CHAPTER-3

MATERIALS
AND
METHODS
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Material and methods are the key constituent of the scientific study. Data from the major portion of materials while identification of its source, specification of the methods of its collection, tools and techniques of analysis, ways of presentation and interpretation of results etc, are the major parts of methodology which need the conceptual and practical clarity. They are study specific and need to be set in accordance with the objectives of the study. Materials required and methods laid for the present study are as follows:

3.1 Data Source:

The problem under study involves data collected from both the secondary and the primary sources which specify their type. Following secondary information were collected from source(s) mentioned with them, for attainment of some of the objectives of the study:

(i) Weekly data on wholesalers’ and consumers’ purchase prices of vegetable under study for the related seasons of Agricultural year 2000-01 from the official records of the market;

(ii) Data on number of licensed market functionaries, license fee, market charges and available infra-structural facilities like grading, transportation storage etc, in Azamgarh vegetable market from the official records of the Mandi Samiti.

Keeping in view the resources and time limitations with researcher, sample survey approach was implied to collect the primary information/data from
both the farmers and the market functionaries. A specifically designed and pretested survey schedule was used for the purpose. Sample respondents constituting both the producer sellers (vegetable growers) and the market functionaries viz., commission agents, wholesellers, Retailers, Palledars etc. dealing with vegetable marketing were interviewed personally. Data Collected from market functionaries pertain to the Agricultural year 2000-01 on following aspects:

(i) Market fee, license fee, other expenses and commission paid/received.

(ii) Purchase pattern of the vegetables: It includes place of purchase/person(s) from whom purchased, method of purchase, time taken in purchase, price paid, etc.

(iii) Marketing functions performed such as grading, packaging, storage, transportation, and cost incurred and problems faced therein.

(iv) Sales pattern of vegetables: It includes the identity of purchasers, price received by sellers, quantity sold, method of sale, factors affecting price determination etc.

The information regarding marketing channels were also collected from market through personal survey. Data pertaining to the physical distribution system were collected from the sample farmers. In addition to these, farmers were interviewed for the information regarding production practices, costs and outputs of the vegetables.
3.2 Sampling Design:

Sampling design for the present study comprises of multistage random sampling technique associated with stratification at its-ultimate stage. There are 22 blocks with 3721 villages in Azamgarh district of Uttar Pradesh. There is a Mandi Samiti in Azamgarh district which looks after the working of all the four semi regulated markets viz, Lalganj, Maharajganj, Mubarakpur and Atraulia (Nariaon). Nizamabad and Muhammadabad (at present in Mau district but work under Mandi samiti Azamgarh) are the two major unregulated markets. In addition, there are several subsidiary markets from which most of the vegetable tradings is done.

3.2.1 Selection of Market:

From the list of all the markets of district one i.e. the Purani Subjee Mandi situated at Azamgarh chauk was selected purposively. The office of the mandi samittee is situated at a distance of 3 km. from the district Head Quarter along the road side (Azamgarh- Varanasi Road).

3.2.2 Selection of Market functionaries:

There are a number of market functionaries operating in the market. Major among them are:
(i) Wholeseller:

Wholeseller are those merchant middlemen who buy and sell in large quantities. They sell either in the same market or in other markets. They sell to retailers, other wholeseller's and processors. They do not sell in significant quantities to ultimate consumers. There are 106 wholeseller listed with Mandi Samiti of the district. Of all the wholesellers operating in the mandi, 5 were selected randomly.

(ii) Commission Agent:

Commission Agents are the persons operating in the wholesale market who act as the representative of either a seller or a buyer. A commission agent normally takes over the physical handlings of the producer, arranges for its sale, collects the price from the buyers, deducts his expenses and commission and remits the balance to the seller. The commission agent receives commission from the producer- seller in the name of suvidha shulk. There are 16 commission agent listed with mandi samiti of the district. Of all the commission agents operating in the mandi, 5 were selected randomly.

(iii) Palledar:

The activities of palledar include loading, unloading, grading, packaging, weighing and stitching. There are 12 palledars listed with Mandi
Samiti of the district. Of all the palledar operating in the mandi, 5 were selected randomly.

(iv) Retailer:

Retailers buy goods from wholesellers and sell them to the consumers in smaller quantities. They are producer's personal representatives. Retailers are closest to consumers in the marketing channels. There are 599 retailers listed with Mandi Samiti of the district. Of all the retailers operating in the mandi, 5 were selected randomly.

