AN ECONOMIC ANALYSIS OF PRODUCTION AND MARKETING OF MAJOR VEGETABLES IN MAHASAMUND DISTRICT OF CHHATTISGARH

M.Sc. (Ag.) Thesis

By

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DEPARTMENT OF AGRICULTURAL ECONOMICS

COLLEGE OF AGRICULTURE

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AN ECONOMIC ANALYSIS OF PRODUCTION AND MARKETING OF MAJOR VEGETABLES IN MAHASAMUND DISTRICT OF CHHATTISGARH

Thesis

Submitted to the

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by

Manisha Sonwani

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CERTIFICATE – I

This is to certify that the thesis entitled "**AN ECONOMIC ANALYSIS OF PRODUCTION AND MARKETING OF MAJOR VEGETABLES IN MAHASAMUND DISTRICT OF CHHATTISGARH**" submitted in partial fulfillment of the requirements for the degree of "**Master of Science in Agriculture**" of the Indira Gandhi Krishi Vishwavidyalaya, Raipur, is a record of the bonafide research work carried out by **Manisha Sonwani** under my guidance and supervision. The subject of the thesis has been approved by the Student's Advisory Committee and the Director of Instructions.

No part of the thesis has been submitted for any other degree or diploma or has been published/published part has been fully acknowledged. All the assistance and help received during the course of the investigations have been duly acknowledged by her.

Date- 22.7.15

Dr. B.C. JAIN

(Major Advisor and Chairman)

THESIS APPROVED BY THE STUDENT'S ADVISORY COMMITTEE

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CERTIFICATE – II

This is to certify that the thesis entitled "**An economic analysis of production and marketing of major vegetables in Mahasamund district of Chhattisgarh**" submitted by **Manisha Sonwani** to the Indira Gandhi Krishi Vishwavidyalaya, Raipur, in partial fulfillment of the requirements for the degree of **Master of science in Agriculture** in the **Department of Agricultural Economics** has been approved by the external examiner and student's Advisory Committee after oral examination.

Date: 18/8/2015

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THESIS ABSTRACT

a) Title of the Thesis : "An economic analysis of production and marketing of major vegetables in Mahasamund district of Chhattisgarh".

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ABSTRACT

The present study was conducted in Mahasamund district of Chhattisgarh. The study was undertaken to fulfill the objectives (1) To estimate the growth rate in area, production and productivity of major vegetables in Mahasamund district and Chhattisgarh state. (2) To work out the cost and return of major vegetables in the study area. (3) To examine the marketing pattern of major vegetables in the study area. (4) To identify the constraints in production and marketing of major vegetables and suggest some suitable measures to overcome them.

Hundred farmers were proportionally selected from ten villages and were categorized into small, medium and large farmers based on their holding size. The primary data were collected for the year 2013-14. The major findings of this study revealed that the average size of farm was worked out to be 3.02 hectares, on an average cropping intensity was observed to be

176.65 percent. On an average, the cost of cultivation per hectare of tomato, brinjal, cabbage, and onion was calculated at Rs.55090.26, Rs.51452.92, Rs 47061.59, and Rs. 50982.07 respectively.

Overall the cost of production of tomato, brinjal, cabbage, and onion was observed as Rs 302.82, Rs 389.60, Rs. 405.91 and Rs 384.22 per quintal respectively. Overall, the input-output ratio of tomato, brinjal, cabbage, and onion came to 1:2.63, 1:2.56, 1:2.46 and 1:2.86 respectively on the sample farms. There were three marketing channels identified for the marketing of major vegetables, which were Channel-I Producer – Consumer. Channel-II Producer – Village merchant- Whole seller – Retailer - Consumer and Channel III Producer - retailer - consumer. More than ninety five per cent marketable surplus was observed in all the major vegetable crops in different size groups of farmers.

The per quintal marketing cost of tomato, brinjal, cabbage, and onion was observed Rs.68.56, Rs.73.56, Rs.53, and Rs.53 in Channel-I and Rs.176.84, Rs.185.68, Rs.139, and Rs.163.16 in Channel-II where as in channel III Rs.160, Rs.140, Rs.124, and Rs.120.

The major constraints pertaining to cultivation of vegetables was irrigation, high input cost which followed by problem of insects, pests and diseases. A major constraint in marketing of vegetables was lack of shortage facility, lack of regulated and cooperative market, lack of processing units and lack of information regarding standardization and grading at grower level in the study area. In view of findings, the study suggested that the varieties capable of resisting disease and pest should be grown. Extension agencies should provide information on new varieties and package of practices as well as procedures of standardization and grading of produce and their benefits. Horticultural Crop Producer's Cooperative Societies should be formed for better performance and achievement. Some specific minimum prices should be declared for vegetables to ensure benefit for the producers it was suggested.

शोधग्रंथ सारांष

(अ) शोधग्रंथ का शीर्षक – छत्तीसगढ़ के महासमुंद जिले में प्रमुख सब्जियों के उत्पादन एवं विपणन का आर्थिक विष्लेषण

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मुख्य सलाहकार के हस्ताक्षर

विभागाध्यक्ष के हस्ताक्षर

दिनांक 22.7.15

सारांष

यह अध्ययन छत्तीसगढ़ के महासमुंद जिले में प्रमुख सब्जियों के उतदन और विपणन के आर्थिक विष्लेषण पर आधारित है, जिसमें महासमुंद जिले और छत्तीसगढ़ राज्य में प्रमुख सब्जियों के क्षेत्रफल, उत्पादन एवं उत्पादकता की वृध्दि दर ज्ञात करना, अध्ययन क्षेत्र में प्रमुख सब्जियों की लागत एवं प्रतिफल का आंकलन करने, वितरण प्रणाली एवं विपणन में आने वाली मुख्य समस्याओं का पता लगाने एवं उनके समाधान के लिए उपयुक्त सुझाव देने संबंधी उद्देष्यों को ध्यान में रखा गया है। इसय अध्ययन में महासमुंद जिले के महासमुंद और बागबाहरा विकाखण्ड के 10 गांवो के कृषि जोत के अनुसार 100 सीमांत, लघु, माध्यम और दीर्घ कृषकों का चयन किया गया, जिनसे वर्ष 2013 – 14 के प्राथमिक आंकड़े एकत्र किये गये। इस अध्ययन से मुख्य निष्कर्ष सामने आये है, जिसमें प्रक्षेत्र का औसत आकार 3.02 हेक्टेयर पाया गया तथा औसतन फल सघनता 176.65 प्रतिषत आंकी गई। टमाटर, बैगन, पत्तागोभी और प्याज की औसतन प्रति हेक्टेयर लागत क्रमषः रूपये 55090.26, रूपये 51452.90, रूपयं 47061.59 और रूपये 50982.07 पायी गईजबकि टमाटर, बैंगन, पत्तागोभी और प्याज का आदान प्रतिफल अनुपात क्रमषः 1:2.69, 1:2.56, 1:2.46 और 1:2.86 पाया गया। इसमें तीन माध्यमों द्वारा सब्जियों का विपणन किया गया, माध्यम–I उत्पादन–उपभोक्ता, माध्यम–II उत्पादक – ग्रामीण व्यापारी – थोक विक्रता – फुटकर व्यापारी – उपभोक्ता, माध्यम–III उत्पादक – फुटकर व्यापारी – उपभोक्ता, विभिन्न प्रकार के किसानो द्वारा प्रमुख सब्जियों में 95 प्रतिशत से अधिक विपणन योग्य अतिरेय पाया गया। माध्यम–I में टमाटर, बैंगन, पत्तागोभी और प्याज में प्रति क्विंटल विपणन लागत क्रमषः रूपये 68.56, रूपये 73.56, रूपये 53 और रूपये 53 आंकी गई है तथा माध्यम –II में इन फसलों की रूपये 176.84, रूपये 185.68, रूपये 139 और रूपये 163.56 प्रति क्विंटल विपणन आती है जबकि माध्यम –III में इन फसलों की विपणन लागत क्रमषः रूपये160, रूपये

140, रूपये 124, और रूपये 120 आंकी गई है। सब्जियों की खेती में मुख्य रूप से अवरोध कीट बीमारी है। इसके अलावा मानकीकरण और श्रेणीकरण की जानकारी का अभाव अवरोध पाया गया है इस अध्ययन से सुझाव दिये गये है कि कीट रोग निरोधक किस्मों की खेती करना चाहिए। सब्जियों की नई किस्मों, कृषि कार्यमाला और मानकीकरण श्रेणीकरण की जानकारी विस्तार संस्थाये किसानो तक पहुचाय। सब्जियों की सहकारी समिति बनाकर उत्पादक आपनी प्रभावी भूमिका निभा सकते ळें सब्जी वाली फसलों के समर्थन मुल्य घोषित कर उत्पादकों को लाभ पहुॅचाया जा सकता है।

CHAPTER – I

INTRODUCTION

The growing importance of vegetables in Indian economy can be well appreciated in terms of their rising domestic demand on account of increase in population and per capita income; their increasing export potential and increased vegetables consumption urban and rural area; need for providing employment opportunities in the rural area, and vegetables being relatively more remunerative crops. It can be grown within a short time period and more than one crop can be grown within a crop season. There are a large number of vegetables having different varieties, which can be grown throughout the year. However, the largest numbers of vegetables are grown according to climatic condition and irrigation facilities.

Vegetables are important constituents of Indian agriculture and nutritional security due to their short duration, high yield, nutritional richness, economic viability and ability to generate on-farm and off-farm employment. Increasing per capita income, health consciousness, urbanization, increasing working women, shifting of farmers to high value vegetables due to higher income, favourable income elasticity of demand and annual growth rate for vegetables are also important ingredients for fueling vegetables growth in the country.

Vegetables form the most important component of a balance diet. Vegetables being a rich source of vitamins and minerals, occupy an important place in the food basket of Indian consumers. Their consumption in sufficient quantities produce taste, palatability, increases appetite and produce fibers. They also produce valuable roughage, which promotes digestion and helps in preventing constipation. Although vegetables are richest and cheapest source of vitamins and minerals in Indian vegetarian diets, the per capita availability of vegetables per day in our country is less. Per day availability of vegetables is 180 gm which is far below the minimum dietary requirement of 280gm/day/person. (Indian Council of Medical Research). Vegetables

play a vital role in the economy of the people in addition to improving the health and nutritional security of the people in the country.

Varied agro climatic conditions in India makes it possible to grow a wide variety of vegetables all the year round in one part of country or another. In India about 40 kinds of vegetables belonging to different groups cultivated solanaceous, cucurbitaceous, leguminous, cruciferous (cole crop), root crop and leafy vegetables are being cultivated. Tomato, Onion, Brinjal, Cabbage, Cauliflower, Okra and Peas are among the most important vegetables grown.

India produces 14 % (146.55 million tonnes) of world's vegetables on 15 % (8.5 million hectares) of world area under vegetables. Productivity of vegetables in India (17.3t/ha) is less than the world average productivity (18.8t/ha). Potato (28.9%), tomato (11.3%), onion (10.3%) and Brinjal (8.1%) are the 4 major vegetables contributing 58.6% of total vegetables production in our country. Other important vegetables are cabbage (5.4%), cauliflower (4.6%), okra (3.9%) and peas (2.4%). India ranks first in the production of okra in the world (73% of world production). India produces 14 % (146.55 million tonnes) of world's vegetables on 15 % (8.5 million hectares) of world area under vegetables. (***Indian Institute of Vegetable Research,*** 2011)

Chhattisgarh is an agricultural chief land and due to large production of rice. Chhattisgarh is known as the rice bowl. Chhattisgarh used to produce over seventy percent of total paddy production in the state. Apart from paddy, vegetables are also grown. About sixty percent of total vegetables area is covered by tomato, brinjal, okra, and cauliflower. The major vegetables grown in Mahasamund district of Chhattisgarh are onion, brinjal, tomato, cabbage, cauliflower, okra. Mahasamund district covers 2.87 percent share in total vegetables area in Chhattisgarh (2012-13).

Table1.1 Area, production and productivity of major vegetables in Mahasamund district and Chhattisgarh state

S. N.	Crop	Chhattisgarh State			Mahasamund District		
		Area (Ha.)	Production (MT)	Productivity (MT/Ha.)	Area (Ha.)	Production (MT)	Productivity (MT/Ha.)
1.	Cauliflower	21425 (7.12)	395768 (9.6)	18.47	560 (5.53)	8960 (6.5)	16
2.	Cabbage	18594 (6.18)	338563 (8.2)	18.21	1050 (10.37)	16800 (12.3)	16
3.	Knol Khol	4093 (1.36)	54244 (1.3)	13.25	0 (0)	0 (0)	0
4.	Brinjal	33069 (10.99)	585978 (14.2)	17.72	1900 (18.76)	28500 (20.9)	15
5.	Tomato	50375 (16.74)	814216 (19.8)	16.16	1195 (11.80)	10755 (7.8)	9
6.	Potato	37888 (12.59)	556398 (13.5)	14.68	1025 (10.12)	10250 (7.5)	10
7.	Onion	20076 (6.67)	309541 (7.5)	15.42	2350 (23.20)	35250 (25.8)	15
8.	Sweet Potato	3369 (1.12)	35765 (0.8)	10.61	40 (0.39)	360 (0.2)	9
9.	Bitter Guard	9106 (3.03)	117462 (2.8)	12.89	365 (3.60)	4745 (3.4)	13
10.	Bottle Guard	11527 (3.83)	207695 (5.0)	18.02	405 (4)	6480 (4.7)	16
11.	Other	91338 (30.36)	695849 (16.9)	7.62	1235 (12.19)	14102 (10.3)	11.42
	Total	300860 (100%)	4111479 (100%)	163.05	10125 (100%)	136202 (100%)	130.42

Source:-Directorate of Horticulture, Raipur (Chhattisgarh), year-2013-14

Scenario of vegetable production in Chhattisgarh

Chhattisgarh stands 15th among all states of India in vegetables cultivation for the year 2008-09. Chhattisgarh occupies an important place in the horticulture map of the country, horticultural crops occupies an area of 6.89 lakh ha. with a production 7.43 metric tonne, although the area comprises only 4.99 percent of the net cultivated

area invested, but the total income generated from horticulture sector accounts to over 33.83 percent of total income derived from combined agriculture sector in the state for 2012-2013. The diverse agro-climatic conditions prevailing in Chhattisgarh has made it possible to grow different types of horticultural crops such as fruits, vegetables, flowers, spices, and plantation crops, medicinal and aromatic crops.

Under various horticultural crops during the year 2012-13, area of fruit was 1.990 lakh ha and production of 1.730 lakh tonne, area of vegetables crops was 3.772 lakh ha and production of 4.965 lakh ton, area of spice crops was 92.7 thousand ha and production of 63.2 thousand tonne, area of flower was 8.44 thousand ha and production of 50.24 thousand metric tonne and area of medicinal and aromatic crops. (Deptt. Of Horticulture, Government of Chhattisgarh).

Horticultural crops are mostly labour intensive in India and provide substantial employment, not only in production but also transportation, processing and marketing (Sharma 1991). A new farmer centric, industry driven knowledge based strategy may bring about desired results. It is the need of the hour to identify doable programs and implement them in a time bound manner. The information regarding current production, productivity and profitability will helpful to stakeholders, to enhance productivity and profitability from agriculture. It will also be required to provide inputs of knowledge and scientific research, access to markets, credit support and insurance coverage and management techniques for effective utilization of various resources for running farming as successful business operation.

The marketing of horticultural crops is also quite complex and risky due to their perishable nature, seasonal production and bulkiness. So the study on "An Economic Analysis Of Production And Marketing Of Major Vegetables In Mahasamund District Of Chhattisgarh" have manifold importance. It is not enough just to produce vegetables; it must be produced efficiently and marketed successfully. It is necessary to improve the marketing system to aid development. A study of the

vegetables marketing system is necessary to understand the complexicity involved and to identify bottleneck with a view to provide efficient services in transfer of farm produce and input from producers to consumers. An efficient marketing system minimizes costs and benefits in all sections of society. In light of the above facts the following specific objectives are being undertaken to fulfill the study.

Objectives

1. To estimate the growth rate in area, production and productivity of major vegetables in Mahasamund district and Chhattisgarh state.
2. To workout the cost and return of major vegetables in the study area.
3. To examine the marketing pattern of major vegetables in the study area.
4. To identify the constraints in production and marketing of major vegetables and suggest some suitable measures to improve the production and marketing of vegetables.

Limitation of the study

During the course of investigation several difficulties were faced in the collection of data from cultivators. The cultivators generally did not maintain any farm records and supply data on the basis of their memory, which may not be very correct. The illiteracy of the farmers also added in this problem. Some of the farmers did not co-operate in giving data because of some misunderstanding regarding agricultural taxes, ceiling etc. They were biased in giving data giving towards higher side of the investment and lower side towards productivity. The area of investigation is restricted 10 villages and one district of the Chhattisgarh state. There might be some variations in other village which is obviously natural on ground of regional demographic heterogeneity. A small sample of 100 respondents is selected for the investigation from 10 villages which increases standard error comparatively to complete enumeration and not provide the valid result for vast area. The present time face the shortage of the time

and the resource to be encounter by the researcher. The items included in the study for detailed investigation are also limited because of shortage in time to cover all the segments. Although, every efforts were made to use standardized tools and techniques of data collection and analysis. However, sufficient care was taken to collect the data by cross checking with the educated neighboring farmers and other village leaders, Gram Panchayat Sarpanch etc.

Set up

The present study has been presented in several chapters. The first chapter is devoted to introduction. Following Introduction, Review of literature is presented in Chapter-II, Material and Methods are presented in Chapter-III, Chapter-IV present the Results and Discussion. Chapter fifth summaries the overall results, draws conclusions and suggest for the future research work emerging from the study.

CHAPTER- II

REVIEW OF LITERATURE

In this chapter, an attempt has been made to review pertinent literature keeping in view the problem entitled, "An Economic Analysis Of Production And Marketing Of Major Vegetables In Mahasamund District Of Chhattisgarh". A brief account of the work reported by the past researcher has been discussed under the following heads:

2.1 Studies on growth rate in area, production and productivity of major vegetables.

2.2 Studies on cost and return of major vegetables.

2.3 Studies on marketing pattern of major vegetables.

2.4 Studies on constraints in production and marketing of major vegetables and suggest some suitable measures to overcome them.

2.1 Growth rate in area, production and productivity

Kainth and Mehra (1988) studied trends and seasonal fluctuations in arrivals and prices of potatoes in Amritsar district, Punjab, were examined together with the price spread of potatoes. Seasonal variations might be primarily due to seasonal production, poor cold storage facilities and lack of retention power of the potato growers. Price variations played a predominant role in creating uncertainty in the income levels of potato growers. The main reason for the variation in prices was the pattern of market arrivals. Producers received only about 59% of the consumer price.

Horton and Anderson (1992) noted that the potato was one of the world's most important and widely grown crops. World potato production in the late 1980s was about 200 Mt. The balance of world production was gradually shifting from the developed to the developing countries and from the temperate to the tropical and subtropical zones. Only about 40% of the world's potatoes were grown in Europe; 35% were grown in other developed countries and 25% in developing countries. Since average potato consumption was still less than a quarter of that in Western Europe it

was likely that demand would continue to grow rapidly in the future. Over 98% of the potatoes grown in developing countries were consumed domestically. However, in some regions such as North Africa, potatoes were an important export crop**.**

Gupta *et al.* (1999) investigated the influence of growth and trends in area, production and yield of potato on change in price of potato in West Bengal. The study revealed that in spite of an increasing trend in area, production and yield, changes in price of potato have been random. Path coefficient analysis indicated that present area under potato was directly associated with the previous year's production and market price.

Johl and Dahiya (2002) found that the area and production of potato had shown significant decrease in developed countries and increase in developing countries. Storage plays a key role in marketing of potatoes, yet with the present capacity hardly 40% of the output in India can be cold-stored. Indigenous storage systems, suitable for short-term storage for 2-3 months only, were in use in selected areas of Madhya Pradesh, Karnataka, and Gujarat and North East region. The farmer‟ s share in consumer‟ s rupee in developed countries was considerably lower than the developing ones. The USA, Netherlands and Canada were the world's largest exporters of French fries. World trade in potato was mostly a European affair since over 80% of it took place within the European Union itself. Developing countries like India, who are major producer and have a comparative advantage also had a minuscule share in world trade due to infrastructural bottlenecks, lack of definitive policies to boost potato exports on a sustained basis, and the absence of an appropriate exim trade set-up.

