The study was carried out to examine the demography of study area, vegetable production, marketing efficiencies, marketing margin, marketing cost and producer’s share in consumer’s rupee in performance of functions in the vegetable supply chain by channel-I, II and III of vegetable marketing. Hence the methods and procedure followed in conducting this research is furnished under the following heads.

3.1 Description of the study area
   3.1.1 Uttarakhand a brief description

3.2 Nature and source of data

3.3 Sampling procedure
   3.2.1 Selection of study area
   3.2.2 Selection of blocks and village
   3.2.3 Selection of respondents
   3.2.3 Collection of data

3.4 Analytical tools and techniques employed

3.5 Terms and concepts used in the study

3.1 Description of the study
The present investigation was carried out in the Kumaon hills and Tarai region (plains) of Uttarakhand State of India.

3.1.1 Uttarakhand: A brief description

History of Uttarakhand
The name of Uttarakhand is mention even in the early Hindu scriptures as Kedarkhand, Manakhand and Himavat. It is often called the Land of the Gods (Dev Bhoomi) because of its various holy places and shrines. It was actually the ancient Puranic name
for the inner stretch of the Indian Himalayas. The Kushanas, Kudinas, Kanishka, Samudra Gupta, the Pauravas, Katuris, Palas, the Chandras and Pawaras and the British have ruled Uttarakhand in turns. In 1791, the expanding Gurkha Empire (people from Nepal) overran Almora, which was the seat of the Kumaon Kingdom. Later on, in the 19th century, expansion of the Gurkha Empire was brought to an end by British annexation of these regions. The Garhwal Kingdom was reestablished in Tehri (Tehri is a city and a municipal board in Tehri Garhwal District in the Indian state of Uttarakhand. Garhwal and Kumaon had to yield to the British as part of the Treaty of Sugauli. After the independence, the princely state of Tehri was merged into Uttar Pradesh.

The present state of Uttarakhand was earlier a part of the United Province of Agra and Awadh. In January 1950, the United Province was renamed as Uttar Pradesh. Uttarakhand was composed of the Garhwal and Kumaon Divisions, along with Tarai and Bhabhar regions of U.P. It emerged as a separate state on 9 November 2000 as the 27th state of India.

**Culture of Uttarakhand:** The people of Uttarakhand are called as Garhwali or Kumaoni. It is estimated that about ninety percent of the people in Uttarakhand are Hindus. Most of the people who reside here belonged to the upper caste. However the scheduled caste section of the population preceded the later migrants settling in the hills. The other communities of the state are Marcha, Tolcha, Shauka, Buksha, Tharu and the Gujjar. The Gujjar’s are mainly cattle herders. Population of the state includes people from other states as Nepal, Bengal, Punjab, Tibet etc. The majority of the native people here are Rajputs.
Majority of the people speak Hindi. Kumaoni and Garhwali dialects of Central Pahari are also spoken by the people. The tribal communities use Jaunsari and Bhotiya dialects.

**Fairs and Festivals of Uttarakhand:** Various folk songs and dances in regular life are prevalent because of the festivals and fairs. In ancient times, when means of transport were not so good, these fairs were an opportunity for friends and relatives to meet regularly. The fairs of Jauljibi, Thal and Bageshwar have been closely linked with the trading activities of the people of this region, while the fairs at Dwarahat, Syalde and Devidhura are important from the religious and cultural point of view.

The traditional fairs and festivals of Uttarakhand are very colorful and distinctive. These festivals are the blend of various natural, social and cultural factors. The people of Uttarakhand also celebrate all the major Indian festivals. Basant Panchami, Bhitauli, Harela, Phooldei, Bat-savitri, Ganga Dusshera, Ghee Sankranti, Khatarua, and Ghughutia are some of the major festivals of Uttarakhand.

The daily lives of hill women are packed with a never-ending succession of festivals, most of them involving fasts and the preparation of special foods.