Wholeseller cum commission Agent (W.C.A.), Mashakhores and Ladani - are also important functionaries operating in the market. The activities of these functionaries are same as commission agent. There are 226 W.C.A., Mashakhores and Ladanis listed with Mandi Samiti of the district. Because of the operational similarity with whole sellers and commissions agents, none of these were selected in the sample. At the last, 5 of the ultimate consumers were also selected to form a sample of consumers.

3.2.3 Selection of the Block:

There are three blocks namely Palhani, Rani ki Saray and Sathiaon which fall under the feeding zone of the selected market. One of them i.e. Palhani was selected by the method of random selection. Fortunately, the mandi is situated
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in the selected block itself, on main road side, and nearest to the block head quarter.

3.2.4 Selection of the villages:

All the villages of the sample block were divided into two zones:

Zone-I:

Villages situated at or within 5 kms from the selected subjee mandi. There are 23 villages falling in this zone.

Zone-II:

Villages situated beyond 5 kms from the selected subjee mandi. There are 144 villages falling in this zone.

Five villages from each of the two zones were selected randomly Zone-wise list of the selected villages is given in Table 3.1.

3.2.4 Selection of the farmers:

A list of the vegetable growing farmers of all the sample villages was prepared. Rearranging the list in descending order of the operational size of their holdings, these farmers were stratified in three distinct size groups namely marginal farmers (with an operational holding below 1.00 hect.), small farmers (1.00 - 2.00 hect.) and large farmers (2.00 hect. and above). Using PPS method, 10
Table 3.1: Number of total farmers and sample farmers in the sample villages.

<table>
<thead>
<tr>
<th>Name of the villages</th>
<th>Marginal farms</th>
<th>Small farms</th>
<th>Large farms</th>
<th>Total farms</th>
<th>Sample farms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total farms</td>
<td>Sample farms</td>
<td>Total farms</td>
<td>Sample farms</td>
<td>Total farms</td>
</tr>
<tr>
<td>Zone-I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Nivi (3 kms)</td>
<td>87</td>
<td>4</td>
<td>10</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>2. Chakbhaikhan (4 kms)</td>
<td>62</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3. Hyderabad (4 kms)</td>
<td>40</td>
<td>4</td>
<td>15</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Zirikpur (3 kms)</td>
<td>43</td>
<td>5</td>
<td>10</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5. Phirtpur (4 kms)</td>
<td>23</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sub-total</td>
<td>255</td>
<td>28</td>
<td>41</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Zone-II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Kurmnndinpur (8 kms)</td>
<td>50</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Itaura (8 kms)</td>
<td>29</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3. Hathia (12 kms)</td>
<td>60</td>
<td>5</td>
<td>10</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4. Shahbajpur (13 kms)</td>
<td>28</td>
<td>4</td>
<td>8</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>5. NImatipur (9 kms)</td>
<td>40</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Sub-total</td>
<td>207</td>
<td>24</td>
<td>33</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>Grand total</td>
<td>462</td>
<td>52</td>
<td>74</td>
<td>26</td>
<td>37</td>
</tr>
</tbody>
</table>

Note: Figures in parentheses are the distance from the selected market.
farmers from each village were tried to select randomly, distributed under all the three strata. But, due to peculiarity of very small number of farmers under large group and very large number of farmers under marginal size group, the number of sample farmers in each category was adjusted in such a way that almost every group may represent its presence in the sample. Table 3.1 depicts the total and the selected number of farmers under each stratum (group).

3.2.5 Selection of vegetable crops:

A number of vegetables are grown in the study area. Considering all of them for the study requires much resources and time which lacks with the researcher. It was, therefore, decided to consider major five of them. Total area under different vegetable was considered as the basis for selection. Potato, Onion, Cauliflower, Brinjal and chillies are the crops which occupy major portion of the area under vegetables and were selected for the study. Of these crops potato and onion are semi-perishable while cauliflower, brinjal and chillies are perishable vegetables. While onion and chillies are used both as vegetables and spices but the major portion of chillies grown in the study area are mainly used as spices and pickles. Detail descriptions of these crops are given as below:
1. Potato:

Potato is one of the most important cash crop in India. It is commonly used vegetable of north India. Besides vegetable, it is used to prepare number of snacks and other items used as ready foods. It belongs to Solanaceae family, genus Solanum and species: Tuberosum. It is a native of S. America and introduced in India in the late 16th Century through Europe. It is a winter crop. In a country with limited resources if the nutritional level of the population has to be maintained under inhospitable situations, the potato has a special value as a food. Potato, because of its high production potential and superior nutritional quality, would prove to be a useful tool for fighting hunger and malnutrition.