Malik *et al.* (2002) using secondary data on vegetable production in Haryana, India for the period 1990/91-1997/98, calculations revealed that the annual compound growth rates of area, production and yield were 11.44, 13.38 and 1.74 per cent for onion; 9.32, 7.27 and -1.88 per cent for tomato; 14.52, 21.09 and 5.74 per cent for cauliflower; 19.97, 14.23 and 2.94 per cent for chillies; 6.69, 7.38 and 0.64 per cent

for okra; and 2.82, -0.87, and -3.60 per cent for potato, respectively. Overall, the annual growth rate for vegetable crops in the state was positive.

Malik and Hooda (2004) analysed the Economics of Production and Export of Onion in India. The results indicated that significant increase was recorded in area, production and productivity in all countries during the period 1980-2000. The state wise analysis revealed that all major onion producing states registered positive and significant growth in area, production and productivity of onion in India. The quantity and value of onion export from India decreased at the rate of 2.82 and 5.21 per cent per annum, respectively. Further, the decline in export of onion to different countries was observed except Malaysia. The productivity of onion was extremely low in comparison to the countries like Egypt and China. There was need to develop high yielding and area specific varieties. The Govt. should popularize the improved production technology among the cultivators through effective extension system. Marketing, financial, storage and processing facilities need to be strengthened. Cultivators should be encouraged to grow export oriented good quality varieties of onion. Market survey of potential importing countries should be done and export promotion policies should be liberalized.

Rajur (2007) the growth on area, production and productivity of chilli increased significantly over the study period (1990-2004) both at district level and state level similar trend was observed in all the selected districts except Bijapur. At the state level, the magnitude of growth rates in area and production were higher compared to other districts. However, Raichur district registered higher growth in yield among all selected districts and state as a whole. The change on mean area was positive on Bijapur and was negative in both Gulbarga and Raichur districts. The total cost of cultivation per hectare was higher in Bijapur district (Rs. 45109.80) followed by Gulbarga (Rs. 44902.70) and Raichur (Rs. 41686.60) districts. The overall cost of cultivation per hectare of chilli was Rs. 43899.71. The total return obtained per hectare

of chilli was more (Rs. 78778.10) in Gulbarga district followed by Raichur (Rs. 76642.10) and Bijapur (Rs. 73945.87) district. The magnitude of price spread in channel I was more in Gulbarga (818.92) followed by Bijapur and Raichur, while it channel II the price spread was also more in Gulbarga followed by Raichur and Bijapur. The nominal protection coefficients (NPCs) indicated that the chilli crop was competitive for exports to other countries. The Sri Lanka was found to be highly loyal market for export of Indian chilli as indicated by the retention of their previous shares of chilli exports from India by 25 per cent. USA retained about 19 per cent of its previous share of chilli exports from India.

Baba *et.al* (2010) the paper has reported the growth of vegetable sector in relation with technology mission, extent and determinants of marketed surplus and price spread of vegetables in the Kashmir valley. At the farm level, vegetables have been observed to occupy an important place in the cropping pattern. The intensity of cropping in the study area has become more than 250 per cent due to multiple cropping of vegetable crops. On an average, producers' marketed surplus has been found more than 92 per cent of the total production of selected vegetables.

2.2 Cost and return of major vegetables

Koshta *et al.* (1996) Studied on production and marketing of progressive vegetable farms under tube well and river irrigation situation in Raipur district of M.P. The main aim of the study was to find the cropping pattern, cost and return, and marketing cost of vegetable crops. All the analysis is categorized in two irrigation situation, category-I (underground water through tube well) and category-II (perennial river water through lift). In category-I cropping intensity is higher (197.1 percent) than the category-II (189.0 percent). River farm had more investment per ha. In various farm assets (excluding land) for Rs.64, 220 per ha as compared to Rs.50, 293 in tube well irrigated farm. The cost and return of vegetable crops and inter cropping is measured by cost-benefit ratio. It was higher in case of papaya (3.52) and low in case

of cucumber (1.04). The marketing cost is measured higher in papaya (50.98) and low in cucumber sold Rs.115.11 and low in papaya Rs.45.11. Hybrid tomato and Banana had more productivity of papaya and other sole crops was noticed more in tube well irrigation farm.

Venkataramana and Gowda (1996) computes the costs and returns of tomato production, estimates labour requirements and examines the problems encountered by farmers in producing and marketing tomatoes. A sample of 100 farmers who grew tomatoes during 1990/91 was selected from Kolar, Srinivaspur and Chintamani taluks of Kolar district, Karnataka state, India. The total cost of production was Rs 36 611.51, of which variable costs were Rs 15 648.26, fixed costs Rs 2556.48 and marketing costs Rs 18 406.77. Though the net return obtained is high compared to many other crops, the high costs of production, perishable nature of the produce, risk associated with large fluctuations in tomato prices, and shortage of labour during peak periods discourage farmers from increasing tomato production.

Arif (1998) conducted a study on potato production in selected areas of Comilla District. He showed that the per hectare gross returns were Rs 81219.97, 81618.66 and 808031.77; gross costs were Rs 51232.54, 51972.89 and 64741.42; net returns were Rs 29987.43, 29645.77 and 292333.15for small, medium and large categories of farmers, respectably.

Arora and Saxena (1999) have conducted a study on vegetables marketing in hill region of Uttar Pradesh: issue and challenges. The main aim of the study is to examine the marketed surplus, marketing cost and price spread. The marketed surplus of vegetables is found ranging from 89.33 per cent in potato to 97.51 per cent in cabbage. The marketing cost incurred by vegetable growers is very high which ranged from Rs 83.47 (radish) to Rs 201.27 (green pea) per quintal, due to very high cost of transport and packing and unauthorized commission paid. The main 24 problems face

by farmers were production oriented, small marketable surplus, in effective rural assembly markets and in efficient marketing practices.

Koshta and Chandrakar (1999) have conducted the study on "Economics of production and marketing of vegetable crops in Durg district of Chhattisgarh region". The personal interview method was used for collection of data. Tomato requires high cost of seed than other crops. Major share of production cost goes to marketing charges in the form of transportation and commission paid to Mandi broker, and accounted approximate from 20 to 40 per cent on per quintal basis. Cabbage has maximum cost benefit ratio, labours and fertilizers / manure was major inputs for vegetables cultivation. Maximum labours days required in pickings followed by intercultural operation. Large farms needed 35 per cent more days than small farms. Main constraints in techno-economic consideration for development of vegetables cultivation were large number of manufacturers of seed/pesticides available in the market, so the selection of good market is the problem of vegetables farmers.

Jain and Tegar (2003) Studied on Economic of production and marketing of tomato in Jashpur district of Chhattisgarh. The study assures about profit level, cost of cultivation is measures that help the farmers to take rational decision about production. The analysis is divided into four categories marginal group (34 farmers), small group (24 farmers), medium group (18 farmers) and large group (14 farmers). The cropping intensity on various farm sizes is estimated to be 108.18 per cent, 111.15 per cent, 115.01 per cent and 118.38 per cent on marginal, small, medium and large farms respectively. The total cost is estimated by adding variable cost, fixed cost and marketing cost. It showed maximum cost at large farms while minimum at marginal firms. The total marketing cost ranged from 19.87 per cent at marginal farm to 13.52 per cent at medium farms. Net return on various sizes of farms is examined as Rs.25317 per ha. at marginal, Rs.28022 per ha. at small, Rs.29987 per ha. at medium and Rs.52192 per ha. at large farms. The cost – benefit ratio on large farms is observed

to be highest among various sizes of farms. It is noted as 1:1.91, 1:1.98, 1:2.22 and 1:2.90 at marginal, small, medium and large farms respectively.

Singh and Banafar (2006) has conducted a study on "An economic analysis of production and marketing of cauliflower in Durg District and C.G state. The main objective of study was to find out the cost of production, marketing channel and marketing efficiency. It was concluded that the average cost of cultivation of cauliflower per hectare was Rs.25228.57.It showed arising trend with the rise in the size of farm. It was due to the fact that the large farm could incur more expenditure on modern input. Average per hectare output was Rs.48156.20. Average, per hectare benefit cost ratio (BCR) was estimated to 1:1.91. Slightly higher share i.e.85.91 percent and 80.15 percent in Shastri market, where it was 83.60 and 78.37 percent for the same vegetable respectively. Channel -2 was found to be more efficient as compare to channel-1.

Iyer Ramya (2009) analyzed the production and marketing of major vegetables in Bilaspur District of Chhattisgarh, The main objectives of study were to examine the marketing pattern, and find out the constraints in production and marketing of vegetable and suggest suitable measures. It was concluded that the cost of cultivation of Tomato, Brinjal and Okra was calculated Rs 29782.82, Rs26252.01 and Rs29788.78 respectively and its input output ratio was 1:2.76, 1:2.83 and 1:2.36 on the sample farms.

Akter and Islam (2011) analysed economics of winter vegetables production in some selected areas of Narsingdi district, Bangladesh. The study was designed to assess the comparative profitability of selected winter vegetables: namely tomato, cauliflower and cabbage. In total, 90 farmers (30 each growing tomato, cauliflower and cabbage) were randomly selected from two villages under Shibpur Upazila in Narsingdi district. Both tabular and quantitative analyses were done to achieve the major objectives of the study. The major findings of the study revealed that production

of all the selected vegetables were profitable. The per hectare gross cost of production of tomato, cauliflower and cabbage were Tk. 118000, 116977 and 120522, respectively and the corresponding gross returns were Tk. 217020, 210000 and 220000, respectively. The per hectare net returns of producing tomato, cauliflower and cabbage were Tk. 97000, 93023 and 99478, respectively. The study reported some problems and constraints which are related to production and marketing of these vegetables. Based on the findings of the study, some recommendations were made to improve cultural and management practices for selected winter vegetables farming with a view to increase the income and employment opportunities of the farmers.

Chatterjee (2011) An attempt has been made on the economics of three major Solanaceous vegetable crops (tomato, brinjal and chilli) grown in West Bengal with their respective cost component analysis and economic return on the basis of the information gathered from ten progressive vegetable growers from three districts selected at random and purposively. Through detailed survey and questionnaire, break up of cost components for each vegetable along with their operational cost and farm harvest price have been collected. It could be determined that cultivating one hectare of brinjal with open pollinated local cultivar, hybrid tomato and chilli with open pollinated local cultivar a farmer gets a minimum return of 2.46/-, Rs. 3.14/- and Rs. 1.27/-, respectively by spending one rupee for cultivation. It is concluded from the present study that during autumn-winter season in West Bengal the cultivation of hybrid tomato is the most remunerative activity, which is closely followed by brinjal. However, brinjal and chilli cultivation seems to be economically more viable during summer-rainy season due to rise in farm harvest price prevailing at that time.

2.3 Marketing pattern of major vegetables.

Marothia *et al.* (1996) has conducted a study on marketing of vegetable in Shastri market of Raipur and Subhash market of Durg districts. The main aim of the study was to examine the existing marketing pattern, marketing cost, margin and price spread in the marketing of vegetable. Forty and thirty-two vegetable growers were considered randomly in these two markets respectively and fifteen retailers were also selected from each of the market. Following two marketing channels were identified Channel-1: Producer – commission agent/retailer – Consumer and Channel-2: producer-Consumer. Small producers usually prefer to sale 21 their whole vegetable directly to the consumer at relatively less price. In Channel-2, producer received slightly higher share i.e.85.91 per cent and 80.15 per cent in Shastri market as compared to Subhash market, where it was 83.60 and 78.37 per cent for the same vegetable respectively. Channel-2 was found to be more efficient as compare to Channel-1.

Gupta and Rathore (1998) made an attempt to assess the share of different categories of farmers in vegetables marketing, the disposal pattern of vegetables, marketing cost and various constraints in the production and marketing of vegetables. They found that the market share of farmers increased with the increase in the size of holding. It was about 4 per cent, 13 per cent, 24 per cent, and 59 per cent on marginal, small, medium, and large farms respectively, of the total marketing cost.

Kumar and Anil (1999) studied the production and marketing of vegetable in Varanashi district of U.P. The study revealed that three marketing channels were found for sale of vegetable produce. In channel-1 (producer-consumer) 7 to 23 per cent of total surplus was sold and producer‟ s share in consumer‟ s rupee was 89 to 96 per cent, which was quit higher as compared to the other channel. The maximum proportion of produce was disposed in channel-II, which ranges from 32 to 75.98 per cent. The producer‟ s share in consumer‟ s rupee was found to be 68.50 to 83.60 per

cent in this channel. In channel-3 (producer-wholesaler-retailer-consumer) only 17 to 33 per cent surplus was sold and share of producer in the consumer rupee was between 62.70 to 73.15 per cent.

Teger (1999) analyzed the production and marketing aspects of tomato in Jashpur district of M.P. with a view to identify the different marketing channels, to estimate efficiency of different marketing channels and policy measure to overcome the marketing problems. The study revealed that producer-retailer-consumer (Channel-I) and producer-consumer (Channel -II) were two important channels. The net share of farmers in consumer's rupee was 80 per cent in 25 Channel-I and 92 per cent in Channel-II. The marketing efficiency of Channel-II was examined more than Channel.

Baruah and Barman (2000) in his studies involves the marketing cost, marketing margin, marketing efficiency, benefit-cost ratio and price spread involved in the production and marketing of tomatoes in Barpeta district, Assam, India, were estimated based on data for the period 1997-98 collected from 5 primary wholesalers, 7 secondary wholesalers, and 10 retailers. Net returns over costs showed direct relationship with farm size. Producers' return was found to be highest when the farmers sold their produce through secondary than through primary wholesalers.

Devaraja (2000) studied channels and price-spread in fruit and vegetables marketing in Mysore district, Karnataka. The main objectives of study were to examine the marketing practices, cost and return and suggestion to improve them of vegetable, fruit and flower crops. There were five channels found: (Channel-I) producer-commission agent, (Channel- II) producer-pre- harvest contractor, (Channel-III) producer-Trader at firm/village, (Channel-IV) producer-retailer and (Channel-V) producer‟ s Co-operative marketing and processing society Ltd, (HOPCOMS-Horticulture Produce Marketing and Processing Cooperative Society). In the case of vegetables most of the cultivators sold their produce through commission agent at the market and only in the case of cabbage and cauliflower, sale of pre harvest contractors

were noticed to the extent of 19 to 20 percent respectively. Direct sales to retailers were also less than 10 percent. Surprisingly around 10 percent of selected cultivators have sold their produce to the HOPCOMS located at Mysore city. This showed that the commission agent play a dominant role in marketing of vegetable in Mysore district .In case of fruit the commission agent at market, pre-harvest contractor and HOPCOMS were the most common method of sale. The fruit like papaya (40.26 percent) and banana (18.89 percent) are sold to HOPCOMS. Among the Different horticulture crops, 26 marketing cost were the highest in case of flower (416.92 Rs./qt), then fruits (114.48 Rs/qt) and minimum in case of vegetables (47.72 rs/qt).

Jain and Chetan (2002) studied the marketing of major horticulture crops in Dharsiwa Block of Raipur. The main objective of study was to identify the different marketing channels involved in marketing of fruits and vegetables, estimate the marketing cost and marketing margins in fruit and vegetable marketing and estimate the marketing efficiency prevailing in different marketing channel. The result of study showed that the area under horticulture crops increased at small and medium farm but decreased at large farm.

Verma and Singh (2002) has conducted a study on market analysis of fruits and vegetables: A case study in Patna Block of U.P. The main aim of study was to examine the existing marketing pattern and marketing cost. Results of the study shows that farmers/contractors pay Rs.10-15 per khachi for transportation from field to different markets. Produce is usually packed in small containers known as khachi or tokri having 50-60 kg of produce and is carried by vehicles owned or hired by traders, wholesalers and Local sellers. Farmer having 15 per Khachi or Tokri for transportation of tomato, chilli and cauliflower from field to wholesale market. Whole seller incurred Rs 50-60 both for market place and Rs. 200 for the payment of market association. Transportation cost comes out Rs. 250-300 per DCM of banana crop (1khachi= 40-60 kg, 1 truck=600-700 kaund, 1DCM=300kaund). Problem related to vegetable

marketing, which result in the reduction of growers returns are: lack of the localized market, lack of infrastructure and week market intelligence.

Gadrel *et al.* (2003) examined the Price Spread in Marketing of White Onion in Raigad District of Maharashtra State. It was observed that the production of white onion on sample farms was 144.91 quintals per hectare, of which 89.23 per cent was marketed surplus. The marketing system for white onion was in the hands of marketing functionaries to the extent of 93 percent. The maximum quantity of white onion was passed through Channel IV i.e. Producer-Wholesaler-Retailer-Consumer (66.96%) followed by Channel III i.e. Producer-Retailer-Consumer (17.32%) Channel II i.e. Producer-Wholesaler-Consumer (14.62%) and Channel I i.e. Producer-Consumer (1.07%).The producer share in consumer's rupee was the highest in Channel I (98.85%) and it was lowest (65.60%) in Channel II. The percentage share of marketing margins in consumer price paid was 11.56, 31.99, 29.57 and 28.88 per cent in Chanel I, II, III and IV respectively. The marketing efficiency (ME) was much higher in Channel I (84%) than that of Channel II (2.19) and Channel III (2.38) and Channel IV (2.46). The white onion cultivators should streamline marketing stragegy to minimize the role of marketing functionaries to harness better from white onion cultivation.

Ghorbani (2008) compare the effect of market sale and contract strategies on yield, using a 90 survey data from tomato farmer in Khorasan. He applied the game theory approach .The result showed that the effect on no contract strategy with tomato processing factories is more than contracted strategy on tomato yield in farm level. With respect to this finding, collective contract framework has been recommended to planner and policy maker.

Barakade *et al.* (2011) estimated the Economics of onion cultivation and its marketing pattern in Satara district of Maharashtra. The present study was carried out into March-April 2010 to determine the economics of onion cultivation, price spread,

marketing channels and marketing efficiency of onion in Satara district. A sample of 180 onion growers was selected randomly from 20 villages in ten tahsils of Satara district of Maharashtra State. Onion cultivation is concentrated in the eastern part of the Satara district. The selected cultivators were classified into three categories i.e. small (below 2 ha.), medium (2-4 ha.) and large (above 4 ha.) based on land holding size of the farmers. The primary data were collected by survey method with the help of pre-tested schedule of questionnaire through personal interview.

Sangeetha and Banumathy (2011) conducted an economic analysis of marketing of major vegetables in Cuddalore district. The first hypothesis of the study was there exists a direct relationship between total marketing cost and the number of middlemen involved in the identified marketing channel. It was clear from the results that the total marketing cost of Tomato and Brinjal was observed as the highest in the marketing channel I. The second hypothesis of the study was current arrivals of vegetables is an important source of information for determining the current wholesale price. The result of the regression analysis showed that there was a significant and negative relationship between current price and current market arrivals of Tomato and Brinjal. Thus, market arrivals played an important role in fixing current wholesale price rather than lagged price. The vegetable market is an unregulated market and due to the lack of organized marketing, the vegetable grower get low share for their produce it was concluded therefore it was suggested that establishment of vegetables cooperatives would benefit of farmers.

Joshi **(**2012) the study was undertaken to analyze marketed surplus and price spread for Okra in Western Uttar Pradesh. Cluster sampling techniques was used to select the sample villages and respondents. Primary data were collected by personal interview of respondents. Simple statistical tools were employed to accomplish different objectives of the study. The marketed surplus of the small category of farms have slightly higher surplus than large, marginal and medium categories of farms. Their relative proportion was 95.31 per cent, 94.88 per cent, 94.85 per cent and 92.76

per cent respectively of the total production. The share of producer in consumer rupee is high in channel were there are less number of intermediaries. The marketing cost incurred by wholesaler in different channels were estimated 6.92 per cent,6.98 per cent and 8.29 per cent of the consumer price respectively and their corresponding net margins were 9.76 per cent, 10.13 per cent and 12.78 per cent of the price paid by the consumer.

