METHODS AND MATERIALS

Selection of area

Broiler production in the Panjab gained momentum mainly after the Poultry Processing Plant was established at Chandigarh during 1968-69. The activities of this Project for distribution and procurement of broiler chicks were mainly carried out within 20 kms radius of its location. Assuming the provision of adequate marketing facilities by this Poultry Project, some commercial private hatcharies also intensified their activities for supplying broiler chicks. This led to concentration of broiler farms in the Chandigarh area which was, therefore, purposively selected.

In the Punjab, it was only at Ludhiana that the price of poultry birds was settled through open auction. Besides, it was hoped by the farmers of this area that the Poultry Project Plant, Chandigarh, located only at a distance of 98 kms from Ludhiana, would lift the broilers for processing. Thus Ludhiana was another important production-cum-marketing
centre for poultry and was, therefore, also purposively selected.

The Panjab State Poultry markets are significantly influenced by the trends and sentiments of the Delhi market, an important assembling and distributing market. Delhi market was, therefore, also selected. Besides, some other towns and areas of the Punjab which were considered important for the objectives of the study were also included in the sample.

Selection of the farmers

There were 116 farmers within 20 kms radius of Chandigarh where intensive activities of the poultry project were carried out. Out of these, all the 37 farmers who reared broilers were selected. Six farmers who were at the trial stage kept only a limited number of broilers and therefore, were dropped from the sample. Another farmer refused to furnish the data in spite of persistent persuasion and repeated trips to his farm. Thus, the remaining 30 farmers formed the sample for the Chandigarh area.

In Ludhiana, only two farmers specialised in broiler rearing. They kept 9000 to 18000 broilers a year. Some other poultry farmers reared broilers either for trial or to utilise layers shed when chicks were in brooding period and changed

*Perhaps he was afraid of tax imposition because he was running some other business, too.
the number of broilers every year. It was, therefore, not possible to categorise the farmers according to the number of broilers. The categorisation was, therefore, based upon the number of layers with the farmers, assuming that the farmers having different levels of knowledge for layers would apply the same to the broilers also. A list of the farmers visiting Ludhiana wholesale market was prepared. The farmers were divided into 5 categories. All the farmers rearing broilers were included in the sample. However, to make the sample broad based, some more farmers were randomly selected to make the total sample upto 25 per cent in each category.

The total sample which consisted of 30 farmers from Chandigarh and 42 farmers from Ludhiana is given in Table III-1.

Table III-1

Details of the sample farmers

<table>
<thead>
<tr>
<th>Category</th>
<th>Chandigarh</th>
<th>Ludhiana</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class interval (Broilers)</td>
<td>No. of farmers selected</td>
</tr>
<tr>
<td>1.</td>
<td>Below 750</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>751 to 1500</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>1501 to 2250</td>
<td>10</td>
</tr>
<tr>
<td>4.</td>
<td>2251 to 3750</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>3751 and above</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Total farmers</td>
<td>30</td>
</tr>
</tbody>
</table>
Thus the total sample comprised of 72 farmers. In addition to the farmers, all the agencies involved in the marketing system of broilers were also included. The following sampling framework for these agencies was followed.

Selection of the processing plant

There was one major processing plant run by the Poultry Project at Chandigarh, which was included and formed the nucleus of this study. Another privately managed small poultry processing plant was also located at Chandigarh but it furnished only a limited information.

Selection of the wholesalers

There was only one wholesaler at Ludhiana, none at Chandigarh and 4 at Delhi. All these wholesalers were selected for the study.

Selection of the retailers

A complete list of the retailers dealing in poultry birds/meat was obtained from the Health Departments at Chandigarh and Ludhiana. The retailers were classified according to the type of poultry product handled by them, viz. (i) retailers selling frozen birds, (ii) retailers selling live birds, and (iii) retailers selling goat meat but also keeping live birds. The total number of such retailers being small in both the towns, 4 retailers from each type were randomly selected.
Selection of the consumers

Since income is an important variable affecting the consumption (demand) of poultry products, the consumers were classified into seven income groups based upon the total disposable income. Each category was further split into urban and rural to examine the behaviour of urban and rural consumers towards meat consumption. Since, total number of consumers in any category could not be known, it was not possible to distribute the sample proportionately. Hence, equal representation was given to each category. Depending upon the time and financial resources, 10 farmers from each category were selected. In all, 70 urban and 70 rural consumers were included in the study.

