xvii. Christhombu Farm

35. Poultry Farmers — 77
   i. Negombo, Katana, Ja-ela, Ragama — 11
   ii. Kandy, Teldeniya, Peradeniya, Kundasale — 07
   iii. Moratuwa, Beruwala, Kalutara, Panadura, Mt. Lavinia, Dehiwala — 15
   iv. Bulathsinhala — 01
   v. Puwakpitiya, Hanwella — 10
   vi. Dompe, Minuwangoda, Meerigama, Giriulle — 08
   vii. Marawila, Nattandiya, Mahawewa — 05
   viii. Homagama, Pannipitiya, Battaramulla, Thalangama — 05
   ix. Yatiyantota — 01
   x. Beminiwatte (ARTI Sponsored Scheme) — 14

36. Private Hatcheries — 07
   i. Negombo — 02
   ii. Ja-ela — 01
   iii. Kandana — 02
   iv. Ratmalana — 01
   v. Mt. Lavinia — 01

ANNEX 3

A CLASSIFICATION OF POULTRIES (DISTRICT-WISE)

	No. of Holdings	No. of Animals
Colombo	54725	1094657
Vavuniya	5628	38056
Puttalam	23260	252074
Jaffna	67325	356847
Kalutara	16496	213310
Galle	8814	109667
Polonnaruwa	4315	51600
Mannar	7931	44181
Hambantota	3903	33760
Amparai	19547	120571
Batticaloa	15258	73631
Trincomalee	9425	63654
Monaragala	4109	29329
Nuwara Eliya	4561	33072
Badulla	7834	79237
Matale	8494	72426
Kandy	26878	340318
Kurunegala	30323	341410
Kegalle	14538	119710
Ratnapura	9690	77968
Matara	8067	76035
Anuradhapura	7275	77342
Total		3698855

Source: Census of Agriculture - 1973
Department of Census & Statistics.

ANNEX 4

COST OF PRODUCTION PER PULLET(EXCLUDING COST OF PARENT STOCK (IMPORTED)AND FEED)

		Rs.Cts.	Rs.Cts.
1.	Incubator (imported) with a capacity of 4000	- 80,000.00*	
2.	Building to install the incubator (with water supply & electricity)	- 20,000.00	
3.	Poultry sheds for 3000 birds (including appliances)	- 80,000.00	
4.	Installation charges and for future repairs	- 10,000.00	
5.	Other buildings and incidental expenses (stationary, postage, transport etc.,)	- 15,000.00	
		205,000.00	
6.	5% depreciation for 18 months		15,375.00
7.	Interest on capital (9%)		28,500.00
8.	Electricity.50 x 18		900.00
9.	Employees' salaries for 18 months (including E.P.F. payments)		
	Farm Manager (Veterinary Officer)	1,000.00 per month	
	Sales Officer/clerical work	750.00 " "	
	Watcher	400.00 " "	
	3 Labourers	1,200.00 " "	
		3,350.00 " "	
			60,300.00
	Total cost		105,075.00
	Total incubator capacity $\frac{4000}{3}$ (80% hatchability)		- 1068
	Total production 1068 x 50		-53400
	(2 weeks have set apart for emergency purposes)		
	Cost per chick $\frac{105,075.00}{53400}$		-1.97

*(De Zoysa & Co., has been made arrangements to import an incubator with a capacity of 8648 from Japan in June 1978 at the price of $7770 = Rs.124320 ($1 = Rs.16.00)

Break up-Housing & incubation - .31cts.
labour -Rs.1.13
Interest - .53 cts.

(This shows the calculations appeared in chapter 3 are very moderate and justifiable.)

ANNEX 5

SCHEDULE FOR THE PREVENTION OF COMMON POULTRY DISEASES

Age	Preventive measure
At 1 day	Vaccination vs. Marek's disease*
From 1 to 5 days	Glucose dissolved in drinking water at the rate of 1 tablespoonful to 1 bottle
From 1 day to 4 weeks	Vitamin B comples tablets dissolved in drinking water at the rate of 10 to 15 per gallon
From 1 day to 4 weeks	Furazolidone in the feed at the rate of 1 oz. to 55 lbs. (one bag) of mash
At 3 weeks	Oral vaccination vs. Newcastle disease, at the rate of 1 vial for 50 chicks
At 5 weeks	First vaccination vs. fowlpox
At 6 weeks	First worming, with any piperazine compound. (Repeat worming at 3 month intervals or more frequently, if necessary)
At 16 to 18 weeks	Intramuscular vaccination vs. Newcastle disease, 1 vial for 200 chicks
At 20 weeks	Repeat vaccination vs. fowlpox

*Marek's disease vaccine is not produced locally; imported vaccine may therefore have to be used.

