CHAPTER III

INFRASTRUCTURE OF BROILER INDUSTRY

Procurement of Chicks:

The availability of varieties of commercial broiler has no doubt given a wider choice to commercial producers to select their own stock. What is important for a producer to know is that performance of the commercial broiler depends on the health and quality of the parent stock. Clearly hatched chicks obtained from a well managed, disease-free flock, will always give a higher return.¹

Broiler farming is like a race, - a race to get the bird up to market weight in the quickest possible time. Considering the quick turnover of activities of flocks on a broiler farm, the right choice of breed is all important as the breed quality can spell the difference between success and failure—in other words profit or loss.

What makes a good broiler chick? Many things, such as the proper selection of pure lines, an efficient breeding programme, and the determination to produce a

superior bird. These are the factors at the breeding level. But equally important in the make up of a good commercial broiler, is the handling of the parent stock and the care and expertise in the hatching operation. This is where the experience of your supplying hatchery comes in.¹

The following are various hatcheries located in Tamilnadu from which the farmers can get the supply of day-old chicks. And also, this list gives particulars about the breeds which can be received.²

**TABLE: 3.1 SOURCES OF SUPPLY OF BREEDS IN TAMIL NADU**

<table>
<thead>
<tr>
<th>Name of the Breed</th>
<th>Name of the hatchery.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. HYBRO</td>
<td>Selvam Hatcheries Pvt. Ltd.</td>
</tr>
<tr>
<td>2. RUBBAR</td>
<td>Pioneer Hatcheries</td>
</tr>
<tr>
<td>3. INDIAN RIVER</td>
<td>Esbece Hatcheries.</td>
</tr>
<tr>
<td>4. ROSS</td>
<td>Vet-Pharm</td>
</tr>
<tr>
<td>5. SHRR</td>
<td>Jayadhevi Hatcheries Perundurai Poultry farm of Hatcheries.</td>
</tr>
</tbody>
</table>
| 6. VENCOB         | a) Food Feeds and Febrism.  
                    | b) Southernfarm Fabrication Pvt.Ltd.  
                    | c) Tapco |

Equipments:

"Good equipment, usually makes success more certain, decreases the labour and increases the pleasure derived from the flock." ¹

There are various purposes and necessities which can be served and fulfilled by many equipments. The following are the equipments which can be used for various purposes. ²

1. Brooder.
2. Feeder.
3. Waterer.
4. Lights.
5. Bulk feed basins.
7. Water jugs.

1. Brooders:

In artificial breeding a number of standing brooders are provided. In this device, the air temperature under the brooder (lower) is kept at a required degree, say 95°F, during the first week of a chick's life. Various methods of brooding are used in the world. In India, this is done mainly through brooders mostly fitted with electric bulbs

¹ ABC of Poultry raising by J.H. Florea: Chap. 3; P. 19.
and in some cases with some heating elements.¹

**Feeders:**

Generally, the following are the two types of feeders in practical use.

1. **Tube Feeders:**

These have a cylindrical body with a pan at the base from which the birds feed. Food is put at the top and it falls down the tube so that the oldest food is always taken first. An allowance of at least four tubes per 100 is recommended. The pan must be adjusted in such a way that the food in the pan is maintained at a low level so that it cannot be easily flicked out.

2. **Long Food Trough:**

The trough may be built in a stand with an alighting rail into which birds fly to feed. It is essential that the trough space allowance should be adequate.

**Feeder space:**

Allow 5 cms. of trough space through 5 weeks and

¹ 'Modern aspects of commercial poultry keeping', by R. Gnanamani, Chap. 7.
² Poultry Guide Feb. 1985; Chap. "Scientific Broiler Production for better returns" by Dr. A. Mitra.
7.6 cms. until market time. When circular pans are used, allow about 20% less feeder space per bird. As the chicks grow, raise feeders so that the top of the feeder is on the same level as the back of the birds.

3. Water and Waterer:

The importance of water can be better appreciated when one considers that an egg consists of about 66% water and 100 hen drink over 22 litres of water per day. The hen cannot suck up water but has to scoop it up, so all water points must contain clean water to a depth of 1-2 inches.

Lights and Lighting:

Many different lighting programmes have been used by broiler grower in the past. However, today the majority of the broiler producers use 23 hrs. of continuous light in the building with one hour of darkness each day to prevent the birds from becoming frightened and resulting in pile-ups and smothering if power failure should occur.