Shejal (2013) the results of the study was marketing cost of Tomato is highest i.e. Rs. 230 per quental, Rs.174 of capsicum and Rs. 167 and Rs. 162 of Green Chilli and Brinjal. The lowest marketing cost of Brinjal. It is revealed that marketing costs turned out to be very high in Sangli district. The reason for high marketing costs lies in high packing and transportation costs along with high commission charged from vegetables produces. In vegetables like tomato share of packing cost and transport cost was the highest i.e. 50% and (32.60%) respectively of total marketing cost. On the other hand the commission paid was an important cost component in all the vegetables. the per quintal price for Brinjal was Rs. 2500, Tomato Rs.1000, Green Chilli Rs.2500 and Capsicum was Rs. 3000 received by farmers, price paid by consumer Rs. 4000, Rs. 3000, Rs. 4000 and Rs. 5000 for Brinjal, Tomato, Green Chilli and Capsicum respectively. There is equal marketing margin for Brinjal and Green Chilli i.e. Rs. 1500 per quintal and equal for Tomato and Capsicum Rs. 2000. The Share of Producers in consumers rupee was highest for Brinjal and Green Chilli i.e. 62.5% and lowest for Tomato i.e. 33.33%. with a view to identify the different marketing channels, to estimate efficiency of different marketing channels and policy measure to overcome the marketing problems. The study revealed that producer-retailer-consumer (Channel-I) and producer-consumer (Channel -II) were two important channels. The net share of farmers in consumer's rupee was 80 per cent in Channel-I and 92 per cent in Channel-II. The marketing efficiency of Channel-II was examined more than Channel-I.

2.4 Constraints in production and marketing of vegetable crops:

Gopalan and Gopalan (1991) studied that the agricultural marketing system in India suffered from severe constraints like high costs, the existence of middlemen, storage and transport bottlenecks and a lack of market information among farmers in a case study of the Nilgiri Cooperative Marketing Society in the potato growing region of Tamil Nadu to evaluate various methods of raising marketing efficiency. The analysis suggested that the cooperative has weakened the many small monopolies and malpractices of middlemen, and had led to a considerable improvement in marketing efficiency. However, there was need for more timely and adequate application of farm inputs, better coverage of potato growers, grading schemes and more efficient dispersal of information, among other requirements.

Sikka and Sharma (1991) identified the types of processed potato products available in the market, the types of packages, and quantity per package, the sources of availability of processed potato products, quantified the supply of these products and market potential and further identified constraints and provided suggestions for wholesalers and retailers to increase demand for processed potato products. A sample of 92 retailers and 12 wholesalers in Delhi, India, were selected for the study. Sales of potato products varied according to season, with sales comparatively higher in the winter months than in the summer season. Price was the single most important factor determining the consumer's opinion of the value of the product. Packing also was an important factor in determining demand.

Patel (1995) examines the market structure and efficiency of tomato marketing and identifies problems that producers face, particularly in relation to input supply. A sample of 50 tomato growers in Padra taluka, Vadodara district, Gujarat, India, was selected. The reference year of the study is 1991/92. Tomatoes are a relatively recently introduced crop in the area. About 25% of the gross cropped area of sample households benefited from a costly lift irrigation facility. Net income per ha after

deducting production and marketing costs was Rs 33 654 during 1991/92. The most important item of expenditure was labour, followed by irrigation, chemical fertilizers, pesticides and seeds. No cold storage facilities were available to growers.

Sharma and Thakur (2000) studied on Vegetable marketing constraints and opportunities in Himachal Pradesh. Multistage random sampling, technique was employed for selection of block (stage1), village (stage2) and farmer respondent (stage3). The marketable surplus of tomato, pea, and cauliflower accounted for more then 94 per cent of the total production on an average farm. The following three marketing channel were found (channel-I) Producer-commission agent- cum-wholesaler- retailer- consumers, (channel-II) Producer- villager traders- commission agent- cum- wholesaler- retailer- consumers, (channel-III) Producer- village traders-consumers. The marketed surplus reduced to nearly 90 per cent, 95 per cent and 93 per cent of total production in tomato, pea, and cauliflower mainly due to post harvest losses. Total marketing cost in sale of tomato, cauliflower and pea through channel- I was Rs.93.18, Rs.84.07 and Rs.117.24 per quintal of produce respectively. In channel-II the cost incurred by the retailer was around 67 per cent and 39 per cent higher then that of the cost/expenses paid by the village traders in the marketing of tomato and cauliflower. In channel- III the per quintal cost of marketing, was low amounting to Rs.23.00 and Rs.22.50 for tomato and cauliflower, respectively. The efficiency index to channel-I for pea turned out to be 2.42, which were higher than that of 1.77 for tomato, and 2.29 for cauliflower sold through this marketing channel. The major constraints of vegetable grower was related to grading and standardization of produce as reported by 60 per cent of farmers.

Babu *et al.* (2003) conducted studied on Price Spread and Marketing of Green Chillies-A Case Study in Andhra Pradesh. It was clear from the study that the producer's shares in the consumer's rupee as well as marketing efficiency were high in the channel II, where there were no middlemen. But, the majority of the farmers were forced to dispose of their commodity to the village merchant who provided credit to

them. The main problems associated with marketing of green chillies were, absence of cold storage structures, high transportation cost unawareness of market information, lack of support price and unsatisfactory marketing arrangements. Based on the findings of the study, the policy implications which emerged out are (i) there is a need of installation of cold storage structures (ii) Proper market information should be made available to the farmers. For that, the extension agency should be strengthened (iii) Adequate and timely credit should be provided to the farmers. (iv)The government should give priority for the establishment and smooth functioning of regulated markets. (v) Production and marketing techniques have to be integrated to reduce postharvest losses and (vi) The government should provide a good support price for the produce.

Balappa and Hugas (2003) studied the Economic Evaluation of Onion Production and its Marketing System in Karnataka. In view of the major cost on labour, there was immediate need to develop the labour saving practices such as use of weedicides, improved tools for planting, harvesting, etc. Appropriate extension method may be adopted to evaluate the farmers on optimum use of inputs. Though the farmers are producing adequate quantity of onion to meet the consumer demand, they were facing problems in marketing of their produce. On the other hand, market intermediaries were accruing higher margin by incurring less cost and services. Therefore, in order to regulate the expenditure on commission, transportation and packing, efforts should be made to develop the necessary infra-structure for the marketing of onion in the state. Alternatively, it was suggested to develop the farmer's market for vegetables in general and onion in particular.

Chole *et al.* (2003) examined the Price Spread in Marketing of Brinjal in Maharashtra State. In case of brinjal following three channels were patronized by the vegetable growers for marketing of their produce: Channel - I (Producer - Retailer-Consumer), Channel - II (Producer- Wholesaler –Retailer - Consumer) Channel -III (Producer - Commission agent — Wholesaler -Retailer-Consumer). The channel II

was most favoured channel in the study area as maximum (nearly 50%) quantity was passed through this channel. The producer's share in consumer's rupee was maximum in channel I (68.28%), followed by channel II (57.94%) and channel III (53.14%). The share of retailer in consumers price 21.04 per cent in channel I, 24.37 per cent in channel II and 25.83 per cent in channel III. The share of wholesaler in consumer's price was 5.12 per cent in channel II and 5.06 per cent in channel III. The net share of commission agent was 6.17 per cent in consumer's rupee in channel III. The total marketing cost was maximum in channel III (46.86%) and minimum in channel I (30.72%). It was also revealed that the marketing efficiency was higher in Channel-I (2.25) followed by Channel-II (1.37) and Channel-III (1.13).It is revealed that the marketing efficiency was higher in channel I (2.25) followed by channel II (1.37) and channel III (1.13).

Kumar *et al.* (2003) explored the problems in potato production and marketing in Hooghly and Burdwan districts, West Bengal, India. Major problems identified were: lack of good quality seed; irrigation problem; insufficient finance; unremunerative market price for the produce; insufficient storage space; and malpractices by traders.

Lokesh *et al.* (2005) examined the Economic Analysis of Tomato Production, Marketing and Processing in Karnataka. The study indicated that the productivity had increased, through over years the area under tomato cultivation had remained stagnant. Tomato was cultivated throughout the year; long duration variety is cultivated in Kharif season and short duration variety in summer season. Supply of good quality raw material was not a constraint and hence existing processing units had to be rehabilitated with modern equipments and quality specifications of national and international standards for the products must be excused for the success and survival of the tomato processing industry. Marketing of the finished products has to be promoted through different media to create awareness among consumers, and in turn increase demand for the produce.

Abdulai (2006) examined the resource use efficiency in vegetable production :the case of smallholder farmers in the Kumasi metro polis .they study revealed that the mean technical units ranging of the pooled sample was 66.67 %.efficiency level varied across all production units ranging from 12.9% to 95.02 .there was no significant difference in technical efficiency indices for land and labour obtained from the study were 0.4556 and 0.4651 respectively .the productivity of land labour and water were estimated to be ¢91, 525,684 per hectare ,¢ 72,119 per man days and ¢ 654,754 per cubic meter respectively. Crop water use efficiency as well as water efficiency was also estimated to be 1061.71 kg/m3 and 203.71 kg/m3 respectively

Hussain *et al.* (2006) studied the production and marketing constraints of potato in Shiger tehsil of Skardu district of Pakistan. Operational farm size in the survey area was 3.23 acres with an area allocation to potato crop of 0.82 acre. Most of the farmers were growing Raja variety of potato, which gave the highest mean yield of 6215 kgs per acre. Wholesalers in Skardu purchased potato with highest average price of Rs.725 per 100 kgs bag, while the local contractor purchased with the lowest average price of Rs.630 per 100 kgs bag. Packing and transportation costs for 100 kgs bag were estimated at Rs.37 and Rs.46 respectively. The results revealed use of ration produce for seed and monopolistic behavior of the local contractors as the major problems that hampered the production and development of the crop in area.

Sultan and Waqas (2007) worked out the economics of vegetable production by farm location. Three vegetables namely bitter gourd, tinda gourd and muskmelon were selected to determine the profitability of these vegetables with special emphasis on location of the farms with respect to market. The study was based on secondary data. Two categories were made leg the farms near to market and the farms far from market and profitability was determined separately for each category thereby indicated that cost of production per acre was higher on the farms near to market than that of the ·farms far from market. Nevertheless, higher returns were also estimated for this category. Results of the study highlighted the need for the development of market

infrastructure to boost up vegetable production in the country to meet the increasing requirement of food supplies and to create more employment opportunities in the rural economy.

Chaudhary (2010) studied the analysis of Tomato Marketing System in District, Nepal. This study was carried out to analyze the marketing system of tomato in Lalitpur district of Nepal during the year 2010. Specifically, this study was intended to identify marketing channels, to estimate gross margin, marketing margin and producer share, to find out the situation of market information and to identify constraints related to production and marketing of vegetables, especially tomato. Accordingly, a representative sample size of 20 tomato growers comprising 10 each from Lamatar and Lubhu village development committees were purposively selected. Similarly, 10 wholesalers from Kalimati fruits and vegetables wholesale market and 10 retailers from Lagankhel vegetable market were purposively selected. In the marketing system, the channel of producer wholesaler-retailer- consumer was most common where about 50 percent tomato passed to consumer through this channel. The marketing margin was estimated to be Rs. 20 per kg and producer share in the study area was 67 percent, which was highest among chain factors.

CHAPTER – III

MATERIALS AND METHODS

This chapter deals with the materials and research methodology adopted for the present study with respect to the selection of study area, selection of respondents, collection of data and analytical techniques. The details of the method and technique adopted for the present study is described as below:

3.1 Sampling design:

3.1.1 Sampling design:

A multi-stage sampling design was adopted for the ultimate selection of vegetable growers. The Chhattisgarh has been divided into three agro-climatic regions and one district was proportionally selected from selected Chhattisgarh Plains region of the state. Two Blocks were purposively selected from the district Mahasamund and a total of hundred farmers were interviewed. The region was the first stage, district was the second stage, blocks were the third stage and households of farm categories were the ultimate stage.

3.1.2. Selection of Zone:

Chhattisgarh have an area of vegetables is 377212 ha under horticultural crops. Chhattisgarh having three agro climatic region i.e. Northern hills, Chhattisgarh Plains and Bastar Plateau. Chhattisgarh Plains zone has been selected purposively for the present study.

3.1.3 Selection of study area:

The study was conducted purposively in Mahasamund district of the Chhattisgarh state. Out of 5 block of Mahasamund district, Mahasamund and Baghbahara block has been selected purposively. Mahasamund block comprises of 189 villages, out of which five villages were purposively selected whereas Baghbahara block comprises of 235 villages, out of which five villages were selected purposively.

Table 3.1 Number of sample households under different categories

Particulars	Number of total households					Number of selected households				
Village	**Marginal**	**Small**	**Medium**	**Large**	**Total**	**Marginal**	**Small**	**Medium**	**Large**	**Total**
Mahasamund										
Birkoni	130	120	47	31	328	4	4	1	1	10
	(19.0)	(19.4)	(11.8)	(13.5)	(17.0)	(11.1)	(12.1)	(4.8)	(10)	(100)
Umarada	67	63	40	20	190	4	3	2	1	10
	(9.8)	(10.2)	(10.0)	(8.7)	(9.8)	(11.1)	(9.1)	(9.5)	(10)	(100)
Kanekera	66	50	40	20	176	4	3	2	1	10
	(9.7)	(8.0)	(10.0)	(8.7)	(9.1)	(11.1)	(9.1)	(9.5)	(10)	(100)
Baronda	61	46	30	25	162	4	3	2	1	10
	(8.9)	(7.4)	(7.5)	(10.8)	(8.4)	(11.1)	(9.1)	(9.5)	(10)	(100)
Sher	58	64	30	20	172	3	4	2	1	10
	(8.5)	(10.3)	(7.5)	(8.7)	(8.9)	(8.3)	(12.1)	(9.5)	(10)	(100)
Baghbahara										
Junwani	47	50	47	26	170	3	3	3	1	10
	(6.9)	(8.1)	(11.8)	(11.3)	(8.8)	(8.3)	(9.1)	(14.3)	(10)	(100)
Sukharidabari	50	60	41	13	164	3	4	2	1	10
	(7.3)	(9.7)	(10.3)	(5.6)	(8.5)	(8.3)	(12.1)	(9.5)	(10)	(100)
Kesekera	150	120	90	54	414	4	3	2	1	10
	(22.0)	(19.4)	(22.5)	(23.5)	(21.5)	(11.1)	(9.1)	(9.5)	(10)	(100)
Dumardihee	28	25	23	11	87	3	3	3	1	10
	(4.1)	(4.0)	(5.8)	(4.8)	(4.5)	(8.3)	(9.1)	(14.3)	(10)	(100)
Borabandha	24	21	11	10	66	4	3	2	1	10
	(3.5)	(3.4)	(2.7)	(4.3)	(3.4)	(11.1)	(9.1)	(9.5)	(10)	(100)
Total	681	619	399	230	1929	36	33	21	10	100
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)

Note: Figures in parentheses indicate percentages to total

From each village respondent were selected not less than 10, according to size of holding by purposively using proportional allocation techniques.

3.1.4 Method of enquiry and collection of data:

The method of enquiry was conducted by survey method and collection of information was based on primary and secondary information. Primary data were collected by personal interview method with the help of pre-tested questionnaire from selected respondents. The Primary data regarding the farm size, cropping pattern, varieties grown of different vegetable crops, input use in vegetable production, return from vegetable crops were collected from selected households.

The secondary data were collected from reviews, literatures and from various government sources including the Directorate of Agriculture, Block development officer.

3.1.5 Period of enquiry:

The detail enquiry was done for the agricultural year 2013-14.

3.2 Analytical tools

3.2.1 Growth rate:

Annual Compound growth rates in area, production and productivity of major vegetables was estimated in the study area and for Chhattisgarh state by fitting an exponential function of the following form.

$Y=AB^t$
Log y= log A+ t log B
Y= area/ production/ productivity
A= constant
B= regression coefficient
t= time in year
Compound growth rate = (Anti-log of B-1) 100

3.2.2 Cost of cultivation:

The cost concepts approach to farm costing is widely used in India. To work out the cost of cultivation standard method of cost of cultivation was adopted. The cost of production of vegetable has been presented in terms of Cost A1, Cost A2, Cost B, Cost C. The cost concepts are given below.

Cost A1:

Value of hired human labour (permanent and casual)

Value of owned bullock labour

Value of hired bullock labour

Value of owned machinery

Hired machinery charges

Value of fertilizers

Value of manures (owned and purchased)

Value of seed (farm produced and purchased)

Value of insecticide and pesticide

Irrigation charges

Land revenue

Depreciation on farm building and implement

Interest on working capital

Miscellaneous expenses (artisans, ropes and repair to small farm implements)

Cost A2:

Cost A1 + Rent paid for leased in land

Cost B:

Cost A1 + Imputed rental value of owned land (less land revenue paid those upon) + interest on fixed capital (excluding land).

Cost C:

Cost B + imputed value of family labour

Tabular analysis:

Tabular analysis was used to compare the value of costs, returns and cost of production of crop of different size groups.

Interest on working capital:

Charged at the rate of 4% per annum for half the period of the crop.

Cost of production per quintal:

It refers to total cost of cultivation divided by output value then multiplied by respective prices of main and by-product.

Depreciation

Depreciation was taken by the equation

Depreciation= initial value – junk value / total life of equipment.

Net income:

It is the difference between total receipts and total expenses. It includes the pay of the farm manager and interest on capital invested in the business. It was calculated Net income = Gross income – Total expenses

Family labour income:

It includes net income or loss plus imputed value of wages for the labour of farmer and his family.

It can be expressed as:

Family labor income=Gross return-Cost B.

Farm business income:

It is the gross income minus total expenses of production excluding wages of family labour, interest on owned capital and rental value of land. It is a measure of the

earnings of a farmer and his family for their capital investment, labour and managerial work. It can be expressed as:

F.B.I. = Family labour income + Interest on fixed capital + Rental value of owned land.

Farm investment income

Farm investment income= Net income + Rental value of own land + Interest on fixed capital

Input-output ratio:

It can be expressed as the ratio of output to input. The ratio was calculated as:

Input-output ratio = O / I

Where,

I = Total input

O = Total output

3.2.3 Marketable Surplus:

For calculating the marketable surplus following formula was used

MS = P – (C +W)

Where,

MS – Marketable Surplus

P – Total Production

C – Family Consumption

W - Quantity use for Wages

3.2.4 Marketing cost

To analyse the marketing cost of following vegetables

$C=Cf+C_{m1}+C_{m2}+C_{m3}+\ldots+C_{mn}$

Where,

C=Total Cost of marketing of the commodity

Cf=Cost paid by the producer from the time produce leaves the farm till he sells it, and

Cmn=Cost incurred by the Ith middleman in the process of buying and selling the product.

3.3 General profile of the study area:

A research programme always required knowledge of the region in which the investigation is to be carried out. Understanding of the general characteristics of the study area is essential to conduct the survey, and it was confined to the Mahasamund district.

3.3.1 Situation:

The topography of Chhattisgarh state is divided in three parts i.e. Chhattisgarh plain, Northern hills and Bastar plateau. Out of this three Mahasamund district comes under plain region of Chhattisgarh state.

Table 3.2 General profile of Chhattisgarh and Mahasamund district

S. No.	Particulars	Chhattisgarh	Mahasamund
1.	Geographical Area	13790 (000) ha.	496.3 (000) ha. (3.60)
2.	Latitude	17°46' to 24°50'	20°47' to 21°31'30"
3.	Longitude	80°15' to 84°20'	82°00' to 83°15'45"
4.	No. of Tehsils	149	5
5.	Populated Villages	20306	1190
6.	Forest village	210	10
7.	No. of Gram Panchayats	9139	491
8.	No. of Janpad Panchayats	146	5
9.	Total Population (According to 2011 Census)	25,545,198	1,032,754 (4.04)
10.	Total Male Population	12,823,895	511,967 (3.99)
11.	Total Female Population	12,712,303	520,787 (4.09)
12.	Total Literates (%)	71.04	71.02
13.	Total Male Literates (%)	80.27	82.05
14.	Total Female Literates (%)	59.58	60.25

Source: Department of Agriculture, Government of Chhattisgarh, Mahasamund, 2011.