NOTE:- In the case of Newcastle disease if oral vaccination is skipped, intramuscular vaccination has to be done when the chicks are 10 to 12 weeks old.

Source: Animal Production and Health Bulletin. Jan./Dec. 1978 Vol. II page 55.

ANNEX 6

BREAKDOWN OF COST EXPENDITURE INCURRED IN SETTING UP AND MAINTAINING FOR 18 MONTHS A 100 LAYER POULTRY FARM

		Rs.Cts.
1. Poultry House (21' x 12')		
1.	500 bricks (Rs.320 per 1000)	160.00
2.	2 cubes of sand (Rs.150 per cube)	300.00
3.	5 bags of cement (Rs.73 per bag)	365.00
4.	20½ meters of wire netting 3/4"(23.52x20½)	482.20
5.	10 lbs. of staples (8x10)	80.00
6.	Galvanised sheets 8'x28 gauge, 20 sheets (58x20)	1160.00
7.	1 plain sheet	35.00
8.	Hingers (02)	15.00
9.	1" x 2" Reepers, 150 feet(.60x150)	90.00
10.	2" x 2" Rafters 580 feet(2 x 580)	1160.00
11.	4" x 2" Rafters 48 feet (4.50x48)	216.00
12.	Labour (mason) for 10 days Rs.40/each	400.00
13.	Labour (carpenter) for 10 days Rs.40 each	400.00
14.	Labour (helper for 10 days Rs.20 each)	200.00
15.	Miscellaneous expenditure	336.80
	Total	5400.00
2. Laying Boxes and Other Appliances		
1.	1" planks (85 feet) (3x85)	255.00
2.	½" planks (60 feet) (1.40x60)	84.00
3.	6 lbs. of nails (6x6)	36.00
4.	Hingers (small) 24x6)	144.00
5.	Labour (carpenter) (5 days Rs.40 each)	200.00
6.	Labour (helper) (5 days Rs.20 each)	100.00
7.	Waterers 4 chick founts (18x4)	72.00
8.	8½ feet long gutter S-Lon(32.75x8½)	280.00
9.	Feeders, chicks (7x16)	112.00
10.	Feeders, hens, 8x24 (8 tabular hanging hoppers)	192.00
11.	Miscellaneous items such as catching crates, knives, office equipment etc.,	525.00
	Total	2000.00

continued/...

3. Cost of Raising 100 Layers from Day Old to Point of Lay(4 months)
(Generally, age of the point of lay is being considered as 5½ or 6 months)

		Rs.Cts
1.	Cost of 120 day old pullets (4.75 x 120)	570.00
2.	Chick mash for one month (200 lbs.) (.88 x 200)	176.00
3.	Chick mash for the period of one to two months (400 lbs.) (.88 x 400)	352.00
4.	Growers mash for the period of three to four months (18 lbs. daily) (.84 x 1080)	907.00
5.	Drugs and additives 1.75 per bird	175.00
6.	Electricity, litter, transport etc.,	220.00
	Total	2400.00

4. Cost for the Laying Period from 4 months to 18 months

1.	Layers mash, for 14 months (100 gms. each per day) (.72 x 9250 lbs.)	6660.00
2.	Drugs and additives (3.00 per bird)	300.00
3.	Miscellaneous (transport, litter, electricity etc.,)	840.00
4.	Labour for 18 months (Rs.200 x 18, part time)	3600.00
	Total	11400.00

Grand total (1) + (2) + (3) + (4) = 21200.00

(Expenditure on feed has been calculated at the present prices of the Oils and Fats Corporation)

Sources:- i. Ceylon Oils and Fats Corporation
ii. A discussion with Farm Manager, Pasyala Government Farm
iii. Building Materials Corporation
iv. Department of Agriculture.
v. A few leading private building material establishments (dealers)

(When the report was written and cost calculations were made the authors could not be aware of the revision of poultry feed prices. For the necessary alterations please see the Addendum II.)

