

**ECONOMICS OF CHILLI PRODUCTION AND
MARKETING IN KHARGONE DISTRICT OF MADHYA
PRADESH
THESIS**



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by

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2018

CERTIFICATE-I

This is to certify that the thesis entitled “**ECONOMICS OF CHILLI PRODUCTION AND MARKETING IN KHARGONE DISTRICT OF MADHYA PRADESH**” submitted in partial fulfilment of the requirements for the Degree of **MASTER OF SCIENCE** in **Agriculture Economics & Farm Management** of **Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior** is a record of the bona-side research work carried out by **Mr.Golu Nigawal** under my guidance and supervision. The subject of the thesis has been approved by the student's Advisory Committee and the Director of Instruction.

No part of the thesis has been submitted for any other degree or diploma or has been published. All the assistance and help received during the course of this investigation has been acknowledged by scholar.

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This is to certify that thesis entitled “**ECONOMICS OF CHILLI PRODUCTION AND MARKETING IN KHARGONE DISTRICT OF MADHYA PRADESH**” submitted by **Mr. Golu Nigawal** to the **Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior** in partial fulfilment of the requirements for the degree of **Master of Science** in **Agriculture** in the **Department of Agriculture Economics & Farm Management** has been accepted after evaluation by the External Examiner and approved by the Student’s Advisory Committee after an Oral examination on the same.

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CHAPTER - I

INTRODUCTION

Despite about half of the population working in agriculture, Indian economy was encountering a situation where supply of food grains and other agricultural products fell short of demand for consumption, mainly due to rising population and low agricultural production and productivity. On the other hand, 1/3rd of the population is facing with extreme poverty due to uneconomic agricultural production. The various agricultural programmes and activities have been launched by Government and other development agencies to bridge the demand-supply gap of agricultural products. Among the other development process the first strategy was to expand area under cultivation, and the second was to bridge the productivity gap between potential and existing yield of agricultural crops. The agriculture has also progressed with the support of scientific investigation pertaining to crop improvement, production, protection, crop nutrition, weed management and water stress tolerance.

Among the agricultural crops, horticulture denotes cultivation of garden plants. But now, the horticulture sector encompasses a wide range of crops e.g., fruit crops, vegetables crops, potato and tuber crops, ornamental crops, medicinal and aromatic crops, spices and plantation crops. While the first few Five Year Plans assigned priority to achieving self sufficiency in food grain production, over the years, horticulture has emerged as an indispensable part of agriculture, offering a wide range of choices to the farmers for crop diversification. It also provides ample opportunities for sustaining large number of agro-industries which generate substantial employment opportunities. The horticulture sector contributes about 24.5% of the GDP from about 8% of the area. It is said that the horticulture involves four areas of study: Pomology (production of fruits), Olericulture (production of vegetables), Floriculture (production of ornamental crops), and Post Harvest Technology (involving maintaining quality and preventing spoilage of horticultural crops).

In India among the horticultural crops, production of spices found to more remunerative economic beneficial crops and chilli is one of them. Chilli (*Capicum annum* L.) is one of the most important commercial crops of India. It is grown throughout the country. Chillies are rich in vitamins, (A and C). The chilli is believed to be originated in the tropical America. The most important chilli growing states in India are Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu, Rajasthan and part of Madhya Pradesh. In Madhya Pradesh, chilli is generally grown in almost all the districts of Malwa Pleatue and Nimar region. It is said that chilli is a common crop adopting in a cropping pattern of prevailing land use system in study area. Chillies from Madhya Pradesh are well known for their pungency and good red colour.

Looking the potential of chilli production per unit of area it is observed that the present production and productivity of chilli in the state of Madhya Pradesh is very inadequate. In order to fulfill the demand of chilli, it is essential that the production of chilli should be increased considerably. This object can be achieved by increasing the present area under chilli and also by increasing the productivity per unit of area by adopting better and improved chilli production technology. There is one another improved method to increase the marketable surplus of chilli i.e. adoption of post harvest technology. It is said that the production or marketable surplus of chilli can also be enhance to protect the post harvest losses occurring during post harvest period.

Many studies depicted than in recent years post-harvest technologies are leading to greater capacity for generating additional production of produce (protect the post harvest losses) with additional generating employment and income than production technology in agriculture. It can help stabilizing market prices through removing vulnerabilities of perishables by transforming them into semi-perishables or durables or through appropriate post-harvest infrastructure hold safely the perishable agricultural commodities for table use.

The chilli is labour as well as capital intensive production so far economic development of farmers and the other workers engaged in relation to chilli production. It is also important that, the productivity with remunerative market price should be enhanced with scares use of land under chilli cultivation. The production of agricultural

products including horticultural crops does not end when the crop is harvested. Increasingly, agricultural products are not consumed in their raw form, and post harvest activities such as cleaning, grading, transport, packaging storage, and marketing account for a growing part of their final value.

Post harvest systems include very diverse activities, including product quality, harvest and storage, utilization and marketing, and policies and institutions. Given the complexity of the post harvest systems, it seems difficult to pinpoint the entry point for investment in research and for evaluation of impact of post harvest research. Yet, there is an emerging consensus on the critical role that post harvest research can play in meeting the overall goals of income growth, food security, poverty alleviation, and sustainable agriculture particularly in developing countries.

Chilli being a commercial crop requires a judicious decision in the investment due to capital intensive cultivation particularly with the adoption of post harvest practices. Maximization of profit with utilization of post harvest practices are the main aim of the farmers by which the chilli growers might be achieve the goals of maximum profit. The profitability can not be achieved with increasing the level of production and productivity alone, but the major portion of profitability depends upon the level of remunerative market price after the disposal of chilli.

In recent times, production and marketing of agricultural and horticultural crops received wide attention from the policy makers, planners and scholars due to its profitable enterprise and export potential. According to the Report of National Commission on Agriculture, "it is necessary to improve the marketing system to aid the process of agricultural including horticultural development. Several institutions have been promoted by the Central and State Governments to develop the marketing of agricultural and horticultural crops with a view to improve market infrastructure, market facilities and reduce the margin of intermediaries so that farmers receive higher share of consumer's rupee. The marketing of farm products is an intricate process and includes the entire marketing functions in moving the produce from the producers to the final consumers. The shortest channel of marketing produce is from producer to consumer while other channel linking producer and consumer consist of intermediary viz. wholesaler and retailer in the study area of chilli production.

The above views show the importance of chilli production with utilization of post harvest technology. The development of market and marketing system is next important as that of increasing productivity also. The trend in modern agriculture is increasing the scope of agricultural marketing from the point of view of product marketing with fair remuneration in agricultural production. Taking into consideration the above facts, the present research has been considered for study with following objectives.

Objectives:

- 1) To examine cost-benefits ratio of chilli production.
- 2) To measure price spread in different marketing channels of chilli.
- 3) Problems of post harvest management and marketing of chilli.

Scope of the study: -

The present study is the importance for chilli growers, agricultural scientist, extension workers, marketing agencies and policy makers to make aware regarding cost and return to be realized in chilli production at farm level with adoption of farmer's practices in general and with adoption of post harvest technology. The study may be able to present the result which explores the possibilities of increasing the yield of chilli and profitability from chilli crop. The extension workers may use this study for advising the farmers to adopt the post harvest technology in chilli production which are profitable on two points of view i.e. it is increasing the marketable surplus by reducing the wastage and by increasing the market price due to quality of product. The economics of marketing channels would be clearly indicative for fair disposal pattern of the producer. So that, the farmer can get remunerative price of their produce of chilli which is perishable in nature.

Limitation of the study: -

1. In this study, no reference is made for factors like risk and uncertainties. Only those factors have been considered which are under the control of chilli growers and contribute significantly towards the returns by production and marketing process.
2. The study is limited to Khargone district, comprising of limited selected chilli growers i.e. 60 adopter of post harvest technology and 60 chilli growers were non adopter.
3. The large area of study and sample was beyond the capacity and control of the investigator; hence, it may be treated as micro study.

4. The primary data collected for the study are entirely based on memory of the respondents, as they do not keep any records regarding the farm practices.
5. The data are pertaining to the agricultural year 2014-15 only.
6. It is only micro study; so generalized results could not fulfill to solve the constraints of chilli production with use of post harvest technology and marketing in wider chilli producing areas.

CHAPTER - II

REVIEW OF LITERATURE

Due to analytical procedure of research scanning relevant literature is helpful in formulating the framework of research problem undertaken. The researcher would be able to make an improvement over the existing study and also expand the horizon of investigation on the subject matter. The review could also help in reflecting the concept and statement of the objectives under study. The review of literature is a guide line which method of study was considered in the earlier as well as for supporting of the present study. The study of old literature related to the problem is paramount important attempt of new research worker, because it forms an integral part of any systematic research work. Hence, an effort was made in this chapter of review the selected reference by keeping in view the objectives of the study. For ease of presentation, this chapter is divided into following subheads.

1. Cost and returns of chilli production.
2. Price spread in different marketing channels of chilli.
3. Problems of post harvest management and marketing of chilli cultivation.

2.1 Cost and returns of chilli production:

Adinarayan (1967) worked out the total cost of cultivation of chillies per unit of area in Bapatla block and reported the cost per acre in small, medium and large size group was found to Rs.791.11, Rs.761.60 and Rs.763.25, respectively. The overall average cost of cultivation was found to Rs.782.21. The study revealed that there was no significant difference in total cost of production between different size groups. The average yield are recorded was 4.50 quintals for dry chillies and the gross income ranged from Rs.264 to Rs.1263 per acre.

Khawaja (1973) studied the cost of production of chilli in Malkapur block of Buldhana district and worked out the cost of cultivation per acre in case at rainfed chilli. The study revealed cost A₁, A₂, B and C were Rs.313.68, Rs.323.79, Rs.474.59 and Rs.484.75 respectively. The average yield per acre for rainfed and irrigated chilli were 2.04 quintal and 4.4 quintals respectively and gross return in case of dry chilli per acre was Rs.896, while in case of irrigated chilli it was Rs.1760.

Gaidhani (1977) studied the cost of production and marketing of chilli in Nagpur

district. He observed that the cost of 'A' in case of small, medium and large size group were Rs.935.41, Rs.1136.24 and Rs.1171.30 respectively. Cost 'A' showed the increasing trend as of holding increased, cost B also increased with increase in size of holding. In case of small, medium and large groups cost 'B' was Rs.1411.18, Rs.1677.49 and Rs.1906.69, respectively and overall average was Rs.1766.32 gross income per hectare received by small, medium and large size groups were Rs.1838.43, Rs.2092 and Rs.2055.71 respectively, was Rs.1996.92/ha. Per hectare net income at cost C were worked out to Rs.362.10 and 283.98 and Rs.109.11 in case of small medium and large size groups respectively. The average cost of production per unit of weight Rs.106.93 (wet chilli). Average yield was 62.91 quintal (wet per hectare). They found the important problems of chilli growers as: supply of input and quality of seed, (improved variety), insect pest and diseases, low price of chilli, distress sale of pickle chilli and high transport cost etc.

Singh *et al.* (1983) stated that the chilli grown in the Easter district of Uttar Pradesh gave a net profit of Rs.3968 per hectare with the cost Rs.6726.77 and total value of output Rs.10694.70. In general, the cost increased with increase in the size of farm as the larger farms could afford higher investment on input. The average cost of production per quintal of Rs.106.93 (wet chilli). Average yield was 62.91 quintal (wet per hectare). They found the important problems of chilli grower as: supply of input and quality of seed, improved varieties, insect pests and diseases, low prices of chilli, distress sale of pickle chilli and high transport cost.

Deoghare (1986) studied the cost of production of chillies in Bhiwap area of Nagpur district. He worked out the per hectare average cost 'A' in the case of medium size group of Rs.6334.69, large size group Rs.6313.90 at lowest i.e. Rs.6138.31 in case of small size group and its overall average worked out to be Rs.6262.69. The per hectare cost 'B' in case of small medium and large group were Rs.11009.88, Rs.11390.90 and Rs.11695.20, respectively and overall average was Rs.11365.08. The per hectare cost 'C' in case of small, medium and large group were Rs.11684.49, Rs.11812.49 and Rs.11917.73, respectively and overall average cost C was Rs.11804.68. The per hectare gross income were Rs.20880.00, Rs.19661.25 and Rs.19012.50 in case of large, medium and small size groups respectively. Although the

gross income in case of large size group was higher by Rs.1867.50 than small size group, the net income per hectare in case of small, medium and large size group were Rs.7328.00, Rs.7848.76 and Rs.8962.27, respectively and overall average was Rs.8044.07. He further reported that per quintal cost of production for wet chillies in case of large medium and small size group were Rs.214.03, Rs.225.30 and Rs.230.46, respectively and per quintal net income was Rs.144.53, Rs.149.69 and Rs.160.96 in case of small, medium and large respectively and overall average was worked out to Rs.151.57. The input output ratio at cost 'A' in case of small, medium and large size groups were 3.09, 3.10 and 3.50 respectively and overall ratio was 3.16. The overall average of input output ratio at cost 'B' and cost 'C' worked out to 1.74 and 1.68, respectively. The total production of chillies per hectare in dry form in small, medium and large size groups worked out to be 26.44 quintals, 54.68 quintals and 109.90 quintals respectively. The overall average production per hectare was 63.60 quintals.

Raju and Luckose (1991) observed that Andhra Pradesh is the largest producer of chillies with a share of 21.78 per cent of the total cultivation area during 1986-87 followed by Maharashtra (17%) and then Karnataka (16.64%). Interestingly these three states account for 55.42 per cent of the total cultivated area in India.

Sharma *et al.* (1992) studied economics of vegetable farming in hilly area of Himachal Pradesh. Study reported the gross returns for chillies small and large size groups were worked out to Rs.17157 and Rs.11563 respectively. The variable cost for small and large size groups were Rs.2908 and Rs.2138 and net returns for small and large size groups were Rs.14249 and Rs.14956 and average was Rs.12351. The regression equation revealed that keeping bullock labour and working capital fixed at their geometric mean levels, one percent increase in human labour will lead to 0.67 per cent increase in income from chillies.

Sharma *et al.* (1992) conducted a study on economics of vegetable farming in mid - hills of H.P. The specific objectives of the study were to examine the profitability of different vegetable crops and input output relationship in the production of selected vegetables. They have selected 16 vegetable crop like potato, lady finger, chillies, radish etc. The study revealed that the lady's finger (Rs.20420/ha) and the chillies

(Rs.12351/ha) Kharif cauliflower (Rs.32307/ha) cabbage (Rs.20271/ha) and potato (Rs.26,033/ha) in rabi – zaid cauliflower (Rs.22130/ha) cabbage (Rs.19063/ha) and peas (Rs. 18117/ha) in Rabi bottle gourd (Rs.9568/ha) brinjal (Rs.8895/ha) and bitter gourd (Rs.8739/ha) in zaid – Kharif were the most remunerative vegetable crops. It was examined that the coefficient of multiple determination (R^2) for all the regression equations was significant and varied between 0.633 to 0.858. The elasticity coefficients associated with bullock labour were positive and significant only in cauliflower (0.116) and potato (0.356). The regression coefficient revealed that one percent increase in human labour will increase the income by 0.64, 0.67, 0.37, 0.32 and 0.72 percent in lady's finger, chillies, cauliflower, cabbage and potato respectively.