In the plains of north India, the sowing time of potato stretches from mid-September to almost mid January. Late sowing may however, gives low yield. In the hilly regions of north India the crop is sown in March-April, Potato can be grown almost on all the types of soil. According to the estimates published by the International Food Policy Research Institute (IFPRI) and International Potato Centre (CIP), India is likely to have the highest growth rates in its production and productivity during the period of 1993-2020. During the same period, world wide demand for potatoes is expected to increase by 40 percent. This scenario calls for concerted efforts to capture the global market by producing international quality potatoes and value added/processed products. Projections made by CPRI also
indicate a production of 49 million tonnes from an area of 2 million hectares by 2020.

2. Onion:

Onion is both the vegetable as well as spicy crops which gives the vegetables an attractive flavour. It is commonly used in preparation of many dishes. On the other hand it has medicinal value and commonly recommended in Ayurveda. As an important commercial crop onion is grown in a large area of India. The world's average productivity of this crop is lower than the Indian average. Onion is a rich source of calcium phosphorus and its nutritive value varies from variety to variety. Small size bulbs are more nutritive than their larger counterparts.

Onion originates from the region comprising north-west India, Afghanistan, the Soviet Republics of Tajik and Uzbek. Western Asia and area around the Mediterranean Sea are the secondary centre of its development. Onion belongs to the family Amaryllidaceae, genus Allium and species cepa. Onion is a cool season crop and its production is affected by the length of the day. The day length requirement varies from variety to varieties. Temperature is more important than the length of the day in seed-stalk development. Most of the varieties if transplanted early will form seed-stalk. Onion is grown however, on all types of
soil it is more sensitive to high acidity and produces a maximum yield over a fairly narrow range of soil reaction.

3. **Cauliflower:**

Taste of cauliflower as a major cold season vegetable now-a-days can be enjoyed throughout the year in India. In the plains of India it is grown generally from September to May as a normal crop. Cauliflower has been developed from cole-worts though originated in Cyprus and around the Mediterranean coast. Cauliflower belongs to the family Cruciferae, genus: Brassica and species Aleracea. It is grouped in Var. botrytis. Morphologically the curd is made up of numerous divided hypertrophic branches which terminate the main stem of the plant. It is a highly suppressed and extremely ramistld hypertrophied flower stalk. No part of flower is apparent in a curd. Cauliflower can be grown on any fertile soil but a fairly deep, loamy soil is baricatty desirable. Cauliflower is a delicate crop and needs more care to grow successfully than most other vegetables. It is used as a vegetable in curries and soups, and for pickles. It is rich in potassium and sulphur. It is also rich in protein.

The varieties of cauliflowers are divided in to two groups according to season, early and late, because the cauliflower varieties are very responsive to temperature and photoperiod. It is, therefore, very important to choose the right variety to be sown at the right time. Early varieties if sown late produce "button"
head and late varieties if sown early will go on giving leafy growth and will produce curds very late.

4. Brinjal:

The brinjal is a native of India. It has been in cultivation in India since ancient times. It is one of the most common vegetables grown throughout the country. The brinjal has got Ayurvedic medicinal properties and white brinjal is said to be good for diabetic patients.

Brinjal belongs to the family Solanaceas, genus Solanum and species melongena. Varieties differ in shape and colour of fruits and also in the growth habit of the plant. The round or egg shaped varieties are grouped under var. esculaentum. The long slender types are put under var. serpentinum and the dwarf early ones under var. deprossum. Brinjal requires a long warm growing season. Temperature between 13°C - 21°C is most favourable for its successful production. In plains there are two, sometimes three, main seasons for sowing brinjal:

(1) Autumn - winter crop - Seed in nursery are sown in June and seedlings transplanted in July.

(2) Spring - summer crop - Seed is sown in early November and the seedlings transplanted during January and early February.

(3) Rainy season crop- Seed is sown in March and the seedlings transplanted in April.

In the hills the seed is sown in early April and the seedlings are transplanted in lost of April. A well- drained and fertile soil is desirable for
growing brinjal. It is a hardy plant and can be grown on different kinds of soil but does best on silt loams or clay loams.

5. Chillies:

The Chilli is a native of America and it is one of the most valuable crops of India. Its different varieties, though are grown throughout the country, but states like Himachal Pradesh, Andhra Pradesh, Maharashtra, Karnataka and Tamil Nadu are the major producer of it. It is mainly grown for vegetables, spices, sauces and pickles, chillies are rich in vitamins, especially Vitamins A and C.