ANNEX 7

COST OF PRODUCTION AT DIFFERENT LAYING PERCENTAGES IN DIFFERENT PRODUCTION CATEGORIES

Production Category I (urbanised area)

Laying Percentage	Cost of Production per egg (Cts.)
50	89
55	81
60	74
65	69
70	64
75	59
80	56

Production Category II (semi-urbanised area)

Laying Percentage	Cost of Production per egg(Cts.)
50	69
55	63
60	68
65	54
70	50
75	47
80	44

Production Category III (Rural area)

Laying Percentage	Cost of Production per egg(Cts.)
50	64
55	58
60	53
65	39
70	36
75	43
80	40

Calculations are based on new(O.F.C) Feed Prices)

ANNEX 8

ADDITIONAL CONSIDERATIONS AND INFORMATION TO BE OBTAINED IN CONNECTION WITH APPLICATIONS FOR POULTRY FINANCE.

A scheme of poultry development may involve production of eggs by raising of layers using the deep litter system and / or increased production of poultry meat by rearing of broilers or otherwise.

In poultry one has to attach as much importance to marketing, as in respect of production facilities. The Bank, therefore, examines the scope for easy marketing of eggs and meat.

A check list of Guide Questiones given below to facilitate the sub-Manager to appraise the proposal. These questions are only suggestive and not exhaustive.

1. LOCATION:
   (a) Environment and climatic factors.
   (b) Nearness to an assured market
   (c) Availability of veterinary assistance

2. PAST EXPERIENCE:
   (a) Whether he has any experience in poultry farming?
   (b) Is he aware of the risk involved in poultry due to occurences of various diseases?

3. PROJECT OUTLAY:
   (a) Whether he has buildings and equipments? and what type of poultry shed does he have?
   (b) What type of birds and feeding arrangements he intends to have?
   (c) What is the bird strength proposed?
   (d) From where is he getting the chicks and how many weeks old?
   (e) Whether the flock is of broilers or layer birds?

4. FINANCIAL REQUIREMENT:
   (a) Capital expenditure on buildings and equipments(fixed capital)
   (b) Recurring expenditure on cost of birds and feeding materials up to 6 months in case of layers and 3 months in case of broilers.

5. MANAGEMENT:
   (a) Who is looking after the poultry?
   (b) To whom is he going to sell the birds or eggs?

6. ECONOMICS:
   (a) Income by sale of eggs per month
   (b) Feeding and maintenance expenses per month
   (c) Net surplus available per month

It is also necessary to investigate whether the borrower has the capacity and willingness to carry on business for such a period until repayment of the entire loan would be completed.

ANNEX 9

AGRICULTURAL CREDIT

Loans for Poultry Production-Essential Features

Eligible	(a) Individual farmers (b) Groups of farmers (c) Agricultural organisation or enterprises
Purpose for which loans may be granted	(a) For purchase of chicks (b) For purchase of incubators and other equipments (c) For construction of Poultry Sheds.
Period of loan	- for (a) & (c) upto 3 years
Interest rate	- As per schedule.
Procedure	- Application to be made on form as per annex 5(a). The completed form will be received by the sub-Manager of the Branch, together with the necessary certification and/or observation of the Cultivation/Productivity Committee. He will discuss the application with the Animal Husbandry Officer at the A.S.C. or the nearest Government Centre. He will also discuss marketing arrangements for the produce of the farm with the applicant and the appropriate officers at the A.S.C. He will then evaluate the proposal as outlined in O.I.C. No.803/73. The sub-Manager of the Branch will then forward the application to the nearest Branch Manager with his remarks and recommendations. The application will thereafter be treated in accordance with Office Instructions Circular No.800/73.
Security	- Please refer to page (6) of Office Instructions Circular No.803/73
Repayment	- The loan is to be repaid in monthly instalments. In regard to advances under (a) where a period upto 6 months may be allowed after grant of the loan for instalment payments to commence when this is considered necessary. If possible arrangements should be made with the buyers of the poultry products for payment to be sent direct to the Bank.
Remarks	- It is necessary to exercise close supervision in Poultry Financing; unless proper precautions are taken, there can be heavy losses and consequent default to the Bank. The points to be looked into periodically after sanction of loans are in regard to purchase of fresh chicks from retail agencies, purchase of food stuff of the requisite quality and quantity adequate attention of disease control and proper arrangements for marketing the product.

ඇමුණුම 10

සැ/මිල/11/03
අලෙවි සංවර්ධන දෙපාර්තමේන්තුව,
1978 නොවැම්බර් 08

සැපයුම් හා විකුණුම් මිල සංශෝධන අංක 3

	ගැනුම් මිල	සැපයුම් මිල	විකුණුම් මිල
බිත්තර I	57	59	63
බිත්තර II	56	58	62
බිත්තර III	40	42	44

අලෙවි සංවර්ධන කොමසාරිස් වෙනුවට.