Singh (1993) studied the total cost of capsicum cultivation from one hectare land for three categories of selected farms for the period 1984-85. He observed that for all farms it was Rs.11312 per hectare and highest on small farms (Rs.12609) and lowest on medium farms (Rs. 8565). It was interesting to note here that gross return from one hectare crop was similar to that of cost magnitude i.e. high cost accompanied by high gross returns.

Singh and Singh (1998) evaluated economic aspects of green chilli in Sikher block, District Mirzapur, Uttar Pradesh, India, during 1994/95. Cost on cultivation was Rs.29371.93/ha, which increased with size of holding. Labour accounted for the highest share of total cost, followed by manure and fertilizers, rental value of owned land, insecticides, pesticides and seed. The average production of chilli was 176.40 quintal/ha. Average net income, family labour income and farm business income were estimated as Rs.28627/ha, Rs.31599.96/ha, and Rs.34630.07/ha, respectively. The average production found to be 105.52, 184.01 and 180 quintal/ha. for the small (0-1.5), medium (1.5-3) and large (above 3 ha) farm groups respectively.

Mishra *et al.* (1999) observed that production and marketing cost of chillies and found that the total cost incurred by the marginal farmers was Rs. 22782.63 per ha, while it was Rs. 18488.90 in the case of medium farmers. Of the total cost, expenditure on manure and fertilizer and human labour accounted for 28.19 per cent and 16.56 per cent, respectively. However, there were no substantial differences in the yield between marginal and medium farmers.

Sharma (1999) reported that chilli [Capsicum], brinjal [aubergines], okras and cauliflowers were each grown in an open field or as intercrops under a 5-year-old mango canopy in field experiments in 1991-92 at Bilaspur, Madhya Pradesh, India. Brinjal produced the highest marketable fruit yield under both open and shaded conditions (319.10 and 62.69 q/ha, respectively). Reductions in yield of Capsicum, brinjal, cauliflower and okra due to intercropping were 87.0, 80.3, 70.4 and 62.3%, respectively.

Thilagavathi *et al.* (2002) studied resource use efficiency of rainfed chillies (*Capsicum annum*), as well as the cost, returns and constraints faced by farms cultivating chilli in Vilathikulam taluk of Tamil Nadu. Study revealed that the net returns from chilli cultivation from one acre of land were found to Rs.6670.

Pramanic *et al.* (2003) a study was undertaken to find out the economics of production and marketing of vegetables in Andaman and Nicobar Island. Results indicated that the yield of ginger, cucumber, bitter gourd, chilli and ridge gourd were higher in that order. Correspondingly, the total cost of cultivation was observed to be higher for ginger, bitter gourd, chilli, brinjal, bhendi etc. It was also found that the yield of all the vegetables were higher in hilly land than in valley land. Cost – benefit ratio was the higher for chilli followed by cucumber, bhendi, marsa, cowpea, snake gourd etc, and it was found to be higher in hilly land than in valley land for all the vegetables. The margin to both the wholesaler and the retailer was highest in ginger (Rs.14.10 and Rs.32.50 per Kg, respectively). Conversely, the marketing margin was the lowest in basal and marsa (Rs.0.90) for wholesale and in potato (Rs.1.50) for retailer.

Patidar (2004) reported that the operational cost A1/A2 was considerably higher in small size (Rs. 45657.81) in comparison to large size farms (Rs. 38740.34). The same pattern was observed in cost B1 and B2. Cost C1 was higher in small size group, but in medium and large size group have a very narrow variation. In case of cost C2 it was maximum in small size and lowest in large size group. Cost C3 was higher in small size group followed by medium and large size groups.

Sharma and Sharma (2004) reported that magnitude of increase of the net return through relaxed capital is important. Magnitude of increment was one and half to three

times of existing net return depending upon area and location of the farms and adoption of new technology. The net return per farm increased with increase in level of technology on all farm sizes. The net return capital ratio increased with in the level of technology at all size of the farms. There are urgent needs for economizing resources and calls for preparation of the optimum farm plan considering regional needs and resource availability with the farmers.

Dass (2005) study revealed that the per acre total cost of cultivation of chilli varied between Rs. 43862.52 to Rs. 43022 in both districts. Net returns per acre were Rs. 11678.81 to Rs. 17145.86 in Ambala and Panipat district, respectively.

Mondloi (2006) reported that the average operational cost of chilli production i.e. cost A₁ was highest on large size group being Rs.26475.14 per hectare and the lowest on small farms (Rs.23817.26 /ha.). Like wise, in case of cost C, the average values varied from Rs.34153.09 on large farm to Rs.36339.97 on small farm respectively. It is interesting to note that the cost concept cost A, B and C shown no definite trend with different size of holding. But it is clear that the cost per unit area was found to be highest on medium farms and lowest was on large farms respectively. It is also revealed that the over all cost per unit of area on farm medium and small farm were increased with compare to large farms. This was mainly due to increase in labour charges, interest on fixed capital and other charges like value on depreciation of fixed capital etc.

Rajur *et al.* (2008) economic analysis of chilli indicated that cost A2 accounted for 30.70 per cent in Gulbarga, 28.81 per cent in Raichur and 32.30 per cent in Bijapur district. Cost B2 accounted for 50.25 per cent in Bijapur, 44.54 per cent in Raichur and 47.09 per cent in Gulbarga district. It is obvious from cost C3 that use of family labour was more in case of Bijapur district than Gulbarga and Raichur districts due to non-availability of hired labour during peak period. Returns over cost C3 was highest in Raichur district (Rs. 34955.50) followed by Gulbarga (Rs. 33870.40) and (Rs. 28836.26) in Bijapur districts, which was due to the lower total cost of chilli production in Raichur district compared to Bijapur and Gulbarga districts.

Chouhan (2009) reported that the average cost of cultivation of chilli (Cost C₁) per hectare was found to Rs.25885 when considered for all technological status and it

was varied as per different technological status i.e. Rs.22711 for below 50 per cent technology, Rs.25841 for 50-75 per cent technology, Rs.29137 for 75-100 per cent technology per hectare on sample holdings. These costs revealed the fact that imputed value of family labour was the highest (Rs.5600) in case of 75-100 per cent technological status and the imputed value of family labour found to decrease with lower technological status of chilli production. It is clear from the data; the total expenditure on cultivation (Cost C_1 , C_2 and C_3) of chilli per hectare and their respective technological use pattern has specific trend between them i.e. the higher technological status showed higher cost of cultivation only might be the higher value involved to purchase the inputs. The average cost C_2 and C_3 comes to Rs.28896 and Rs.31486 per hectare of chilli production respectively.

Dewangan (2010) study revealed that the per hectare cost of cultivation of chilli, onion, coriander and ginger were found Rs. 23365.39, Rs. 22427.13, Rs. 21748.41 and Rs. 70774.77 respectively. On an average the per quintal cost of production of chilli, onion, coriander and ginger were observed to be Rs. 1560.09, Rs. 158.35, Rs. 1322.02 and Rs. 1897.16 respectively. The input-output ratio of chilli, onion, coriander and ginger came to 1:3.39, 1:3.57, 1:2.78 and 1:3.39 respectively at the sample farms.

Shukla (2010) reported that cost of producing one ha chilli was Rs. 25155.00 which included material cost, labour cost in nursery and labour cost in main field. On an average the yield from one ha was 22.03 q. The market price of that was Rs. 83273.40. The total benefit received by farmers by cultivating chilli was Rs. - 58118.4 per ha. The BC ratio of one ha was recorded 3.31. The present study showed that chilli cultivation in the area is quite beneficial for the farmers and they also find good marketing facilities in nearby areas.

Jagtap *et al.* (2012) economic analysis of chilli production indicated that cost 'C' was found to Rs. 40541.72, Rs. 42811.07 and Rs. 53421.29 per acre for small, medium and large farmers respectively. Net returns over cost 'C' was Rs. 19329.52, Rs. 24114.79 and Rs. 21400.51 per acre and input-output ratio at cost 'C' was 1:1.48, 1:1.56 and 1:1.40 for small, medium and large farmers respectively.

Patel (2012) determined the cost structure of chilli production and revealed that the cost C_1 , C_2 and C_3 were found to variation. The study revealed that Rs.28068.74 incurred as (Cost C_1) followed by Rs.37176.24 (Cost C_2) and Rs.40893.86 (Cost C_3) respectively. The average yield of green chilli in the study area was 98.36 quintal per farm which shows very satisfactory in respect to average yield of Madhya Pradesh. The other measurement of farm profit like net farm income found to on an average Rs.13751.14 per hectare. The average B.C. ratio was observed 1.33 and it was found to very nominal.

Patel (2012) reported that on an average cost of cultivation per hectare of chilli crop with adoption of post harvest technology was found to Rs.16421.62 (Cost A_1) followed by Rs.16518.45 (Cost B_1), Rs.20682.76 (Cost B_2), Rs.18450.31 (Cost C_1), Rs.22614.62 (Cost C_2) and Rs.24872.08 (Cost C_3) respectively. In this study cost A_2 was not under taken due to that all the chilli growers were used their own land.

Sreedhara *et al.* (2013) found that cost of establishment of capsicum production under protected condition was Rs.2,51,109 per unit (0.25 acre). The total cost of cultivation of capsicum production under protected conditions was Rs.55,080 per units. The total variable cost was Rs.20,374 per unit. Among the variable costs, the labour cost was highest (Rs.10,291), followed by expenditure on material cost(Rs.8,487). Among the total cost of cultivation, the proportion of total fixed cost was highest (Rs.34,707) compared to total variable cost (Rs.20,373). The total yield of capsicum production under protected conditions was 5.50 tons per unit. The total returns and net returns from capsicum production under protected conditions were Rs.1,54,734 per unit and Rs.1,15,279 per unit, respectively. The B:C ratio of capsicum production under protected conditions was 3.92.

Patel (2014) study revealed that average cost of cultivation of chilli was estimated as Rs.122935.62 per hectare and observed highest i.e. Rs.130302.58 per hectare at small farms. The yield of green chilli was observed 95.81 quintal per hectare, 107.11 quintal per hectare, 123.50 quintal per hectare and 141.31 quintal per hectare at marginal, small, medium and large farms respectively along with 117.40 quintal per hectare on an average. The gross return from chilli crop was observed as Rs.257072.66 per hectare across the farms. The net return from this crop was calculated as

Rs.127451.60 per hectare while farms are spent on an average of Rs.1047.15 for produce the one quintal of chilli. The average ratio of input-output was estimated as 1:2.04 across the different farms of district which shows cultivation is profitable to the farms of the district. The average use of human labour was estimated as about 521 labour days per hectare.

Madariya (2015) reported that the net income is real profit for which farmers are interested to realize as highest as possible. The study reveals that the highest net income Rs.9288 per hectare was realized by chilli growers when they adopted “high level” of chilli production technology. On the other hand, the “moderate” and “least adoption” of technological status chilli growers realized Rs.8470 and Rs.6839 per hectare as net profit from chilli cultivation. Study also reported that the benefit over per rupee investment found i.e. 1.23 on “high level of adoption” farms followed by 1.23 and 1.19 in case of “moderate” and “least adoption” of technological status farms respectively.

Banjare (2016) reported that an overall the cost of cultivation per hectare of chilli was calculated as Rs.93724.87. The cost of cultivation per hectare showed rising trend with the rise in farm size. On the other hand, an overall input –output ratio of chilli came to 1:2.53 on the sample farms. The overall gross return of chilli is estimate as Rs.289867.56 per hectare.

Srikala *et al.* (2016) reported that the per hectare cost of cultivation of chillies for the period from 2005 -06 to 2010-11 for Andhra Pradesh indicated that the operational costs ranged from Rs.93,332 in 2005-06 to Rs.1,84,391 in 2010-11. Similarly, the total costs varied from Rs.1,09,597 to Rs.2,21,656 for the corresponding periods. Among the operational costs the percentage of labour component in the total costs increased from 35.13 in 2005-06 to 40.00 in 2010-11. Analogously, among fixed costs, rental value of owned land as a percent of total cost rose from 12.77 in 2005-06 to 15.79 in 2010-11. During the corresponding period, net returns increased from Rs.66,403 to Rs.1,63,430 per hectare.

2.2 Price spread in different marketing channels of chilli:

Krishna (1994) reported that area under vegetable production in Bihar state has remained almost stagnant. Four vegetable crops are studied (potatoes, sweet potatoes,

onions and chillies). The marketable surplus of these crops varies between 78% and 91%. Village sales are high for small farmers but low for large farmers. Cooperative marketing institutions play an important role in Ranchi market but are non-existent in Jamshedpur. Marketing margins are high in both markets, reducing the producers' share of the consumer price.

Sikka *et al.* (1994) reported that the agro-climatic conditions of the north-western hilly region of India are conducive to cultivation of various fruits and vegetables, which can give very high returns to farmers compared with traditional crops. As a result, horticultural crops are becoming increasingly popular in this region. However, all these fruits and vegetables are highly perishable and require immediate disposal especially in the absence of cold storage. This calls for elaborate arrangements for marketing these products. Due to the increasing volume of production, the marketing problems are being aggravated. Moreover the producer's share of the consumer's rupee is very low, and this needs immediate attention. It is against this background the present study has been conducted to highlight the existing problems which horticulturists are facing, and most importantly the needs which are likely to emerge in the near future.

Singh *et al.* (1994) conducted a study on chilli marketing in Mohanpur, Begusarai district, Bihar, India he examined the producers involved in preparation of the crop for marketing, including grading; the proportion of produce sold to different markets, transport facilities and cost of transportation and the price spread in various marketing channels. Data for 1992/93 were collected from 35 farmers and from local traders, wholesalers, retailers and consumers. All but one of the 35 farmers sold their produce just after harvest to local traders. It is more profitable for local traders to sell directly to Samastipur market than to Begusarai and Phulbaria. The price-spread analysis indicates that intermediaries charge a high profit margin in relation to the services rendered.

Gauraha (1999) study revealed that the estimate the costs and returns of vegetable production; identify the marketing channels for vegetables; and estimate the postharvest losses of vegetable crops in Bilaspur district, Chhattisgarh region, Madhya Pradesh, India. Data for the year 1995-96 were obtained from interviews with 15 vegetable growers, 10 wholesaler-cum-commission agents, 10 retailers, and 20 consumers. Total

costs and returns were highest for chillies in small and medium farms in comparison to other crops. 62.57% of the total produce was traded to wholesaler-cum-commission agents. The rest were traded to retailers (28.03%), local sellers (8.23%), and directly to consumers (1.17%). Overall post harvest losses towards the consumption end of the distribution system were around 17.26% of the harvested quantity. Maximum post harvest loss was observed in tomato (32.64%), followed by cauliflower (22.36%), and potato (19.79%). Factors responsible for post harvest losses are identified and some remedial measures to reduce losses are suggested.

Pramanic *et al.* (2003) a study was undertaken to find out the economics of production and marketing of vegetables in Andaman and Nicobar Island. Results indicated that the margin to both the wholesaler and the retailer was highest in chilli (Rs.14.10 and Rs.32.50 per Kg, respectively). Conversely, the marketing margin was the lowest in basal and marsa (Rs.0.90) for wholesale and in potato (Rs.1.50) for retailer.

