Chapter-II

Review Of Literature
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REVIEW OF LITERATURE

The present chapter deals with the brief review of relevant studies done by the researchers relating to the present problem entitled "A study of Economics of Production and Marketing of Potato in Uttar Pradesh with Special Reference to District Auraiya". A brief account of the work reported by the past researchers is given in the following line:

(A) Marketing Aspect:

Agrawal (1949) reported that in Uttar Pradesh the producer's share in consumer's rupee was only 57.20 per cent in case of potatoes. Wholesaler's and retailer's margin were 6.0 per cent and 8.0 per cent, respectively whereas the handling, cartage and marketing charges accounted for 20.00 per cent and 8.80 per cent, respectively.

Grag et al. (1973) reported that the progressive and modern method of production, storage and marketing of
potatoes assures a higher income to growers. They concluded that the input and output per hectare was higher on progressive farms as against less progressive farms, because of higher investment of improved seed, manures and fertilizers and plant protection measure resulting in higher yields per hectare. The producer's share in consumer's price was low due to higher marketing charges. The higher marketing charges were due to non-regulation on potato mandi.

Bais (1974) concluded that the transport cost per quintal of potato varies from place to place depending on the distance covered and type of means of transport used. In case of bullock carts it was observed to be 6-8 paisa per quintal per kilometer whereas in case of truck it was 4.50 paisa per quintal per kilometer only.

Singh and Malik (1975) in a study on "Marketing of potato Ambals (Haryana)" concluded that producers sold their produce through commission agent: Local traders appeared between producer and commission agents. The producer's share in consumer's rupee was 64.08 per cent and 56.25 per cent through these two channels
respectively. Thus, in the second channel a margin of 7.83 per cent of the total prices paid by the consumers went in the pocket of the local traders.

Chatha and Kaul (1979) in a study on "Price spread of potato crop in Jallundhur (Punjab)" reported that there was a wide margin between retail and wholesale prices to the extent of 45.13 per cent. Marketing costs and margins were further examined for their feasibility. It was observed that the spread could be narrowed down without affecting the efficiency of marketing and in the process both the producer's and consumer's surplus could be raised.

Rangashwamy et al. (1981) estimated that on an average total marketing expense per quintal for potato were about Rs. 15.61 for Hoshiarpur farmers and Rs. 14.33 for Tanda farmers. The highest expenses in the large group were substituted to the high cost of transportation for sales of their produce in the distant markets. Small farmers disposed off their produce in the nearly markets incurring lower marketing cost.
Singh et al (1982) reported that the higher marketing cost of potato in Farrukhabad district was due to transport charge 55.95 per cent followed by bardana charges 23.08 per cent, loading and mandi charges 4.19 per cent. The producer's share in consumers rupee Farrukhabad potato mandi came to 66.92 per cent during 1980-81 as against 69.30 per cent during 1975-76.

Chauhan (1983) in a study on "Economic analysis of potato production and marketing in Faizabad district of U.P." reported that on an average 18.33 per cent of the produce was marketed through wholesalers, while 34.17 per cent through retailers and 47.50 per cent was sold directly to the consumers. The percentage of produce sold to consumer increases with decrease in farm size. It was also observed that the price spread shows an increasing trend with an increase in the size of holding. The overall price spread of potato per quintal was observed highest for large size group i.e. Rs. 24.61 followed by medium Rs. 7.70.

Ahmad and Elias (1986) reported that the marketing was much unorganized in Bangladesh and they recommended that a contract system of marketing should
be introduced to ensure better prices and an assured market to the potato growers. Government intervention would be necessary to introduce such a system.

Kalyankar and Rajmani (1987) reported that the producer's share in consumer's rupee in potato was 65.71 per cent i.e. Rs.167.99 per quintal paid by the consumer, the remaining 34.29 per cent being spread over on different marketing agencies. The study emphasize the need to stabilize price during peak harvesting periods by providing cold storage facilities in the producing centers and establishing wholesale and retail markets in the potato producing areas to minimize the marketing cost of potatoes.

Kainth and Mehra (1988) conducted a study on seasonality pattern of market arrival and prices of potatoes in Punjab. The coefficient of variation of arrivals was 58.54 per cent and that of prices was 38.32 per cent. It showed that variation in arrival was one and a half times the variations in prices of potatoes. The average market arrival and prices during different months. In Amritsar potato marketing season begin with the arrival of fresh potatoes
crop in the month of December and ended in the month of March during this peak period (December-March) majority of the farmers sell their produce immediate after the harvest and market gets glutted. Potato prices were much higher (Rs. 137.58) in the lean period as compared to price of Rs. 74.60 in the peak marketing season. The index of seasonal price variations of potato was lowest in December (66.63) followed (66.43) in February. The prices begin to firm up by June and the peak level was achieved in October at Rs. 133.02. The highest index of arrivals was observed in December (242.06) as the arrival of the crop started during November and picked up sufficiently during December. The producer received about 59 per cent of price paid by the consumer.