Selection of the hotels

There were 16 important hotels at Chandigarh and 12 at Ludhiana. Out of these, 25 per cent hotels were randomly selected for examining the supply and demand position with them.

Selection of Cooperative Societies

There was only one cooperative society in the state which purchased poultry birds (after dressing) and the same was included.

Collection of data

This study was based on both the secondary and the
primary data. The secondary data regarding number of poultry birds, production of other meats, etc., for India and other countries were collected from the FAO Production Year Books. Secondary data on trends in poultry production in India, its concentration in different states and within the Punjab State in different districts were collected from the published reports and other periodical publications issued by the Governments of India and the Punjab. Besides, the data were also collected for sheep and goat which were assumed to be close substitutes for poultry meat.

The primary data from farmers and all the agencies were collected through well structured pretested schedules by personal interviews except commercial hatcheries from whom the data were sought through mail.

The data collected from the farmers pertained to the number of broilers and layers reared, education and poultry training levels, sources of feed, loans obtained, market information, marketed surplus, prices received by the farmers from different buyers, etc. The data regarding feed consumption and body weight of broilers at different ages were also collected from the farmers and from an experiment conducted by the Punjab Agricultural University on commercial broilers with a special feed formula. Data regarding sales by the farmers during different weeks and to different agencies were also collected.

Modes of transportation used by the farmers were
examined and the data on transport mortality by different modes were collected. Transport mortality for the Poultry Project and shrinkages of live-weight during transit were collected from the records of the Project. Transportation losses with retailers who purchased from the farmers or from local buyers or assembly point were also recorded.

Data from the retailers were collected regarding sales of different meats, sales of poultry meat on different days of the week, consumers' demand for different meats, losses to their stocks for frozen and fresh meat, during winter and summer. Sales at the retail counter of the super-market and at farmers' cooperatives retail shops were also recorded. Data regarding the sources for procurement of birds were also collected. Data from retail agencies were collected on adequacy/inadequacy for the supplies available to them. Similar data were collected from the retailers dealing in live-birds.

Data from the consumers were collected for the consumption of meat during 1972-73, consumers' preference for different types of meats, colour of the meat, consumption on festivals and various days of the week. Consumers' preference for broiler chick, and hen meat was examined by conducting an experiment with a panel of consumers.*

*A panel of 12 consumers was made to indicate their preferences after tasting the meat. The meat was cooked by adding equal quantities of salt and spices. The cooking was one as acceptable to the consumers. After getting each sample tasted, every consumer was requested to wash his mouth with hot water boiled with tea leaves. This was carried on till all the samples were got tasted.
Similarly another experiment was conducted to examine the consumers' preferences for frozen and fresh broilers.

Information regarding the activities of the Poultry Processing Plant, Chandigarh was obtained from its records. The relevant data pertained to the annual number of chicks of broilers distributed amongst the farmers, broilers and layers procured, processed and sold, capacity of the plant utilised, prices paid to the farmer and fixed for selling meat to the consumer, mortality and shrinkage during transit, carcasses condemned by the plant, storage capacity and its utilization, cost of processing birds and profit/loss to the Poultry Project.

Analysis of the data

Tabular analysis was depended upon to arrive at various conclusions. Specific statistical tools were also applied wherever necessary. The analysis of data was carried out in the following sections:

1. Production and marketable surplus

The number of poultry birds and population of different countries were compared to examine the per capita availability of the poultry birds. Production of meat from other sources was also examined. Production of important feed ingredients and rain fall was compared with the number of poultry birds in different districts of the State to examine if poultry concentration is related with these factors.
Number of poultry birds with the selected farmers was examined for 1970-71 through 1972-73 to study the fluctuations and the factors responsible for the same. Number of broiler chicks purchased from commercial hatcheries and Poultry Project, Chandigarh were compared for the three years of the study period so as to examine preferences by the farmers for a particular agency and the factors leading to this. Some key factors which influence the efficiency of the poultry farms are education, training in poultry, sources of feed, loan, market information, methods used to catch the birds, etc. These factors were examined for the different size categories of the poultry farms to find out the association of the availability of technical know how with the level of entrepreneur ship of poultry business.

Volume of marketable surplus was worked out by deducting the mortality, home consumption and missing birds. The relationship of the size of the poultry enterprise and volume of marketable surplus was examined.