Patidar (2004) the study has identified the following channels of distribution:

Channel-I: Producer --- Commission agent --- Wholesaler --- Retailer --- Consumer

Channel-II: Producer --- Village merchant --- Wholesaler --- Retailer --- Consumer

The comparative statement of price spread of channel-I and channel-II indicates that increase of marketing functionaries member as well as various functionaries they render tends to increase the cost of marketing and margins of concerned agencies involved in this activity. In channel-I producers share in paid price of consumers was slightly high (77.98%) compared to channel-II where it was 77.43%.

Dass (2005) observed three important marketing channels were examined in the study. These channels were as Channel-I: Producer-Consumer, Channel-II: Producer-Retailer-Consumer and Channel-III: Producer-Commission agent Retailer- Consumer. The marketing channel-I was found to be more efficient than channel-II and Channel-III. It is clear from the figures that Channel-I is more efficient as producer gets about 95 per cent of consumers rupee in this channel while it decreased to 75.85 per cent in Channel-II and 65.57 per cent in channel-III. He concludes that marketing efficiency inversely related with number of market intermediaries.

Dewangan (2010) study revealed that there were three marketing channel for the marketing of major spices were identified. Channel-I producer-consumer and Channel-II producer-commission agent/retailer-consumer. Channel-III producer-shopkeeper-consumer. More than eighty five per cent marketable surpluses were observed in all the major spice crops of different size groups of farmers.

Patel (2012) reported four marketing channels of chilli were observed in the study area and it is as follows:

Channel I: Producer → Wholesalers (mandi) → Retailer → Consumers

Channel II: Producer → Local traders → Wholesalers (mandi) → Retailer → Consumers

Channel III: Producer → Local traders → Retailers → Consumers

Channel IV: Producers → Local traders → Consumers

The data reveals that among all these channels on an average in third channel (Producer → Local traders → Retailers → Consumers) the marketing cost was found to lowest i.e. Rs.135.00 per quintal of chilli followed by second channel (Producer → Local traders → Wholesalers (mandi) → Retailer → Consumers) Rs.140.00 per quintal, fourth channel (Producers → Local traders → Consumers) Rs.150 per quintal and first channel (Producer → Wholesalers (mandi) → Retailer → Consumers) Rs.152.00, respectively.

Sashimatsung and Giribabu (2015) reported that a majority of the farmer-producer (52.3%) sell their produce to retailers i.e. channel – II indicating the most prominent channel. The net price received by producers in consumer's rupee in channel – I is 97.63%, channel – II: 82.43% and channel – III: 61.9% signifying producer-consumer channel the highest marketing efficiency channel according Shepherd's and Acharya-Agarwal methods. It further concluded that, 93% of chilli is traded in market by way of retailers and wholesalers and only 7% within village.

Banjare (2016) observed that three marketing channels for chilli are observed in study area.

Channel - I Producer → Consumer

Channel – II Producer → Itinerant Trader → Consumer

Channel – III Producer → Commission Agent → Retailer → Consumer

Srikala *et al.* (2016) reported that the price spread analysis for the selected channel indicated that the producer received 64.45 per cent of consumer's price. The

share of the wholesaler and the retailer worked out to 9.85 and 8.21 per cent respectively.

2.3 Problems of post harvest management and marketing of chilli cultivation.

Rao and Kamraju (1990) studied the constraints of agriculture growth in Meghalaya. They found that lack of adequate local agricultural research base, insufficient of funds for the agricultural sector specially for agriculture research and education, lack of proper congenial marketing environment, lack of roads to markets lack of processing facilities near by producing centers ultimately resulting in very poor agricultural industry linkage and interactions are the major constraints responsible for the disturbing and disquieting performance of agriculture in Meghalaya.

Patidar (2004) reported that chilli marketing is still under the influence of different marketing agencies and arbitrary charges they used to recover from producers is neither beneficial in the part of producers nor the consumers. Regulation of mandi and specification of relevant market charges required to be followed in chilli marketing.

Dass (2005) observed on the basis of information collected from the chilli growers, the main problems in production faced by them were lack of quality seeds (88.89 per cent), insect-pest and diseases (78.89 per cent), scarcity of labour (74.44 per cent) and lack of technical knowledge (53.89 per cent). Losses during marketing functions (70 per cent), lack of regulated markets (40 per cent) and lack of transportation facilities (13.33 per cent).

Mandloi (2006) reported that the majority of the farmers (78 per cent) reported the prices of improved inputs are high in market. Thus, they are not applying adequate quantity of these inputs. Farmers want subsidized supply of inputs, as it is the first suggestion by majority of the farmers. This impression is more in case of small and medium farmers. The inputs like H.Y.V. of seed, fertilizer and pesticides etc. are essential for higher productivity, which are not adequately applied. Low price of out put and traditional farming is not risky and under the control of farmers himself, reported by 70 per cent of the total farmers. The lack of fund and unavailability of proper market are next in important constraints about 61 per cent of total respondents reported this problem. This feeling is also more in case of small to medium farmers. Short-term credit is very essential especially to small and medium farmers to adopt the improved

technology and apply the proper dose of inputs etc.

Patel (2012) revealed that the constraint confronted by farmers is divided into five parts and each part having their own importance. The most important constraints was economic cause got rank Ist followed by institutional infrastructure cause both got (rank IInd), natural causes (rank IIIrd), technological cause (rank IVth) and social cause (rank Vth) respectively.

Patel (2012) reported that the constraint confronted by farmers is divided into five parts and each part having their own importance. The most important constraints was natural causes got rank Ist followed by institutional infrastructure cause (rank IInd), economic cause (rank IIIrd), social cause (rank IVth) and technological cause (rank Vth) respectively.

Madariya (2015) reported that the socio economic and technological constraints also caused for low yield or higher yield gap. The main constraints are: “high cost of inputs” followed by “lack of training and guidance”, “lack of technical knowledge”, “non availability of inputs in time” and “lack of own funds” respectively.

Banjare (2016) observed that shortage of labour was the major problem as reported by 69.33 per cent spice growers. Another constraint faced by the growers was attack of insects, pests and diseases (66 percent), and high wage rate (65.33 per cent) causing a negative impact of the crop.

Chapter - III

RESEARCH METHODOLOGY

Material and methods of research provides guide line for conducting research. Hence, every research carried out on scientific line should have a research design to be applied as per the stated problems. A scientific research is a systematic method of discovering new facts or verifying old facts through sequences, interrelationship, causal application and through the natural laws which cover them. When the research is in social science it involves the analysis of human behaviour or trend of social phenomenon to formulate broad principles of scientific concepts. The research than becomes a careful or diligent scientific or scholarly enquiry and a special study or experimental aimed at the discovery, interpretation or application of new facts to formulate a theory or law.

In the process of research a basic concept regarding theory and its application in present investigation is must for perfect and accurate finding of cause and effect relationship, therefore, it is important to follow the methods prescribed for empirical research. Since the empirical research has the immediate social usefulness one must take the method follow-up by work of others and must learn through the trial and error method. Empirical research is based on inductive logic so in empirical research factual and material evidences and census data are used to develop the descriptions, measurements comparison and test the hypothesized relationship that are themselves part of speculative side of scientific work. Research methodology also involves to built ability to raise significant questions and to formulate fruitful hypotheses which demands appropriate technical methods which are helpful in selection of sample, method of enquiry and statistical tools used to conserves knowledge and the dynamic approaches which are interrelated with objectives through the process of analysis and verification for which scientific reasoning and logic is employed thus achieving rationality in the conclusion drawn. The research methodology and design are the main feet for waking, thus making the research move ahead. This chapter involves various steps applied to the study of the problem. The material and methods are described in the following sub heads:

Study area

Sampling procedure

Study period

The data and its collection

Analytical tools

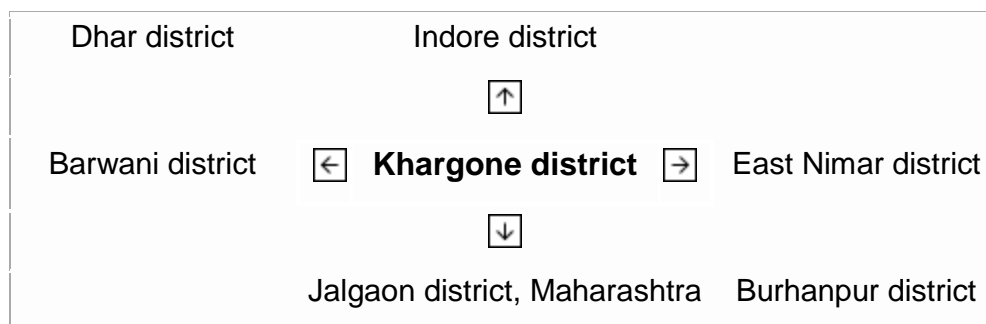
Concept used

3.1 Study area:

In this section attempt an has been made to discuss the background information of area covered under study. Khargone district of Madhya Pradesh has been selected for the purpose of this study because chilli is the important commercial (cash) crop in the region.

Location:

Khargone district lies between latitude 21.⁰22" to 22.⁰35" North and longitude 75.⁰06" to 75.⁰19" East. Khargone is located towards West of Madhya Pradesh, lying wholly on the Narmada Valley. The total geographical area of the district covers 8153 square kilometers and consists of 9 development blocks.





Map of Khargone District

Climate and rainfall:

The district has moderate climate. The average maximum temperature was recorded to be 37.8⁰C in summer and minimum 9.0⁰C in winter. The rainy season extends from June to mid September. On an average 886 to 1087 mm. rainfall is received during monsoon. Maximum rainfall is recorded in the month of July-August.

Land:

Sandy loam and black loam soil is generally found in the area. This soil is quite suitable for growing cotton, jowar, maize, soybean, arhar, moong, groundnut, wheat, lentil etc.

Main crops:

The major crops of the district are soybean, cotton jowar, arhar, maize and

groundnut in kharif and wheat, gram and lentil in rabi season. Vegetables including chilli cultivation is also popular in Khargone district.

3.2 Sampling Procedure:

The multi stage sampling technique was used for drawing a sample for the present study. At first stage, block in Khargone district was selected randomly. At second stage, villages were selected from selected block. At third stage of selection, chilli growers were selected as sample of study.

Selection of block:

At first stage, Khargone block of Khargone district was selected purposively because Khargone block is one of the important chilli growing tract.

Selection of villages:

At second stage of selection, list of maximum chilli producing villages have been prepared. Out of these villages, 5 villages namely Dusnawaj, Birapur, Bilali, Maingaon and Barud were selected randomly based on the area under chilli crop.

Selection of chilli growers:

At the third stage of selection, a list of chilli growing cultivators of each village was prepared and 60 chilli growers have been selected randomly who have adopted post harvest management technique. To compare the economic advantage of post harvest management technique, 60 chilli growers were also selected from the same list, who did not adopt the post harvest management technique in chilli farming.

For collecting information on marketing cost, marketing margins and producers' share the equal number of marketing agent and marketing traders i.e. 3 in each channel have been selected randomly from the list among who deal with chilli marketing in study area.

3.3 Nature of data:

For present study, both primary and secondary data were required which were collected from various sources.

Primary data:

Primary data were collected from selected chilli growers for study. The primary data was recorded on general information of respondents and regarding their farm

economy. The data were also collected regarding input utilization pattern in production of chilli crop and their respective yield in order to adoption of post harvest technology. On the other hand, the same data were collected from non adopter of post harvest technology at farm level. To find out the profitability in adoption of post harvest technology and marketing of chilli, cost and profitability information has been also collected from adopter and non adopter chilli growers. The primary data also collected from selected middle men involved in chilli marketing.

Secondary data:

The required secondary data were collected from Department of Agriculture/Horticulture, Marketing agencies and other statistical data was collected through published record of Statistical Department.

3.4 Period of the study:

Regarding production and marketing of chilli, all the collected primary data were related to the agricultural year 2014-15 kharif season only.

3.5 Collection of data:

Depending upon the objectives of the study, both primary and secondary data were used. The primary data were collected from selected respondents using pre-tested question-schedule through survey method. Each of the selected samples respondents were approached personally for recording relevant data.

3.6 Analytical tools:

Collected data were edited and checked for their adequacy and accuracy. Keeping in view the objectives of the study, the data were classified and tabulated. The classified and tabulated data was further processed in terms of average and percentage to arrive at conclusive figures for interpretation of data. In present study following Mathematical and Economics tools were used.

The estimates of cost benefit in chilli cultivation different costs incurred and returns realized on cost concept basis were utilized.

Cost concepts:

The cost of cultivation was used in this study. The cost concepts are given below:

Cost A₁: It includes: -

Value of hired human labour,

Value of hired and owned bullock labour,
Value of hired and owned machinery labour,
Value of owned and purchased seed,
Value of fertilizers, manures and chemicals,
Value of insecticide and pesticides,
Expenditure on irrigation,
Land revenue and taxes,
Interest paid on crop loan if taken,
Depreciation on farm assets excluding land,
Interest on working capital,
Miscellaneous expenses.

Cost A₂: It includes-

Cost A₁ + rent paid for leased in land

Cost B₁: It includes-

Cost A₂ + interest on value of owned fixed capital assets. (excluding land)

Cost B₂: It includes-

Cost B₁ + rental value of owned land

Cost C₁: It includes-

Cost B₁ + imputed value of family labour

Cost C₂: It includes-

Cost B₂ + imputed value of family labour

Cost C₃: It includes-

Cost C₂ + 10 per cent of cost C₁ to account for managerial input of the farmer.

Profitability concepts:

These are defined as under: -

Gross income: It is defined as: total value of main product + by product.

Net farm income (NFI) = Gross income – Cost C₃ (total cost)

Family labour income (FLI) = Gross income – Cost B₂

Farm business income (FBI) = Gross income – Cost A₁

B:C ratio (Benefit cost ratio) = Gross income / Gross expenses

Cost of production per quintal:

$$\text{Cost of production per quintal} = \frac{\text{Total cost} - \text{value of by product}}{\text{Quantity of main produce (quintal)}}$$

Sorce – “Special expert committee on cost estimates, GOI, New Delhi”

The information of dispose of chilli in different channels were observed and marketing cost, marketing margin and price spread in different marketing channels were calculated to find out the profitable and suitable channel prevailing in the study area.

Following channels were found on the basis of marketing pattern of chilli in study area:

Channel I: Producer → Local traders → Wholesalers (mandi) → Retailer → Consumers

Channel II: Producer → Wholesalers (mandi) → Retailer → Consumers

Channel III: Producer → Local traders → Retailers → Consumers

Channel IV: Producer → Retailers → Consumers

Marketing costs:

Marketing cost includes all the marketing charges paid by producers, wholesalers and retailers of chilli from local assembling to retailing center in the marketing processes.

Market margins:

It includes profit of margins kept by different market functionaries.

Total marketing cost:

It consists of marketing cost and marketing margin together.

Price spread:

The price spread consists of the marketing costs and margins which ultimately determine the producer's share in the price paid by the consumer.