Diwakar (1990) studied structural changes in the potato market, in Farukhabad district of Uttar Pradesh. The marketing efficiency of an economy often determines the level of profitability of farm products. In this article the needs of the potato market in Farrukhabad, Uttar Pradesh were assessed in an attempt to optimize the returns to potato production in India. Farrukhabad is the largest
potato market in the country. Data from Mandi Samiti for the period 1972-76 revealed that there was a high degree of market concentration amongst buyers and sellers or middleman. Some suggestions were made to create more competitive environment, which was seen as an essential pre-requisite for optimizing profitability.

Sarkar et al. (1992) conducted a study to analyze the economics of marketing potatoes by farmers in some selected areas of Sadar Upozila of Naogaon district, Bangladesh. The study shows that average potato production is positively related to the size of farm under potato cultivation. The per farm sale was highest (152 quintals) for large farms and the lowest (42 quintals) for small farms, and the largest volume of sale (69 per cent) was made at the market. The major elements of marketing cost of farmers are transport, storage and wastage. Most potatoes (26 per cent) kept for table use was stored at home, while most potatoes (33 per cent) used for seed were stored in cold storage. The findings indicate an inverse relationship between farmer's net share and the
length of marketing channel, i.e., the larger the marketing channel, the lower the farmer's net share.

Singh et al. (1993) conducted a study on marketing of potato in a major potato producing area of Gujarat. This study examines: the pattern of potato marketing and marketed surplus; and marketing costs and returns from potato production. The study was conducted in Deesa Taluka in Banaskantha district in Gujarat state, India. Data for 1984-85 were collected from a sample of 11 marginal, 17 small, 29 medium and 21 large farmers. The results indicated that the area has potential for increasing potato production and farm income. Marketing costs borne by producers were higher particularly the traders' commission. In order to increase the producers' margin, the marketing system needs to be made more efficient by means of enforcing market regulations and strengthening marketing in order that it can compete effectively with traders.

De and Bhukta (1994) identified channels of marketing potatoes and studied the marketing costs, marketing margins and price spread, to determine the
producers' share in the consumers' price in different channels of marketing of potatoes in the district of Hooghly, West Bengal, India; makes a comparative analysis of costs and returns under each channel according to the farm size; and computes the price and yield effects on farm income through the change of channel and to identify the reasons for rigidity of the existing channel. The study shows that one of the worst problems in potato marketing is a distress sale by small and marginal farmers. It is therefore suggested that the government should lay down rules to make cold stores (1) pay advances to those farmers who keep their potatoes in cold stores or (2) issue a negotiable instrument on the basis of which farmers can obtain advances from a bank.

Pandey et al. (1994) studied the seasonal and spatial variations and trends in retail and wholesale potato prices in the two major potato markets of Guwahati and Jalandhar in eastern and north western India. Data were collected for the period 1983-90 for Guwahati and for 1985-89 for Jalandhar. Despite the increase in the general price index, the price indices of potatoes in both markets
showed a declining trend over the period. Out of season, retail and wholesale prices in both markets were considerably higher with less variation. There was a 67 per cent and 74 per cent difference in the wholesale and retail prices between the months immediately after harvest and the month immediately before harvest in both regions.

Reddy and Achoth (1994) investigated the marketing efficiency of four marketing channels for potatoes in Chikkaballapurtaluk, Karnataka, India. Channel IV, in which the produce was sold at Bangalore, was the most efficient with producers receiving the highest price 64 per cent in this channel as compared to about 45 per cent in the other channels in which produce was sold at Chikkaballapur. The high quality required in channel IV is a reason why farmers were not using this channel, and hence quality improvement should be sought. The lower price of potatoes sold at Bangalore could be attributed to the lower margin of retailers; the market was more competitive here due to the large number of retailers.

Arya (1995) concluded four hypotheses relating to potato crop marketing are tested using weekly price data
collected from the Agricultural Produce Market Committee for Ahmedabad, Gujarat, India, for the period October 1987 to September 1990. These are: (1) large fluctuations in producer price increase uncertainty and consequently lead to a less than optimum utilization of resources; (2) a stable (fluctuating) price level will enhance (reduce) consumer welfare; (3) the producers' share of consumer price is higher in years of high prices and lower in years of low prices; and (4) a rise or fall in the producers' share is more than proportionate to the rate of rise or fall in the actual price level. It is found that the producers' share has fluctuated over the period. The increasing coefficient of variation in retail price has lowered consumer welfare. Producers' share and retail price are positively correlated, but the rise or fall in the producers' share is less than proportionate to the rate of rise or fall in retail price.

Steenkamp et al. (1995) examine determination of marketing margins in the South African potato industry. An analysis conducted at national level to determine factors influencing the margin of potatoes were also applied at a regional level. The markets of Cape Town,
Durban, Bloemfontein, and Johannesburg were analysed to detect regional differences. In each region, the producer price proved to be the main determinant of price margins for potatoes. A strong interrelationship exists between the Johannesburg, Bloemfontein and Durban markets.