HOUSING:

"Broiler Housing" is one of the most important

infrastructure of the broiler scheme. The reason is that optimum growth depends in the housing condition. Improper housing and tendency to over-crowd the chicks to increase profitability per unit of floor-space results in poor growth, decreased feed consumption, poor feed-efficiency, feather picking, cannibalism, high mortality, and various other stress related problems. "It is not only the optimum housing space but the orientation of the broiler house also needs to be equally considered." ¹

Hot places, where there is high ambient temperature unfavourable for optimum broiler growth, require special housing system and management to overcome the adverse effects of heat in growth, feed intake, and livability. Selection of appropriate roofing material, preferably a non-metal, East-West orientation of the broiler house, provision of foggers of roof sprinklers for evaporative cooling can minimise the solar radiation and keep the broiler house in the places where summer temperature is high.

"For maximum profit to be obtained from broiler business, good housing and labour saving conveniences are desirable." ²

² Chap. Broiler Management" by Dr. M.Ahamed.
Types of Houses:

There are, generally, four types of housing. They are.

1. Open House.
2. Environmentally controlled House.
3. Cage system.
4. Brooder and grower houses.

Material for Broiler Housing:

The following are the various materials used in the construction of broiler housing:

1. Cement.
2. Stones and bricks.
3. Iron.
4. Roof materials. (Asbestos, cement sheets, coconut leaves etc.). Wooden trusses, floor materials, mesh wooden pieces, tarpaulines etc.¹

Different systems of rearing:²

There are two systems of rearing.

1. All-in-All-out system.
2. Multiple Rearing.

² Chap. Setting up a Broiler Farm' by Gnanamani.
1. **All-in-all-out system:**

The most practical programme for broiler rearing has been the all-in-all-out system in which only one age group of broilers is in the farm at the same time. All the chicks are started in the same day and later sold on the same day, after which there is a period when no birds are on the premises. This lack of birds breaks any cycle of an infectious disease, and the next group of birds has a clean environment with no possibility of contracting a disease from older flocks on the farm.

2. **Multiple Rearing system:**

Although in the past, it was more profitable to keep the broilers of the same age group in the farm, advances in disease control and commercial convenience make it practical to keep several ages in the same farm and many operations now follow this procedure. But this system calls for expert management. According to this system, chicks are started either every week, once in ten days, fortnightly or once in twenty days etc.

**Litter Material:**

It is a common practice to use litter from the day-old
stage. Generally used litter materials are sawdust, paddy husk, maize, cobs, groundnut husks, cane bagasse or rice, wheat straw etc.¹

While selecting the litter material to be used, the locally available materials could be made use of.² The litter material should be free from injurious material and reasonably free from dust. The litter material should be such that it can absorb as quickly as possible the excretion of the chicks and keep the place dry always. When run through the hand, it should be dry, friable and free from obnoxious odour, caked litter is a bad sign. To dry caked litter, lime it so that heat is built up. House of old litter is not recommended.

Floor space requirements:

Do not put more than the recommended number of broilers into a shed, crowding causes stress and poor growth. Neither is it advisable to provide too much floor space. During the first four weeks, cordon off part of the shed, so that the birds do not have too

¹ Indian Poultry Industry Year Book, 1986, P. 110.
² Chap. Brooding of the Chickens, by Dr. K.V. Rao.
much space to move about in and around and thereby lose energy and lower feed conversion;

Growth and feed conversion are inversely proportional to floor space per bird. The more you crowd the broiler, the poorer the result. Crowding affects feathering and feed conversion as well as growth. 1

Broiler chicks must be provided a minimum of 32 sq. cm. (6 inches) of brooder space per chick under the cover. Allow one square foot of floor space per adult broiler. For the purpose of house construction an average of 0.75 sq. foot space per broiler may be provided. 2

The following table explains the effect of floor space in feathering and feed conversion of broiler. 3

TABLE - 3.2.

Effect of floor space in feathering and feed conversion of broilers.

<table>
<thead>
<tr>
<th>Floor space per bird</th>
<th>Poorly feathered</th>
<th>Feed Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Conversion</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>0.09</td>
<td>0.2</td>
<td>1.85</td>
</tr>
<tr>
<td>0.08</td>
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<td>1.94</td>
</tr>
<tr>
<td>0.04</td>
<td>8.0</td>
<td>1.98</td>
</tr>
<tr>
<td>0.03</td>
<td>14.1</td>
<td>2.04</td>
</tr>
</tbody>
</table>

1, 2 and 3 Commercial Chicken production Manual. Chap. 20.
Ventilation and its importance:

In broiler housing an important aspect which should not be lost sight of is the house ventilation. Free movement of air or ventilation regulates the moisture and heat of the broiler house. Good ventilation provides adequate oxygen to the broiler chicks, removes the carbon-dioxide given off by the birds, moisture warmth, and toxic gases from the house. Moist litter and strong smell of ammonia in a broiler house are signs of poor ventilation.