Formula for price-spread is used as:

$$P = \left(\frac{C-M}{C} \right) \times 100$$

Where,

P= Producer's share in the consumer's rupee

C=Price paid by ultimate consumers

M=Marketing costs including market margins

Concept use in study:

Evaluation of farm inputs:

Methods followed in evaluating different farm input for the present study are described in the following paragraphs.

i. Hired human labour:

The chilli growers normally engage permanent farm labour on the basis of yearly wages and casual labour on daily wages basis, for performing farm operations. The casual labour was evaluated on the basis of actual wages prevailed in the locality. The wages of male and female labour included payment given both in cash and/or kind. The value of kind components given to the labour was calculated at their prevailing market prices.

ii. Family labour:

The family labour cost was evaluated at the rate of prevailing wages the locality for casual hired labour at various stages of operations.

iii. Bullock and machinery labour:

Estimation of bullock and machine labour charges on actual wage in prevailed in the locality were considered. For estimation of depreciation, interest on working capital, interest on fixed capital and rental value of owned land, following standard norms were used.

iv. Depreciation on farm assets:

The straight-line method is used for calculating rate of depreciation. The depreciation rates for different farm assets are taken on fixed rate @ 10 per cent for duration of crop.

v. Interest on working capital:

It is worked out @ 12.50 percent for half of the duration of the crop.

vi. Interest on fixed capital:

Interest is charged @ 10 percent per annum on the value of implements, machineries, farm building, and irrigation structure and drought animals. It excludes interest on land input, because rental value of owned land is calculated separately.

vii. Rental value of owned land:

It is calculated on the basis of 25 percent (1/4) of the gross income or prevalent rate in the area for the same.

Value of farm produce:

This includes the value of main product and the By-product of the crop. The harvest price of the crop was considered for calculating the value of main produce. The value of by produce was calculated at the prevailing price in the locality.

Concept of post harvest technology:

Post harvest technology is important process of production particularly in chilli cultivation because chilli is a perishable product. The prime requisite of chilli harvesting at the correct stage of its marketing it may be dispose as green chilli or it may be dispose as dry chilli. The green chilli contains a high moisture content (60-85%) at the time of harvest and the dry chilli contents (8-12%) moisture. If the proper care was not taken by chilli producer after harvesting the chilli, some studies estimated that about 10 per cent of chilli is lost in different stages of functions performed for its disposal. These functions may be grading, packaging, transportation, storage and at the time of marketing.

Hence, "Post harvest technology in chilli cultivation mainly deals with process indicating the existing of a close association between agriculture and the technology of care at the time of grading, packaging, transportation, storage and at the time of marketing." In present study post harvest technology of chilli includes the operations incurred at the time and after the harvesting of chilli.

Grading:

Grading is pre-requisite process for development of the modern marketing, trade and economy of chilli. The Indian chillies are graded mostly by farmers on the basis of colour and size, before they are brought in the market. The damaged discoloured and immature pods are removed depending on market demand. However, at traders level the other important quality parameter are moisture and stalks. Excess moisture add weight to the pods but give room to various fungi to grow.

Packaging:

Packaging is an important function for every produce and so is in marketing of Chilli. It is a practice to protect the produce from any damage during storage, transportation and other marketing aspects. It is required at every stage of marketing from the producer to the consumer. In recent years, packaging plays an important role in marketing of produce. Good packaging of chilli not only facilitates convenience in transportation and storage but also attracts consumer to pay more. The packaging reduces the marketing cost and protects the quality.

Transportation:

Transport is vital for the economic development of a country, since every commodity produced requires being transported from producing area distribution stages. Quick, cheap reliable and convenient mean of transport are essential for boosting production and trade. Chillies are mainly transported in gunny bags (old or new) and some times in bamboo baskets. Transport of Chillies is broadly divided into two phases i.e. (i) from farm to Assembling Market and (ii) from assembling market to consuming markets/places. In the first phase, the producers and village/ itinerant merchants are involved and in the second phase wholesalers and processors are involved. Head loads, cartloads and tractor loads are generally used depending on the economic status and land holdings by the Chilli producers in the area. Of course, this does not have any bearing on the dispatches of chillies from the market places.

Storage:

Storage is a very important component of marketing which has a direct impact on the prices. Adequate storage facilities will help in effectively distributing and marketing at all times and in all places. Storage function thus is responsible for balancing supply and demand situation. In India, different states follow different methods of storage. In some states the chillies are stored in markets with the commission agents in their shops for 5 to 30 days. Farmer also store chilli in the houses for about 5 to 15 days.

Marketing:

Chillies are brought to regulated markets in different parts of the country mostly by primary producers. Unlike other perishable commodities, green chillies are sold in the market by many producers in a phased manner. The producers try to get the best advantage of the prices. They store the produce as long as they can and bring to the market when prices are favourable to them. Only during glut the producer-seller come to the market with entire produce and try to dispose off the lots as quickly as possible because storing and selling may result in further loss due to crash in prices. It is observed that due to long time between harvest and marketing of chilli there is weight loss and other quality loss. So during this marketing time farmers take care to check the losses.

CHAPTER - IV RESULTS

Result is the main findings of research problem which is documented on the basis of facts and cause and effect relationship. This chapter is presented after tabulation, analysis and interpretation of data as per the stated objectives. In this chapter assembled data after processing and analysis are presented in an appropriate, and logically consistent tabular form. This chapter also deals with interpretation of the true meaning of the facts presented, in terms of the purpose of the study in the form of data. This chapter deals with the empirical-statement of the objectives set fourth for the study. For the convenience of the study the chapter consists of five sections as below:

- 1. Socio economic structure of chilli growers:**
2. Cost of cultivation incurred in chilli production.
3. Return realized from chilli production.
4. Price spread in different marketing channels of chilli.
5. Problems of post harvest management and marketing of chilli.

4.1: Socio economic structure of chilli growers:

It is a well known fact that social and economic factors of farmers serve for development of agriculture business, technological status at farm level and decision making process to get maximum farm profit from their farm. The present section of study comprises of personal characteristics of chilli growers and family composition (structure of family) on one hand and on the other hand it determines the "farm structure" operated by them.

I. Structure of family:

Farm is determined as socio economic unit which is organized by farmers themselves and their family members. In respect of management activities, operational organization of farm is mostly depending out upon the personal characteristics like age and education of farmers. It is found that family members of farmers are generally engaged as farm labour. Hence, the importance of family labour can not be ignored. Structure of farm family consists of size of individual family and characteristics like family work force etc. There is a need for brief information about the sample respondents and their family members, because they are responsible for farm

development and routine farm work.

Age and education level:-

Farm management practices are mostly influenced with the level of experience and education level of chilli growers. The length of age in years and education counts experience gained by farmers, therefore, it is pertinent to have an idea regarding the age and education level of the chilli growers. The data on distribution of chilli growers according their age and education level have been presented in table 4.1.

Table: 4.1 Distribution of chilli growers according to their age and education level.

(Average number of chilli growers)

S.No.	Description	Adopter	Non adopter
A.	Average Age (year)	44	45
i	Young (upto 30 years)	13 (21.66)	10 (16.67)
ii	Middle (31 to 50 years)	28 (46.67)	27 (45.00)
iii	Old (Above 50 years)	19 (31.67)	23 (38.33)
	Total	60 (100.00)	60 (100.00)
B	Education level		
i	Illiterate	17 (28.33)	23 (38.33)
ii	Up to primary	13 (21.67)	12 (20.00)
iii	Up to middle	11 (18.33)	10 (16.67)
iv	Up to high school	13 (21.67)	11 (18.33)
v	College	6 (10.00)	4 (6.67)
vi	Total	60 (100.00)	60 (100.00)

Data in parentheses shows percentage of total

Age level:

Age factor plays an important role in adoption of improved technology. It can be said that younger generation (young and middle age group) might be more receptive towards improved production practices including post harvest technology in chilli production. On the other hand, elder chilli growers might be following traditional practices due to lack of knowledge.

The distribution of chilli growers as young, middle and old age group, data depicted that the chilli growers in case of adopter of post harvest chilli technology the chilli growers were found to be young (21.66%) and middle age (46.67%), while the old

chilli growers was found to (31.67%). On the other hand, the chilli growers in case of non adopter of post harvest chilli technology the chilli growers were found to be young (16.67%) and middle age (45.00%), while the old chilli growers was found to (38.33%).

Study revealed that in case of adopter and non adopter of post harvest chilli technology the maximum chilli growers were found middle age group i.e. the average age was 44 and 45 years.

Education level:

Education is associated with direct bearing on farming situation as it reflected and motivated chilli growers for adoption of improved technology. However, it might be depend upon the quality and nature of education and training. Table 4.1 presents the distribution of the chilli growers as per level of education in different situation of groups i.e. adopter and non adopter of post harvest chilli technology.

The illiteracy position of chilli growers "adopter and non adopter of post harvest chilli technology" depicted that the level of literacy found to be higher in case of adopter chilli growers. In respect of illiterate chilli growers, maximum 38.33 per cent was found in case of non adopter, while, it was 28.33 per cent in case of adopter chilli growers.

It is also depicted that the chilli growers "adopter of post harvest chilli technology" found in comparison to non adopter chilli growers.

In a nutshell, it is interesting point that there are higher numbers of chilli growers found to be illiterate in case of non adopter of post harvest technology in chilli cultivation. It may be concluded that the adopter chilli growers of post harvest technology found to have higher education in comparison to non adopter chilli growers. It is also concluded on the basis of result that the education has direct effect on adoption pattern of post harvest technology in chilli cultivation.

Size of family and work force:

Size of farm family and available work force in a family are considered to be factors influencing economic status of farmers. Family is one unit, which includes the total number of members to cultivate the given operational area. The detail of family strength and available work force has been presented in table 4.2.

Table: 4.2 Distribution of chilli growers as size of family and work force.

(Average number of chilli growers)

S.No.	Family Description	Adopter	Non adopter
A.	Strength		
i	Small family (upto 5 members)	12 (20.00)	13 (21.67)
ii	Medium family (6 to 7 members)	22 (36.67)	32 (53.33)
iii	Large family (more than 7 members)	26 (43.33)	15 (25.00)
iv	Total	60 (100.00)	60 (100.00)
B	Work force		
i	Upto 3 workers	24 (40.00)	27 (45.00)
ii	Upto 4 workers	21 (35.00)	24 (40.00)
iii	More than 4 workers	15 (25.00)	9 (15.00)
iv	Total	60 (100.00)	60 (100.00)

Data in parentheses shows percentage of total

The data presented in table 4.2 determine the strength of family and work force available in the family of adopter and non adopter of post harvest technology chilli growers.

The distribution of chilli growers as per strength of the family, data depicted that the chilli growers in case of adopter of post harvest chilli technology the chilli growers were found to have small family (20.00%) followed by medium family (36.67%) and large family (43.33%) respectively. On the other hand, chilli growers in case of non adopter of post harvest chilli technology chilli growers were found to have small family (21.67%) followed by medium family (53.33%) and large family (25.00%) respectively.

It is clear from the data that on an average the adopter chilli growers have large size of family in comparison to non adopter chilli growers.

As concerned with work force availability in the family of chilli growers, data depicted that the (40.00%) chilli growers in case of adopter of post harvest chilli technology have upto 3 workers in a family followed by (35.00%) chilli growers have upto 4 workers in a family and (25.00%) chilli growers have above 4 workers in a family. On the other hand, data depicted that the (45.00%) chilli growers in case of non adopter of post harvest chilli technology have upto 3 workers in a family followed by (40.00%) chilli growers have upto 4 workers in a family and (15.00%) chilli growers have above 4 workers in a family.

It is concluded from the data that on an average the adopter chilli growers have higher number of work force in comparison to non adopter chilli growers. The higher work force in the family of adopter chilli growers might be a reason in adoption of post harvest technology.

II. Farm structure of chilli growers:

This portion of study deals with economic structure of the sample chilli growers. It includes the detailed analysis of investment on fixed capital, land use pattern of operational area and area under chilli on per farm-family.

Investment on fixed farm assets:

The value of the fixed farm assets generally determines the absolute cost incurred on farm house, farm machinery, implements and drought animal which is invested during the past years. The data on average value of fixed farm assets have been presented in table 4.3.

Table: 4.3 Value of the total farm assets.

(Rs. thousand/farm)

S.No.	Description	Adopter	Non adopter
1.	Farm house	51	51
2.	Bullocks	17	19
3.	Implements	79	71
4.	Total assets	147	141

The data on an average of total value of fixed farm assets at the farm of "adopter of post harvest technology" chilli growers found to be Rs.147000 per farm. On the other hand, the average of total value of fixed farm assets at the farm of "non adopter of post harvest technology" chilli growers found to be Rs.141000 per farm. This seems to be not very much difference on the value of fixed farm assets in both the situation.

As evident from the table 4.3, data revealed that the maximum expenditure on fixed assets was found on implements followed by expenditure on farm house comprises second positions and the minimum expenditure was on bullocks per farm, in both the condition.

Land use and irrigation pattern:

Land use pattern is a process, which assigns each tract of land in an area to its proper class in a system of classes. The classes in the system are defined in terms of the qualities or characteristics with which the classification is concerned. The land use pattern of a country at any particular time is determined by the physical, economic and

institutional framework taken together. In other words the existing land use pattern has been evolved as the result of the action and interaction of various factors such as the physical characteristics of land, the institutional framework, the structure of other resources such as capital, labour *etc.* The land use pattern also determines the level of profitability from cropping pattern. The land use and irrigation pattern of sampled chilli growers has been presented in table 4.4.

Table: 4.4 Land use and irrigation pattern.

S.No.	Particulars	(ha/farm)	
		Adopter	Non adopter
1.	Size of holdings	4.13 (100.00)	3.96 (100.00)
2.	Cultivated area	4.01 (97.09)	3.86 (97.47)
3.	Fallow land	0.11 (2.66)	0.14 (3.54)
4.	Irrigated area	2.26 (54.72)	2.21 (55.81)
5.	Kharif crops	3.90 (94.43)	3.72 (93.94)
6.	Rabi crops	2.93 (70.94)	2.77 (69.95)
7.	Gross cropped area	6.83 (165.38)	6.49 (163.89)
8.	Area under chilli	1.32 (31.96)	1.25 (31.57)
9.	Cropping intensity (%)	170.32	168.13

Figure in parentheses showed the percentage of size of holdings

The size of holding is the actual agricultural area under possession of chilli growers. Data on "adopter of post harvest technology" chilli growers depicted that the average size of holding was found to be 4.13 hectares per farm. On the other hand, data on "non adopter of post harvest technology" chilli growers depicted that the average size of holding was found to be 3.96 hectare per farm. It is concluded on the basis of data regarding size of holding of adopter and non adopter chilli growers showed that the adopter chilli growers had slightly larger area over non adopter chilli area.

Irrigation is the important factor of production without which the other yield attributing inputs found to be ineffective. In chilli cultivation irrigation facilities is must due to erratic nature of rainfall and dry spell during the crop period. Agricultural scientist proposed irrigation during different stages of crops if there are long dry spell in rainy season also.

In case of "adopter of post harvest technology" chilli growers, data depicted that the average irrigated area was found to be 54.72 per cent to size of holding i.e.

accounted to 2.26 hectare per farm. On the other hand, in case of "non adopter of post harvest technology" chilli growers, data depicted that the average irrigated area was found to 55.81 per cent to size of holding i.e. accounted to 2.21 hectare per farm.

It is concluded on the basis of data regarding size of irrigated area of adopter and non adopter chilli growers showed that the adopter chilli growers had slightly lower irrigated area over to non adopter chilli area.