Vaidya (1995) conducted a study for marketing of seed potato in the district Shimla and Lahaul-Spiti of Himachal Pradesh. He concluded that the total cost was Rs. 68.38 per bag of 80 kg and the large share of this was because of the transportation cost followed by packing costs and labour charges. In case of channel of cooperative society, the producer incurred marketing cost of Rs. 67.13 and the consumer's price was observed to be Rs. 140.78, thereby giving a net price of Rs. 73.65 per bag of 80 kgs. In percentage terms, this worked out to be 32.32 per cent.

Singh et al. (1996) in a study "An economic analysis of potato marketing in Punjab" reported that the major share (more than 90 per cent) of the marketable surplus of potatoes was sold in the local regulated markets. The results pertaining to producer's share in
consumers rupee was highest in channel III (Producer-consumer Apni Mandi) about 83.36 per cent for all the selected markets followed by channel II (Producer retailer-consumer) 37.81 per cent and channel-I (Producer-wholesaler-retailer-consumer) 34.08 per cent. The marketing cost incurred by farmers also showed a similar pattern. The result to the price spreads in various channels in the selected market showed that both on marketing costs and net price to producer increase with the elimination of middleman in the marketing channels.

Kumar et al (1997) reported that the marketing cost received between 12.05 per cent channel II. (a) (Producer-village trader-whole seller-retailer-consumer) and 24.20 per cent in channel II (b) Producer-wholesaler-retailer-consumer). Gross margin of intermediaries was lowest in channel III (a) and highest in channel II (b). Similarly, the lowest and highest value of price-spread is both, the absolute terms and the percentage terms are in channel (a) and channel III (b), respectively. Consequently, the producer's share in consumer's rupee was highest i.e. (69.38 per cent) in channel II (a) and lowest in channel II
(b) It has been also observed that marketing efficiency of producers varies from channel to channel and that every farmer cannot adopt the most efficient channel because of his own limitations.

Kerur et al. (1998) identified two main channels for potato marketing in Hubli, West Bengal. It was found that many farmers sold at low prices to village merchants due to perishability and the risk involved. The producer's share of the consumer's rupee was greater in channel-I (Producer-wholesaler-retailer-consumer) with a low marketing margin compared to channel-II (Producer - village merchant - wholesaler - retailer - consumer). Thus, channel-I was found to be the most efficient in the study area.

Singh and Sharma (1998) reported that the marketed surplus of potato was as high as 88 per cent of the total output which varied from 82 per cent on small farms to marketed surplus on small farms was during January-March either at the farm itself or in local markets and about 24 per cent was disposed off during February to April in distant markets without in cold stores. The farmers
at the overall situation incurred the highest expenses in the sale of potato in distant markets during May-August after storing in cold storage followed by sale at cold storage during Sept. Nov. Across the farm size groups, the cost of marketing of potato at all places and times was the highest in the case of large farms while it was lowest for small farms.

Dahiya et al. (1999) analyzed the seasonal variations in potato wholesale prices and arrivals in respect of major markets introducing areas and major terminal markets over 1991 to 1998. Market integration and competitiveness had been investigated. The price index was the lowest 66.3 in January in Jalandhar market, followed by Kanpur 63.2 and Patna 60.2 in February corresponding to the harvesting pattern of the potato crop being December-January in Punjab to January-February on wards in U.P. and Bihar. Delhi market also recorded the lowest price index of 53.7 in January followed by Calcutta 57.8 and Mumbai 73.4 in February. In both the producing markets and terminal markets, the price indices ruled over 100 during June to November. The prices peaked to the
highest levels in November in producing markets due to depleted supplies from the cold stores. July to November was the late potato season and the terminal markets registered the highest price indices of 123 in Calcutta market, followed by 123.7 in Mumbai market and 145 in Delhi market in September. In June with the harvesting pattern of the crop, the peak arrivals indices were recorded during December to January in the markets under study. The markets were not integrated competitive, particularly during the peak arrival period of December to March mainly due to infrastructural bottlenecks. The cold storage capacity was insufficient particularly in Bihar, U.P. and West Bengal where only 22.3 per cent, 41.3 per cent and about 40-50 per cent of total potato production could be cold stored except in Punjab where the cold storage capacity was more than optimum. The marketable surplus was about 90 per cent for the potato crop. However, the marketed surplus was about 60 per cent, which was disposed off during harvest season of December to March, when the prices the rules low. Unremunerative farm harvest prices and inefficient market structure resulted in
the producers getting poor returns for their investment and such an emerging scenario was a great implement for the future improvement of the potato crop.

Nagaraja et al. (1999) conducted study in Kolar district of Karnataka and concluded that more than 03 per cent of farmers were being affected high cost of seed materials. Further, the fluctuations in price (83.33 per cent) involvement of middlemen (53.33 per cent), low price for the produce (46.67 per cent), in sufficient storage facilities as delayed payment (33.33 per cent) were the important marketing implements faced by potato growers. Therefore, it is essential to transfer scientific production technologies to transfer strategies to get maximum returns to potato growers.