Temperature:

The period upto two weeks of a chick's life is more critical because the feathers and the heat regulatory mechanisms of the chick are not adequately developed and the development of nervous and endocrine system with chicks is not complete until three to four weeks of age. Here it is essential that the body temperature of the chicks must be maintained at its optimum by regulating the ambient temperature as low as it generally happens during winter, extra heat is provided to the chicks and this kind of providing heat is known as "brooding". Initially day old chicks

1. Poultry Guide June 84 Chap.7 Some Tips for successful broiler by Bhim Singh and others.
should be provided 95°F temperature and then temperature is gradually lowered by about 5°F each week, upto 5 weeks and then it may be kept constant at 75°F. 1

Humidity:

Excessive humidity in the broiler house leads to bad litter condition and causes stress to the bird. Therefore, the range of humidity in a broiler house should always be within a range of 55-70°. (Humidity in broiler house is affected by (1) Rainfall (2) Faulty Management and (3) Number of birds. 2

FEED:

The efficiency of Broiler production depends on feeds and it is the greatest single element of expense in broiler production because it amounts to 70-75% of the total cost of the broiler production.

Amount of food consumption in the broilers differ with the age of broiler and environmental conditions. There are two types of rations which are fed to the broilers.


1. Starter Ration: This is fed to the broilers from 0-6 weeks of age.

2. Finisher Ration: This is fed to the broilers from six weeks onwards.

Usually the broiler after consuming 2.5-2.7 kgs. of feed weighs about 1.2 - 1.4 kgs. and the quantity and quality of meat depends upon the quality of feed. They should be rich in energy, protein, minerals and vitamins.

MARKETING POULTRY PRODUCTS

Poultrymen are confronted with four major problems in marketing their products:

1. How to keep the volume of production in line with consumer demand.

2. How to plan production to be able to market the products at the peak seasonal price.

3. How to produce the quality of products desired by the processor and consumer; and

4. How to locate the best market.

The large-scale producer analyses his marketing programme very carefully because his livelihood depends upon the profit from the enterprise. The small producers
are quite often careless in marketing their products, and many of our poultrymen are small producers, since the poultry enterprise is a subsidiary one in most villages. Considerable increases in poultry income would result from the use of improved marketing methods.

The finished birds can be sold.

a. As live birds.
b. Dressed and ready to cook;
c. In cut-up parts,
d. As stripped boneless meat and
e. Further processing.¹

The dressed and ready to cook broiler meat are marketed in the two forms.² viz.

1. Non-frozen.
2. Frozen.

1. Refrigerated Non-frozen form:

Usually dressed poultry in this form are hardless in the temperature ranging from 1-7°C. In advanced countries like USA, 90% of broilers chicken 20% of turkeys


processed are marketed in the above form. The same is the situation in this country too.

2. Deep Frozen Form:

The idea of serving poultry and poultry products in the deep frozen form was mainly to reduce or prevent spoilage and offer a product to the consumer in the desirable look. A few years back the conventional deep freezing consisted of lowering the temperature of the product - 22°C to 0°C and then holding the item at 1°C to 3°C.

The bulk of the broilers are sold as live birds in unorganised markets in the absence of inadequate dressing. Presently the poultry trade is predominantly in the hands of the private traders and commission agents, operating in various metropolitan cities. Usually they sell the birds on wholesale and retail to canteen, hotels etc.

Price:

Price of chicken carcasses depends on law of supply

1. Indian Poultry Industry Year Book. 1986 P.6.
and demand situation; usually the cost of counting chicken is higher than that of broiler, cockrels and spent hen. The live bird sale is more in this country, so the price is fixed on the basis of per kg. in live weight. The price is also fixed on dressed weight basis.

**Poultry Meat Processing for market:**

This refers to the preparation of the primary product to the extent required for the market. Before discussing the processing of poultry for table, it is worthwhile to review the prevailing situation of slaughtering areas and conditions for poultry in India.

At present, no organised processing plants are available in the country except in a very few places like Chandigarh, Hissar and one in Delhi. Most of these plants are neither working in full capacity nor being used continuously on a commercial scale. These plants supply dressed birds to a limited number of consumers, dressed chicken to the large volume of consumers is supplied by private people, who have small chicken centres around the marketing place. Depending on the consumers attitude they sell live birds, slaughter them and the dressed bird is handed over to the consumer. Some will do the dressing free of cost and others will charge a price ranging between

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TRENDS IN WHOLESALE PRICES OF BROILER DURING THE DECADE 1976-85.
50 Paise to one rupee per bird.