The area under kharif crops in existing cropping pattern of adopter and non adopter chilli growers show that kharif crops was found to predominated over rabi crops. The crops under rabi season was found to lower due to unavailability of irrigation facilities in both the situation.

The area under chilli is important among the existing cropping pattern of chilli growers under study. The study showed that the percentage area under chilli to total size of holding found to different at the farm of adopter and non adopter chilli growers. Data depicted that in case of "adopter of post harvest technology" chilli growers the average area under chilli was found to 31.96 per cent to size of holding i.e. accounted to 1.32 hectare per farm. On the other hand in case of "non adopter of post harvest technology" chilli growers the average area under chilli was found to 31.57 per cent to size of holding i.e. accounted to 1.25 hectare per farm.

It is concluded that there was no any specific difference was found under area of chilli cultivation by the chilli growers of adopter and non adopter of post harvest chilli technology.

4.2: Cost of cultivation incurred in chilli production:

Mostly chilli growers seek to achieve higher profit from production and disposal of their produce. To achieve the maximum profit, the chilli growers must be allocated their resources on economic point of view with adoption of post harvest technology. The post harvest chilli production technology not only increases the marketable surplus but also fetched the higher remunerative market price due to quality of product. Hence, a study of economics of chilli cultivation on adopter and non adopter of post harvest chilli production technology is important to find out their profitability. The comparative study is also important to choose best alternative resources, cultivation practices and scale of production etc. Secondly, it gives an estimate of the amount, (financial requirement) for

cultivating with different aspect i.e. adoption and non adoption of post harvest chilli production technology respectively.

The cost of cultivation is mainly depends upon the labour and material inputs utilization pattern on per hectare basis. Hence, to know the input utilization pattern in the situation of adopter and non adopter of post harvest chilli production technology at the farm of chilli growers has been considered for analysis. The detail of input utilization pattern in chilli cultivation at the farm of adopter and non adopter of post harvest chilli production technology has been presented in table 4.5.

Table: 4.5 Input utilization patterns in chilli cultivation at the farm of adopter and non adopter of post harvest chilli production technology.

S.No.	Practices	Adopter		Non adopter	
		per farm	per ha	per farm	per ha
1.	Chilli area (hectare)	1.32	1.00	1.25	1.00
2.	Family labour (days)	77	59	76	60
3.	Hired labour (days)	31	24	26	21
4.	Total human labour (days)	108	82	102	81
5.	Bullock labour (days)	8	6	9	7
6.	Machine labour (hour)	7	5	4	3
7.	Seed and seed treatment (Rs.)	7002	5305	6480	5184
8.	Fertilizer and manure (Rs.)	3899	2953	3837	3070
9.	Plant protection measure (Rs.)	2697	2043	2397	1918
10.	Irrigation charges (Rs.)	1400	1060	1200	960
11.	Expenditure on post harvest technology (Rs.)	2713	2056	--	--

The data indicated that the utilization pattern of human labour, bullock labour, machine labour and cost incurred on productive inputs in cultivation of chilli farms have no any specific difference at the farm of adopter and non adopter of post harvest chilli production technology. The reason for the similar cost of cultivation of chilli upto harvesting stage might be that the post harvest technology started from standing crops at maturity level. After the post harvest stage of chilli considerable quantities of produced go to waste owing to improper post harvest operations and the lack of processing. This results in a considerable gap between gross production and net availability (marketable surplus).

It is concluded that the input utilization pattern in adopter and non adopter of post harvest technology farm found to nominal variation in agronomical practices and in material utilization pattern except the expenditure on labour incurred in post harvest technology. The differences in material input utilization pattern among the different

situation was due to quality and price of inputs, which was very nominal.

The inputs utilization patterns in chilli cultivation given clear cut idea regarding cost of cultivation incurred on per hectare basis. The detail of cost structure of chilli cultivation on adoption and non adoption level of post harvest chilli production technology has been presented in table 4.6.

Table: 4.6 Cost of cultivation of chilli on adopter and non adopter farm.

(Rs/ha)			
S.No.	Particulars of cost	Adopter	Non adopter
1.	Hired human labour	4800	4200
2.	Bullock labour	2100	2450
3.	Machine power	3500	2100
4.	Seed and seed treatment	5305	5184
5.	Fertilizer +manure	2953	3070
6.	Plant protection	2043	1918
7.	Irrigation	1060	960
8.	Post harvest technology	2056	--
9.	Interest on working capital	496	414
10.	Depreciation	1186	1187
11.	Land revenue	108	110
	Cost-A₁	25607	21593
12.	Interest on fixed capital	119	119
	Cost-B₁	25726	21712
13.	Rental value of land	5000	5000
	Cost-B₂	30726	26712
14.	Imputed value of family labour	11800	12000
	Cost-C₁	37526	33712
	Cost-C₂	42526	38712
	Cost-C₃ (10% of C₂+C₂)	46779	42583

The above table shows that on an average cost of cultivation per hectare of chilli crop with "adoption of post harvest technology" was found to (Cost A₁) Rs.25607 followed by (Cost B₁) Rs.25726, (Cost B₂) Rs.30726, (Cost C₁) Rs.37526, (Cost C₂) Rs.42526 and (Cost C₃) Rs.46779 respectively. In this study cost A₂ was not under taken due to that all the chilli growers were used their own land.

On the other hand, on an average cost of cultivation per hectare of chilli crop with "non adoption of post harvest technology" was found to (Cost A₁) Rs.21593 followed by (Cost B₁) Rs.21712, (Cost B₂) Rs.26712, (Cost C₁) Rs.33712, (Cost C₂) Rs.38712 and (Cost C₃) Rs.42583 respectively.

The realization of cost A₁ is important in cost of cultivation analysis because it is the real cost which was expenses by chilli growers' own pocket. It is also revealed that the average operational cost i.e. cost A₁ was higher on the farm of adopted post harvest

chilli production technology. The additional expenditure on the process of post harvest process was incurred by Rs.2056 per hectare.

The total cost estimates i.e. cost C_1 , C_2 and C_3 based on the imputed values would give an unrealistic and even misleading picture of costs. It is attributable to the fact that chilli growers try to minimize only out of pocket expenses of cultivation and that by and large, they make maximum use of resources they own, but it is also not justifiable to take into account only paid out cost. To determine the cost structure cost C_1 , C_2 and C_3 were also analyzed in present study. The maximum cost C_3 was found Rs.46779 per hectare in case of farms of adopter chilli growers followed by Rs.42583 per hectare in case of farms of non adopter chilli growers respectively. Rs.4196 additional expenditure incurred by adopter chilli growers of post harvest chilli production technology may be justified on additional return are to be analyze.

4.3:Return realized from chilli production:

Yield of green chilli in quintals, available marketable surplus of green chilli, gross income, net income, B.C. ratio and other profitability measure analysis are the tools employed for estimating the economics of production of chilli. For this purpose, the various returns realized from chilli production on per hectare basis of adopter and non adopter farms of chilli production technology have been presented in tables 4.7.

Table: 4.7 Returns realized from chilli crop on adopter and non adopter farm.
(Rs/ha)

S.No.	Particulars of cost	Adopter	Non adopter
1.	Cost- C_3	46779	42583
2.	Yield (q.)	37.18	36.80
3.	Marketable surplus (q.)	36.74	34.64
4.	Gross income	82348	71763
5.	Net farm income	35569	29180
6.	Family labour income	51622	45051
7.	Farm business income	56741	50170
8.	B:C ratio	1.76	1.69

Yield is the main factors of total production at farm level due to utilization of different productive resources. On the other hand, measurement of profitability realized from per quintal of green chilli marketed at the different marketing prices. The yield per hectare of green chilli found to variation in different adoption level on adopter and non

adopters' farm of post harvest chilli production technology. Study depicted that the adopter farmers realized on an average 37.18 quintal per hectare of green chilli, while non adopter farmers realized on an average 36.80 quintal per hectare of green chilli. This nominal difference in yield might be due to harvesting care during picking of green chilli at farm level.

Marketable surplus is the main product which is disposed through various marketing channels. It is realized that with the adoption of post harvest technology in green chilli production, mainly marketable surplus was found to increase. The average marketable surplus on adopter chilli growers was found to be 36.74 quintal per hectare while it was 34.64 quintal per hectare on non adopter farm of chilli growers. The additional 2.10 quintal of green chilli was available for marketing and this was due to adoption of post harvest chilli production technology.

Gross income per hectare of green chilli production received by adopter and non adopter of chilli growers found to variation. This was due to different quantity of available marketable surplus per unit of area and market price received on the basis of quality of crop and time of disposal through different marketing channels. The overall gross income per hectare of this crop in case of adopter chilli growers was found to on an average Rs.82348 per hectare. On the other hand, the overall gross income per hectare of this crop in case of non adopter chilli growers was found to on an average Rs.71763 per hectare.

Net income is the real income realized by chilli growers which is deduction of cost of cultivation in the total value of gross income received by chilli growers. Study revealed that the overall net income per hectare of this crop in case of adopter chilli growers was found to on an average Rs.35569 per hectare. On the other hand, the overall net income per hectare of this crop in case of non adopter chilli growers was found to on an average Rs.29180 per hectare. The additional Rs.6389 of net return received by chilli growers adopted the post harvest technology was the remuneration of technology which check the post harvest losses of green chilli. This trend was might be also due to higher market price received by farmers through disposal of proper marketing channel.

The other measurement of farm profitability in chilli production by adopter and

non adopter chilli growers was also analyzed. In study it is found the farmers realized on an average Rs.51622 per hectare as family labour income and Rs.56741 per hectare was realized as farm business income in case of adopter farmers. On the other hand, it is found the farmers realized on an average Rs.45051 per hectare as family labour income and Rs.50170 per hectare was realized as farm business income in case of non adopter farmers.

B.C. Ratio is the relationship which shows the return from one rupee investment in production process. Study shows that the B.C. ratio in adopter of post harvest technology farms was highest i.e. 1.76, while, it was 1.69 on the farm of non adopter of post harvest technology.

4.4: Price spread in different marketing channels of chilli:

The importance of marketing can not be ignored in production process to fetch the maximum profit. The remunerative market price depends upon the number of intermediaries involve in marketing functions. The fair marketing system is one in which farmers get high share of consumers' price. Following four marketing channels were found on the basis of marketing pattern of chilli in study area.

Channel I: Producer → Local traders → Wholesalers (mandi) → Retailer → Consumers

Channel II: Producer → Wholesalers (mandi) → Retailer → Consumers

Channel III: Producer → Local traders → Retailers → Consumers

Channel IV: Producer → Retailers → Consumers

For analysis of price spread in different marketing channels of chilli the following sub head of market constituents have been studied.

Marketing cost:

Marketing cost includes all the market charges incurred to dispose the chilli from village assembling on the farm to the reach upto final consumer. The chain of marketing cost of chilli from producer to ultimate consumer's have been divided into following sub heads:

1. Charges paid by the producers
2. Charges paid by the local traders / wholesalers / retailers
3. Total margins of local traders / wholesalers / retailers

4. Price spread with different channels

The table 4.8 presents the detail of marketing cost and margins at different marketing channels of chilli.

Table: 4.8 Marketing cost and margins at different marketing channels of chilli.

(Rs./Quintal)

S.No.	Particulars	Channels			
		I	II	III	IV
1.	Producers sale price	2000	2550	2000	2400
2.	Producer marketing cost	--	200	--	100
3.	Net amount received by producers	2000	2350	2000	2300
4.	Purchase price of local traders	2000	--	2000	--
5.	Local traders marketing cost	200	--	300	--
6.	Local traders margins	350	--	430	--
7.	Local traders sale price	2550	--	2730	--
	Or				
	Wholesaler purchase price	2550	2550	--	--
8.	Wholesaler marketing cost	30	30	--	--
9.	Wholesaler margins	150	150	--	--
10.	Wholesaler sale price	2730	2730	--	--
	Or				
	Retailer purchase price	2730	2730	2730	2400
11.	Retailer marketing cost	50	50	50	300
12.	Retailer margins	220	220	220	300
13.	Retailer sale price	3000	3000	3000	3000
	Or				
	Consumer purchase price	3000	3000	3000	3000

In study area there are three types of middlemen / functionaries are involved in chilli marketing i.e. local traders, wholesalers and retailers. These middlemen help to reach the product from producers to final consumers. In case of green chilli the ultimate consumer may be household consumer or hotel and other value added functionaries. In chilli marketing the middlemen includes the chain of local traders, wholesaler / regulated market and retailers etc. are mainly considered.

The data revealed that among all these channels, from second channel i.e. sale through (Producer → Wholesalers (mandi) → Retailer → Consumers) the chilli producers reaps highest net saving on an average Rs.2350 per quintal. The next remunerative channel was forth channel (Producer → Retailer → Consumers) in which producers received the amount of Rs.2300 per quintal of chilli at net saving. Data also revealed that among all these channels, from first and third channel i.e. sale through local traders the chilli producers reaps minimum net saving on an average Rs.2000 per quintal. On the basis of analysis, it is concluded that highest amount received by

producer through fair dealing with wholesaler i.e. sale in the mandi. Due to certain conditions the chilli growers should also sell their chilli to retailers also because it is the second option of chilli disposal in the area.

Price spread:

The details of price spread in marketing of chilli in different marketing channels have been presented in table 4.9.

Table: 4.9 Price spread in marketing of chilli in different channels.

S.No.	Particulars	Channels			
		I	II	III	IV
		(Rs./Quintal)			
1.	Marketing Cost	280 (9.33)	280 (9.33)	350 (11.67)	400 (13.33)
	Producers	--	200 (6.67)	--	100 (3.33)
	Local traders	200 (6.67)	--	300 (10.00)	--
	Wholesaler	30 (1.00)	30 (1.00)	--	--
	Retailer	50 (1.67)	50 (1.67)	50 (1.67)	300 (10.00)
2.	Marketing Margins	720 (24.00)	370 (12.33)	650 (21.67)	300 (10.00)
	Local traders	350 (11.67)	--	430 (14.33)	--
	Wholesaler	150 (5.00)	150 (5.00)	--	--
	Retailer	220 (7.33)	220 (7.33)	220 (7.33)	300 (10.00)
3.	Total cost + margin	1000 (33.33)	650 (21.67)	1000 (33.33)	700 (23.33)
4.	Producers Rupees	2000 (66.67)	2350 (78.33)	2000 (66.67)	2300 (76.67)
5.	Consumer Rupee	3000 (100.00)	3000 (100.00)	3000 (100.00)	3000 (100.00)
6.	Price Spread (%)	33.33	21.67	33.33	23.33

Figure in parentheses shows the per cent to consumer rupee

The data presented in table 4.9 determine proportion of consumers' rupees received by chilli producers through different channel of marketing. The study also depicted the proportion of consumers' rupees invested or expenditure made in the form of marketing cost and margin. This investment or marketing expenditure on disposal of chilli is known as price spread. The aim of study of price spread is to determine the producers share in consumer's rupees in chilli marketing.

It is concluded that in channel second (Producer → Wholesalers (mandi) → Retailer → Consumers), the marketing cost and marketing margin both together found

to lowest i.e. 21.67 per cent to consumers rupee. The lowest marketing cost and margin is the main reason that this channel provided highest amount to the producer as net saving Rs.2350 per quintal and it is the 78.33 per cent to consumers' rupee.