Note: Figure in parenthesis indicate percentages to total

The general profile of Chhattisgarh and Mahasamund district is presented in table 3.2 Mahasamund district is spread out in an area of 4.96300 ha in the Central-East of Chhattisgarh State. The district lies between 20°47' to 21°31'30" latitude and 82°00' to 83°15'45" longitude, surrounded by districts of Raigarh and Raipur of Chhattisgarh State and Nawapara and Bargarh of Orissa.

Out of total villages (20306) of Chhattisgarh state, this district has 1190 populated and 10 forest villages. The district has 5 tehsil and 5 development block. The total geographical area of the state is 138 lakh ha. out of which Mahasamund district is spread over in 4.96 lakh (3.60 percent) hectares. The total population of the state is 25,545,198 out of which Mahasamund district has a population of 1,032,754 which is 4.04 percent population of Chhattisgarh State (Census 2011). The total literacy rate of the district is 71.02 per cent which is nearer to the total literacy of the State i.e. 71.04 per cent. The detailed information about general profile of Mahasamund district and Chhattisgarh as a whole is presented in Table 3.2

3.3.2 Cropping pattern

Being a mono-cropped region, paddy is the main cereal crop of the district during kharif season. Nearly 88.61 per cent area is allocated under paddy crop in kharif season. However, several other crops are also being grown in kharif as well as during rabi season in this district, although the area under cultivation is very less. The cropping pattern and area under different crops in Mahasamund district is presented in table 3.3.

The total area under different crops in kharif and rabi season is observed as 83.91 per cent and 7.57 per cent respectively. Remaining 26.78 per cent of the total cropped area is allocated during summer season in the district. The area under paddy is observed to be as 81.82 per cent (including kharif and summer season) of the total cropped area of the district. The remaining area is allocated under other crops like urd, groundnut, wheat, kudu, lathyrus, mustard, sesame, gram, and maize in this district.

Table 3.3: Cropping pattern of Mahasamund district

S. No.	Season/Crops	Area (000 ha.)
A.	**Kharif**	
1	Paddy	233.74 (74.35)
2	Sorghum	0.03 (0.01)
3	Maize	0.43 (0.14)
4	Kudu	0.05 (0.02)
5	Pigeon-pea	1.16 (0.14)
6	Mung	4.28 (1.36)
7	Urd	11.44 (3.64)
8	Groundnut	6.4 (2.03)
9	Sesame	1.08 (0.34)
10	Niger	0.01 (0.003)
11	Vegetable	4.16 (1.32)
12	Other	1 (0.32)
	Sub Total	**263.78 (83.91)**
B.	**Rabi**	
1	Wheat	3.16 (1.01)
2	Lathyrus	9.23 (2.93)
3	Alsi	3.02 (0.96)
4	Mustard	1.28 (0.41)
5	Gram	1.32 (0.42)
6	Vegetable	4.24 (1.35)
7	Other	1.56 (0.50)
	Sub Total	**23.81 (7.57)**
C.	**Summer**	
1	Paddy	23.49 (7.47)
2	Vegetable	2.06 (0.65)
3	Other	1.23 (0.39)
	Sub Total	**26.78 (8.51)**
	Total cropped area	314.37 (100.0)
	Net area sown	263.78
	Cropping Intensity (%)	119.17

Source: Department of Agriculture, Government of Chhattisgarh, Mahasamund, 2011.
Note: Figure in parenthesis indicate percentages to total cropped area

3.3.3 Land utilization pattern of Mahasamund district

The total geographical area of the Chhattisgarh State is 13790000 hectare. Out of the total geographical area Mahasamund district has 496300 hectare area constituting 3.60 per cent. The land utilization pattern of the study area is presented in the Table 3.4.

Table 3.4: Land utilization pattern of Chhattisgarh and Mahasamund district

S. No.	Particulars	Chhattisgarh Area (ha)	Mahasamund Area (ha)
1.	Total Geographical Area	13790000	496300 (3.60)
2.	Area Under Forest	6349000	110200 (1.74)
3.	Land Under Non-Agriculture Use	1004000	47510 (4.73)
4.	Permanent Pasture and Grazing Land	855000	30250 (3.54)
5.	Cultivable Waste Land	346000	8210 (2.37)
6.	Fallow land (old fallow + current fallow)	523000	13060 (2.50)
7.	Net Cropped Area	4710000	263780 (5.60)
8.	Grossed Cropped Area	6183000	314370 (5.08)
9.	Cropping Intensity	131.27	119.17(90.78)

Source: Department of Agriculture, Government of Chhattisgarh, Mahasamund, 2011

Note: Figure in parenthesis indicate percentages to total geographical pattern

The area under forest covers 6349000 hectare of entire State, where Mahasamund district has covered 110200 hectare area constituting 1.74 per cent of total forest area of the State and also the net cropped area of the State has covered 4710000 hectare while Mahasamund district covers 263780 hectare that is 5.60 per cent of cropped area of the State. The cropping intensity of the district is 119.17 per cent as compared to 131.27 per cent in the state.

3.3.4 Climate

The climate of the study area is characterized by sub tropical parameter. In general, three distinct climatic seasons are found in the block viz. rainy season from mid June to early October, winter season from early October to February and summer season from March to middle of June. Hottest and dry month in district is May –June

with maximum temperature varies from 42C to 45 C while winter season is in mid October to starting February. Minimum temperature touches 14 -20 C temperature.

3.3.5 Rainfall

The average rainfall of the study area varies between 831.2-1074.32mm. The maximum rainfall is received from monsoon accounts for more than 90 percent of the total rainfall during the month of July – August.

3.3.6 Irrigation facility

Irrigation facility by the different resources and its share in net irrigated area is shown in table 3.5. Out of the total area sown 28.94 percent and 61.72 percent are under net irrigated area, in district respectively. The important source of irrigation is tube well which share 84.79 per cent and 90.93 percent in net irrigated area in district respectively.

Table 3.5: Sources wise Irrigated Area

S. No.	Particulars	Mahasamund District	
		No.	Area(ha.)
1.	Tube well		
	Government	59	41980
	Private	8179	31057
	Sub Total	8238	73037(81.73)
2.	Well	13236	1622 (1.81)
3.	Tank	3836	11625 (13.01)
4.	Other Sources	-	3078 (3.45)
5.	Net Irrigated Area(ha)	-	89362(100.00)
6.	Area irrigated more than once(ha)	-	3222
7.	Gross irrigated area(ha)	-	92584
8.	Percentage of the net irrigated area from total cropped area	-	28.94

Notes: Figure in parentheses indicate percentages to total irrigated area.

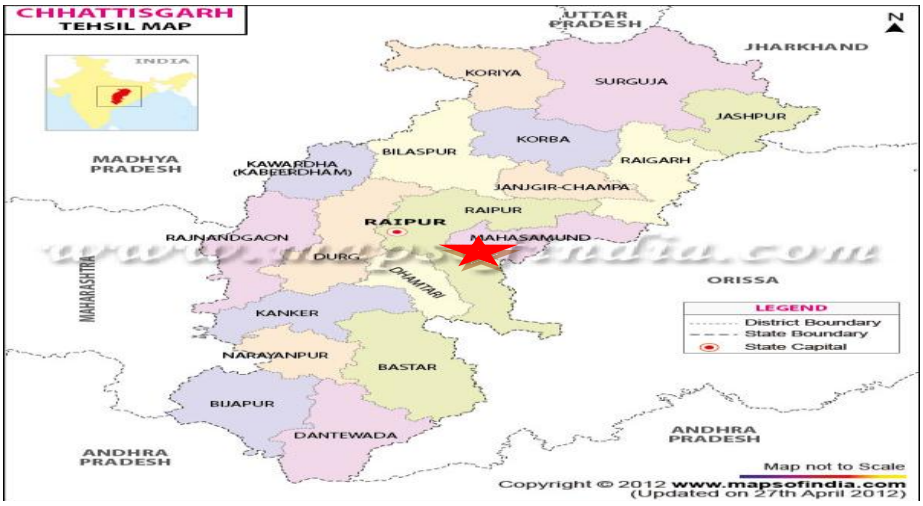
Source: District planning and statistical office, Mahasamund (2009).

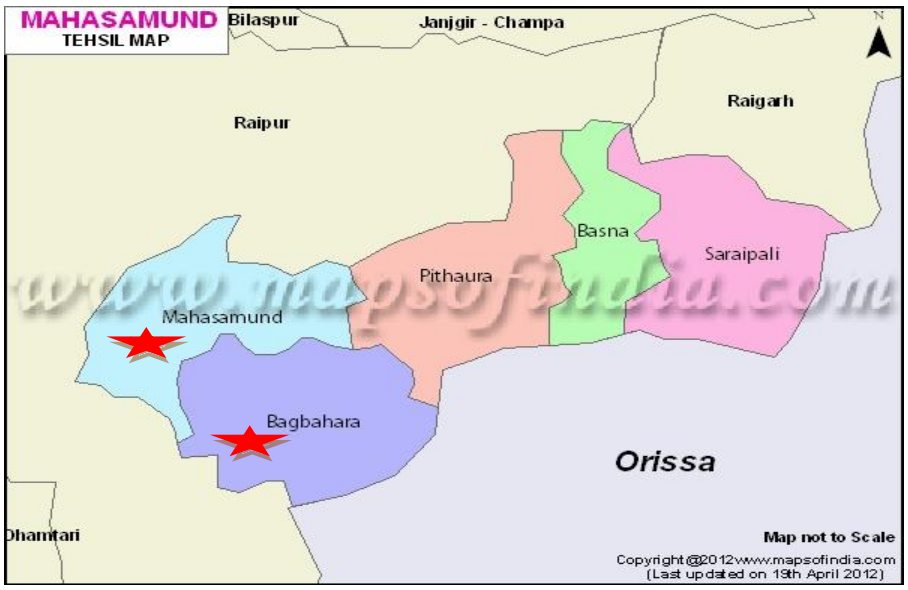
3.6: Administrative set up Mahasamund

Sl.No	Particulars	Values
1	**Geographical Area**	**4790 Sq. Km.**
2	**Latitude of Mahasamund**	20°47' to 21°31'30"
3	**Longitude of Mahasamund**	82°00' to 83°15'45"
4	**No. of Tehsils**	5
5	**Total Villages**	1151
6	**Populated Villages**	1112
7	**No. of Gram Panchayat**	491
8	**No. of Janpad Panchayat**	5
9	**Revenue Inspector Board**	10

Source District official website, Mahasamund

Map-I: Map of the Study area





Note: Star marks indicate study area

CHAPTER – IV
RESULTS AND DISCUSSION

The present chapter was going to present the results and discussion for various objectives. The chapter was arranged in different sub-sections according to objectives of the study. The general characteristics of the vegetable growers are described in sub-section 4.1, while the compound growth rate of area, production and productivity was estimated in sub-section 4.2, the cost and returns of major vegetables was present in sub-section 4.3, Section 4.4 deals about the marketable surplus, marketing cost and price spread followed by constraints faced by producer in production and marketing were described in last sub-section 4.5.

4.1 General Feature of sample farmers.

4.1.1 General characteristics:

The general characteristics of the sample households were presented in the Table 4.1. The marginal farmers' concentration (36%) was higher than other category followed by small (33%), medium (21%) and then large farms (10%). Family size and composition were large in case of large farmers (6.50) followed by marginal (6.19), small (6) and medium farms (5.85). Average family size of sample households was 6.09.

About 75.53 percent population was being put in between of 15-60 years age group in sample farms. The population of below 15 year of age constitutes 22 per cent while remaining of 2.46 per cent of population may fall in the group of above 60 years. It was clear from the Table 4.1, that the other backward caste constitutes 51 percent of the total household while the percentage of schedule caste (33%), schedule tribe (11%) and general category was 5 per cent in the sample farms.

Table.4.1: General demography of sample house-holds.

S .No.	Particulars	Marginal	Small	Medium	Large	Aggregate
1	Total number of households	36 (100)	33 (100)	21 (100)	10 (100)	100 (100)
2	Total family members	223 (36.62)	198 (32.51)	123 (20.20)	65 (10.67)	609 (100)
	a.Male	113 (18.56)	103 (16.91)	61 (10.02)	31 (5.09)	308 (50.57)
	b.Female	110 (18.06)	95 (15.60)	62 (10.18)	34 (5.58)	301 (49.43)
	Average family size	6.19	6	5.85	6.50	6.09
3	Age groups					
	1. Below 15 years					
	a.Male	15 (11.19)	30 (22.39)	11 (8.21)	7 (5.22)	134 (100)
	b.Female	19 (14.18)	29 (21.64)	15 (11.19)	8 (5.98)	
	2.Between 15 to 60 years					
	a.Male	97 (21.09)	69 (15)	48 (10.43)	22 (4.78)	460 (100)
	b.Female	89 (19.35)	64 (13.91)	47 (10.22)	24 (5.22)	
	3.Above 60 years					
	a.Male	1 (6.67)	4 (26.67)	2 (13.33)	2 (13.33)	15 (100)
	b.Female	2 (13.33)	2 (13.33)	_	2 (13.33)	
4	Social group					
	a.Schedule tribe	5 (13.89)	3 (9.09)	3 (14.28)	0 (0)	11 (11)
	b.Schedule caste	12 (33.33)	8 (24.24)	6 (28.57)	7 (70)	33 (33)
	c.OBC	16 (44.44)	20 (60.61)	12 (57.14)	3 (30)	51 (51)
	d.Other category	3 (8.33)	2 (6.06)	0 (0)	0 (0)	5 (5)
	Total	36 (100)	33 (100)	21 (100)	10 (100)	100 (100)

Note : Figures in parenthesis indicate percentages to respective total.

4.1.2 Educational status and occupation of sample house-holds.

The highest literacy percent was observed in large (100 percent) category of farmers. The education levels up to Illiterate, Primary, Higher secondary and College were 41 per cent, 34 per cent, 21 per cent and 4 per cent respectively of the total households.

Table.4.2: Education and occupation in sample house-holds.

S. No.	Particulars	Marginal	Small	Medium	Large	Total
1	Total number of house hold	36 (100)	33 (100)	21 (100)	10 (100)	100 (100)
2	Education					
	a.Illiterate	21 (58.33)	17 (51.51)	3 (14.28)	0 (0)	41 (41)
	b.Primary school	15 (41.67)	11 (33.33)	8 (38.09)	0 (0)	34 (34)
	c.Higher school	0 (0)	3 (9.09)	9 (42.86)	9 (90)	21 (21)
	d.College	0 (0)	2 (6.06)	1 (4.76)	1 (10)	4 (4)
	Total literate	15 (41.67)	16 (48.48)	18 (85.71)	10 (100)	59 (59)
	Total	36 (100)	33 (100)	21 (100)	10 (100)	100 (100)
3	Occupation					
	1.Agriculture	179 (83.64)	129 (78.18)	46 (60.53)	16 (50)	370 (75.97)
	2.Agriculture worker	35 (16.35)	33 (20)	22 (28.95)	2 (6.25)	92 (18.89)
	3.Service	0 (0)	1 (0.61)	2 (2.63)	4 (12.5)	7 (1.44)
	4.Business	0 (0)	2 (1.2)	6 (7.89)	10 (31.25)	18 (3.70)
	Total working members	214 (100)	165 (100)	76 (100)	32 (100)	487 (100)

Note : Figure in parenthesis indicate percentages to total.

The occupation of farmers was also presented in the Table.4.2. The Table 4.2 shows that 75.97 percent farmers of working group were involved in agriculture. The primary occupation in sample house-hold (75.97%) followed by agricultural worker where 18.89 per cent people were workers in agriculture. The other sources of income were business and service of the farmer family members to the family in the study area.

4.1.3 Land utilization

It was evident from table 4.3 that the total cultivated area was observed to be 0.49, 1.48, 3.17 and 6.40 hectare at marginal, small, medium and large farms respectively along with 1.97 hectare as an overall average.

Table.4.3: Land utilization in sample household

S. No.	Particulars	Marginal	Small	Medium	Large	Average
1.	Owned area / Cultivated area	0.49 (100)	1.48 (100)	3.17 (100)	6.4 (100)	1.97 (100)
2.	Leased in/out land	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
3.	Total cultivated area	0.49 (100)	1.48 (100)	3.17 (100)	6.4 (100)	1.97 (100)
4.	Irrigated area	0.49 (100)	1.04 (70.27)	1.56 (49.21)	1.8 (28.12)	1.03 (52.13)
5.	Unirrigated area	-	0.44 (29.73)	1.61 (50.79)	4.6 (71.87)	0.94 (47.71)
6.	Area under selected crop					
	1. Tomato	0.16 (32.65)	0.3454 (23.34)	0.39538 (12.47)	0.52 (8.12)	0.31 (15.55)
	2. Brinjal	0.17 (34.69)	0.2636 (17.8)	0.209524 (6.61)	0.36 (5.62)	0.23 (11.57)
	3.Cabbage	0.11 (22.45)	0.1212 (8.19)	0.204762 (6.46)	0.31 (4.84)	0.15 (7.79)
	4.Onion	0.23 (46.94)	0.4576 (30.92)	0.566667 (17.87)	0.73 (11.41)	0.42 (21.59)

Note: Figure in parenthesis indicate percentages to total.

The table indicates that the irrigated area on the sampled farms was decreases as the size of holding increased and the percentage to total irrigation. The overall irrigated area was 52.13 per cent to the total cultivated area. The area allocation under selected crop was 0.31 ha, 0.23 ha, 0.15 ha and 0.42 ha for tomato, brinjal, cabbage and onion.

4.1.4 Source wise irrigation facilities at sample house hold.

Category-wise area under various sources of irrigation. Canal are main source of irrigation (about 37.03 per cent) were covered as source of irrigation in study area, small farmer was higher in case of tube-well followed by medium farms. Well was second important source of irrigation (about 30.08 per cent) in the study area. Tube-well was second important source of irrigation (about 16.06 per cent) in the study area. Other unidentified source of irrigation facilities was about 16.82 percent to the total irrigated area in sample house-holds.

Table.4.4 Source wise irrigation at sample hose-holds.

Sl No	Particulars	Marginal	Small	Medium	Large	Average
1	**Tube well**	_	_	0.5	0.6	0.165
				(32.05)	(33.33)	(16.06)
2	**Well**	0.2	0.5	0.2	0.3	0.309
		(40.2)	(48.08)	(12.82)	(16.67)	(30.08)
3	**Canal**	0.29	0.4	0.4	0.6	0.3804
		(59.18)	(38.46)	(25.64)	(33.33)	(37.03)
4	**Others**	_	0.14	0.46	0.3	0.1728
			(13.46)	(29.49)	(16.67)	(16.82)
	Total	0.49	1.04	1.56	1.8	1.0272
		(100)	(100)	(100)	(100)	(100)

Note Figures in parentheses indicates percent to total.