**Dressing of chicken and the dressing plant:**

The 8 weeks old chicken are cut and dressed in the dressing plant.

**Processing involved in dressing:**

The neck of the chick is slit with a sharp knife and left for oozing of blood. When the blood oozes and the chicken dies, it is dipped in water of 60°C in a scandal. This is a drum shaped appliance for heating water using electricity. It has thermometer to read the temperature of water and is fitted with a red light which works automatically. The red light burns till the water gets heated to 60°C and is maintained at 60°C. The chick is dipped in scalder for about 1\( \frac{1}{2} \) minutes and is taken out and is put in the feather plucker. Feather plucker is a machine which is electrically operated. It consists of a stainless steel drum in which rubber rods are fixed vertically. The drum rotates fast while the feathers of the chicken come out.

The chicken is kept in the feather plucker which is operated for about two minutes, within two minutes all the feather except the smaller ones are removed due to the
speed of rotation. After two minutes the door of the feather plucker is opened and the feathered chicken is dropped into the tray kept in the floor.

The next stage is the removal of small feather and this is done manually. The legs and heads are cut and removed, then the abdomen is opened partially. Then the viscera is removed and the abdomen is cleaned by using water. After this the heart and liver is replaced. All these processes are done over a dressing table.

Then the chicken is dipped in ice cold water for long preservation. Each chicken is packed in a polythene bag, weighed and a slip for weight and priceslip is attached to the cover. They are preserved in deep freeze and taken out according to the need.

During sales each chicken is weighed and sold at the rate of Rs.16.95 per kg. The prices include sales tax which is Rs.1.06.

Packaging and the importance of packing:

The Poultry processing industry is in the phase of rapid growth in our country. The number of poultry dressing plants and units under Government and private sectors are

increasing every year. Use of available scientific knowledge in the packing of dressed poultry and poultry products will help in preserving their nutritional value, checking unnecessary wastages and presenting them to the consumers in the most acceptable forms.

Factors influencing packaging material:

Selection of a suitable packaging material depends on its physio-chemical properties like tensile, strength, bursting strength, tearing, resistance, etc. in relation to characteristics of poultry meat. Packing dressed chicken should be done as per requirement at a particular time. It may be for whole-bird, cut up parts, bulk-shipment or frozen storage.

Flexible packaging materials are most suitable for dressed whole-birds, halved birds, or cut-up parts or birds to be stored in frozen condition. These can be prefabricated into bags depending upon the requirements. Some of the commonly used flexible packaging materials in the poultry industry are:

1. Plastic Films:

Following are the various plastics. Plastic films
can be polythylene, Heat shrinkage polythene, Polypropylene plio films, etc. with varying thickness.

2. Pachment Paper:

   Vegetable pachment paper, having a minimum average twisting strength of 7.5 kg/cm² and average tearing resistance of not less than 18 cm. in any direction is suitable for packing materials.

3. Waxed Paper:

   Bleached or semi-bleached deodourised kraft paper wet-waxed on both sides with fully refined paraffin having melting point of not less than 52°C can serve as a suitable wrapper. The waxed sheets should have a minimum bursting strength of 7.5 kg/cm² and tearing resistance of 188 in any direction.

4. Packing frozen poultry:

   Freezing of unpacked poultry results in several problems. Surface desiccation of meat gives rise to discolouration, toughness and loss of flavour which is known as "Freezer burn". Since poultry fat is higher in unsaturated fatty acids, frozen chicken is prone to the development of axiodative
rancidity. Further pigment from bone marrow may come out during freezing causing bone darkening'. These problems can be avoided by vacuum packaging in heat shrinkage film of high tearing resistance. Birds which are not frozen but stored for a long period can be packed in cheap shrinkage polythene film after executing the air.

**Bulk containers:**

Birds from dressing units to retail outlets can be transported in wire baskets, metal containers, and plastic crates. The latest trend is towards use of only plastic crates due to many advantages. These are light weight, tough, dust proof, and easy to stock, handle and clean. These are able to withstand a temperature range of 40°C to 75°C. Such plastic crates in various dimensions are easily available in metropolitan cities. It is hoped that over the next decade, packaging will be an important step in storage, transport and distribution of dressed poultry.

**Transportation of live bird from the broiler house to the Processing Unit.**

The birds should be procured during cooler parts
of the day, usually in the night or early morning hours in order to avoid stress from extremes of climate. Shelf-type, crates are used to transport birds. Crates in which the birds are carried should be properly washed and disinfected before they leave the dressing plant to prevent any cross-contamination from infected birds.