The data also revealed that the producer's share in consumer's rupee was on an average found to 76.67 per cent in forth channel of marketing i.e. (Producer → Retailers → Consumers) in which farmers saving was Rs.2300 per quintal of chilli.

The lowest profitable channel have been found to first channel and third channel sale through local traders, in which producers received only 66.67 per cent of consumers' rupee.

4.5: Problems of post harvest management and marketing of chilli:

Chilli is a capital and labour intensive commercial crop. It requires high level of management to increase the productivity and post harvest management technology to reduce post harvest losses because it is perishable crop. It is also fact that the market price was not very remunerative due to quality of product and many marketing problems. This could be due to various reasons and it is responsibility to planning agencies for removing such constraints. The planner should be taken care for development of productive resources and marketing system. So that not only area under chilli can be enhanced rapidly, but also to generate high income to the growers through increased marketable surplus and better price in the market. There are several problems which become hindrance in adoption of proper post harvest chilli production technology and proper marketing study area. These problems need to be identified; hence, the constraints confronted by chilli growers are presented in table 4.10.

Table: 4.10 Production and marketing problems in chilli cultivation identified by the sample chilli growers.

S.No.	Constraints	Frequency n=60	%	Rank
1.	Lack of labour during post harvest management	38	63.33*	VII th
2.	Unavailability of capable labour during requirement	32	53.33	IX th
3.	Perisability of chilli during management of post harvest process	49	81.67*	IV th
4.	Lack of knowledge about post harvest chilli production technology	30	50.00	X th
5.	Lack of storage facilities during post harvest chilli production technology	52	86.67*	II nd
6.	Economic inefficiency for management process of post harvest chilli production technology	42	70.00*	VI th
7.	High expenditure of marketing management during post harvest chilli production technology	55	91.67*	I st
8.	Lack of proper marketing process	45	75.00*	V th
9.	High losses of produce during marketing	34	56.67	VIII th
10.	Low marketing demand of chilli	28	46.67	XI th
11.	Lack of packaging material	20	33.33	XIII th
12.	Lack of proper transportation and high expensive of transportation	25	41.67	XII th
13.	Lack of marketing information	18	30.00	XIV th
14.	Low market price due to seasonal production	50	83.33*	III rd
15.	Average	37	61.67	

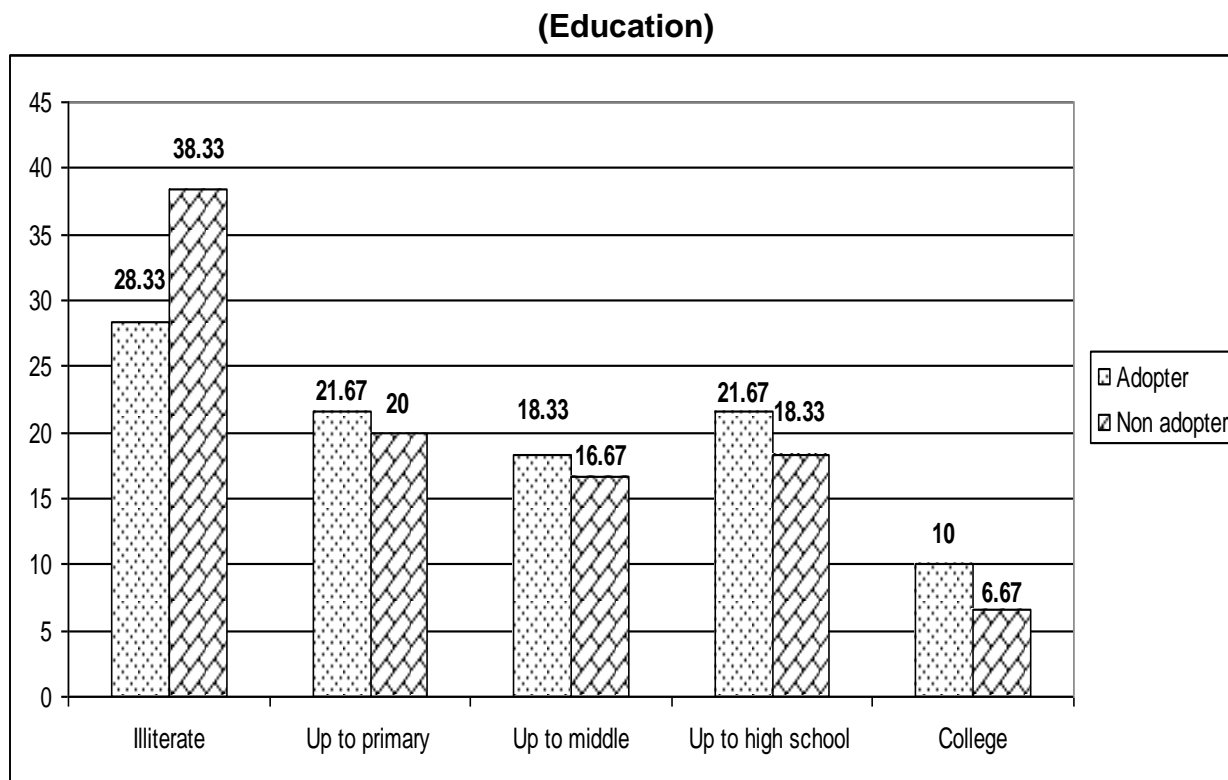
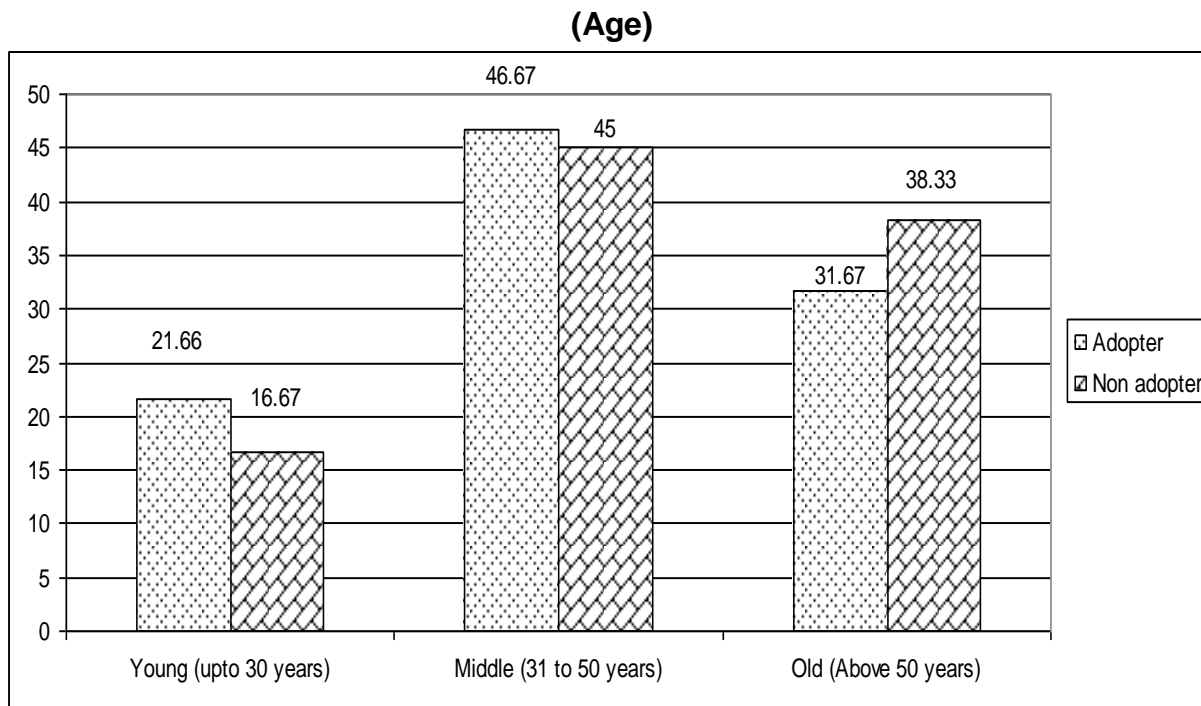
*higher than average value

The constraint confronted by chilli growers is divided into two parts and each part having their own importance. The most important constraints has higher than average value of constraints, while, normal constraints has lower than average value of constraints.

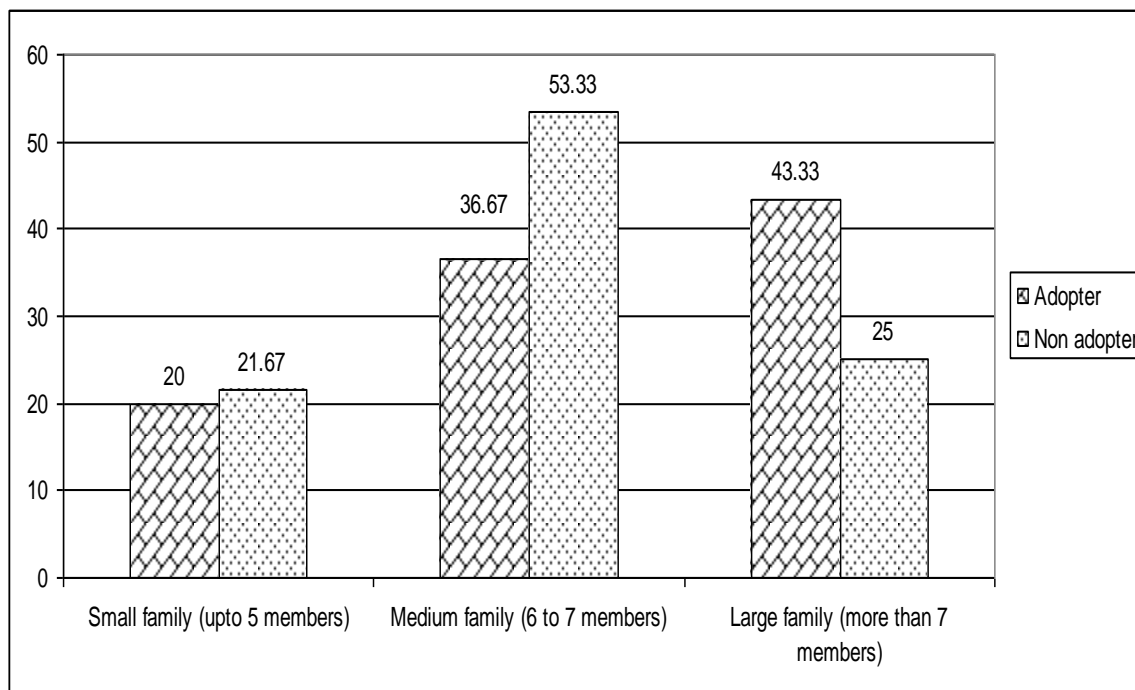
Among the important constraints, the maximum number of chilli growers (91.67%) reported "high expenditure of marketing management during post harvest chilli production technology" followed by "lack of storage facilities during post harvest chilli production technology" reported by (86.67%) chilli growers, "low market price due to seasonal production" reported by (83.33%) chilli growers, "perisability of chilli during management of post harvest process" reported by (81.67%) chilli growers, "lack of proper marketing process" reported by (75.00%) chilli growers, "economic inefficiency for management process of post harvest chilli production technology" reported by (70.00%) chilli growers and "lack of labour during post harvest management" reported by (63.33%) chilli growers respectively.

Among the normal constraints, the maximum number of chilli growers (56.67%) reported "high losses of produce during marketing" followed by "unavailability of capable labour during requirement" reported by (53.33%) chilli growers, "lack of knowledge about post harvest chilli production technology" reported by (50.00%) chilli growers, "low marketing demand of chilli" reported by (46.67%) chilli growers, "lack of proper transportation and high expensive of transportation" reported by (41.67%) chilli growers, "lack of packaging material" reported by (33.33%) chilli growers and "lack of marketing information" reported by (30.00%) chilli growers respectively.

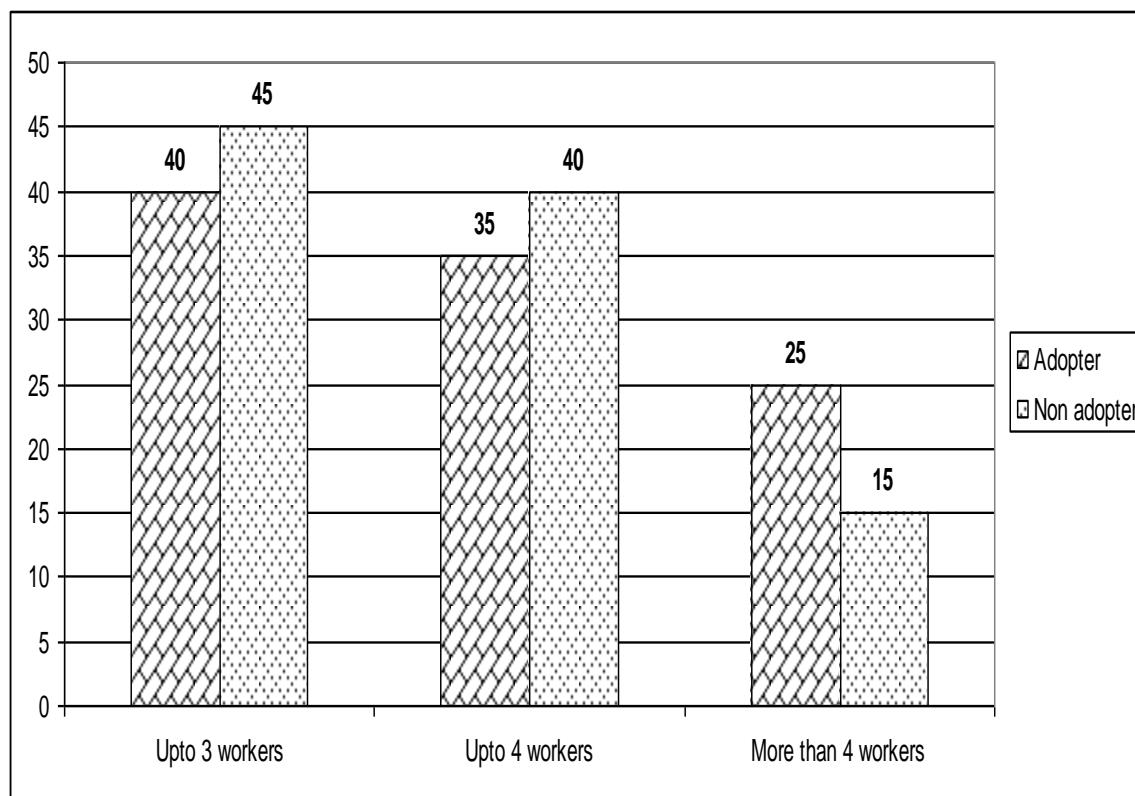
Fig:1: Distribution of chilli growers according to their age and education level.



**Fig:2: Distribution of chilli growers as size of family and work force.
(Strength)**



(Work force)



CHAPTER - V DISCUSSION

In the chapter of result the data were analyzed, processed, prescribed and presented in the form of findings as per interpretation of the objectives of study. The present chapter deals with the description in detail about the interpretation of result's findings. It is process after analysis of data to find out the answers of stated objectives. The present study was under taken with the objective of economic analysis of chilli cultivation with the use of post harvest chilli production technology and non adoption conditions. The result of this objective may be to provide the possibilities to check the post harvest losses of chilli and consequently enhancement of the quantity and quality of chilli with high market price and profitability. The other important objective of study was to identify the price spread of chilli in different marketing channels. The result of the study could pinpoint the possibilities of remunerative price and to fetch the better price in the marketing of chilli.