Sen and Maurya (1999) conducted a study to estimates the marketing charges and the producers' share of consumer price for major vegetables grown in Sewapuri block and sold in the vegetable markets of Varanasi city, Uttar Pradesh, India. Data were collected from a sample of 150 farmers selected from ten villages in Sewapuri block for the period July 1993 to June 1994. The vegetables
covered in the study are: potato, tomato, cauliflower, aubergine, okra, pea, cucumber, sponge gourd and bitter gourd. Results indicate that the margins of wholesalers varied from 7 per cent to 10 per cent of the price paid by the consumer, whereas the margins of retailers ranged from 10 per cent to 14 per cent.

Kumar et al. (2003) conducted a study on price behavior of potatoes in Meerut wholesale market. The highest index of potato arrivals was observed in the month of December (161.43) when fresh potato starts flowing into the market in a big way. Arrivals of potato were below average (100) in the months of April to October. The potato arrival in Meerut wholesale market was normally heavy from November to March and minimum during May to July. The indices of seasonal price variations of potato was the lowest in February (68.03) and highest in August (132.57).

Mitra and Sarkar (2003) carried a survey on relative profitability from production and trade and studied selected potato markets in West Bengal. Based on the results of a two-year market survey conducted in 1999-
2000, this paper examined the phenomenon of low prices received by potato farmers in West Bengal, India and indicated that even as traders make huge profits. It was argued that the differential profit earned by producers and traders, especially large traders was due to the informational vantage enjoyed by the latter. The formation of small seller's cooperatives, to ensure proper flow of information, was suggested.

Pandey et al. (2003) conducted a study on price spread analysis of potato marketing at Shimla and reported that the producer who sold their surplus produce through the producer-commission agent-retailer-consumer channel could realize only 73.38 per cent of the consumer's price with a gross price of Rs. 700 per quintal. The rest 26.62 per cent of the consumer price was shared among other market functionaries together with marketing costs, which was also called the price spread. The retailer's margin, which also included the loss of potato at his level, accounted for 3.50 per cent of the consumer's rupee. The gross margin of commission agent was 7.88 per cent of the consumer's rupee. The price
spread was found to be Rs. 213, which was about 27 per cent of the price paid by consumers.

Rana et al. (2003) carried out a study about "Seasonal price indices of potato for major Indian markets. The price indices in October and November months were higher than 100 coverage; and for January, February and March the indices were less than 100. December month showed a lot of inter-market variation in potato prices during both the years.

(B) Production aspect:

Bais (1974) in a study on "Economics of potato cultivation, its marketing and storage in Shamshabad Block of Farrukhabad district (U.P.)", concluded that as far as distribution of input cost of potato is concerned the total cost of input per hectare of potato decreased with an increase in the size of holdings. The cost of seed contributed the highest cost per hectare followed by fertilizer, average being Rs. 1004.07 (31.97 per cent) and Rs. 967.21 (30.78 per cent). The cost per hectare was
significantly (-) truly correlated with size of holding ($r = 0.576$) significant at 5.0 per cent level.

Chatha and Kaul (1979) reported that Punjab state has witnessed increase in area and production of potato during the last decade. The area almost double whereas production has gone up four times. The increased production is mainly due to expansion in area that increases at the rate of 7.26 per cent, whereas the rate of growth of yield was only 3.3 per cent.

Dahiya and Sharma (1980) in a study on "Economics of potato cultivation in India" observed that seed, manure and fertilizers, human labour, land rent and irrigation accounted for 70.00 to 90.00 per cent of the total cost of cultivation. The studies conducted in plains revealed that seed cost was the highest ranging between 33.0 to 54.0 per cent followed by manures and fertilizers costing between 15.0 to 26.0 per cent. The other major items of cost were found to be human labour 12.00 to 20.0 per cent, land rent 7.0 to 28.0 per cent irrigation 0.70 to 7.25 per cent. However, in respect of hills, human labour was the predominant cost component sharing about 27.0
to 40.0 per cent of total cost, followed by seed (18.0 to 28.0 per cent), land (1249 to 32.44 per cent), respectively.

Divaker and Murlidharan (1980) reported that the phenomena of spatial and temporal variations in potato prices. They found that prices of different varieties of potato in same market as well as price for production, which was 95 per cent in 1970-71. This was so, because since the introduction of seed pot technique farmers were taking autumn crop alone, leading to the increased use of seed from total production. Seed alone consumed about 26 per cent of total production during 1977-78. The study indicated that record marketed surplus in the state was lower than the marketed surplus during 1972-73 to 1978-79. This was so because a sizable quantity was sold in big consuming markets outside the state owing to better prices there. The study showed that farmers marketed 51 per cent of their produce in their field, 13.82 per cent in potato markets within the state, 23.40 per cent in big consuming markets outside the state and 11.78 per cent on storage premises.
Singh *et al* (1982) reported that Farrukhabad district is the most important area in the plains of U.P. State where potato culture has been practiced for a long time. They concluded that percentage area under potato was the highest on the large size group of farms, because of their better economic position as they could afford higher expenditure on cash inputs required in the production of potato crops. The average intensity of cropping comes to 260.49 per cent which showed a rising trend with the rise in the size of farms.