**Education of Uttarakhand:** The Uttarakhand Board of School Education and Exams are working under the umbrella of Directorate of School Education. In Uttarakhand, the department of education has an amalgamated structure which has under it, the basic education and secondary education and State Council of Education, Research and Training. The educational institutions of
Uttarakhand are asset to India and the world. One of the oldest engineering colleges of the country, the Indian Institute of Technology at Roorkee, Forest Research Institute at Dehradun and Harbinger of Green Revolution in the country, the G. B. Pant University of Agriculture & Technology, Pantnagar are in Uttarakhand. Other universities of prime importance are Kumaun University in Nainital and Almora, and the H.N.B. Garhwal University in Srinagar.

**Demography of Uttarakhand:** The population of the state is 101.17 lakh. Out of which the males constitutes 51.54 and female form 49.63 lakh of the total population. As a result of the policies and planning of the government, the per capita income of the state has increased from Rs 14,000 to Rs 56,000. The literacy rate of the state is 79.63% in which males are 88.33% and females are 70.70% literate. *(Census 2011)*

**Districts of Uttarakhand:** The present administrative set-up of Uttarakhand is inherited from state of Uttar Pradesh. There are 13 districts in Uttarakhand. These districts are divided into two divisions, namely Garhwal division and Kumaon division. There are seven districts under Garhwal division and six districts under Kumaon division. The seven districts under the Garhwal division are Chamoli, Dehradun, Haridwar, Pauri Garhwal, Rudraprayag, Tehri Garhwal, and Uttarkashi. The six districts that come under Kumaon division are Almora, Bageshwar, Champawat, Nainital, Pithoragarh, Udham Singh Nagar.

**3.2 Nature of source of data**

In order to test the specific objective of investigation, data were collected from the primary sources. Primary data regarding the marketing efficiency of the vegetable supply chain for the year
2009-10 were collected from the farmers with respect to cost of marketing, value added and price received by them. Similarly, the data on cost and return obtained by the market intermediaries as well as by the retailers were obtained through interview schedule which contains indicators such as physical losses involved, quantity sold, selling price and commission received by the intermediaries. Similarly, the data regarding the roles played by intermediaries, factors influencing the supply chain, problems and expectations of the farmers, retailers and consumers were also collected through a structured schedule by personal interview.

### 3.3 Sampling procedure

#### 3.3.1 Selection of study area

Out of the districts of Kumaon division of Uttarakhand Nainital and Udham Singh Nagar districts were selected as the study area for studying the vegetable supply channels in vegetable marketing as both of districts were the hub of retail revolution having many vegetable markets operating from long time according to secondary data collected from District Horticulture Officer (DHO) these two districts (Nainital and U.S. Nagar) have favorable agro-climatic conditions for area wise vegetable cultivation (Table 1.2 and 1.3).

**Nainital District:** In Uttarakhand state, district of Nainital lies in the Kumaon division. It is situated in the Himalayan and Sub-Himalayan regions between latitudes 28°-30° N and Longitudes 78°-81° E, covering an area of about 3853 square kilometer. On the basis of geographical conditions, the district divided into two regions, viz., Bhabar and hill. The area of Nainital district is 411073 hectare, of which 73.01% are under forests and 6.51% area fell under uncultivated land. Horticultural crops occupied
Fig 3.1 Study area at a glance
3.96% of total reported area. The literacy rate of the district is 84.85% in which males are 91.09% and females are 78.21% literate. *(Census 2011)*

**Udham Singh Nagar District:** Udham Singh Nagar is basically an industrial district and many industries related professions are prevalent here. It is perfect example of 'Unity in Diversity' for which India is so widely known, on the other hand different cultures, religions and life styles are blended in absolute harmony. The fertile land lends itself to different forms of agriculture giving rise to agriculture related activities and industries making this land a green place which has resulted into prosperity all around. Pantnagar University is a leading temple of learning in the fields of agriculture and technology with one of the finest built university known all around the world. U.S. Nagar which is situated in the *Tarai* belt at the foothills of the shivalic range of Himalyas at 27°N latitude, 79.3°E longitude and at an altitude of 550 m. from the mean sea. The total area is 1989 acre, geographical area is 2912 sq. Km., Total Population is 1,648,367 and the literacy rate of the district is 74.44% in which males are 82.48% and females are 65.73% literate. *(Census 2011)*

**3.3.2 Selection of Blocks and Villages**
There are eight blocks in Nainital district namely Ramnagar, Kotabag, Ramgarh, Bhimtal, Betalghat, Dhari, Okhalkanda and Haldwani. Out of eight development block in the district two blocks viz; Dhari and Ramgarh having highest total cropped area [575 and 540 ha respectively] and production [12880 and 12096 metric tonnes (MT), respectively] were
selected purposively to represent the district because of having major vegetable production. Satbunga and Natuwakhan from Ramgarh and Phadpani and Naugaon from Dhari block, two major vegetable producing villages, were selected.