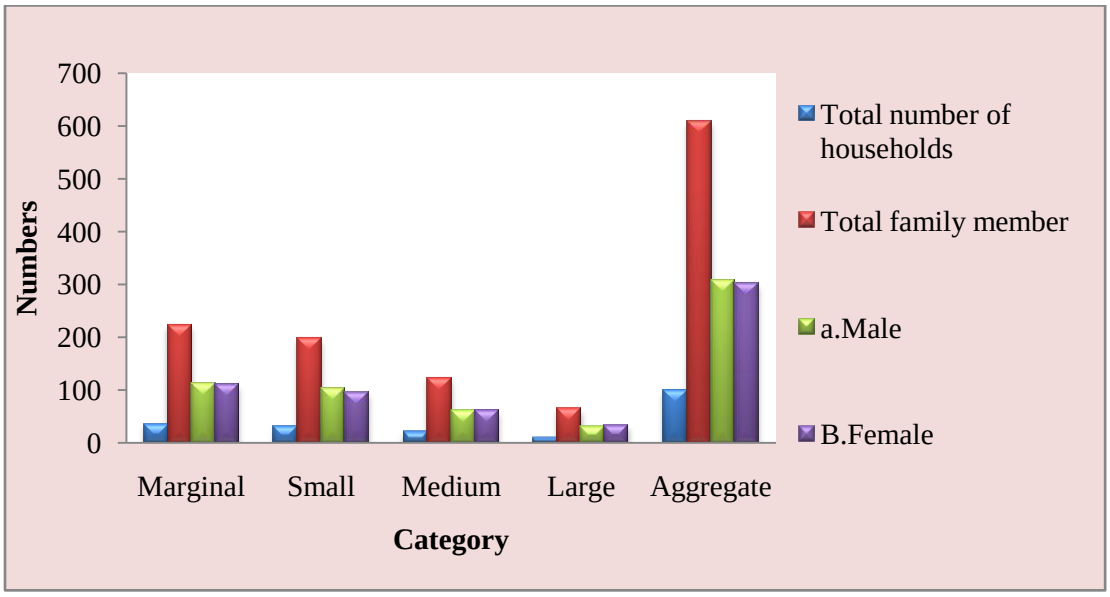


Fig.4.1: General demography features in sample house-holds.

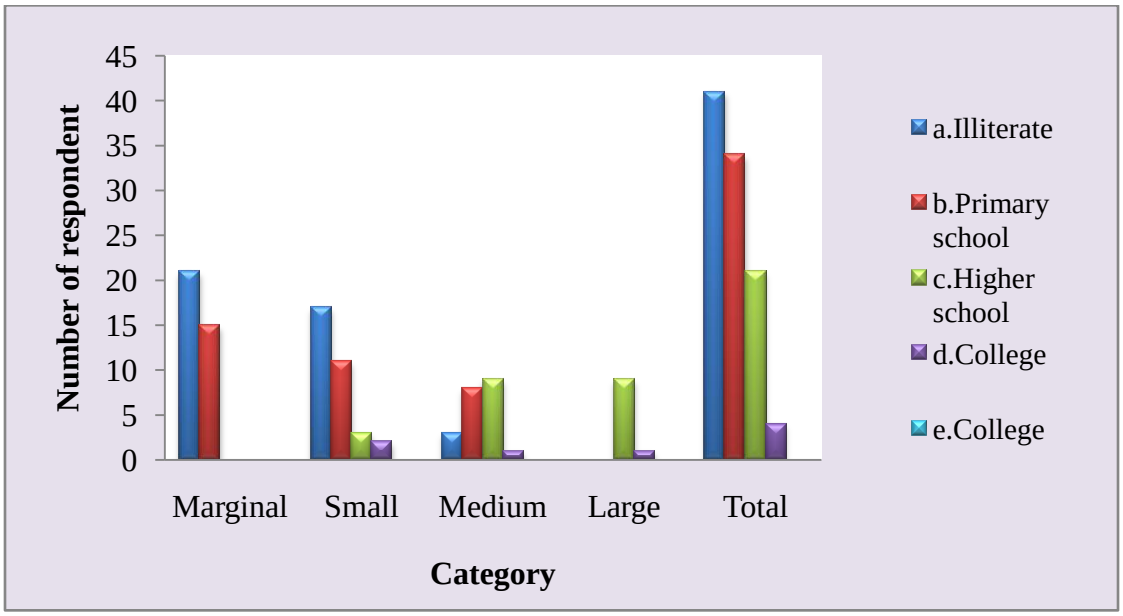


Fig.4.2: Education of sample households.

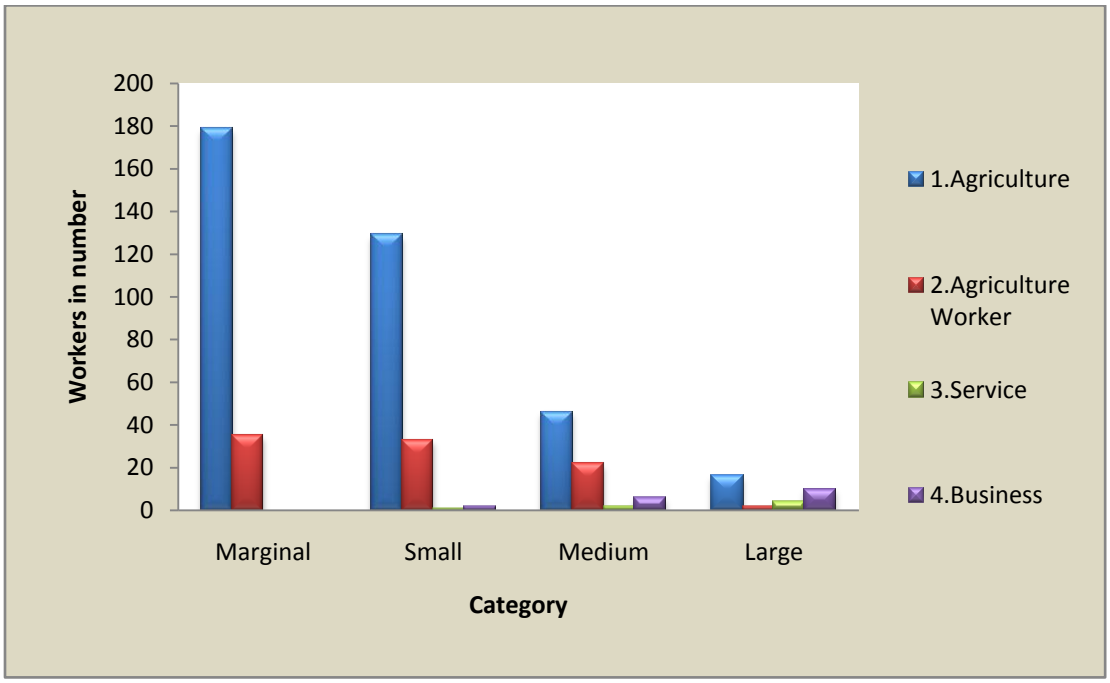


Fig.4.3: Occupational status in sample house-holds.

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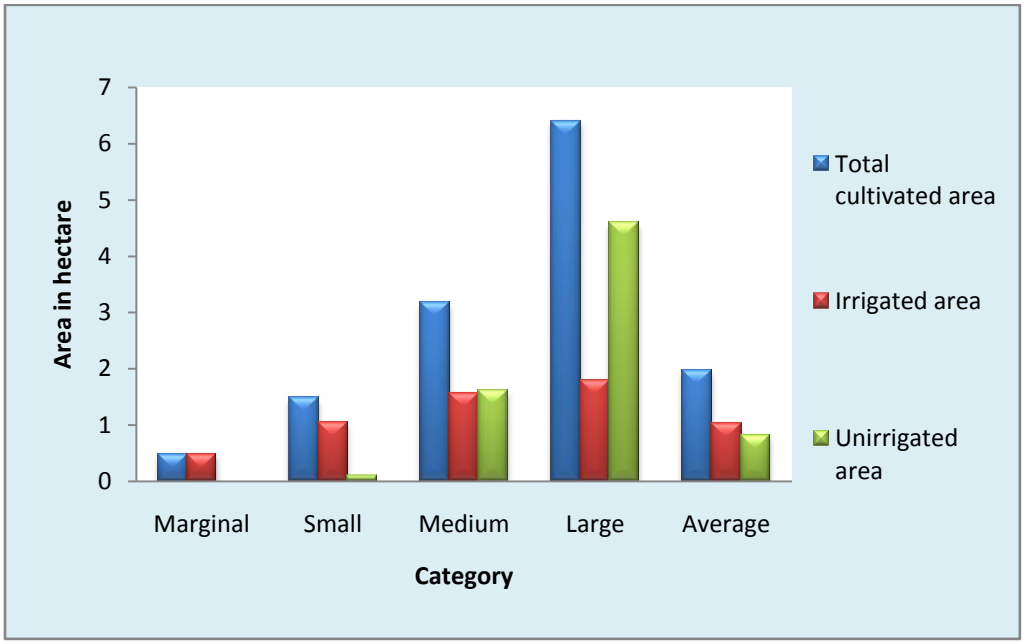

Fig.4.4: Land utilization in sample household.

4.1.5 Cropping pattern of sample house hold

The cropping pattern at sampled farms was presented in Table 4.5. The total cropped area was observed as 0.93 hectare, 2.74 hectare, 4.64 hectare and 8.20 hectare at marginal, small, medium and large farms, respectively. The average total cropped area was 3.02 hectare at sampled farm of which 1.98 hectare (65.56 %) was allocated during kharif season while remaining 1.07 hectare (35.43 percent) was allocated during rabi season. The area under kharif season in different crops was observed to be higher at large farms followed by medium farms, where in the rabi season cropped area observed to be higher at small followed by marginal farms. The cropping intensity was about 189.79 percent at marginal farms, 183.89 percent at small, 147.77 percent at medium and 128.13 percent at large farm. The average cropping intensity was 176.65 per cent at total sampled household. It was observed that the cropping intensity was higher at marginal farms followed by small farms. Paddy was major crop in sample house hold followed by vegetable crops has it was near by to the city center.

Table 4.5: Cropping pattern of sample house hold. (In hectare)

S.No.	Particulars	Marginal	Small	Medium	Large	Average
A	Kharif					
	Paddy	0.04	0.95	1.9	3.7	1.09
		(4.30)	(34.67)	(40.95)	(45.12)	(36.09)
	Maize	0	0	0.19	0.1	0.05
		(0)	(0)	(4.09)	(1.22)	(1.65)
	Millets	0	0	0.16	0.33	0.06
		(0)	(0)	(3.45)	(4.02)	(1.99)
	Red gram	0	0	0.04	0.05	0.01
		(0)	(0)	(.86)	(.61)	(.33)
	Green gram	0	0	0	0.52	0.05
		(0)	(0)	(0)	(6.34)	(1.65)
	Cauliflower	0	0.08	0.07	0.16	0.06
		(0)	(2.92)	(1.51)	(1.95)	(1.99)
	Okra	0	0.01	0.09	0.21	0.04
		(0)	(0.36)	(1.94)	(2.56)	(1.32)
	Cabbage	0.06	0	0.05	0.16	0.05
		(6.45)	(0)	(1.08)	(1.95)	(1.65)
	Onion	0.11	0.04	0.12	0.36	0.1
		(11.83)	(1.46)	(2.59)	(4.39)	(3.3)

	Tomato	0.08	0.04	0.10	0.35	0.1
		(8.60)	(1.46)	(2.15)	(4.27)	(3.3)
	Brinjal	0.08	0.07	0.02	0.25	0.08
		(8.60)	(2.55)	(.43)	(3.05)	(2.65)
	Other vegetables	0.12	0.2	0.40	0.21	0.22
		(12.90)	(7.29)	(8.62)	(2.56)	(7.28)
	Total	0.496	1.49	3.141	6.4	1.98
		(52.69)	(54.37)	(67.67)	(78.04)	(65.56)
B	Rabi					
	Paddy	0	0.17	0.05	0.24	0.09
		(0)	(6.20)	(1.08)	(2.92)	(2.98)
	Maize	0	0	0	0.1	0.01
		(0)	(0)	(0)	(1.22)	(0.33)
	Wheat	0	0	0	0.1	0.01
		(0)	(0)	(0)	(1.22)	(0.33)
	Cucurbits	0	0	0.23	0.11	0.06
		(0)	(0)	(4.95)	(1.34)	(1.9)
	Capsicum	0.01	0.02	0.02	0.07	0.02
		(1.07)	(0.73)	(.43)	(0.85)	(0.66)
	Green gram	0	0	0	0	0
		(0)	(0)	(0)	(0)	(0)
	Cabbage	0.06	0.09	0.16	0.18	0.10
		(6.45)	(3.28)	(3.45)	(2.19)	(3.3)
	Onion	0.12	0.42	0.45	0.5	0.33
		(12.90)	(15.33)	(9.69)	(6.09)	(10.93)
	Tomato	0.08	0.29	0.29	0.17	0.2
		(8.60)	(10.58)	(6.25)	(2.07)	(6.62)
	Brinjal	0.09	0.23	0.19	0.11	0.16
		(9.68)	(8.39)	(4.09)	(1.34)	(5.29)
	Other vegetables	0.09	0.7	0.11	0.22	0.31
		(9.68)	(25.55)	(2.37)	(2.68)	(10.26)
	Total	0.44	1.24	1.503	1.8	1.07
		(47.31)	(50.20)	(32.33)	(21.95)	(35.43)
	Total Cropped area	0.93	2.74	4.64	8.2	3.02
		(100)	(100)	(100)	(100)	(100)
	Net Cropped area	0.49	1.49	3.14	6.4	1.97
	Double Cropped area	0.5	1.24	1.49	1.8	1.09
	Cropping intensity	189.79	183.89	147.77	128.13	176.65

Note: Figure in parenthesis indicate percentage to total.

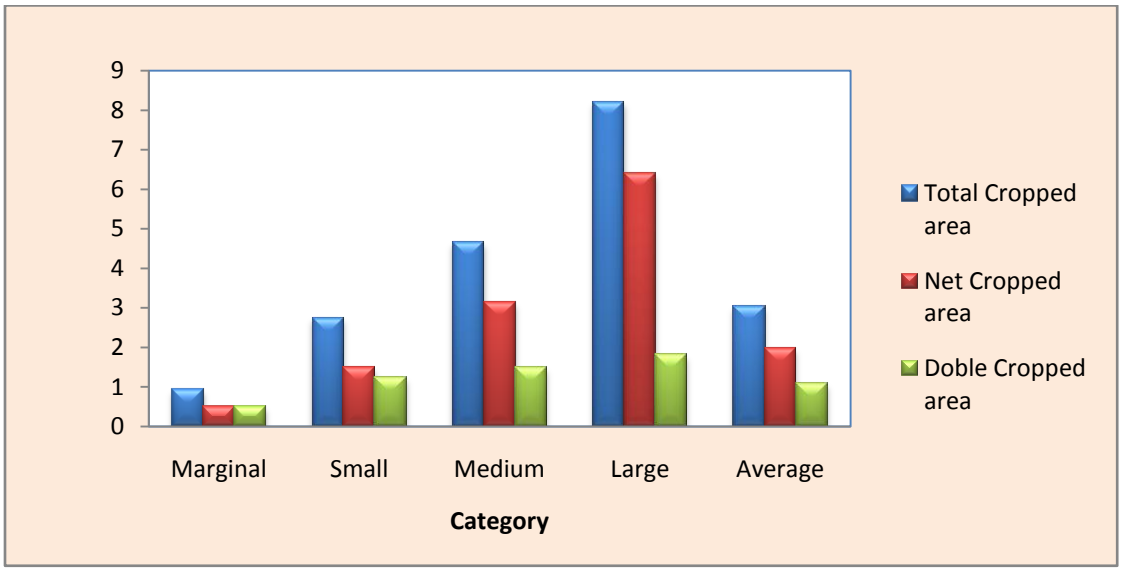

Fig.4.5: Cropping pattern in sample house-hold.

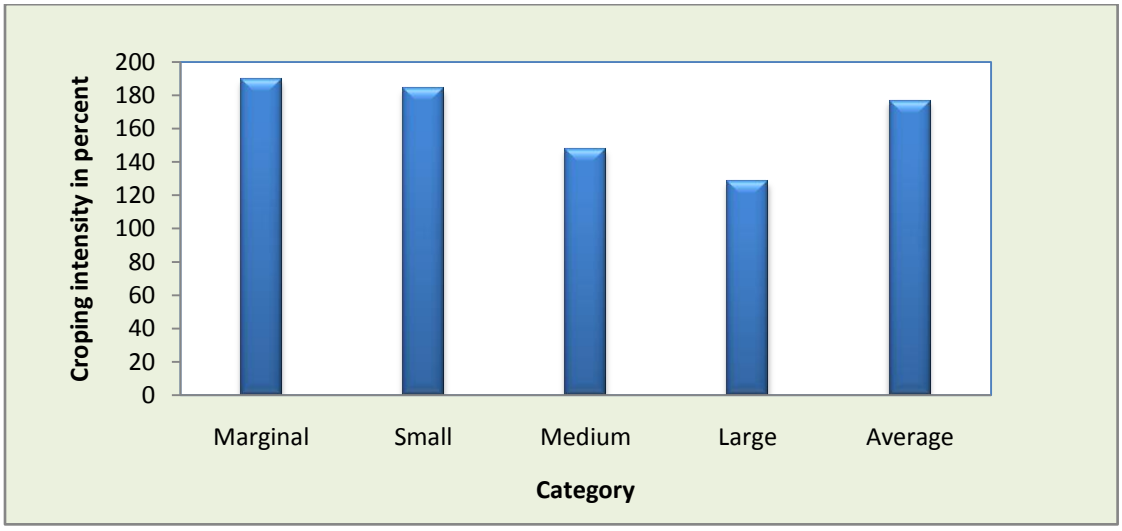

Fig.4.6: Cropping intensity in sample house- holds

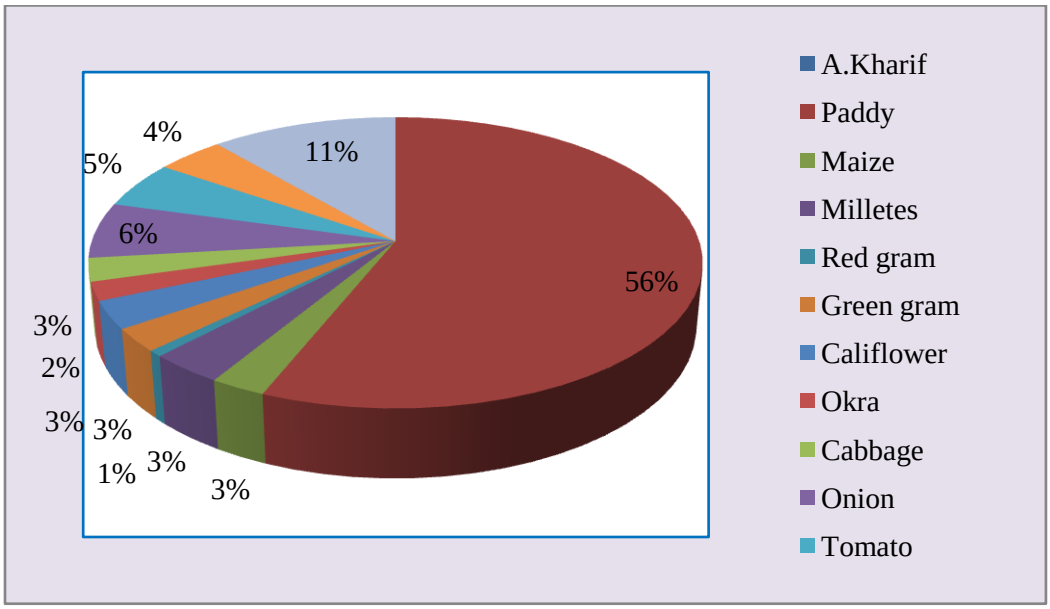

Fig.4.7: Cropping in kharif of sample house-holds.