Bakshi and Banerjee (1984) in a study on "Economics of potato cultivation in district Burdwan (W.B.)" observed that the size of holding was directly related to the per hectare cost of production, productivity and output ratio irrespective of irrigation facility. Cost per quintal gave a decreasing trend with the increase in the size of holdings.

Singh (1984) reported that the total cost per hectare showed a definite relationship with the size of farm in potato while in tomato and cauliflower did not show any definite relationship. The cost A, and cost B
increases with the size of farm while cost C was maximum for large farmers in potato and small farmers in tomato and cauliflower. The study also revealed that the return per hectare increases with the size of farm in potato and tomato because the large farmers were expending more on inputs like seed, fertilizer and irrigation. The return per hectare of cauliflower increased with the increase in size of farm was little less than that of small farms.

Singh (1985) concluded that the cost of cultivation of potato per hectare, in the Farrukhabad district of U.P., decrease with the increase in the size of holding being Rs. 6694.46 for below 0-1 hectare size group, Rs. 6296.97 for 1-2 hectare size group and Rs. 5613.87 for above 2.0 hectare size group farms.

Rizvi and Singh (1987) conducted study based on information collected from Soraon block of Sorao-tehsil, Allahabad district, Uttar Pradesh for the agricultural year 1985-86. Per household production of potato increases with farm size; per ha production is higher on large farms, followed by medium farms. The average per household marketable surplus of potato was 225.36 quintals and
average per household marketed surplus was 217.25 quintals. Marketing efficiency in terms of producer's share in the consumer's price was: (1) potato growers disposing of their potato in the field (77 per cent); (2) farmers disposing of their potato in mandis (76 per cent); and (3) farmers storing potatoes in cold storage before selling (78 per cent).

Bandyopadhyay (1991) reported that the West Bengal has emerged, in recent years, as a major potato producing state in country. The combinations of certain new seed varieties, fertilizers, pesticides, assured water supply, timely availability of inputs, cold storage facility and marketing net work play a crucial role in potato cultivation.

Thakur and Moorti (1991) conducted a study on economics of potato in Himachal Pradesh. The study examined in detail the economics of production and marketing of potatoes in the temperate dry zone of Himachal Pradesh (Lahaul-spiti), a major seed potato production region. A sample of 100 farmers (43 marginal, 31 small and 26 large farmers) were selected from Lahaul
and 50 farmers (29 marginal, 10 small and 11 large farmers) from spiti. The per hectare yield was higher in Lahaul than spiti due to greater use of fertilizers and better irrigation facilities. The highest gross farm income comes from potatoes in Lahaul (Rs. 15215) and cereals (Rs. 4650) in spiti. Labour requirements during the peak periods of sowing and harvesting were relatively higher in spiti than in Lahaul. The credit requirement on marginal farms was lower in spiti than in Lahaul, while on small and large farms, the credit requirement was greater in spiti. In Lahaul more than 80 per cent and in spiti about 64 per cent of potatoes were marketed. The remaining were retained for seed and home consumption. Seven marketing channels were found for potatoes in Lahaul and 3 marketing channel in spiti. The analysis of price-spread showed that potato growers received the highest net returns by selling through the Government procurement system.

Dahiya and Srinivas (1994) reported that the cost of production of Kufri Chandramukhi and Kufri Sinduri in Punjab was only Rs. 601 and 504 per tonnes and was much
lower than the average export price. In Uttar Pradesh, a principal potato grower state, the production cost was Rs. 502 per tonnes showing that it also had the economic feasibility for exports.

Bajwa et al. (1995) 5 studied yields, producer prices, cost of production and gross and net income are shown for ten potato growing areas in Pakistan for the 1993-94 season. There is a clear pattern of higher unit production costs in the hills for the summer crop as compared to the autumn crop in the plains. This is mainly explained by lower yield levels in the hills. Potato prices are higher in the summer season in the hills than in the autumn season in the plains due to supply and demand factors. Consequently, potato growers in the hills recorded higher returns than those in the plains, despite lower yields.

Reddy et al. (1995) 52 conducted survey with a sample of 90 potato producers from 10 villages in Chikkaballapur taluk, Karnataka, India, to assess production and marketing constraints. The major production problems faced were: non-availability of quality seed tubers at reasonable prices, lack of adequate
capital, high cost of fertilizers and plant protection chemicals, and high incidence of pests and diseases. With regard to marketing aspects, the major problems faced were: fear of price fall, immediate need for cash, lack of improved storage facilities, high cost of transportation and high commission charges, violent price fluctuation and absence of a price support programme.