English translation of the above letter

ANNEX 10

Marketing Department,
8.11.78

PURCHASE AND SELLING PRICE AMENDMENTS NO.3

	Purchase price	Supply price	Selling price
Eggs I	57	59	63
Eggs II	56	58	62
Eggs III	40	42	44

For Commissioner of Marketing
Development.

BIBLIOGRAPHY

1.	AGRICULTURAL MARKETING(1964)	Proceedings of the Ceylon National Training Centre on Agricultural Marketing, Peradeniya 28th May-13th June 1964 (sponsored by the Ministry of Agriculture, Food & Cooperatives with the assistance of the F.A.O.)
2.	AGRICULTURAL PLAN(1958)	Ministry of Agriculture & Food(First Report of the Ministry Planning Committee)
3.	AMINO ACID CONTENT OF FOODS AND BIOLOGICAL DATA ON PROTEINS (1968)	FAO, Rome
4.	ANIMAL PRODUCTION AND HEALTH BULLETIN(1978)	Editorial, Jan/Dec. 1978. Vol. II.
5.	ANNUAL REPORT OF THE CENTRAL BANK OF CEYLON (1978)	pp. 28, 29 & 43.
6.	ASIAN LIVESTOCK	Monthly publication of FAO Animal Production and Health, Commission for Asia the Far East and South-West Pacific,Vol. IV No.1.Jan.1979. Vol. V. No.4. April 1980.Vol. V No.5 May 1980.
7.	BISHOP C.E. & TOUSSAINT, W.D. (1958).	Introduction to Agricultural Economic Analysis -Willy International Edition.
8.	BOSE S. (1972)	Poultry Nutrition - New Delhi, Indian Council of Agricultural Research.
9.	BUREAU OF AG. ECONOMICS,CANBERRA (1976-1977)	Eggs Situation and Outlook
10.	CENTO WORKSHOPS ON MARKETING OF LIVESTOCK AND THEIR PRODUCTS (1971)	Commonwealth Bureau of Agricultural Economics-Oxford-England.
11.	CHANGES IN FOOD HABITS IN RELATION TO INCREASE OF PRODUCTIVITY (1973)	Report of the Symposium held in Manila in August 1972, Published by Asian Productivity Organization(A.P.O)
12.	DEPARTMENT OF CENSUS AND STATISTICS (1972)	Socio Economic Survey of Sri Lanka 1969/'70 - Special Report on Food and Nutritional Levels in Sri Lanka.
13.	DE SILVA. EARL. C. (1967)	Demand and Consumption of Meat in Ceylon.

14. DRUCKER, P.F. (1958) - Marketing and Economic Development - Journal of Marketing 22(1) pp.252-259.

15. DUNK R. MILTON (1979) - TECHNOLOGY BOOSTS U.S. POULTRY PRODUCTION

16. ENCYCLOPAEDIA BRITANNICA - Micropaedia Vol. VIII p. 164.

17. ENERGY AND PROTEIN REQUIREMENTS (1973) - Report of a Joint FAO/WHO Ad Hoc Expert Committee. WHO-Geneva

18. FAHIMUDDIN M. (1963) - Animal Production in Bihar-Asia Publishing House.

19. FINAL REPORT OF SIXTH RANDOM SAMPLE TEST FOR EGG PRODUCTION IN 1975-76 - Ministry of Agriculture and Irrigation, Government of India, Banglore. cit. Indian Poultry Industry Year Book 1976-77; New Delhi.

20. GANEGODA G.A.P. (1978) - Nutritive Value of Blood Meal and Small Scale Processing and Feeding of Abottoir Blood - Animal Production and Health Bulletin, Publication of the Department of Animal Production-Jan./Dec. 1978. Vol.II.Nos.122.

21. GUNAWARDENA P.J. & CHANDRASIRI ATHULA (1980) - Factors Influencing Vegetable Prices (A Study of the Vegetable Economy in Sri Lanka) (ARTI).

22. HALLIAN DAVIS (1978) - 'Factors Affecting the Size and Structure of the U.K.Laying Flock' - Oxford Agrarian Studies Vol. VII.

23. HALLIAN.D (1978) - Producers' Response to Supported and Free Market Prices - A Study of U.K. Egg Industry 1966-1976 - Journal of Ag.Economics Vol.XXIX.No.2 May 1978.