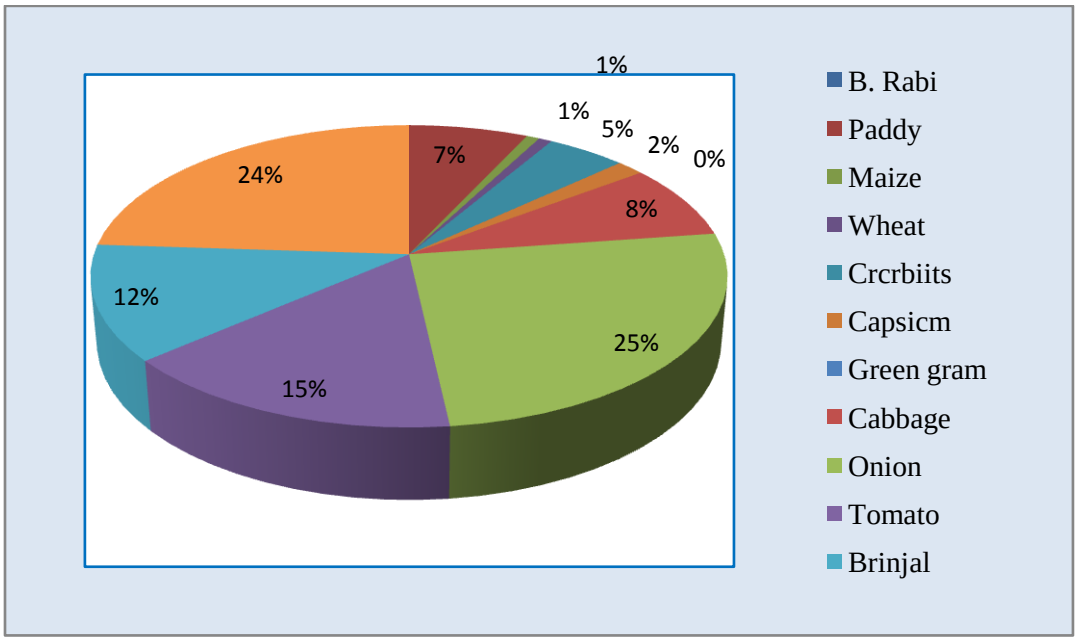

Fig.4.8: Cropping in Rabi of sample house-holds.

4.2 Compound growth rates in area, production and productivity of major vegetables (2004-2014).

To examine the growth rates in area, production and productivity of major vegetables in Mahasamund district and Chhattisgarh state and for the period of 2004-05 to 2013-14, by using exponential form.

4.2.1 Compound growth rates in area, production and productivity of major vegetables in Mahasamund. (2004-2014).

The exponential form of model was used to estimate the growth rates of major vegetables in the study area. Result estimated was presented in Table 4.6.

Table.4.6: Compound growth rates in area, production and productivity of major vegetables in Mahasamund. (2004-2014).

Items	Particulars	Mahasamund			
		Tomato	Brinjal	Cabbage	Onion
Area	F.Value	36.36	39.47	33.56	12.59
	R^2(%)	81.96	83.15	80.75	61.16
	G.R(%)	28.04*	29.72*	30.71*	40.91*
Production	F.Value	18.29	48.16	33.47	9.69
	R^2(%)	69.57	85.76	80.71	54.78
	G.R(%)	19.02*	31.56*	31.61*	40.91**
Productivity	F.Value	8.29	8.29	0.12	2.62
	R^2(%)	50.89	50.89	1.5	24.64
	G.R(%)	-7.04**	1.42**	0.69	32.16

*significance at 1% level of probability

**significance at 5% level of probability

Table 4.6 indicates that the area under major vegetables (Tomato, Brinjal, Cabbage, and Onion) in Mahasamund registered a significant positive growth rate for the period (2004-2014) which was one percent probability, and production also observed significant positive growth rate at one percent probability except onion shows significant at five percent probability. Productivity in tomato shows significant negative growth in Mahasamund where as brinjal shows positive significant growth

rate in district. This growth in area, production and productivity was due to policy implication of governments like NRHM (National Rural Horticultural Mission).

4.7: Compound growth rates in area, production and productivity of major vegetables in Chhattisgarh state. (2004-2014).

Items	Particulars	Chhattisgarh			
		Tomato	**Brinjal**	**Cabbage**	**Onion**
Area	F.Value	10.42	24.46	56.4	90.72
	R^2(%)	56.59	75.35	87.57	91.89
	G.R(%)	7.21**	9.22*	14.86*	16.45*
Production	F.Value	84.15	44.75	48.1	66.09
	R^2(%)	91.32	84.83	85.74	89.2
	G.R(%)	14.53*	14.81*	19.74*	19.65*
Productivity	F.Value	12.93	51.69	13.4	4.95
	R^2(%)	61.77	86.59	62.62	38.23
	G.R(%)	6.83*	5.12*	4.25*	2.27

*significance at 1% level of probability

**significance at 5% level of probability

Table 4.7 indicates that the area under major vegetables (Tomato, Brinjal, Cabbage, and Onion) in Chhattisgarh state registered a significant positive growth rate for the period (2004-2014) at one percent probability in brinjal, cabbage and onion while tomato shows significant at 5 percent probability. Production of major selected vegetables observed significant positive growth rate at one percent probability in Chhattisgarh state. Productivity in tomato, brinjal and cabbage shows significant positive growth in Chhattisgarh, where as onion shows positive non-significant growth rate. This growth in area, production and productivity was due to policy implication of governments like NRHM (National Rural Horticultural Mission) and increased availability of improved varieties and inputs.

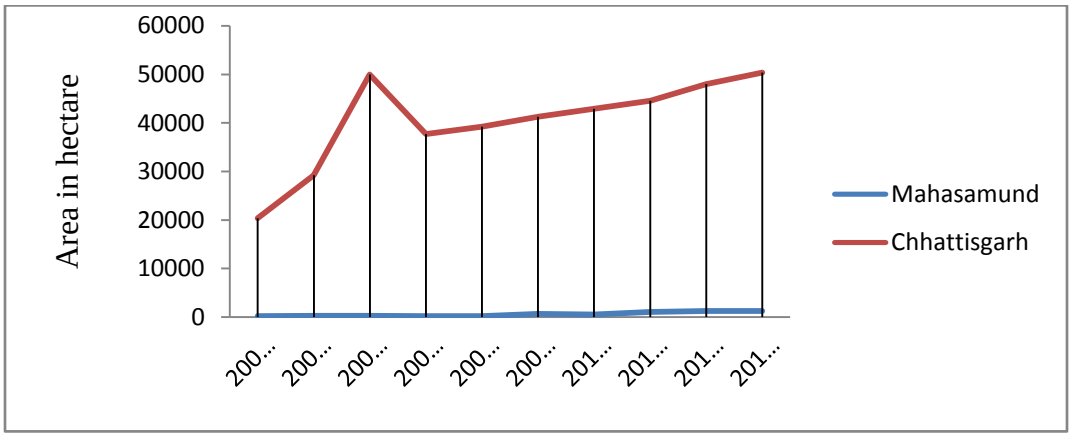

Fig. 4.9: Growth rate of area under tomato in Mahasamund district and Chhattisgarh

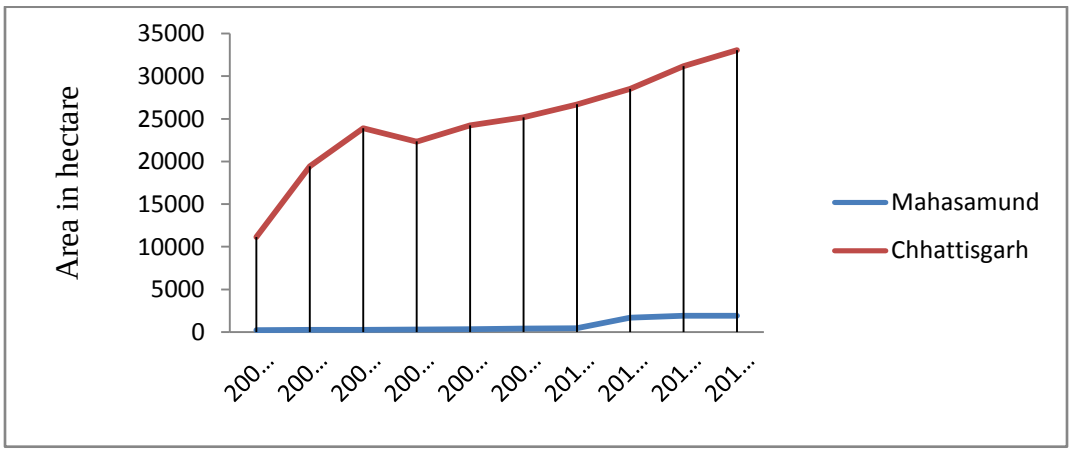

Fig. 4.10: Growth rate of area under brinjal in Mahasamund district and Chhattisgarh

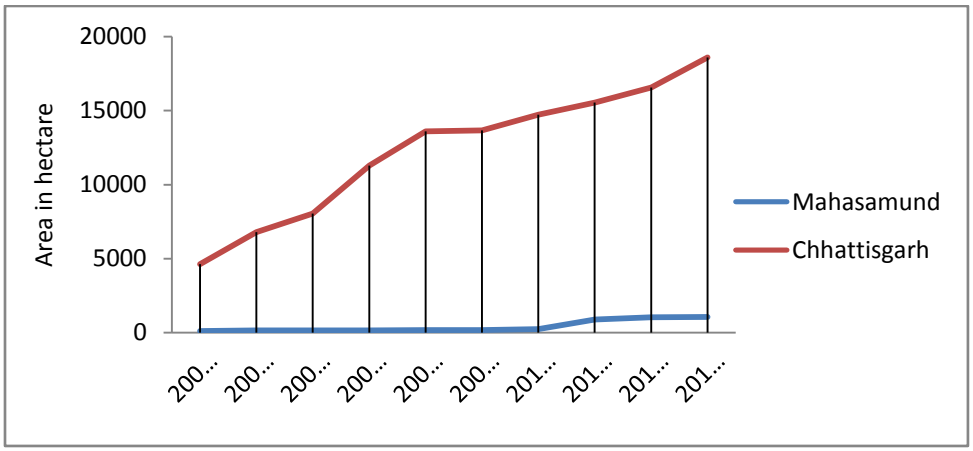

Fig. 4.11: Growth rate of area under cabbage in Mahasamund district and Chhattisgarh

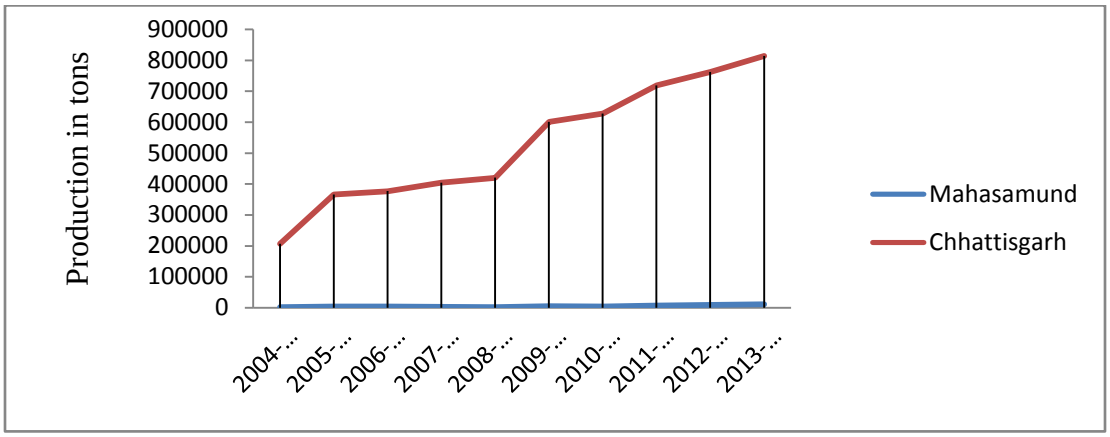

Fig. 4.12: Growth rate of production under tomato in Mahasamund district and Chhattisgarh

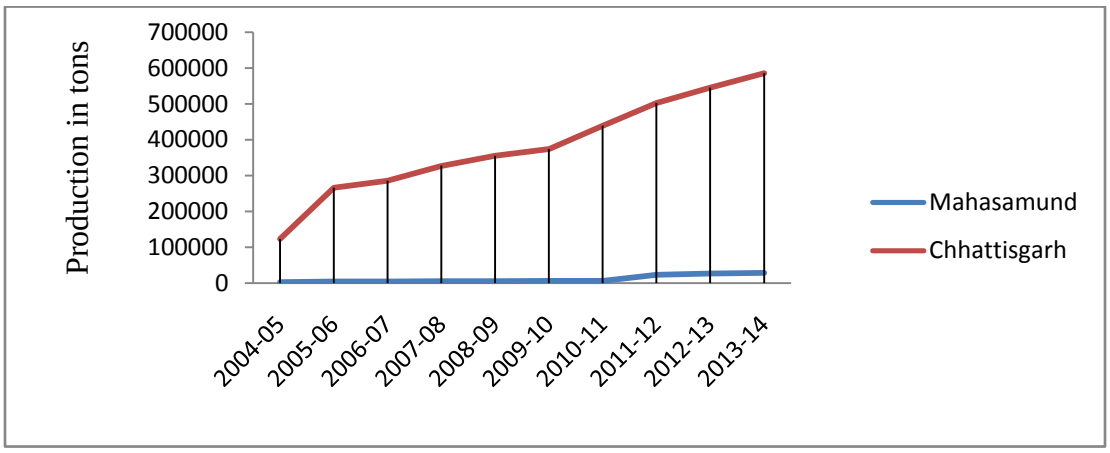

Fig. 4.13: Growth rate of production under brinjal in Mahasamund district and Chhattisgarh

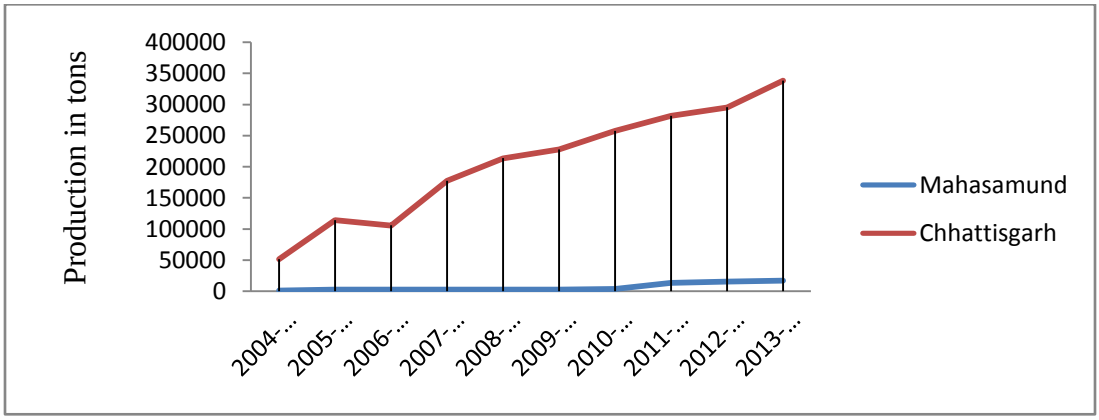

Fig. 4.14: Growth rate of production under cabbage in Mahasamund district and Chhattisgarh

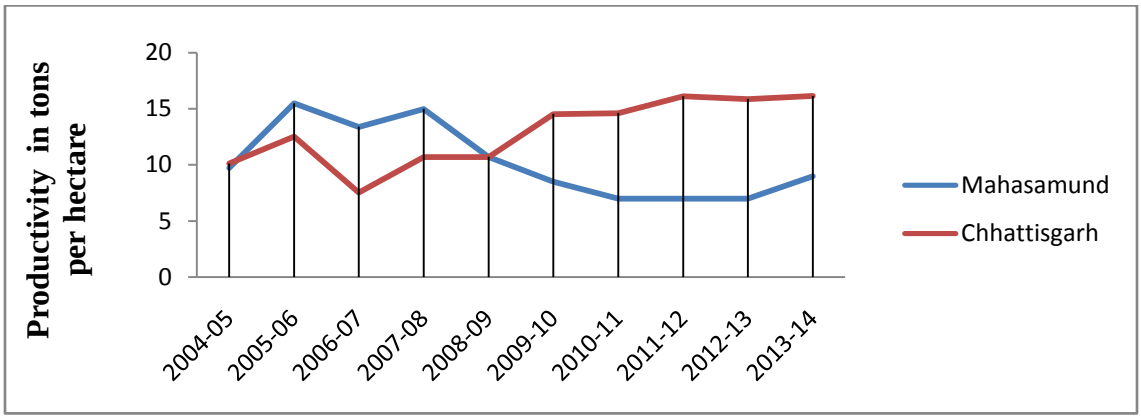

Fig. 4.15: Growth rate of productivity under tomato in Mahasamund district and Chhattisgarh

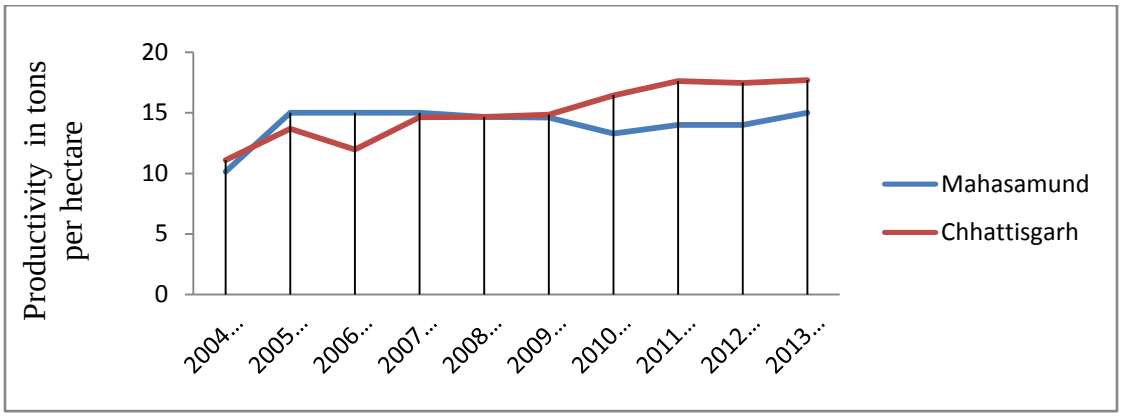

Fig. 4.16: Growth rate of productivity under brinjal in Mahasamund district and Chhattisgarh

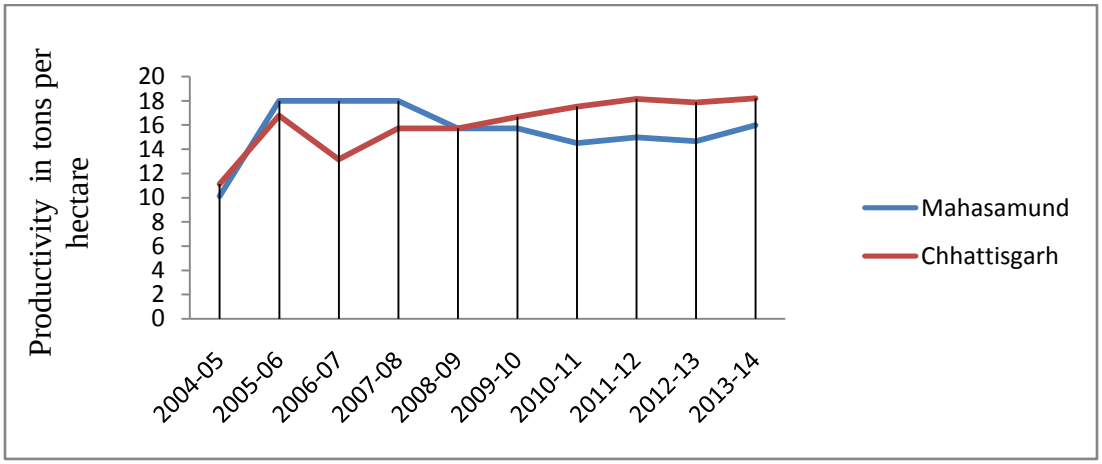

Fig. 4.17: Growth rate of productivity under cabbage in Mahasamund district and Chhattisgarh

4.3. Cost of cultivation and returns at sample households.

4.3.1 Operation wise cost of cultivation of tomato at sample house-holds.

The operation wise cost of cultivation of tomato production at sample farms is presented in Table 4.8. The average cost of cultivation was estimated as Rs. 55090.26 per hectare. The per hectare cost of cultivation at sample farms was varies from Rs.54355.71 per hectare at marginal farms to Rs.57182.29 per hectare at large farms, exhibiting increasing trend with increasing farm size.

Table 4.8 reveals that irrespective of farm size average cost for sowing and transplanting was costliest operation in tomato cultivation, which was 14.32 percent to the total cost, large farmers incur higher cost on this operation followed by small, medium and marginal farms. Manuring and fertilizer was second major cost spending operation (10.45 percent to the total). Other major operation followed was plant protection (7.27%), picking (7.09% percent). About 65.51 percent to the cost of cultivation was shared by operational cost.