Sinha and Singh (1996) examine economic analysis of potato cultivation, based upon sixty-six randomly selected farmers of Bihar Sharif block of Nalanda district, and indicated that average cost of cultivation of potato was about Rs. 22877.00 per ha. Seed, followed by manure and fertilizers and human labour recorded the highest share in the total cost. Average gross return per ha was Rs. 54600.00 with the net return of Rs. 31723.00. The return was about 239 per cent of the total cost of cultivation. Potato cultivation was acknowledged to be the most remunerative crop enterprise in the project area.

Singh and Kishore (1997) conducted study in Barhpur block in Farrukhabad district of U.P. during 1995-96 to examine the cost and returns and relative
profitability of two varieties of potatoes. The average cost of cultivation per hectare for Kufri Chandramukhi variety amounted to Rs. 19778.00 and Rs. 20913.00 per ha. for Kufri Badshah. Both varieties of potato showed an increasing trend in cost of cultivation with increase in farm size due to higher use of input resources by the large farmers. The average yield, gross income and net income of Kufri Badshah were higher than those of Kufri Chandramukhi variety. So the cultivation of Kufri Badshah variety is more profitable for potato growers in the study area.

Sinha et al. (1998) based on data collected in 1995-96 from 60 farms, concluded that the highest net returns were obtained by the Paddy-Potato-Onion (Rs. 49110.51) followed by Paddy-Onion (Rs. 32586.55), Paddy-Potato (Rs. 28820.11) and Paddy-Barseem (Rs. 17871.19) cropping systems. Paddy-Wheat, Paddy-Pulses/Oilseeds and Paddy-Khesari gave a net return, which varied, from Rs. 10455.00 to Rs. 12078.33. The profit was highest in almost all the crop sequences on partly owned farms. The wholly owned and self operated farms recorded higher costs in almost all
the crop sequences. Benefit-cost ratio was recorded as highest for the Paddy-Onion (2.79) followed by Paddy-Berseem (2.12) and Paddy-Potato-Onion (1.83) systems.

Dahiya and Pandy (1999) examined the economics of potato cultivation for small hills during 1989-90 and found that the farmers used only 1.83 tonnes/ha. seed rates accounting for 28.6 per cent of total cost. Since the crop cultivation is labour intensive in the hilly regions, human labour had a significant share of 25.8 per cent of total cost of cultivation and rental value of land accounted for 23.2 per cent of total cost of Rs. 18475.00 per ha. The net income came to Rs. 2998.00 per ha.

Rembeza (1999) compared the structural changes of potato production in Germany, Netherlands and United Kingdom. In each of these countries different rules of organizing potato production and marketing were in force. In the U.K. a system of area quota and price intervention existed united 1990s. In the Netherlands and Germany such regulations were not used. There was typically strong future market and organized integration of potato sector in the Netherlands. Potato production became
concentrated, most in Netherlands, the least in Germany. The experience of potato sector indicated that better conditions for fast structural evaluation were created by the market free of excessive regulations and organized integration of potato sector.

Kadam, et al. (2000) conducted a study on an economic analysis of production of potato in Satara district (Maharashtra) with 90 cultivators during the year 1997-98. Results reveal that overall cost of cultivation came to Rs. 49194.01 per ha and net income came to Rs. 16338.60 per ha. The use of human labour decreased with increase in size of holding but other inputs such as bullock labour, mechanical labour, tubers, plant protection etc increased with the size group of holdings. The impact of fertilizes through positive in sign was statistically non-significant so it played a complementary role in the production process, raising the productivity of other inputs. The impact of manures was negative in sign and was statistically non-significant. Farmers were using more manures than required.
Singh et al. (2002) carried out an economic analysis of farm income distribution on potato specialized farms in Agra district of Uttar Pradesh. The study revealed that the resource position of the farmers reflected through investment was conspicuously different across the size-groups by virtue of the size of business and usefulness of their investment in farm inventories. The study also indicates that the large farmers were more progressive in adopting modern production technology. The gains from potato production showed positive association with the size of farm in the farm of productivity, price, gross income and net income and negative with respect to cost of production. The study further revealed that the income pattern of the potato specialized farmers was quite different from one farm size-group to the other. The small farmers earned a considerable share of their income from other sources, non-potato crops and livestock enterprises. However, these sources of deriving income were not much significant on the large farms. Though small farmers were also taking potato as one of the prominent crop but it was observed that they did not reap as much benefit per unit
area by large farm potato growers primarily due to poor resource endowment base. The potato cultivation in the study area appeared as more favorable to large farmers due to their access to modern production technology including marketing, which widens the gap in the income distribution among different categories of farms.