Whereas, there are seven blocks in Udham Singh Nagar district namely Khatima, Sitarganj, Rudrapur, Gadrpur, Bajpur, Kashipur and Jaspur. Out of seven development block in the district, two blocks viz; Kashipur and Bajpur have highest total cropped area [939 and 483 ha respectively] and production [19842 and 10206 metric tonnes (MT), respectively] were selected purposively to represent the district because of having major vegetable production. Two major vegetable producing villages Kundeswari and Kanakpur from Kashipur and Gudiyaanan and Kalyanpur from Bajpur block were taken for the study.

3.3.3 Selection of respondents
To evaluate the objective of the study multistage random sampling technique was adopted. Mainly three channels of vegetable supply chain (VSC) were identified and selected which were commonly followed in both the districts (fig 3.2.).

![Vegetable Supply Chart](image)

**Fig 3.2 Vegetable Supply Chart**
At the initial stage farmers were selected in each chain who sold their produce in selected vegetable supply chain. In the second stage, intermediaries involved in the supply chain, specially in supply channel of vegetable marketing where large number of intermediaries existed. In the third stage retailers of each chain were selected. Similarly, in the final stage the consumer who purchased the vegetables from each channel was selected.

Firstly, in the channel-I of vegetable supply chain 20 farmers, 4 intermediaries, 5 traditional retailers and 20 consumers were selected randomly.

Secondly, in channel-II of vegetable supply chain 20 farmers, 5 retailers and 20 consumers were selected at random that is from the local retailers of both of districts,

Thirdly, in channel-III, vegetable supply chain, 5 farmers/retailers and 20 consumers were selected at random from the local village and market level. Only 5 farmers were available doing direct business with these formats hence only these 5 farmers were selected. However the total size of the sample with respect to farmers was decided keeping in mind the time, resources and availability of sample for the investigator.

Thus, total 90 farmers, 4 intermediaries, 10 retailers and 60 consumers were selected from the each district in aggregate for all the channels of VSC. For the homogeneity of the results 4 vegetables namely tomato, pea, cabbage and potato, which
were commonly grown in large quantities in all the selected channels of VSC, were selected for the study.

3.3.4 Collection of data

Primary data were collected from primary producers and other marketing agencies. Selected respondents were interviewed personally with the help of pre-tested questionnaires. Framers’ fields were also visited in order to get clear understanding, observations and perceptions about the production and marketing systems in the study area. Primary, secondary and terminal markets were also visited for primary data collection field perception and observation.

While secondary data were gathered from publications, statistical bulletins and various official records used from the following sources:

a- Directorate of Agriculture, Govt. of Uttarakhand,
b- Commissioner of land record and settlement, Govt. of Uttarakhand,
c- Directorate of Economics and Statistics, Govt. of Uttarakhand,
d- Food and Agriculture Organization (FAO)
e- Directorate of Horticulture and Food Processing, Chaubatia, Nainital, Uttarakhand,
f- District Statistical Office, Nainital and U.S. Nagar, Uttarakhand;
g- District Horticulture office, Nainital and Udham Singh Nagar Uttarakhand;
h- Development Blocks’ Offices and Mandi Samittee Haldwani, Rudrapur Kashipur and Khatima of Uttarakhand.
Due to the absence of producers’ records regarding farm activities, data collection depended on a combination of methods, which rely on memory recall for basic information such as labor use, wages, input costs etc.

### 3.4 Analytical tools and techniques employed

Detailed description of the analytical tools employed in the study is given below.