Table 4.8 indicate that average share of fixed cost was 34.49 per cent to the total cost of cultivation of tomato and the rental value of land alone contributed about 94.73 per cent to the total fixed cost which was Rs.18000 per hectare, however no case was observed of leased in land in the study area under selected crops. Average fixed cost estimated was Rs.19002.02 per hectare which varies from Rs.19066.52 per hectare (35.08%) at marginal to Rs.19008.35 per hectare (33.24%) at large farms. The data shows that fixed cost higher at marginal farms followed by large, medium and small.

The cost of cultivation per hectare showed a rising trend with the rise in the size of farms. The rise in cost was associated with the higher expenditure incurred on cash inputs like manure and fertilizers, hired labour etc. The higher expenditure returns into higher yield on large farms as compare to others.

Table: 4.8: Operation wise cost of cultivation in tomato crop In Rs/hectare

Sl. No	Particulars	Marginal	Small	Medium	Large	Average
A.	**Operational cost**					
1	Field preparation	2154.55 (3.96)	2039.43 (3.73)	2581.14 (4.66)	3071.7 (5.37)	2339.98 (4.25)
2	Manure and Fertilizers	5523.21 (10.16)	5174.32 (9.46)	6503.6 (11.75)	6472.1 (11.34)	5756.71 (10.45)
4	Nursery preparation	952.35 (1.75)	578.7 (1.06)	474.71 (0.86)	771.1 (1.35)	704.004 (1.28)
5	Sowing/ Transplanting	7363.44 (13.55)	7873.37 (14.39)	7890.61 (14.25)	9111.1 (15.93)	7889.98 (14.32)
6	Interculture	1600.91 (2.94)	1427.5 (2.61)	1695.37 (3.06)	2041.3 (3.57)	1628.32 (2.95)
7	Irrigation	2445.29 (4.49)	2615.96 (4.78)	2454.55 (4.43)	2125.5 (3.71)	2456.45 (4.46)
8	Plant protection chemicals	4081.7 (7.51)	3926.38 (7.17)	3686.04 (6.66)	4483 (7.84)	4004.32 (7.27)
9	Picking/ Harvesting	4400.43 (8.09)	3791.94 (6.93)	3300.88 (5.96)	3983.8 (6.97)	3909.71 (7.09)
10	Cleaning	735.77 (1.35)	976.6 (1.78)	638.99 (1.15)	1032.3 (1.80)	834.80 (1.5)
11	Grading	845.66 (1.55)	976.6 (1.78)	638.99 (1.15)	1032.3 (1.80)	870.12 (1.58)
12	Packing/ Transport	1116.17 (2.05)	1178.21 (2.15)	1121.95 (2.03)	1251 (2.19)	1156.61 (2.09)
13	Stacking	3924 (7.22)	3465 (6.33)	3114 (5.62)	2470 (4.32)	3395.18 (6.16)
13	Interest on working capital	145.71 (0.27)	233.68 (0.43)	291.32 (0.53)	328.74 (0.57)	231.33 (0.42)
14	Misalaneous	0 (0)	1500 (2.74)	2000 (3.61)	0 (0)	910.71 (1.65)
	Total	35289.19 (64.92)	35757.69 (65.35)	36392.15 (65.74)	38173.94 (66.76)	36088.24 (65.51)
B.	**Fixed**					
	Land revenue	10 (0.02)	10 (0.02)	10 (0.02)	10 (0.02)	10 (0.02)
	Depreciation	411.76 (0.76)	308.76 (0.56)	312.92 (0.56)	355.56 (0.62)	349.44 (0.63)
	Interest on fixed capital	644.76 (1.19)	641.16 (1.17)	641.3 (1.16)	642.79 (1.12)	642.58 (1.17)

Rental value of owned land	18000 (33.11)	18000 (32.89)	18000 (32.52)	18000 (31.48)	18000 (32.67)
Total fixed cost	19066.52 (35.08)	18959.92 (34.65)	18964.22 (34.26)	19008.35 (33.24)	19002.02 (34.49)
Total cost of cultivation	54355.71 (100)	54717.6 (100)	55356.37 (100)	57182.29 (100)	55090.26 (100)

Note : figures in parenthesis indicate percentages to total.

4.3.2 Input cost of cultivation of tomato crop in sample household.

The cost of inputs used for tomato cultivation under different sample farms was estimated in Rs/hectare, which is presented in Table 4.9. Table 4.9 reveals that average, cost of input used for tomato was found to be Rs.36088.24 per hectare which varies from Rs.35289.19 per hectare at marginal farms to Rs.38173.94 per hectare at large farm.

Table 4.9 shows that share of total human labour was the maximum to the total input cost for tomato which was (43.94%) to the total which was higher at marginal farms followed by large farms. Next costliest input item was seed cost, average cost incurred was Rs.5167.18 per hectare (14.32% to the total) which was higher at medium farms and decreases with farm decreases, followed by manure and fertilizer (13.79% to the total) which was higher at medium farms followed by large, and staking was fourth higher cost spending input on which average cost was Rs.2943.71 per hectare (8.16% to the total), and the minimum cost observed was machine labor cost which was 1.46 percent to the total. The cost of inputs for tomato showed a rising trend with the farm size holdings. It was due to the fact that the large farmers could be incurred more expenditure on modern farm inputs like quality seed, fertilizer, plant protection material, hired labour etc.

Table.4.9: Input cost for cultivation of tomato crop at sample house-hold in Rs/ha.

Sl. No	Particulars	Marginal	Small	Medium	Large	Average
A	**Labour cost**					
1	Human labour					
	Family	15118.05	8755.11	3613.08	5095.5	9175.68
		(42.84)	(24.48)	(9.93)	(13.35)	(25.42)
	Hired	1349.25	6904.97	11004.35	11686.7	6680.75
		(3.82)	(19.31)	(30.24)	(30.61)	(18.51)
	Total	16467.3	15660.08	14617.43	16782.2	15856.42
		(46.66)	(43.79)	(40.17)	(43.96)	(43.94)
2	Bullock labour	2196.64	1622	1642.86	2085	1877.32
		(6.22)	(4.54)	(4.51)	(5.46)	(5.20)
3	Machine power	0	645.16	908.84	888	528.98
		(0)	(1.80)	(2.49)	(2.32)	(1.46)
	Total labour cost	18663.94	17927.24	17169.13	19755.2	18262.72
		(52.89)	(50.13)	(47.18)	(51.75)	(50.60)
B	**Input cost**					
4	Seed	4887.71	5051.38	5478.23	5590	5167.18
		(13.85)	(14.13)	(15.05)	(14.64)	(14.32)
5	Manure &	4539.54	4595.62	5793.88	5600	4977.85
	Fertilizers	(12.86)	(12.85)	(15.92)	(14.67)	(13.79)
6	Plant protection	2552.29	2949.77	3005.59	3400	2898.29
		(7.23)	(8.25)	(8.25)	(8.91)	(8.03)
7	Irrigation	1000	2000	2000	1500	1607.14
		(2.83)	(5.59)	(5.49)	(3.93)	(4.45)
5	Interest on	145.71	233.68	291.32	328.74	231.33
	working capital	(0.41)	(0.65)	(0.80)	(0.86)	(0.64)
8	Stacking	3500	3000	2654	2000	2943.71
		(9.92)	(8.39)	(7.29)	(5.24)	(8.16)
	Total Input Cost	16625.25	17830.45	19223.02	18418.74	17825.5
		(47.11)	(49.86)	(52.82)	(48.25)	(49.39)
	Total cost	35289.19	35757.69	36392.15	38173.94	36088.24
		(100)	(100)	(100)	(100)	(100)

Note : figure in parenthesis indicate percentages to total.

4.3.3. Cost and returns of tomato crop

The cost and returns on the basis of cost concept in the production of tomato has been presented in Table 4.10. Table 4.10 shows that average cost-A1, cost-A2

cost-B, cost-C were worked out to Rs.27272 per hectare, Rs. 27272 per hectare, Rs.45914.58 per hectare, Rs.55090.26 per hectare in the average sample farms. It was noted that rupees Rs.18000 per hectare was considered as imputed rental value of owned land for crop season, however no case of leased in land was found

Table.4.10: Break up of Cost based on cost concept. (Rs/hectare)

Sl. No	Costs	Marginal	Small	Medium	Large	Average
1	CostA1	20592.9	27321.34	33101.99	33444	27272
2	CostA2	20592.9	27321.34	33101.99	33444	27272
3	Cost B	39237.66	45962.5	51743.29	52086.79	45914.58
4	Cost C	54355.71	54717.61	55356.37	57182.29	55090.26

4.3.4. Measure of Farm profit of tomato crop in sample households

The farm measure is presented in Table 4.11. The average main production was worked out as 181.20 quintal per hectare which ranges from about 177.5 quintal per hectare at marginal farms to 190 quintal per hectare at large farms. The average cost of cultivation for tomato was Rs.55090.26 per hectare. The average gross income was observed as Rs.144960 per hectare in the study area which ranges from Rs.142000 per hectare at marginal farms to Rs.152000 per hectare at large farms.

On an average net income calculated was Rs.89869.74 per hectare which ranges from Rs.87644.29 per hectare at marginal farms to Rs.94817.71 per hectare at large farms. Net income was found higher at large farms followed by medium, small and marginal farms. Average Family labour income by separating Cost B from gross income was Rs.99045.42 per hectare, which varies from Rs.102762.34 per hectare at marginal farms to Rs.99913.21 per hectare at large farms shows family labour income was higher at marginal farms followed by large, small and medium farms. Average farm business income was Rs.117688 per hectare, ranges from Rs.121407.1 per hectare at marginal farms to Rs.118556 per hectare at large farms. Farm business

income was calculated by separating cost A1 from gross income which was higher at marginal farms as their Cost A1 was minimum followed by large, small and medium farms respectively. Average farm investment income was found to be Rs.72512.32 per hectare in sample house-holds and table shows large farms has higher farm investment income followed medium, small and marginal farms.

Average returns per rupees or input – output ratio was 1:2.63 which ranges from 1:2.61 at marginal farm to 1:2.66 at large farms. This was higher at large farms followed by medium, small and marginal farms.

Table.4.11: Measure of Farm profit of sample house-hold

Sl. No	Particulars	Marginal	Small	Medium	Large	Average
1	**Main yield**	177.5	180	182.7	190	181.20
2	**Gross income@800**	142000	144000	146160	152000	144960
3	**cost of cultivation**	54355.71	54717.61	55356.37	57182.29	55090.26
4	**Net income**	87644.29	89282.39	90803.63	94817.71	89869.74
5	**cost of production**	306.23	303.99	302.99	300.96	302.82
6	**Family Labour income**	102762.34	98037.5	94416.71	99913.21	99045.42
7	**Farm business income**	121407.1	116678.66	113058.01	118556	117688
8	**Farm investment income**	70289.05	71923.55	73444.93	77460.5	72512.32
9	**Input-Output ratio**	1:2.61	1:2.63	1:2.64	1:2.66	1:2.63

4.3.5. Operation wise cost of cultivation in brinjal crop

The operation wise cost of cultivation of brinjal production at sample farms is presented in Table 4.12. The average cost of cultivation was estimated as Rs.51452.92 per hectare. The per hectare cost of cultivation at sample farms was varies from Rs.50631.71 per hectare at marginal farms to Rs.54761.18 per hectare at large farms, exhibiting increasing trend with increasing farm size.

Table 4.12 reveals that irrespective of farm size average cost for sowing and transplanting was costliest operation in brinjal cultivation, which was 15.53 percent to the total cost, large farmers incurred higher cost on this operation followed by small farms. Manure and fertilizers was second major cost spending operation (10.63 percent to the total). Other major operations followed were picking (7.77% percent), plant protection (7.63%). About 63.05 percent to the cost of cultivation was shared by operational cost.

Table 4.12. indicate that average share of fixed cost was 36.95 per cent to the total cost of cultivation of brinjal and the rental value of land alone contributed about 94.68 per cent to the total fixed cost which was Rs.18000 per hectare, however no case was observed of leased in land in the study area under selected crops. Average fixed cost estimated was Rs.19010.72 per hectare which varies from Rs.19066.52 per hectare (37.66%) at marginal to Rs.19008.35 per hectare (34.71%) at large farms. The data shows that fixed cost higher at marginal farms followed by large farms.

The cost of cultivation per hectare showed a rising trend with the rise in the size of farms. The rise in cost was associated with the higher expenditure incurred on cash inputs like manure and fertilizers, hired labor etc. The higher expenditure returns into higher yield on large farms as compare to others.

Table: 4.12: Operation wise cost of cultivation in brinjal crop in Rs/hectare

S.N	Particulars	Marginal	Small	Medium	Large	Average
A.	Operational cost					
1	Field preparation	2154.55 (4.25)	2039.43 (4.02)	2581.14 (4.94)	3071.7 (5.61)	2301.16 (4.47)
2	Manure and Fertilizers	5423.21 (10.71)	4674.32 (9.21)	6403.6 (12.26)	6538.77 (11.94)	5470.74 (10.63)
4	Nursery preparation	952.35 (1.88)	578.7 (1.14)	474.71 (0.91)	771.1 (1.41)	743.61 (1.44)
5	Sowing/ Transplanting	7463.44 (14.74)	8173.37 (16.10)	7990.61 (15.29)	9159.99 (16.73)	7992.56 (15.53)
6	Interculture	1600.91 (3.16)	1427.5 (2.81)	1695.37 (3.24)	2041.3 (3.73)	1618.67 (3.14)
7	Irrigation	2445.29 (4.83)	2615.96 (5.15)	2454.55 (4.69)	2125.5 (3.88)	2457.25 (4.77)
8	Plant protection chemicals	4081.7 (8.06)	3626.38 (7.145)	3686.04 (7.05)	4416.33 (8.06)	3928.50 (7.63)
9	Picking	4400.43 (8.69)	3791.94 (7.47)	3300.88 (6.32)	3983.8 (7.27)	4000.07 (7.77)
10	Cleaning	735.77 (1.45)	976.6 (1.92)	638.99 (1.22)	1032.3 (1.88)	839.64 (1.63)
11	Grading	845.66 (1.67)	976.6 (1.92)	638.99 (1.22)	1032.3 (1.88)	884.59 (1.72)
12	Packing/ Transport	1316.17 (2.59)	1178.21 (2.32)	1121.95 (2.15)	1251 (2.28)	1236.90 (2.40)
13	Interest on working capital	145.71 (0.29)	233.68 (0.46)	291.32 (0.56)	328.74 (0.60)	218.51 (0.42)
14	Misalaneous	0 (0)	1500 (2.95)	2000 (3.83)	0 (0)	750 (1.46)
	Total	31565.19 (62.34)	31792.69 (62.64)	33278.15 (63.69)	35752.83 (60.29)	32442.2 (63.05)
B	Fixed cost					
1	Land revenue	10 (0.02)	10 (0.02)	10 (0.02)	10 (0.02)	10 (0.02)
2	Depreciation	411.76 (0.81)	308.76 (0.61)	312.92 (0.59)	355.56 (0.65)	357.84 (0.69)
3	Interest on fixed capital	644.76 (1.27)	641.16 (1.26)	641.3 (1.23)	642.79 (1.17)	642.87 (1.25)
4	Rental value of Owned land	18000 (35.55)	18000 (35.47)	18000 (34.45)	18000 (32.87)	18000 (34.98)
	Total fixed cost	19066.52 (37.66)	18959.92 (37.36)	18964.22 (36.30)	19008.35 (34.71)	19010.72 (36.95)

Total cost of cultivation	50631.71 (100)	50752.6 (100)	52242.37 (100)	54761.18 (100)	51452.92 (100)

Note : figure in parenthesis indicate percentages to total.

4.3.6. Input cost of cultivation in brinjal crop

The cost of inputs used for brinjal cultivation under different sample farms was estimated in Rs/hectare, which is presented in Table 4.13. Table 4.13 reveals that average, cost of input used for brinjal was found to be Rs.32442.2 per hectare which varies from Rs.31565.19 per hectare at marginal farms to Rs.35752.83 per hectare at large farm.

Table shows that share of total human labour was the maximum to the total input cost for brinjal which was (48.52%) to the total which was higher at marginal farms Rs.16502.46 per hectare followed by small farms Rs.15195.08 per hectare. Next costliest input item was seed cost, average cost incurred was Rs.5276.534 per hectare (16.26% to the total) which was higher at small farms and decreases with farm decreases, followed by manure and fertilizer (14.38% to the total) which was higher at medium farms followed by large farms, and plant protection chemicals was fourth higher cost spending operation on which average cost was Rs.2751.625 per hectare (8.48% to the total), and the minimum cost observed was machine labor cost which was 1.39 percent to the total. The cost of inputs for brinjal showed a rising trend with the farm size holdings. It was due to the fact that the large farmers could be incurred more expenditure on modern farm inputs like quality seed, fertilizer, plant protection material, hired labour etc.

Table 4.13: Input cost of cultivation in brinjal crop in Rs/ha.

Sl. No	Particulars	Marginal	Small	Medium	Large	Average
A	**Labour cost**					
1	Human labour					
	Family	15024.05 (47.59)	8510.11 (26.77)	3393.08 (10.19)	4915.5 (13.75)	9986.953 (30.7)
	Hired	1478.41 (4.68)	6684.97 (21.03)	10764.35 (32.35)	11396.7 (31.88)	5753.801 (17.73)
	Total	16502.46 (52.28)	15195.08 (47.79)	14157.43 (42.54)	16312.2 (45.62)	15740.75 (48.52)
2	Bullock labour	1937.48 (6.14)	1622 (5.10)	1642.86 (4.94)	2085 (5.83)	1817.041 (5.60)
3	Machine power	0 (0)	645.16 (2.03)	908.84 (2.73)	888 (2.48)	450.3018 (1.39)
	Total labour cost	18439.94 (58.42)	17462.24 (54.92)	16709.13 (50.21)	20285.2 (56.74)	18144.46 (55.93)
B	**Input cost**					
4	Seed	4987.71 (14.06)	5351.38 (16.83)	5578.23 (16.76)	5666.67 (15.85)	5276.53 (16.26)
5	Manure & Fertilizers	4439.54 (8.08)	4095.62 (12.88)	5693.88 (17.11)	5638.89 (15.77)	4664.70 (14.38)
6	Plant protection	2552.29 (3.17)	2649.77 (8.33)	3005.59 (9.03)	3333.33 (9.32)	2751.62 (8.48)
7	Irrigation	1000 (3.17)	2000 (6.29)	2000 (6.01)	1500 (4.19)	1522.73 (4.69)
8	Interest on working capital	145.71 (0.46)	233.68 (0.73)	291.32 (0.87)	328.74 (0.92)	218.51 (0.67)
	Total Input Cost	13125.25 (41.58)	14330.45 (45.07)	16569.02 (49.79)	16467.63 (46.06)	14434.09 (44.49)
	Total Cost	31565.19 (100)	31792.69 (100)	33278.15 (100)	35752.83 (100)	32442.2 (100)

Note : figure in parenthesis indicate percentages to total.

4.3.7. Cost and returns of brinjal crop

The cost and returns on the basis of cost concept in the production of brinjal has been presented in Table 4.14. Table 4.14 shows that average cost-A1, cost-A2 cost-B, cost-C were worked out to Rs.22823.09 per hectare, Rs. 22823.09 per hectare, Rs.41465.96 per hectare, Rs.51452.92 per hectare in the average sample farms. It was noted that rupees Rs.18000 per hectare was considered as imputed rental value of owned land for crop season, however no case of leased in land was found.

Table 4.14: Break up of Cost based on cost concept. (Rs/hectare)

Sl No	Costs	Marginal	Small	Medium	Large	Average
1	CostA1	16962.9	23601.34	30207.99	31202.89	22823.09
2	CostA2	16962.9	23601.34	30207.99	31202.89	22823.09
3	Cost B	35607.66	42242.50	48849.29	49845.68	41465.96
4	Cost C	50631.71	50752.61	52242.37	54761.18	51452.92

4.3.8. Measure of Farm profit by size of farm

The farm measure is presented in Table 4.15. The average main production was worked out as 137.29 quintal per hectare which ranges from about 135 quintal per hectare at marginal farms to 145.7 quintal per hectare at large farms. The average cost of cultivation for brinjal was Rs.51452.92 per hectare. The average gross income was observed as Rs.131798.4 per hectare in the study area which ranges from Rs.129600 per hectare at marginal farms to Rs.139872 per hectare at large farms.