One of the important objects of chilli growers is to find out the better remuneration and maximum profit from chilli cultivation. For higher marketable surplus in respect of quality and quantity and better marketing price post harvest technology is the important issue. The influence of post harvest technology developed in respect of chilli production and its adoption in augmenting economic development of farmers are being recognized. Study showed that the development efforts regarding chilli production found to quite of marginal level. Hence, the study revealed a very important to evaluate the superior productivity potential of the available technology package and their profitability in chilli production under actual (adoption of post harvest technology) farm situation compared with general prevailing farmer's practices (non adoption of post harvest technology) farms respectively. The study depicted that the higher adoption of post harvest technology in chilli production have higher income potential/efficiency.

The primary goal of post harvest chilli production technology is to determine reduce the losses in fresh produce chilli. It is useful to maintain safety between harvest and consumption sites. The strategies for attaining these goals include: (1) growing cultivars that have good flavor and nutritional quality plus long post harvest-life potential

when harvested at optimum maturity; (2) using an integrated crop management system that maximizes yield without sacrificing quality; and (3) using optimal post harvest handling practices to maintain quality and safety of the products. The findings of study provided Scope in Madhya Pradesh for future prospects of chilli development which are discussed as below:

1. The study clearly depicted that the magnitude of post harvest losses in chilli is still to be minimized by proper cultural operations, harvesting, transportation, storage facilities at the time of marketing.
2. Through the establishment of cold storage and other amenities, the chilli can be remain safe for long time when its demand is higher and supply is less. There is a greater scope for chilli processing industry which needs chilli around the year.
3. In peak season due to improper handling practices, marketing, storage problems or may be said due to lack of post harvest technology is sizable quantity of chilli are spoilt in various stages. This loss seriously causes the economic development of chilli growers.
4. The post harvest technology helps to boost export of chilli in the form of preserved and value added products.

Looking at the economic importance of post harvest technology in chilli production as the study has been concluded, the farmers should adopt it without any hesitation. Although extension services are increasingly involved in providing educational programmes and training activities on post harvest topics, often there is a lack of follow-through and support after the training. Those participating in post harvest training may be convinced and willing to implement improved practices at farm level because it is economic importance in chilli production.

In Madhya Pradesh including study area a variety of government agencies through the extension services (Krishi Vigyan Kendra or KVKs), farm demonstrations and fairs are supposed to provide information on post harvest chilli production technology. Awareness is a need in backward area to improve post harvest extension programmes and to strengthen the connections between researchers, extension workers, and clientele groups of producers and handlers. All appropriate methods of communicating relevant information in a concise manner should be used. There are

many opportunities for collaborative efforts in extension of post harvest information among many of the region.

Due to perishable nature of chilli, marketing is one of the major problems to reaping the maximum profit after its disposal. As per the observation of study in respect of chilli marketing, marketing cooperatives should be encouraged among producers of chilli in important production areas. Such organizations are especially needed in backward area because of the relatively small farm size. Advantages of marketing cooperatives include: providing central accumulation points for the harvested commodity, reducing costs by purchasing harvesting and packing supplies and materials in quantity, providing for proper preparation for market and storage when needed, facilitating transportation to the markets, and acting as a common selling unit for the members, coordinating the marketing communication and advertising programme, and distributing profits among members.

On the basis of present economic findings of study it is suggested to conduct practical adaptive research on farmers' field aimed at economic testing of post harvest management in chilli production under local conditions. The impact of farm level observation should be to identify issues regarding practicality feasible, affordable costs, potential returns and remunerative one. It is also suggested to provide demonstrations of post harvest technology at the farm of chilli producer determined to be feasible (both technically and financially), providing comprehensive, hands-on training on improved post harvest practices, and providing information of practical use to women involved in horticulture.

CHAPTER – VI

SUMMARY, CONCLUSION AND SUGGESTIONS FOR FURTHER WORK

Summary:

Chilli (*Capsicum*) is one of the important condiments/spices cultivated widely in India. The cultivation of chilli is not only high remunerative to the producer which provide job to farmers but also provide high profit in per unit of area. It occupies land for about 120 days and permits relay cropping. For these reasons, it is an ideal crop in a labour surplus area and is particularly suited to the small and marginal farming situation also. Khargone district in Madhya Pradesh is one of the major chilli growing tracts.

Profit maximization with improved production technology and proper marketing are the main criteria of the farmers. Therefore, farmers are generally wanted to know the profitability with adoption of production technology and marketing in production process. Specially, it is important in the context of changing input - output prices because stable equilibrium of cost and return is liable to change due to change in price parity between input and output. Hence, it is necessary to examine the cost structure and profitability of chilli cultivation in adoption of post harvest technology and proper marketing techniques.

The present study will have its paramount economic importance aims at evaluating the profitability from adoption production technique and its proper marketing of chilli in Khargone district of Madhya Pradesh. The specific objectives of the study were:

OBJECTIVES:

- 4) To examine cost-benefits ratio of chilli production.
- 5) To measure price spread in different marketing channels of chilli.
- 6) Problems of post harvest management and marketing of chilli.

The multi stage sampling technique was used for drawing a sample for the present study. At first stage, Khargone block of Khargone district was selected purposively because Khargone block is one of the important chilli growing tracts. At second stage of selection, list of maximum chilli producing villages have been prepared. Out of these villages, 5 villages were selected randomly based on the area under chilli

crop. At the third stage of selection, a list of chilli growing cultivators of each village was prepared and 60 chilli growers have been selected randomly who have adopted post harvest management technique. To compare the economic advantage of post harvest management technique, 60 chilli growers was also selected from the same list, who did not adopt the post harvest management technique in chilli farming.

For collecting information on marketing cost, marketing margins and producers' share the equal number of marketing agent and marketing traders i.e. 3 in each channel have been selected randomly from the list among who deal with chilli marketing in study area.

For present study, both primary and secondary data were required which were collected from various sources. Primary data was collected from selected chilli growers for study. The required secondary data was collected from Department of Agriculture/Horticulture, Marketing agencies and other statistical data was collected through published record of Statistical Department. Regarding production and marketing of chilli, all the collected primary data was related to the agricultural year 2014-15 kharif season only.

Collected data was edited and checked for their adequacy and accuracy. Keeping in view the objectives of the study, the data was classified and tabulated. The classified and tabulated data was further processed in terms of average and percentage to arrive at conclusive figures for interpretation of data.

Cost concepts:

The cost of cultivation classified as recommended, "Special expert committee on cost estimates, GOI, New Delhi", was used in this study. The cost concepts are given below:

Cost A₁: It includes: -

- Value of hired human labour,
- Value of hired and owned bullock labour,
- Value of hired and owned machinery labour,
- Value of owned and purchased seed,
- Value of fertilizers, manures and chemicals,
- Value of insecticide and pesticides,

Expenditure on irrigation,
Land revenue and taxes,
Interest paid on crop loan if taken,
Depreciation on farm assets excluding land,
Interest on working capital,
Miscellaneous expenses.

Cost A₂: It includes-

Cost A₁ + rent paid for leased in land

Cost B₁: It includes-

Cost A₂ + interest on value of owned fixed capital assets. (excluding land)

Cost B₂: It includes-

Cost B₁ + rental value of owned land

Cost C₁: It includes-

Cost B₁ + imputed value of family labour

Cost C₂: It includes-

Cost B₂ + imputed value of family labour

Cost C₃: It includes-

Cost C₂ + 10 per cent of cost C₁ to account for managerial input of the farmer.

Profitability concepts:

These are defined as under: -

Gross income: It is defined as: total value of main product +by product.

Net farm income (NFI) = Gross income – Cost C₃ (total cost)

Family labour income (FLI) = Gross income – Cost B₂

Farm business income (FBI) = Gross income –Cost A₁

B:C ratio (Benefit cost ratio) = Gross income/ Gross expenses

Cost of production per quintal:

$$\text{Cost of production per quintal} = \frac{\text{Total cost} - \text{value of by product}}{\text{Quantity of main produce (quintal)}}$$

Marketing costs:

Marketing cost includes all the marketing charges paid by producers, wholesalers and retailers of chilli from local assembling to retailing center in the marketing processes.

Market margins:

It includes profit of margins kept by different market functionaries.

Total marketing cost:

It consists of marketing cost and marketing margin together.

Price spread:

The price spread consists of the marketing costs and margins which ultimately determine the producer's share in the price paid by the consumer.

Formula for price-spread is used as:

$$P = \left(\frac{C-M}{C} \right) \times 100$$

Where,

P= Producer's share in the consumer's rupee

C=Price paid by ultimate consumers

M=Marketing costs including market margins

Conclusion:

From the foregoing results it could be concluded as under:

1. Data on "adopter of post harvest technology" chilli growers depicted that the average size of holding was found to be 4.13 hectare per farm. On the other hand, data on "non adopter of post harvest technology" chilli growers depicted that the average size of holding was found to be 3.96 hectare per farm.
2. In case of "adopter of post harvest technology" chilli growers, data depicted that the average irrigated area was found to 54.72 per cent to size of holding i.e. accounted to 2.26 hectare per farm. On the other hand, in case of "non adopter of post harvest technology" chilli growers, data depicted that the average irrigated area was found to 55.81 per cent to size of holding i.e. accounted to 2.21 hectare per farm.
3. Data depicted that in case of "adopter of post harvest technology" chilli growers the average area under chilli was found to 31.96 per cent to size of holding i.e. accounted to 1.32 hectare per farm. On the other hand in case of "non adopter of

post harvest technology" chilli growers the average area under chilli was found to 31.57 per cent to size of holding i.e. accounted to 1.25 hectare per farm.

4. The data indicated that the utilization pattern of human labour, bullock labour, machine labour and cost incurred on productive inputs in cultivation of chilli farms have no any specific difference at the farm of adopter and non adopter of post harvest chilli production technology.
5. It is concluded that the input utilization pattern in adopter and non adopter of post harvest technology farm found to nominal variation in agronomical practices and in material utilization pattern except the expenditure on labour incurred in post harvest technology.
6. Data shows that on an average cost of cultivation per hectare of chilli crop with "adoption of post harvest technology" was found to (Cost A₁) Rs.25607 followed by (Cost B₁) Rs.25726, (Cost B₂) Rs.30726, (Cost C₁) Rs.37526, (Cost C₂) Rs.42526 and (Cost C₃) Rs.46779 respectively. In this study cost A₂ was not under taken due to that all the chilli growers were used their own land.
7. On the other hand, on an average cost of cultivation per hectare of chilli crop with "non adoption of post harvest technology" was found to (Cost A₁) Rs.21593 followed by (Cost B₁) Rs.21712, (Cost B₂) Rs.26712, (Cost C₁) Rs.33712, (Cost C₂) Rs.38712 and (Cost C₃) Rs.42583 respectively.
8. Study depicted that the adopter farmers realized on an average 37.18 quintal per hectare of green chilli, while non adopter farmers realized on an average 36.80 quintal per hectare of green chilli. This nominal difference in yield might be due to harvesting care during picking of green chilli at farm level.
9. The average marketable surplus on adopter chilli growers was found to be 36.74 quintal per hectare while it was 34.64 quintal per hectare on non adopter farm of chilli growers. The additional 2.10 quintal of green chilli was available for marketing and this was due to adoption of post harvest chilli production technology.
10. Study revealed that the overall net income per hectare of this crop in case of adopter chilli growers was found to on an average Rs.35569 per hectare. On the other hand, the overall net income per hectare of this crop in case of non adopter chilli growers was found to on an average Rs.29180 per hectare. The additional Rs.6389 of net

return received by chilli growers adopted the post harvest technology was the remuneration of technology which check the post harvest losses of green chilli. This trend was might be also due to higher market price received by farmers through disposal of proper marketing channel.

11. Study shows that the B.C. ratio in adopter of post harvest technology farms was highest i.e. 1.76, while, it was 1.69 on the farm of non adopter of post harvest technology.

12. Following four marketing channels were found on the basis of marketing pattern of chilli in study area.

Channel I: Producer → Local traders → Wholesalers (mandi) → Retailer → Consumers

Channel II: Producer → Wholesalers (mandi) → Retailer → Consumers

Channel III: Producer → Local traders → Retailers → Consumers

Channel IV: Producer → Retailers → Consumers

13. The data revealed that among all these channels, from second channel i.e. sale through (Producer → Wholesalers (mandi) → Retailer → Consumers) the chilli producers reaps highest net saving on an average Rs.2350 per quintal. The next remunerative channel was forth channel (Producer → Retailer → Consumers) in which producers received the amount of Rs.2300 per quintal of chilli at net saving. Data also revealed that among all these channels, from first and third channel i.e. sale through local traders the chilli producers reaps minimum net saving on an average Rs.2000 per quintal.

14. It is concluded that in channel second (Producer → Wholesalers (mandi) → Retailer → Consumers), the marketing cost and marketing margin both together found to lowest i.e. 21.67 per cent to consumers rupee. The lowest marketing cost and margin is the main reason that this channel provided highest amount to the producer as net saving Rs.2350 per quintal and it is the 78.33 per cent to consumers' rupee.

15. The data also revealed that the producer's share in consumer's rupee was on an average found to 76.67 per cent in forth channel of marketing i.e. (Producer → Retailers → Consumers) in which farmers saving was Rs.2300 per quintal of chilli.

16. The lowest profitable channel have been found to first channel and third channel sale through local traders, in which producers received only 66.67 per cent of consumers' rupee.
17. Among the important constraints, the maximum number of chilli growers (91.67%) reported "high expenditure of marketing management during post harvest chilli production technology" followed by "lack of storage facilities during post harvest chilli production technology" reported by (86.67%) chilli growers, "low market price due to seasonal production" reported by (83.33%) chilli growers, "perisability of chilli during management of post harvest process" reported by (81.67%) chilli growers, "lack of proper marketing process" reported by (75.00%) chilli growers, "economic inefficiency for management process of post harvest chilli production technology" reported by (70.00%) chilli growers and "lack of labour during post harvest management" reported by (63.33%) chilli growers respectively.

Suggestion: -

Post harvest chilli production technology found to be remunerative in respect of enhancing marketable surplus and profit. Hence, for further development of chilli production in the area and for higher adoption of post harvest technology in chilli production following suggestions may be considered.

1. Chilli marketable surplus could be increased in the area through checking the post harvest losses with adoption of post harvest management techniques. The market price per unit of chilli could also be achieving high with the increasing quality of chilli with adoption of post harvest management technique. For that purpose; required facilities and technique of post harvest chilli production should be provided by the development agencies because there are limitations in the study area.
2. Grading is one of the important post harvest technologies in chilli. Grading of chilli ensures better prices to producers and better quality to consumers. However, most of the markets are lagging behind in providing grading service. Hence, it is suggested to the marketing agencies they should be given proper guidance to the chilli growers regarding grading. Efforts so far made have induced producers to realize that they get higher prices for better quality when graded.