24. HAND-BOOK OF ANIMAL HUSBANDRY IN INDIA(1977) - (Council of Agricultural Research) New Delhi, Revised Edition. p. 107.

25. HAND-BOOK ON HUMAN NUTRITIONAL REQUIREMENTS - (1974) - WHO Monograph Series No.61, Geneva.

26. HANSEN P.L.(1949) - Input Output Relationships in Egg Production. Journal of Farm Economics Vol. XXXI . Nov. 1949.

27. HARTMAN DAVID (1974) - The Egg Cycle and the Ability of Recursive Models to Explain it. American Journal of Agri. Economics May 1974.

28. HILL B.E. & INBERSENT K.A(1977) — An Economic Analysis of Agriculture.

29. INDIAN FARMING VOL.XVIII(1968) — No.9, December 1968. Editor's Page.

30. INDRARATNE A.D.V. DE S.(1975) — Food Marketing System in the City of Colombo - Food Marketing Systems in Asian Countries (Case Studies of 13 Cities in Asia) F.A.O. Bangkok.

31. JAIN S.C.(1971) — Principles and Practices of Agricultural Marketing and Prices. India.

32. JASDANWALLA Z.Y. (1966) — Marketing Efficiency in Indian Agriculture, Allied Publishers, P.V.T. Ltd.

33. KANWAR PRAKESH CHAND & SIKKA B.K. (1979) — Price Spread and Behaviour in the Marketing of Eggs in Himchal Pradesh -Indian Journal of Agricultural Economics - Vol. XXXIV. pp. 174-179 Conference Number, October/December 1979. No.4 Indian Society of Agricultural Economics, Bombay.

34. KULASEGARAM P. (1978) — A Programme for Disease Prevention in Chickens. (Veterinary Research Institute) Animal Production and Health Bulletin Publication of the Department of Animal Production and Health - Jan./Dec. 1978.Vol.II. Nos. 1 & 2.

35. LADEFOGED, ANKER A.V. & MAHADEVAN P. (1956) — Karandagolla - A New Features in Poultry Development - Tropical Agriculturist. Agricultural Journal of Ceylon Vol. C XII No. 2 April-June 1956.

36. LEWIS ALFRED (L979) — The New World of Food - Chapter V. Keeping Animals Fit - p. 34.

37. LIVESTOCK DEVELOPMENT SURVEY SRI LANKA(1976) — Vol.I. Integrated Development Programme for the Dry Zone Vol. I & II Technical Reports U.N.D.P., F,A,O. Rome 1976.

38. MARKETING (1970) — World Food Problems No.10 - A Dynamic Force in Agricultural Development. F.A.O.

39. MUKHERJEE B.B. (1960) — Agricultural Marketing In India - Patna, India (Second Edition).

40. NATIONAL COUNCIL OF APPLIED ECONOMIC RESEARCH(1978) — Agriculture and Livestock in Rajestan.

41. OBAIDULLAH A.K.M. (1969) — Commercial Poultry Raising -(A Study of an Experimented Poultry Project) Pakistan Academy for Rural Development,August, 1969.

42. OMOLULU A. (Professor, University of Nigeria) (1978) — 'Proteins in the Human System' "Ceylon Daily News" - 31st October 1979 p.8.

43. PING KWON HO & SONSOMSOOK KAMOLWAN (1980) — 'The Little Chicken Farm is Laying Golden Eggs'- FAR-EASTERN ECONOMIC REVIEW - July 11 - 17, 1980.p. 57.

44. RAJAGURU A.S.B., RAVINDRAN V, SRISKANDARAJAH & GUNAWARDENA W.V.D.A. (1978) — "Use of Poultry Litter as a Protein Supplement in Swine Rations "- Department of Animal Husbandry, Faculty of Agriculture, University of Peradeniya - Journal of the National Agricultural Society of Ceylon - Vol. 15 p.20.

45. RAO A.R.& SUKHIJA S.S.(1980) — Nutritional Economics of Poultry Foods - EASTERN ECONOMIST,Vol.74 No. 8 Feb. 1980 pp.388-395.

46. REPORT ON MEAT PRODUCTION AND MARKETING — March 1969 - (Committee Appointed by the Hon.Minister of Agriculture and Food in August 1968).