Chilli belongs to the family Solanceae and genus Capsicum. Four different species are under cultivation, of which C. annum is most common. Most of the green and dried chillies available in the market belong to this species. The varieties of chillies are broadly divided in two groups viz long pungent types including picklings and bell shaped non-pungent, mild and thick fleshed types.

Chilli is a plant of tropical and sup-tropical regions requiring a warm humid climate. In general the chillies plants require a temperature of 20ºC-25ºC. Chillies crop is grown on practically all types of soils except on salty land provided the soil is well drained and well aerated.
**Analytical Tools:**

Analytical tools refer to the various mathematical and statistical formula and functions have been used for calculation required for achieving the desired goals or objectives. Tabular analysis for its inherent nature is adopted in most of the part of this study.

It is also adopted as useful and effective tools of presentation of results. Further, percentages and averages were worked out to draw a general picture of different aspects covered in the study. Other tools of analysis as per specific purposes are as follows:

(i) **Coefficient of Variation:**

Coefficient of variation (C.V.) is an effective statistical tool to work out the variations. Here this technique is used to calculate variations in distribution of returns different vegetable crops and their wholesale and retail prices. Following formula is used for this:

\[
\text{C.V.} = \frac{Sd}{x}
\]

where,

- C.V. = coefficient of variation
- \( Sd \) = Standard deviation
- \( x \) = Mean value.
(ii) Marketing efficiency:

Marketing efficiency of channel with respect to a particular commodity refers to its capability of providing higher benefits to producer from the sales proceeds. Actually it is the net gain on per rupee of expenditure against marketing cost. It is worked out as follows:

\[ \text{ME} = \frac{V}{I} - 1 \]

where,

- \( V \) = Value of the produce sold (i.e. consumer's price)
- \( I \) = Total cost of marketing

\[ i.e. \quad I = C_p + \sum_{i=1}^{n} M_{ci} \]

where,

- \( C_p \) = Cost incurred by producer in marketing of his produce
- \( M_{ci} \) = Marketing cost incurred by the \( i^{th} \) functionary
- \( n \) = number of market functionaries operating in the channel

Marketing efficiency here reflects the relative efficiency of a particular channel. Lower is marketing cost, more efficient is the Channel.
(iii) Price spread:

Price spread refers to the proportion of consumer's rupee that is shared by the market functionaries as their margin including the marketing costs and charges. It can be worked out as under:

$$PS_j = \frac{RP_j - PP_j}{RP_j} \times 100$$

where,

- $PS_j$ = price spread of $j^{th}$ vegetable (Percentage)
- $RP_j$ = Retail price of $j^{th}$ vegetable (Rs. Per quintal)
- $PP_j$ = Producer's price of $j^{th}$ vegetable (Rs. per Quintal)

It is also a measure of relative efficiency of different channels. Smaller is the price spread, more efficient is the channel.

(iv) Producer's Share in consumer's rupee:

It refers to the proportion of consumers rupee received by the producer seller. In other words it reveals that how many paisa a producer seller can receive from one rupee spent by consumer on purchase of a particular commodity here it is calculated as:

$$Po = \frac{Pp}{Pr} \times 100$$

where,

- $Po$ = Producer's share in consumers rupee (percentage)
- $Pp$ = Net price received by the producer (Rs per quintal)
- $Pr$ = Price paid by consumers i.e. retail price (Rs per quintal)

Higher is the producer's share, more efficient is the channel.
**Functional Analysis:**

Price of a commodity is determined by forces of demand and supply. Same is true in case of vegetables. In the mandi it was observed that demands of the vegetables are largely governed by its retail prices. Lower is the price higher is the demand. But the retail prices are governed by amount of the supply. This is the reason for which the prices of vegetables during post harvest periods rule very low and that during off seasons rule very high.

Further, the retail prices i.e. consumer prices form a ground for fixing up the producer's price. To assess the effect of consumer's price on producer's share following function has been tried:

\[ y = ax^b \]

where,

- \( y \) = Net gain of producer in rupees per quintal
- \( x \) = Consumer's price in rupees per quintal
- \( a \) = Constant
- \( b \) = regression coefficient (elasticity).

Further, coefficient of determination \( (R^2) \) has been calculated to access the proportion of variation in producer’s net receipt explained by the variation in retail price i.e. consumer’s price.