(C) Production and Marketing aspect:

Rizvi and Singh (1987) conducted study based on information collected from Soraon block of Sorao-tehsil, Allahabad district, Uttar Pradesh for the agricultural year 1985-86. Per household production of potato increases with farm size; per ha production is higher on large farms, followed by medium farms. The average per household marketable surplus of potato was 225.36 quintals and average per household marketed surplus was 217.25 quintals. Marketing efficiency in terms of producer's share in the consumer's price was: (1) potato growers disposing of their potato in the field (77 per cent); (2) farmers disposing of their potato in mandis (76 per cent); and (3) farmers storing potatoes in cold storage before selling (78 per cent).
Dahiya et al. (1990) reported that Himachal Pradesh accounts for only 1.8 per cent of the area under potato cultivation in India and about 1 per cent of national potato production. The state meets about 4 per cent of the seed potato requirement at the national level, but the significance of potato production in Himachal Pradesh is underscored by the fact that the state is endowed with natural advantages for the production of disease-free and healthy seed potatoes. The state exports 60,000-70,000 tones of potatoes per year, mostly seed potatoes, particularly to Karnataka, Gujarat, Maharashtra and West Bengal. The study on marketing of table potatoes and seed potatoes focuses on the arrivals and off take pattern by variety and grade, trends in exports, dynamics of price determination of seed potatoes, retailers' marketing margins and the constraints in marketing. A survey covering farmers and traders visiting Shimla and Manali markets was also conducted during the 1987-88 marketing season. The study identifies the factors influencing price determination, the oligopolistic control of private traders in Shimla market and the need for collection of accurate
area and production statistics. It offers an action plan by way of suggestions for overcoming the marketing problems and improving marketing efficiency.

Sarkar and Akbar (1992) found in their study conducted in Bangladesh that average potato production was positively related to the size of farm under potato production cultivation. They also found that the quantity of per farm sale was highest for large farmers and lowest for small farms, and the largest volume of sale was made of markets. The major elements of marketing cost of farmers were transportation, storage and wastage.

Singh et al. (1993) conducted a study in Deesa taluka in Banaskanth district of Gujarat state and found that the area had potential for increasing potato production and farm income. Marketing cost borne by farmers was high.

Kushwaha et al. (1994) conducted a study on marketing of potato in district Muzaffarpur (Bihar) in the context of diversified agricultural growth. They found that percentage cost of human labour and bullock labours were
higher for the year 1980-81 as compared to 1993-94. The percentage costs of modern farm inputs like those of use of tractor, fertilizers, seed and irrigation were higher for the year 1993-94 in comparisons to 1980-81, which resulted into higher per hectare production of potato for the year 1993-94 in the study area. The marketing cost per quintal of potato paid by producer in Muzaffarpur mandi came to Rs. 7.30 and Rs. 17.80 for the year 1980-81 and 1993-94, respectively. Marketing cost was high due to transport charges, which accounted for 61.64 per cent and 67.42 per cent followed by commission 20.55 per cent and 11.24 per cent, loading-unloading 8.22 per cent and 10.11 per cent, miscellaneous 5.48 per cent and 8.42 per cent and mandi charges 4.11 per cent and 2.81 per cent for the year 1980-81 and 1993-94, respectively. The producer's share in consumer's price came to 59.62 per cent and 51.10 per cent for the year 1980-81 and 1993-94, respectively.

Verma (1996) reported that, on an average, per hectare total cost of cultivation of potato came to Rs. 18625.00. Amongst all the input items, cost of seed contributed the highest percentage being 37.58, followed
by hired labour 23.09 per cent. The average yield of potato came to 182.30 qtls./ha. The gross income and net income came to Rs. 36400.00 and Rs. 17775.00 per ha. The average input-output ratio was 1:1.95. The result further reveals that the marketing cost came to Rs. 31.30 per quintal. The higher marketing cost was due to higher commission charges, which accounted for 44.16 per cent. The producer's share in consumer's price was 87.32 per cent in same market.

Verma and Rajput (1998) reported that the average input-output ratio in potato production varied from 1:1.86 on cost C2 basis to 1:2.06 on cost A, basis. The producer's share in consumer's price in the marketing of potato in the mandi came to 65 per cent. The low share of the producer was mainly due to higher marketing and transport charges and higher middlemen's charges. To improve the marketing system for potato it has been suggested that the facility of cold storage should be extended at the farmer's at cheaper rates.

Verma and Rajput (2000) reported that the average input-output ratio in potato production varied from 1:1.70
C's basis to 1:2.05 on cost A, basis. The price of potato tends to be low during post-harvest period as compared to the pre-harvest period. The major reason, which compelled the farmers to sell their produce, was the low retention power due to non-storability and immediate cash requirements. The producers had obtained only 65.22 per cent of the consumer's rupee. While the wholesalers got 4.17 per cent and the retailer's obtained 6.67 per cent of the consumer's rupee. The wholesalers and retailers were getting a larger share in the consumer's rupee. Producers also had to pay for the gunny bags, loading, unloading, weighing, commission and mandi charges of the produce in the regulated market. The average cost of storing per quintal to potato in a cold storage came to Rs. 115.00 per quintal. The post harvest management of potato at the farm level in Indore district needs a lot of improvement at various fronts including production, grading, storage, transportation and marketing of the produce.