2. **Transportation of processed meat from the processing Unit to Wholesale/retail/consumers.**

   For short distance transport, insulated containers of suitable thermal efficiency provided with effective refrigeration with wooden boxes fitted with thermocole or ice boxes are used. Insulated vehicles provided with effective refrigerated van, refrigerated railway wagons etc. are used for long distance transport. Transport by non-refrigerated vehicles even overnight is not permitted and advisable. As a general rule, perishable products like broiler should be distributed through relatively short channels to avoid deterioration in quality. At every step, the handling should be hygienic, quick and efficient, providing lower temperature. In the retail outlets besides being kept at a lower temperature display cabinets should be provided so that the product can be prevented from
further contamination by the marketing atmosphere.

Organisations:

The Government of India has entrusted the responsibility for marketing of eggs and poultry at the regional and the national level to the National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED) by providing financial support.

"In 1982 a Private Sector Agency was created under the name of National Egg Coordination committee (NECC) which declares prices for poultry products."

The phenomenal success of commercial poultry production in recent years owes much to the effect of education, extension and related agencies in the public, co-operative and private sector.

Today, a nationwide network of agricultural universities, veterinary colleges, agricultural colleges and research institutions provide a base for specialised courses and post graduate education, research and training for disease, diagnosis and extension activities, and there is a chain of central government poultry farms, state government farms, intensive poultry development projects/Blocks.
The Indian Council of Agricultural Research (ICAR) in New Delhi co-ordinates, guides and finances research in the field of poultry science through Agricultural Universities and National Research Institution. Although the oldest poultry science department in the country was set up in 1939 at IVRI, the Central Aviation Research Institute (CARI) was established in 1979 in the Campus of IVRI to coordinate and tackle the wide ranging problems of farmers and the input industry at the national level. Also located at CARI is the UNDP centre of Excellence for Advanced studies in poultry science which attracts scientists and other specialists from all over the country.

In the majority of agricultural universities, poultry science education and research, forms part of veterinary/agricultural (Animal science) Colleges. Recently there is a trend towards the establishment of separate poultry science departments in these institutions.
The first of them was set up by the Andhra Pradesh Agricultural University (APU) in Hyderabad.

All India Co-ordinated Research Project (AICRP) in Poultry breeding for developing egg-type and meat-type birds is in progress at twelve centres and sub-centres under the sponsorship of the Indian Council of Agricultural Research (ICAR). The Project is being co-ordinated from CARI.

For the field specialists, the central training Institute for Poultry Production and Management (CTIPPM) at Hessarghatta, Bangalore, offers courses of short duration in genetics, nutrition, management and marketing.

The Food Technological Research Institute at Mysore conducts training courses and disseminates know-how in new methods developed for the processing of poultry products and their better preservation.

Voluntary organisations such as Action for Food Production (AFPRO) in New Delhi organises short-term training courses in different parts of the country.

Poultry Development officers in the State Departments
of Animal Husbandry also guide farmers regarding the facilities available locally within their respective states. Veterenarians in Government Hospitals and also those running private disease diagnostic laboratories help in tackling diseases and provide vaccination facilities.

The following institutions provide Education, Extension and Research facilities.

1. Annamalai University, Annamalai Nagar.
2. Farmers Training Centre, Government of Tamil Nadu, Tindivanam.
3. Krishi Vidya Kendra, Tamil Nadu Agricultural University, Tiruchirappalli.
5. Tamil Nadu Agricultural University, Coimbatore.
7. Poultry Research Station, Nandanam, Madras-35.

The following are the various Insurance Companies extending insurance facilities to the poultry Industry.

2. Loss prevention Association of India Limited, Bombay-1.

The following are the various departments and projects of the Government of India which extend their services to poultry industry.

1. Ministry of Agriculture, Department of Agriculture and Co-operation, New Delhi.
3. Department of Rural Development.
4. Agricultural Marketing.
5. Council for advancement of Rural Technology, (CART)
6. Indian Agricultural Statistics Research Institute, (IASRI)
7. Indian Council of Agricultural Research (ICAR)
8. Indian Standard Institution (ISI)
10. National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED)
11. National Bank for Agricultural and Rural Development (NABARD)
13. People's action for Development (India) (PADI)

State Government Departments:

1. Animal Husbandry Department, Madras-6.
2. Poultry extension Centres etc.

In addition the Nationalised banks give loans under IRDP, Schemes etc.