Simple conventional method of tabular analysis was used to study the marketing efficiencies, marketing margin, marketing cost, producer’s share in consumer’s rupee and price spread. Average and percentage were worked out to examine the roles played by the intermediaries, factors influencing supply chain, cost and returns in the vegetable supply chains, problems and expectations of the producers, retail formats and consumers in the supply chain was worked out.

The software of statistical analysis Microsoft Excel was used for data analysis.

### 3.5 Terms and concepts used in the study

**Supply Chain Management (SCM):** Supply Chain Management is the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the management as a whole (Suresh Reddy, 2005).

**Vegetable supply chain channel–I:** This supply chain is the upstream and downstream relationship with producers/farmer to village commission agent/wholesaler to Retailer to Consumer.
Vegetable supply chain channel –II: This supply chain is the upstream and downstream relationship with producers/farmer to Cooperatives/Retailer to Consumer.

Vegetable supply chain channel –III: This supply chain is the upstream and downstream relationship with producers/farmer to Consumer.

Market intermediaries: Market intermediaries are those individual who performs various marketing functions, involved in purchase and sale of goods and move goods from producers to consumer.

Producer’s net price: This refers to the price per unit that farmers realise after deducting the marketing costs from the gross price.

Commission agent’s net returns: It is the difference between commission agent gross returns and total marketing cost incurred by commission agent.

Wholesaler’s net returns: It is the difference between wholesaler gross returns and total marketing cost incurred by wholesaler.

Retailer’s net returns: It is the difference between retailer’s gross returns and total marketing cost incurred by retailer.

Marketing margin: This refers to the net profit of the different market intermediaries from a particular produce after deducting costs incurred by them for handling the commodity.
It was calculated with the following formula:

\[ A_{mi} = P_{mi} - (P_p + M_{ci}) \]

Where,
- \( A_{mi} \): The absolute margin of the \( i^{th} \) middleman
- \( P_{mi} \): The selling price of the \( i^{th} \) middleman
- \( P_p \): Producer’s price for his vegetables produce
- \( M_{ci} \): Marketing cost of the \( i^{th} \) middleman

**Marketing costs:** This comprised all marketing charges from local assembling to retailing in the marketing process. These costs limit the income of vegetable growers and affect the cost of living of consumers. These were calculated with following formula:

\[ T_c = C_p + M_{ci} \]

Where,
- \( T_c \): Total cost of vegetable marketing
- \( C_p \): Cost incurred by producer
- \( M_{ci} \): Marketing cost increased by \( i^{th} \) middleman

**Producer’s share in the consumer rupee:** This refers to the farmer’s net price to the retail price of the produce and expressed in percentage. It was calculated as follows:

\[ P_s = \left( \frac{P_p}{P_c} \right) \times 100 \]

Where,
- \( P_s \): Producer’s share in consumer’s rupee
- \( P_p \): Producer’s price for his vegetables produce
- \( P_c \): Price paid by consumer

**Price spread:** This refers to the difference between the net price received by the farmer and the price paid by the
consumer for the produce and calculated as per following formula.

**Price spread = Consumer price – Producer price**

**Marketable surplus:** This refers to the quantity of produce which can be made available to the non-farm population, that is, the residual left with the producer/farmer after meeting his requirements for family consumption, seeds, feed for cattle, payment to labor, payment to landlord as rent and social and religious payments in kind. This is calculated as:

\[ MS = P - C \]

Where,
- **MS**: Marketable Surplus
- **P**: Total Production
- **C**: Total requirements

**Marketed surplus:** This is the quantity of produce which the producer/farmer actually sells in the market, irrespective of his other requirements.

**Marketing efficiency index:** The ratio of the net price received by the producer/seller to the total marketing cost and total net margins of intermediaries. This was calculated as per following procedure given by Acharya and Agarwal (1998).

\[ ME = \frac{FP}{MC + MM} \]

Where,
- **ME**: Marketing efficiency
- **FP**: Net price received by the producer-seller
- **MC**: Total marketing cost
- **MM**: Net marketing margin
**Aggregate average:** It is the respective total value of the four vegetables (Tomato, Pea, Cabbage and Potato) divided by four.