2. **Cost of production**

Cost of production was studied by taking into account both fixed and variable costs. The costs were worked out from 8th to 12th week because majority of the farmers sold their broilers during this period. Marginal costs and returns analysis was conducted for 9th to 12th week so as to examine the economics of rearing broilers beyond 8 weeks.
The yearly variations in different items of input costs during 1970-71 to 1972-73 were analysed to examine the adjustments attempted by the farmers with the passage of time. Feed conversion ratios were examined for Ludhiana, Poultry Project and Commercial broilers to find out the most remunerative breed for the farmers. The performance of commercial broilers in terms of feed conversion ratio and weight gained was also studied for different types of feed, viz., Agricultural University feed and the feed obtained from the market.

3. **Assembling, distribution and transportation**

   For examining daily volumes at the wholesaler and retailer shops, daily number of birds assembled at each place were taken into account. The percentage of daily assembling was worked out for farmers and traders in each case. Shrinkage in the live weight during transportation was worked out for the live birds transported by the Poultry Project vans as these birds were weighed both at the farm and at the project premises. Number of birds brought in different containers were also examined. The space provided per bird during transit by the farmers was compared with the standards laid down by the Indian Standard Institute (IS).

4. **Grading and standardisation**

   The steps taken by the farmers to grade the birds before sale were examined by asking indirect questions,
whether they sold sick, poorly feathered and inactive birds separately than those birds which were healthy, good feathered and active ones. To work out the premium for grading two lots brought by different farmers were divided into two equal halves excluding the birds of heterogeneous weights. One half of the birds was graded into two grades 'A' and 'B' and the other half was left ungraded. The graded and ungraded birds were sold by open auction. For examining reaction of wholesalers and retailers towards grading of poultry birds, enquiries were made how they disposed inactive and poorly feathered birds and active ones with good feathers. Consumers' reaction towards grading was ascertained by recording their answers about the factors they kept in mind while purchasing live birds at retail shops. Poultry Project, Chandigarh authorities were also asked about the factors which they kept in mind for purchasing the live birds and for condemnation of the dressed birds. Grade specifications for live poultry birds in U.S.A. (which has long established broilers industry) and India were compared to bring improvements in grade specifications, for India.

5. Marketing channels and price spreads

The role of different marketing channels was examined

'A' grade birds had good feathers, bright eyes and active ones, while 'B' grade birds were lethargic and poorly feathered.
by working out the percentage of total marketable surplus flowing from the producer to the consumer. The price spreads in different channels at a point of time and over space were worked out by using the "Mode" method.

6. Prices

Prices received by the farmers from different agencies at a point of time and over space were compared. Monthly price indices were worked out to find out the seasonal fluctuations in prices. Prices of broilers at Ludhiana, Delhi (where birds were sold by auction) and Chandigarh (where prices were settled through negotiations with the private buyers and through contract with the Poultry Project Chandigarh) were compared to determine the favourable situation for the farmers. Prices were also compared in the producing and consuming areas of Ludhiana and Chandigarh with Delhi. In the producing area, prices were compared for different towns having different levels of population (Ludhiana, Nawan Shahar and Sahnewal) and located at various distances from the Ludhiana City where daily auction was held. Relationship between size of the poultry farm and the prices received from different agencies was worked out to examine the discrimination with different sized poultry farms.

Price paid by the cooperative societies which accepted dressed birds, was compared with the Poultry Project Prices paid to the farmers. Method adopted by the Poultry Project
for price fixation to purchase live birds and for sale of dressed meat was also examined. Relationships of wholesale and retail prices, prices for live birds and feed, dressed meat and live birds, and, procurement prices offered by the Poultry Project and feed prices were worked out.

7. Consumption

For examining the meat consumption pattern with the consumers, they were categorised into 7 categories depending upon levels of income. Percentage of different types of meats consumed by each category was worked out. Pattern of meat consumption during different reasons was examined by working out the seasonal indices for consumption of fowl, broiler and total meat separately.

8. Progress made by the Poultry Project Chandigarh

Progress made by the Poultry Project Chandigarh, was studied by examining distribution of day old chicks to farmers from 1965-66 to 1972-73, number of birds dressed as compared to the capacity of the plant, impact on dressing costs and economics of Poultry Project. Yield of meat obtained from the live birds was compared with that obtained in U.S.A. Mortality and shrinkage of the birds transported by the poultry project and carcasses condemned during processing were also estimated.