De et al. (2002) conducted a study on "Trends of potato cultivation in Tripura and analysis of farmer's share on consumer's rupee for pre and post-cold storage potato
under Saproom subdivision". The cultivation of potato for true seed production in Tripura, India, from 1984-85 to 1999-2000 was studied. The magnitude of area and production significantly increased from 2625 ha and 38400 MT in 1984-85 to 5575 ha and 96650 MT in 1999-2000, respectively. However, the increase in productivity from 14628 kg/ha in 1984-85 to 17336 kg/ha in 1999-2000 was not significant. The farmer's share in consumer's rupee was evaluated for pre and post cold storage potato under sabroom subdivision of South Tripura district and found a significant decrease in farmer's share on consumer rupee from pre to post-storage potato (56.89 and 36.85 per cent) for pre and post storage, respectively. The marketing costs of post-storage potato was higher than that of pre-storage potato by 64.48 per cent.

Pandit et al. (2003) conducted a study on potato production and marketing impediments in West Bengal. In this study 92 potato farmers were interviewed to explore the problems in potato production and marketing in Hooghly and Burdwan district, West Bengal, India. Major problems identified were: lack of good quality seed; irrigation
problem; insufficient finance; unremunerative market price for the produce; insufficient storage space; and malpractices by traders.

Timpanaro and Abou Hadid (2003) presented an analysis of the production, marketing, supply and prices of organic early potatoes in Sicily, Italy, using data for the 2000-01 crop year. Despite some problems in marketing, it was indicated that the prospect for organic early potatoes in Italy was positive.

Husain et al. (2004) reported that the most common marketing channel in the study area in Tehri Garhwal district of Uttarakhand were (i) producer-consumer, (ii) producer-commission agent-retailer-consumer and (iii) producer-local contractor-commission agent-retailer-consumer. The result suggested that among all the three marketing channels identified for potato marketing, that highest percentage of the producer share in consumer's price was in channel I being 95.86 per cent because of the fact that there was no intermediary involved in this channel, the producer share in consumer's price was 61.91 per cent in channel II, while it was lowest...
50.21 per cent in channel III in which three intermediary were involved.

Lazarus and White (2004) used farm-level linear programming model to investigate the economic impacts of crop rotations which result in reduced potato acreage. Crop rotations (an Integrated Pest Management tactic) reduced total pesticide use, but also reduced returns above variable costs as successively stringent rotation requirements were forced into the solution. The crop rotations which caused the least effect on income were identified.

Chatterjee, et al. (2007) analyzed the total factor productivity growth (TFPG) of potato for the state of West Bengal during 1980–81 to 2001–02 showed that the state recorded 6.19% growth of output index, 3.17% growth of input index and 2.92% growth in TFP index. The technological advancement in potato has occurred in West Bengal during the entire period.

Kumar et al. (2007) reported that the cost of cultivation of potato was higher in large farm (Rs. 172323/ha) followed by medium (Rs. 45651/ha) and small
farm Rs. 25997/ha). The overall cost of cultivation of potato was Rs. 81323/ha. The cost of production was again higher in large farm size group (1424 Rs./quintal) where as average cost of production was Rs. 712/quintal. The average yield per hectare was observed to be higher in small farm (312 quintal) as compared to other categories of farms. The overall average cost-benefit ratio was found as 1:3.53. The cost benefit ratio on small, medium and large farm came to 1:4.48, 1:4.20 and 1:3.58, respectively.

Hossain et al. (2008) carried out a study in three potato growing areas viz. Munshiganj, Bogra and Jessore covering 75 potato growers to measure technical efficiency and economic performance of potato production. Farmers obtained average tuber yield of 24.90 t/ha which was higher than the average yield of Bangladesh (14.90 t/ha) but close to potential yield (25-30 t/ha) of diamant and cardinal varieties. The estimated results showed that gross margin and BCR for potato cultivation were Tk. 174319/ha and 2.40, respectively. The average level of technical efficiency among the sample farmers was 75%. This implies that given the existing technology and level of inputs the
output could be increased by 25%. Training on the potato production, extension linkage and quality seed played a significant role in the technical efficiency of the potato production.

Singh, et al. (2008) conducted field experiment during 2000–2003 on diversified rice-wheat cropping systems involving potato, vegetable peas and groundnut, and water management treatments in rice to increase the production, economics and water use efficiency. Inclusion of potato, vegetable peas and groundnut in rice-wheat cropping system increased the production, economics and land use efficiency on an average by 95, 75 and 11 per cent respectively. Rice equivalent yield (REY) was maximum in rice/groundnut/rice-potato-wheat (24.60 t/ha/yr), which was at par with rice-potato-wheat (24.27 t/ha/yr) followed by rice-vegetable peas-wheat (19.02 t/ha/yr) as against traditional rice-wheat (11.63 t/ha/yr) system. Net returns was the highest in rice-vegetable peas-wheat (Rs.67540/ha/yr) system, which was at par with R/G/R-potato-wheat (Rs.67424/ha/yr) and rice-potato-wheat
(Rs. 64906/ha/yr) as against rice-wheat (Rs. 38159/ha/yr) system.