3. Storage is a very important component of marketing which has a direct impact on the prices. Adequate storage facilities will help in effectively distributing and marketing at all times and in all places. Storage function thus is responsible for balancing supply and demand situation. It is observed that due to inadequate cold storage facilities farmers are forced to sell their produce at lower rate. Hence, it is suggested to the planners that cold storage facilities for chilli is must for providing remunerative price to the chilli growers.
4. Transport is vital for the economic development of a country, since every commodity produced requires being transported from producing area and distribution stages. Quick, cheap reliable and convenient mean of transport are essential for boosting production and trade. The farmers are not properly trained in harvesting, transportation and marketing of Chillies. Training will improve their skill for better marketing of their produce.
5. The data of the study showed that the chilli growers with adoption of post harvest technology realized additional marketable surplus. This additional marketable surplus realized higher net income, family labour income and farm business income over non adoption condition. The chilli growers look for economy in per rupee investment. Hence, this technology should be popularized to increase the marketable surplus and to increase economic condition of the chilli growers.
6. The proper use of improved technology and improved practices of chilli production need to be demonstrated. Hence, the extension worker and planner should take care on this point. It was revealed on the study that chilli production required much higher initial investment. Hence, to reduce the risk aversion influence on productivity, an attractive crop insurance scheme needs to be implemented effectively in the area.
7. Adaptive research must be conducted in the areas to find out the area specific problems regarding use in various levels of yield attributing inputs and their relative profitability with adoption of post harvest technology.

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**DEPARTMENT OF AGRICULTURAL ECONOMICS AND
FARM MANAGEMENT
COLLEGE OF AGRICULTURE, GWALIOR (M.P)**

TOPIC

“Economics of Chilli Production and marketing in Khargone district of Madhya Pradesh.”

Advisor: Dr. J.S. Raghuwanshi

Investigator: Golu Nigawal

(अ) सामान्य जानकारी

- 1) कृषक का नाम श्री
- 2) पिता/पति का नाम श्री
- 3) जाति(सामान्य/पिछड़ा वर्ग/अ. जाति/अ. जनजाति)
- 4) पता ग्राम तहसील
जिला प्रदेश
- 5) व्यवसाय 1) प्राथमिक 2) द्वितीयक

6) सामाजिक एवं आर्थिक स्थिति (पारिवारिक जानकारी)

क्रमांक	सदस्य का नाम	उम्र	लिंग	शिक्षा	मुखिया से संबंध	व्यवसाय
(i)						
(ii)						
(iii)						
(iv)						
(v)						
(vi)						
(vii)						

7) जोत का विवरण

- (i) स्वयं की भूमि हेक्टर (ii) कुल राजस्व की राशि रु
- (iii) किराये पर ली गई भूमि हेक्टर (iv) कुल किराये की राशि रु
- (v) किराये पर दी गई भूमिहेक्टर (vi) प्राप्त रु
- (vii) कुल जोत का क्षेत्रफल हेक्टर

8) भूमि उपयोग विवरण :

क्रमांक	विवरण	क्षेत्रफल (हेक्टर)
(i)	शुद्ध बोया गया क्षेत्र	
(ii)	चालू पड़त भूमि	
(iii)	कृषि उत्पादन योग्य बेकार पड़ी भूमि	
(iv)	कृषि अयोग्य भूमि सड़क मार्ग	
(vii)	मिर्च का क्षेत्रफल	

9) सिंचाई के साधनों का विवरण :

क्रमांक	स्रोत	सिंचित क्षेत्रफल (हेक्टर)
(i)	कुओं द्वारा	
(ii)	नलकूप द्वारा	
(iii)	तालाब द्वारा	
(iv)	नहर द्वारा	
(v)	नदी नालो द्वारा	
(vi)	अन्य	

10) प्रक्षेत्र सम्पत्ति विवरण :

क्रमांक	विवरण	क्षेत्र/संख्या	वर्तमान कीमत	अनुमानित वार्षिक किराया	उपयोग के वर्ष
(i)	भवन				
(ii)	सिंचाई यंत्र				
(अ)	कुआं				
(ब)	नलकूप				
(स)	विद्युप पम्प				
(द)	डीजल पम्प				
(इ)	जनरेटर				
(फ)	सिंप्रिकलर				
(य)	अन्य				
(iii)	उपकरण/यंत्र				
(अ)	मुख्य उपकरण				
(1)	हारवेस्टर				
(2)	ट्रेक्टर				
(3)	रीपर				
(4)	थ्रेसर				
(5)	सीडड्रिल				
(6)	चैफकटर				
(7)	गोल्डबोर्ड				
(8)	कल्टीवेटर				
(9)	हैरों				
(10)	ट्राली				
(11)	बैलगाड़ी				
(12)	अन्य				
(ब)	लघु उपकरण				
(1)	देपी हल				
(2)	दुफन				
(3)	तिफन				
(4)	बखर				
(5)	पाटा				

(6)	डोरा				
(7)	बैल चलित शीझड्रिल				

11) फसल पद्धति :

क्रमांक	मौसम/फसल	किस्म	क्षेत्रफल (हेक्टर)		
			सिंचित	असिंचित	अर्द्धसिंचित
(i)	खरीफ				
(अ)				
(ब)				
(स)				
(ii)	रबी				
(अ)				
(ब)				
(स)				

(ब) मिर्च उत्पादन का आय-व्यय विप्लेषण

(Adoption of Post Harvest Technology)

1. मजदूरो पर खर्च

क्षेत्र

क्रमांक	क्रियाएँ	परिवारिक श्रम संख्या दिन	किराये का श्रम संख्या दिन	बैल श्रम संख्या दिन	मशीन श्रम घण्टे
(अ)	भूमि का तैयारी				
(1)	जुताई				
(2)	बखरनी				
(3)	समतली करण				
(ब)	खाद/उर्वरक				
(स)	बुवाई/बीजोपचार				
(द)	पौध संरक्षण				
(1)	कीटनाशक छिडकाव				
(2)	खरपतवारनाशक छिडकाव				
(3)	कवकनाशी छिडकाव				
(य)	सिंचाई				
(र)	निदाई/गुड़ाई				
(ल)	अन्य कार्य				
(क)	तुड़ाई				
(ख)	फसल की पैकिंग करना				
(ग)	विपणन हेतु स्थानंतरण				
(घ)	श्रेणीकरण एवं साफ करना				
(ङ)	बाजार व्यवस्था करना				
(च)	अन्य व्यवस्था करना				

2. आगतो पर खर्च (Adoption of Post Harvest Technology)

क्षेत्र

क्रमांक	टागत	नाम/जाति	मात्रा	रिमार्क एवं मूल्य
(अ)	बीज			
(ब)	बीजोपचार			
(स)	कल्चर			
(द)	गोबर एवं कम्पोस्ट खाद			
(य)	उर्वरक			

(1)	नाईट्रोजन			
(2)	फास्फोरस			
(3)	पोटेषियम			
(र)	सिंचाई			
(1)	बिजली व्यय			
(2)	डीजल			
(3)	नहर का व्यय			
(4)	अन्य			
(ल)	पौध संरक्षण			
(1)	कीटनाशक			
(2)	खरपतवारनाशक			
(3)	फफूंदनाशक			
(क)	तुड़ाई व्यय			
(ख)	अन्य			

3. आय (उपज) (Adoption of Post Harvest Technology)

क्रमांक	उपज	मात्रा	तुड़ाई के समय बिक्री मूल्य (रूपये) प्रति इकाई	सकल मूल्य (रूपये)
(अ)	मुख्य उपज			
(ब)	उप उपज			

(स) मिर्च उत्पादन का आय-व्यय विप्लेषण

(Non- Adoption of Post Harvest Technology)

1. मजदूरो पर खर्च

क्षेत्र

क्रमांक	क्रियाएँ	परिवारिक श्रम संख्या दिन	किराये का श्रम संख्या दिन	बैल श्रम संख्या दिन	मशीन श्रम घण्टे
(अ)	भूमि का तैयारी				
(1)	जुताई				
(2)	बखरनी				
(3)	समतली करण				
(ब)	खाद/उर्वरक				
(स)	बुवाई/बीजोपचार				
(द)	पौध संरक्षण				
(1)	कीटनाशक छिडकाव				
(2)	खरपतवारनाशक छिडकाव				
(3)	कवकनाशी छिडकाव				
(य)	सिंचाई				
(र)	निदाई/गुड़ाई				
(ल)	अन्य कार्य				
(क)	तुड़ाई				

2. आगतो पर खर्च (Non- Adoption of Post Harvest Technology)

क्षेत्र.....

क्रमांक	टागत	नाम/जाति	मात्रा	रिमार्क एवं मूल्य
(अ)	बीज			
(ब)	बीजोपचार			
(स)	कल्चर			

(द)	गोबर एवं कम्पोस्ट खाद			
(य)	उर्वरक			
(1)	नाइट्रोजन			
(2)	फास्फोरस			
(3)	पोटेशियम			
(र)	सिंचाई			
(1)	बिजली व्यय			
(2)	डीजल			
(3)	नहर का व्यय			
(4)	अन्य			
(ल)	पौध संरक्षण			
(1)	कीटनाषक			
(2)	खरपतबारनाषक			
(3)	फफूंदनाषक			
(क)	तुड़ाई व्यय			
(ख)	अन्य			

3. आय (उपज) (Non-Adoption of Post Harvest Technology)

क्रमांक	उपज	मात्रा	तुड़ाई के समय बिक्री मूल्य (रूपये) प्रति इकाई	सकल मूल्य (रूपये)
(अ)	मुख्य उपज			
(ब)	उप उपज			

(द) मिर्च का बाजार पद्धति

1. किसानों द्वारा वहन किया गया विपणन व्यय

क्र.	विवरण	मात्रा	दर	कुल व्यय
1.	प्रक्षेत्र पर बोरा भराई			
2	प्रक्षेत्र पर हम्माली			
3	परिवहन व्यय			
4	नीलामी शुल्क			
5	बाजार शुल्क			
6	मण्डी में हम्माली शुल्क			
7	तुलाई शुल्क			
8	सफाई शुल्क			
9	कमीशन			
10	चौकीदारी शुल्क			
11	भंडारण शुल्क			
12	अन्य			

किसानों को प्राप्त उत्पाद की दर रु. प्रति किं

2. विपणन स्थान

आप अपना उत्पाद कहाँ बेचते हैं।

- | | |
|---------------------------------|--------------|
| 1. ग्रामीण व्यापारी को गाँव मे: | मात्रा |
| 2. बड़े व्यापारी को गाँव मे : | मात्रा |
| 3. ग्रामीण व्यापारी को मंडी मे: | मात्रा |
| 4. बड़े व्यापारी को मंडी मे : | मात्रा |
| 5. अन्य | मात्रा |

3. मिर्च के विपणन संबंधित सामान्य जानकारी:

1. क्या आप फसल विपणन लोन लेते हैं है : हाँ/ नहीं
2. क्या आपको बाजार मूल्य की जानकारी है : हाँ/ नहीं
3. क्या आपको मण्डी कर/बाजार के कर/मण्डी शुल्क एवं माप की जानकारी है। हाँ/ नहीं
4. आपके उत्पाद का भाव कम होने का क्या कारण है। हाँ/ नहीं
5. क्या आप अपने उत्पाद का मूल्य बढ़ा सकते हैं। हाँ/ नहीं
6. क्या आपको भण्डार गृह की जानकारी है। हाँ/ नहीं
7. क्या आप विपणन पूर्व श्रेणीकरण करते हैं। हाँ/ नहीं
8. क्या आप विपणन समाचार संबंधी पत्र/पत्रिकाएँ पढ़ते हैं। हाँ/ नहीं
9. क्या आप विपणन साख के बारे में जानते हैं। हाँ/ नहीं
10. क्या आपके यहां फसल कटाई पूर्व बेची जाती है। हाँ/ नहीं
11. क्या आपको अपनी फसल के मूल्य का भुगतान नगद होता है। हाँ/ नहीं
12. आपके यहां यातायात चार्ज क्या है। सामान्य/अधिक
13. तुलाई के लिए कम्प्यूटर कांटे का प्रयोग होता है। हाँ/ नहीं
14. निम्न सुविधाओं में से कौन-कौन सी सुविधाएँ आपको मिलती हैं।
 - 1) मिट्टी परीक्षण
 - 2) भंडारण
 - 3) मनोरंजन
 - 4) गाड़ी खड़ी करने का स्थान
 - 5) अतिथिगृह
 - 6) केन्टीन
 - 7) बिजली
 - 8) पानी
 - 9) सुलभ काम्पलेक्स
 - 10) सड़क
 - 11) चौकीदारी

4. थोक विक्रेता का विवरण (Wholesaler Proforma)

(अ) थोक विक्रेता द्वारा खरीदी के समय भुगतान रुपया प्रति कु० :

(ब) थोक विक्रेता द्वारा खरीदी के समय व्यय रुपया प्रति कु० :

1. कमीशन 2. तुलाई 3. चढाई ३३३. 4. ढुलाई
 5. उतराई 6. पूंजी पर ब्याज 7. संग्रहण
 8. बोरा पर खर्च 9. क्षरण (कमी) 10. कर

(स) थोक विक्रेता द्वारा लाभ रुपया प्रति कु० :

5. फुटकर विक्रेता का विवरण ;त्मजंपसमत च्त्ववितउंद्ध

(अ) फुटकर विक्रेता द्वारा खरीदी के समय भुकतान रुपया प्रति कु० :

(ब) फुटकर विक्रेता द्वारा खरीदी के समय व्यय रुपया प्रति कु० :

1. कमीशन 2. तुलाई 3. चढाई 4. ढुलाई
 5. उतराई 6. पूंजी पर ब्याज 7. संग्रहण
 8. बोरा पर खर्च 9. क्षरण (कमी) 10. कर

(स) फुटकर विक्रेता द्वारा लाभ रुपया प्रति कु० :

(य) कटाई उपरान्त प्रबंधन एवं विपणन की समस्याएं

क्रमांक	समस्याएं	हाँ/नहीं
i	कटाई उपरान्त प्रबंधन प्रक्रिया के समय मजदूर की कमी होना	
ii	समय पर कार्य क्षमता वाले मजदूर की कमी होना	
iii	कटाई उपरान्त प्रबंधन प्रक्रिया समय में मिर्च में खराबी आना	
iv	कटाई उपरान्त प्रबंधन तकनीकी ज्ञान की कमी	
v	कटाई उपरान्त प्रबंधन समय में भंडारण की कमी होना	
vi	कटाई उपरान्त प्रबंधन हेतु आर्थिक तंगी का होना	
vii	कटाई उपरान्त विपणन प्रबंधन हेतु खर्च अधिक होना	
viii	उचित विपणन की व्यवस्था न होना	
ix	विपणन के समय अधिक अपव्यय होना	
x	बाजार मांग की कमी होना	
xi	उचित पैकिंग व्यवस्था न होना	
xii	उचित यातायात की कमी एवं अधिक खर्चीला होना	
xiii	विपणन सूचना का आभाव	
xiv	सामयिक उत्पादन होने से कम कीमत मिलना	

VITA

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CLASS	BOARD/UNIVERSITY	SUBJECTS	YEAR	%
M.Sc. (Ag.)	RVSKVV, GWALIOR	Agricultural Economics and Farm Management	2018	66.30
B.Sc. (Ag)	RVSKVV, GWALIOR	Agriculture	2014	66.80
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High School	M.P. Board, BHOPAL	All subject	2005	52.60

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