47. REPORT TO THE GOVERNMENT OF CEYLON ON POULTRY PRODUCTION — Brant W. A., John,FAO Report No:225 Rome, March 1954.

48. REVIEW OF THE ECONOMY (1976) — Central Bank of Ceylon p.21.

49. REVIEW OF THE ECONOMY (1977) — Central Bank of Ceylon p.3.

50. RICHARDS P. & STOUTJESDIJK(1970) — Agriculture in Ceylon Until 1975- Development Centre Studies. Development Centre of the Organization for Economic Co-operation and Development - Paris - 1970

51. SAMUELSON PAUL A. (1976) — Economics (Tenth Edition)pp.405-407.

52. RUPASINGHE D.S.C (1978) — Livestock Pilot Project-Agricultural Insurance Board.(AIB)

53. SIDHU D.S. GUPTA M.P. & SIROHI A.S(1972) — Estimation of Demand Functions for Eggs in Punjab - An Econometric Study - Indian Journal of Agricultural Economics -Vol.XXVII July-Sept. 1972 No.3 pp.20-38.

54. SIDHU D.S. & RANJI P.S.(1979) — Price Spreads in Egg Industry in the Punjab - Indian Journal of Agricultural Economics - Vol.XXXIV Conference Number, October/December 1979. No.4. Indian Society of Agricultural Economics, Bombay. pp. 168-174.

55. SHAW.J.R. CAPPER G.S. & MANSER P.J. (1979) — A Strategy for the Development of the Livestock Feed Industry in Sri Lanka,Tropical Products Institute, Ministry of Overseas Development, U.K. February, 1979.

56. SPEIGHT H. (1960) — Economics - The Science of Prices and Incomes - pp. 199-215.

57. STATISTICAL ABSTRACT OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA 1977 — (Department of Census and Statistics, Ministry of Plan Implementation (1979).

58. STEWART G.F. & ABBOTT J.C. (1961) — Marketing Eggs and Poultry F.A.O. Marketing Guide No.4 1961.

59. SURVEY OF CEYLON'S CONSUMER FINANCES 1973 PART I — (Central Bank of Ceylon).

60. SURVEY OF CEYLON'S CONSUMER FINANCES 1973 PART II — (Central Bank of Ceylon).

61. THE DEVELOPMENT OF AGRICULTURE & ANIMAL HUSBANDRY UNDER THE FIVE YEAR PLAN(1972) — Proceedings of a Symposium - Compiled and Edited by U.D.A. Senanayake.

62. THE FINANCIAL COST OF AGRICULTURAL CREDIT (1978) — A Case Study of Indian Experience World Bank Staff Working Paper No.296 Oct. 1978.

63. THE NEW ENCYCLOPAEDIA BRITANNICA — Macropedia Vol. 6. p.142. p.803.

64. THE PROFITABILITY OF POULTRY FARMING IN THE VARIOUS DIVISIONS IN ISRAEL 1966/'67. — Series B. No.3 Institute of Farm Income Research, Tel Aviv Nov. 1968.

65. THE URBAN FAMILY BUDGET SURVEY OF 1977 — Department of Census and Statistics.

66. WARLEY T.K. (EDITED 1967) — Agricultural Products and Their Markets. Papers Read at International Seminar on Agricultural Marketing Held at the University of Nottingham, Oxford.

67. WATERSTON ALBERT (1973) — Preparing a Program for Agriculture - EDI Seminar Paper/ No.5, Economic Development Institute, International Bank for Reconstruction and Development. Washington, D.C. 1973.pp. 27-54.

68. WATT B.K. & MERRILL A.L. (1979) — Composition of Foods; U.S. Department of Agriculture, Washington D.C.

69. WEERASINGHE CHITRA (1979) — 'Old Hometruths in New Packages' 'Sunday Observer', 21st Oct. 1979. p.7.

70. WICKRAMASINGHE O.D.S (1968) — A Visit to the Poultry Processors' Plant in New South Wales - Australia. Marketing - The Official Organ of the Marketing Department Officers' Union 30th June 1968.

71. WIJERATNE W.V.S. (1965) — Milk, Meat and Egg Production in Ceylon. Livestock Division, Department of Agriculture, Peradeniya. Tropical Agriculturist - Agricultural Journal of Ceylon Vol. XXI. Nos. 1 & 2, Jan./June 1965.

72. WIJAYASINGHE M.S., RAJAGURU A.S.B. (1977) — Use of Silkworm (Bombyx Mori L.) Pupae as a Protein Supplement in Poultry Rations - Department of Animal Husbandry, Faculty of Agriculture, University of Peradeniya, - Journal of the National Science Council of Sri Lanka Vol. 5. No. 2 December 1977, p. 95.