On an average net income calculated was Rs.80345.48 per hectare which ranges from Rs.78968.29 per hectare at marginal farms to Rs.85110.82 per hectare at large farms. Net income was found higher at large farms followed by medium, small and marginal farms. Average Family labour income by separating Cost B from gross income was Rs.90332.44 per hectare, which varies from Rs.93992.34 per hectare at marginal farms to Rs.90026.32 per hectare at large farms shows family labor income was higher at marginal farms followed by large, small and medium farms. Average farm business income was Rs.108975.31 per hectare, ranges from Rs.112637.1 per hectare at marginal farms to Rs.108669.11 per hectare at large farms. Farm business income was calculated by separating cost A1 from gross income which was higher at marginal farms as their Cost A1 was minimum followed by large, small and medium farms respectively. Average farm investment income was found to be Rs.62988.35 per hectare in sample house-holds and table shows large farms has higher farm investment income followed medium, small and marginal farms.

Average returns per rupees or input – output ratio was 1:2.56 which ranges from 1:2.56 at marginal farm to 1:2.55 at large farms. This was higher at small farms followed by marginal, large and medium farms.

Table: 4.15: Measure of Farm profit of sample house-holds

S. No	Particulars	Marginal	Small	Medium	Large	Average
1	Main yield	135	136	138.74	145.70	137.29
2	Gross income@960	129600	130560	133190.4	139872	131798.4
4	cost of cultivation	50631.71	50752.6	52242.37	54761.18	51452.92
6	Net income	78968.29	79807.4	80948.03	85110.82	80345.48
5	cost of production	375.05	373.18	376.55	375.85	389.60
6.	Family labour income	93992.34	88317.5	84341.11	90026.32	90332.44
7.	Farm business income	112637.1	106958.66	102982.41	108669.11	108975.31
8.	Farm investment income	61613.05	62448.56	63589.33	67752.12	62988.35
6	Input-Output ratio	1:2.56	1:2.57	1:2.55	1:2.55	1:2.56

4.3.9. Operation wise cost of cultivation of cabbage at sample house-holds.

The operation wise cost of cultivation of cabbage production at sample farms is presented in Table 4.16. The average cost of cultivation was estimated as Rs.47061.59 per hectare. The per hectare cost of cultivation at sample farms was varies from Rs.44780.96 per hectare at marginal farms to Rs.50355.4 per hectare at large farms, exhibiting increasing trend with increasing farm size.

Table 4.16 reveals that irrespective of farm size average cost for sowing and transplanting was costliest operation in cabbage cultivation, which was 13.54 percent to the total cost, large farmers incurred higher cost on this operation followed by small

farm. Manure and fertilizers was second major cost spending operation (13.33 percent to the total). Other major operations followed were plant protection (8.24%), field preparation (5.32%). About 59.29 percent to the cost of cultivation was shared by operational cost.

Table 4.16 indicate that average share of fixed cost was 40.70 per cent to the total cost of cultivation of cabbage and the rental value of land alone contributed about 93.96 per cent to the total fixed cost which was Rs.18000 per hectare, however no case was observed of leased in land in the study area under selected crops. Average fixed cost estimated was Rs.19156.08 per hectare which varies from Rs.19337.42 per hectare (43.18%) at marginal to Rs.19116.45 per hectare (37.96%) at large farms. The data shows that fixed cost higher at marginal farm followed by large farms.

The cost of cultivation per hectare showed a rising trend with the rise in the size of farms. The rise in cost was associated with the higher expenditure incurred on cash inputs like manure and fertilizers, hired labor etc. The higher expenditure returns into higher yield on large farms as compare to others.

Table 4.16: Operation wise cost of cultivation in Cabbage crop in Rs/hectare

S. N	Particulars	Marginal	Small	Medium	Large	Average
A.	Operational cost					
1	Field preparation	2434.16 (5.43)	2360 (4.99)	2753.48 (5.66)	2491.21 (4.95)	2502.58 (5.32)
2	Manure and Fertilizers	5418.78 (12.10)	5872.5 (12.43)	7223.24 (14.84)	7752.97 (15.39)	6275.09 (13.33)
4	Nursery preparation	220 (0.49)	300 (0.63)	340 (0.69)	300 (0.59)	280 (0.594)
5	Sowing/ Transplanting	5723.13 (12.78)	6547.5 (13.86)	6597.68 (13.56)	7514.71 (14.92)	6371.81 (13.54)
6	Interculture	941.73 (2.10)	1102.5 (2.33)	1216.28 (2.49)	1329.4 (2.64)	1099.02 (2.33)
7	Irrigation	1941.73 (4.34)	1732.5 (3.67)	1676.75 (3.44)	2114.7 (4.19)	1844.79 (3.92)
8	Plant protection chemicals	3474.48 (7.76)	3732.5 (7.90)	4286.05 (8.80)	4576.47 (9.08)	3879.63 (8.24)
9	Harvest	2128.84 (4.75)	2540 (5.38)	3009.29 (6.18)	2338.24 (4.6)	2477.92 (5.26)
10	Cleaning	922.39 (2.06)	942.5 (1.99)	813.95 (1.67)	482.36 (0.96)	845.30 (1.79)
11	Grading	922.39 (2.06)	942.5 (1.99)	813.95 (1.67)	482.36 (0.96)	845.30 (1.79)
12	Packing/ Transport	1156.83 (2.58)	982.5 (2.08)	586.04 (1.2)	558.82 (1.11)	895.79 (1.9)
13	Interest on working capital	159.08 (0.35)	200.75 (0.42)	264.8 (0.54)	297.7 (0.59)	213.25 (0.45)
14	Miscellaneous	1000 (2.23)	1000 (2.12)	1500 (3.08)	1000 (1.98)	1125 (2.39)
	Total	25443.54 (56.82)	28255.75 (59.82)	29581.5 (60.78)	31238.9 (62.03)	27905.5 (59.29)
B.	Fixed cost					
1	Land revenue	10 (0.02)	10 (0.02)	10 (0.02)	10 (0.02)	10 (0.02)
2	Depreciation	673.499 (1.50)	325 (0.69)	427.91 (0.88)	460 (0.91)	498.29 (1.06)

3	Interest on fixed capital	653.92 (1.46)	641.72 (1.35)	645.33 (1.33)	646.45 (1.28)	647.79 (1.38)
4	Rental value of Owned land	18000 (40.19)	18000 (38.11)	18000 (36.99)	18000 (35.74)	18000 (38.25)
	Total fixed cost	19337.42 (43.18)	18976.72 (40.18)	19083.24 (39.21)	19116.45 (37.96)	19156.08 (40.70)
	Total cost of cultivation(A+B)	44780.96 (100)	47232.47 (100)	48664.75 (100)	50355.4 (100)	47061.59 (100)

Note : figure in parenthesis indicate percentages to total.

4.3.10. Input cost of cultivation of cabbage crop

The cost of inputs used for cabbage cultivation under different sample farms was estimated in Rs/hectare, which is presented in Table 4.17. Table 4.17 reveals that average cost of input used for cabbage was found to be Rs.27905.51 per hectare which varies from Rs.25443.54 per hectare at marginal farms to Rs.31238.92 per hectare at large farm.

Table shows that share of total human labour was the maximum to the total input cost for cabbage which was (43.15) percent to the total which was higher at small farms Rs.13217.5 per hectare followed by marginal farms Rs.11411.86 per hectare. Next costliest input item was manure and fertilizers, average cost incurred was Rs.5441.55 per hectare (19.49% to the total) which was higher at large farms and decreases with farm decreases, followed by seed cost (13.84% to the total) which was higher at large farms followed by medium, and plant protection chemicals was fourth higher cost spending operation on which average cost was Rs.2989.96 per hectare (10.71% to the total), and the minimum cost observed was machine labor cost which was 2.59 percent to the total. The cost of inputs for cabbage showed a rising trend with the farm size holdings. It was due to the fact that the large farmers could be incurred more expenditure on modern farm inputs like quality seed, fertilizer, plant protection material, hired labor etc.

Table 4.17: Input cost of Cabbage crop at sample house-hold (in Rs/ha.)

Sl. No	Particulars	Marginal	Small	Medium	Large	Average
A	**Labour cost**					
1	Human labour					
	Family	10159.62 (39.93)	8315 (29.43)	3274.4 (11.069)	1640 (5.25)	6912.21 (24.77)
	Hired	1252.24 (4.93)	4902.5 (17.35)	8565.58 (28.95)	10339.46 (33.098)	5129.04 (18.38)
	Total	11411.86 (44.85)	13217.5 (46.78)	11839.98 (40.024)	11979.46 (38.35)	12041.25 (43.15)
2	Bullock labour	1709.37 (6.72)	1375 (4.87)	1744.18 (5.89)	1202.95 (3.85)	1571.178 (5.63)
3	Machine power	585.65 (2.30)	800 (2.83)	744.19 (2.51)	941.18 (3.01)	723.31 (2.59)
	Total labour cost	13706.88 (53.87)	15392.5 (54.47)	14328.35 (48.4)	14123.59 (45.21)	14335.74 (51.37)
B	**Input cost**					
4	Seed	3500 (13.75)	3850 (13.62)	4100 (13.86)	4500 (14.40)	3862.5 (13.84)
5	Manure & Fertilizers	4547.58 (17.87)	5062.5 (17.92)	6399.99 (21.6)	6964.71 (22.29)	5441.55 (19.49)
6	Plant protection	2530 (9.94)	2750 (9.73)	3488.37 (11.79)	3852.92 (12.33)	2989.96 (10.71)
7	Irrigation	1000 (3.93)	1000 (3.54)	1000 (3.38)	1500 (4.80)	1062.5 (3.81)
8	Interest on working capital	159.08 (0.62)	200.75 (0.71)	264.8 (0.89)	297.7 (0.95)	213.25 (0.76)
	Total Input Cost	11736.66 (46.13)	12863.25 (45.52)	15253.16 (51.56)	17115.33 (54.79)	13569.76 (48.63)
	Total Cost	25443.54 (100)	28255.75 (100)	29581.51 (100)	31238.92 (100)	27905.51 (100)

Note : figure in parenthesis indicate percentages to total.

4.3.11. Cost and returns of cabbage crop

The cost and returns on the basis of cost concept in the production of cabbage has been presented in Table 4.18. Table 4.18 shows that average cost-A1, cost-A2 cost-B, cost-C were worked out to Rs.21501.59 per hectare, Rs. 21501.59 per hectare, Rs.40149.38 per hectare, Rs.47061.59 per hectare in the average sample farms. It was noted that rupees Rs.18000 per hectare was considered as imputed rental value of

owned land for crop season, however no case of leased in land was found in study area.

Table 4.18: Break up of Cost based on cost concept. in Rs/hectare

Sl. No	Costs	Marginal	Small	Medium	Large	Average
1	Cost A1	15967.42	20275.75	26745.02	30068.94	21501.59
2	CostA2	15967.42	20275.75	26745.02	30068.94	21501.59
3	Cost B	34621.34	38917.47	45390.35	48715.39	40149.38
4	Cost C	44780.96	47232.47	48664.75	50355.39	47061.59

4.3.12. Measure of Farm profit by size of farm

The farm measure is presented in Table 4.19. The average main production was worked out as 115.94 quintal per hectare which ranges from about 110 quintal per hectare at marginal farms to 123.5 quintal per hectare at large farms. The average cost of cultivation for cabbage was Rs.47061.59 per hectare. The average gross income was observed as Rs.115940 per hectare in the study area which ranges from Rs.110000 per hectare at marginal farms to Rs.123500 per hectare at large farms.

On an average net income calculated was Rs.68878.41 per hectare which ranges from Rs.65219.04 per hectare at marginal farms to Rs.73144.6 per hectare at large farms. Net income was found higher at large farms followed by medium, small and marginal farms. Average Family labor income by separating Cost B from gross income was Rs.75790.62 per hectare, which varies from Rs.75378.66 per hectare at marginal farms to Rs. 74784.61 per hectare at large farms shows family labor income was higher at small farms followed by marginal, medium and large farms. Average farm business income was Rs.94438.41 per hectare, ranges from Rs.94032.58 per hectare at marginal farms to Rs.93431.06 per hectare at large farms. Farm business income was calculated by separating cost A1 from gross income which was higher at small farms as their Cost A1 was minimum followed by marginal, medium and large farms respectively. Average farm investment income was found to be Rs.51526.2 per

hectare in sample house-holds and table shows large farms has higher farm investment income followed medium, small and marginal farms.

Average returns per rupees or input – output ratio was 1:2.46 which ranges from 1:2.46 at marginal farm to 1:2.45 at large farms. This was higher at medium farms followed by small, marginal and large farms.

Table.4.19: Measure of Farm profit of sample house-hold

Sl. No	Particulars	Marginal	Small	Medium	Large	Average
1	Main yield	110	116.5	120.5	123.5	115.9
2	Gross income@1000	110000	116500	120500	123500	115940
3	cost of cultivation	44780.96	47232.47	48664.75	50355.4	47061.59
4	Net income	65219.04	69267.53	71835.25	73144.6	68878.41
5	cost of production	407.099	405.43	403.86	407.74	405.91
6.	Family labour income	75378.66	77582.53	75109.65	74784.61	75790.62
7.	Farm business income	94032.58	96224.25	93754.98	93431.06	94438.41
8.	Farm investment income	47872.96	51909.25	54480.58	55791.05	51526.2
9.	Input-Output ratio	1:2.46	1:2.47	1:2.48	1:2.45	1:2.46

4.3.13. Operation wise cost of cultivation of onion at sample house-holds.

The operation wise cost of cultivation of onion production at sample farms is presented in Table 4.20. The average cost of cultivation was estimated as Rs.50982.07 per hectare. The per hectare cost of cultivation at sample farms was varies from Rs.48306.26 per hectare at marginal farms to Rs.57164.96 per hectare at large farms, exhibiting increasing trend with increasing farm size.

Table 4.20 reveals that irrespective of farm size average cost for manuring and fertilizer was costliest operation in onion cultivation, which was 14.33 percent to the total cost, small farmers incurred higher cost on this operation followed by large farm. Sowing and transplanting was second major cost spending operation (8.93 percent to the total). Other major operation followed were plant protection (7.10%), harvesting (6.23% percent). About 62.67 percent to the cost of cultivation was shared by operational cost.

Table 4.20 indicate that average share of fixed cost was 37.32 per cent to the total cost of cultivation of onion and the rental value of land alone contributed about 94.59 per cent to the total fixed cost which was Rs.18000 per hectare, however no case was observed of leased in land in the study area under selected crops. Average fixed cost estimated was Rs.19028.71 per hectare which varies from Rs.19083.19 per hectare (39.5%) at marginal to Rs.19070.47 per hectare (33.36) at large farms. The data shows that fixed cost higher at marginal farm followed by medium farms.

The cost of cultivation per hectare showed a rising trend with the rise in the size of farms. The rise in cost was associated with the higher expenditure incurred on cash inputs like manure and fertilizers, hired labor etc. The higher expenditure returns into higher yield on large farms as compare to others.

Table: 4.20: Operation wise cost of cultivation of Onion crop in Rs/hectare

SN	Particulars	Marginal farms	Small farms	Medium farms	Large farms	Average
A.	Operational cost					
1	Field preparation	2500.42 (5.18)	2332.96 (4.68)	3348.85 (6.35)	4107.78 (7.18)	2846.46 (5.583)
2	Manure and Fertilizers	5442.18 (11.26)	8478.65 (16.99)	7386.39 (14.02)	8588.3 (15.02)	7306.35 (14.33)
4	Nursery preparation	1092.12 (2.26)	578.11 (1.16)	959.56 (1.82)	1153.24 (2.02)	898.028 (1.76)
5	Sowing/ Transplanting	4316.41 (8.93)	4166.69 (8.35)	4956.66 (9.4)	5406.24 (9.46)	4553.97 (8.93)
6	Interculture	1638.07 (3.39)	2015.58 (4.04)	1948.59 (3.69)	2053.24 (3.59)	1888.79 (3.70)
7	Irrigation	3118.97 (6.46)	2281.56 (4.57)	2518.81 (4.78)	2563.63 (4.48)	2630.14 (5.16)
8	Plant protection chemicals	2913.14 (6.03)	3463.61 (6.94)	4000.35 (7.59)	5057.92 (8.85)	3622.49 (7.10)
9	Harvest	2682.13 (5.55)	3229.7 (6.47)	3446.7 (6.54)	3738.96 (6.5)	3176.58 (6.23)
10	Cleaning	1267.29 (2.62)	759.22 (1.52)	1041.81 (1.98)	1198.7 (2.09)	1037.11 (2.03)
11	Grading	1267.29 (2.62)	759.22 (1.52)	1041.81 (1.98)	1198.7 (2.09)	1037.11 (2.03)
12	Packing/ Transport	1840.42 (3.8)	1167.16 (2.34)	1155.3 (2.19)	1175.33 (2.05)	1372.63 (2.69)
13	Interest on working capital	144.27 (0.298)	231.69 (0.46)	306.03 (0.58)	352.455 (0.62)	237.43 (0.46)
14	Misalaneous	1000 (2.07)	1500 (3.0)	1500 (2.85)	1500 (2.62)	1346.15 (2.64)
	Total	29222.71 (60.49)	30964.15 (62.06)	33610.86 (63.79)	38094.5 (66.63)	31953.25 (62.67)
B.	Fixed cost					
1	Land revenue	10 (0.02)	10 (0.02)	10 (0.19)	10 (0.017)	10 (0.02)
2	Depreciation	427.86 (0.88)	277.19 (0.55)	424.24 (0.8)	415.58 (0.73)	375.23 (0.73)
3	Interest on fixed capital	645.33 (1.33)	640.05 (1.28)	645.19 (1.22)	644.89 (1.13)	643.48 (1.26)

4	Rental value of Owned land	18000 (37.26)	18000 (36.08)	18000 (34.16)	18000 (31.49)	18000 (35.31)
	Total fixed cost	19083.19 (39.5)	18927.24 (37.94)	19079.43 (36.21)	19070.47 (33.36)	19028.71 (37.32)
	Total cost of cultivation	48306.26 (100)	49891.4 (100)	52690.29 (100)	57164.96 (100)	50982.07 (100)

Note : figure in parenthesis were percentages to the total.

4.3.14. Input cost used in cultivation of onion crop

The cost of inputs used for onion cultivation under different sample farms was estimated in Rs/hectare, which is presented in Table 4.21. Table 4.21 reveals that average, cost of input used for onion was found to be Rs.31953.25 per hectare which varies from Rs. 29222.71 per hectare at marginal farms to Rs.38094.5 per hectare at large farm.

Table shows that share of total human labour was the maximum to the total input cost for onion which was (54.29%) to the total which was higher at marginal farms Rs.18042.1 per hectare followed by medium farms Rs.18361.44 per hectare. Next costliest input item was manure and fertilizer, average cost incurred was Rs.6310.19 per hectare (19.75% to the total) which was higher at large farms and decreases with farm decreases, followed by plant protection chemicals (7.63%) to the total which was higher at large farms followed by medium, and bullock labour was fourth higher cost spending operation on which average cost was Rs.2021.56 per hectare (6.33% to the total), and the minimum cost observed was machine labor cost which was 2.59 percent to the total. The cost of inputs for onion showed a rising trend with the farm size holdings. It was due to the fact that the large farmers could be incurred more expenditure on modern farm inputs like quality seed, fertilizer, plant protection material, hired labour etc.

Table 4.21: Input cost of cultivation of onion crop in Rs/ha.

Sl. No	Particulars	Marginal	Small	Medium	Large	Average
A	Labour cost					
1	Human labour					
	Family	15089.41 (51.63)	7850.09 (25.35)	3135.9 (9.33)	2922.08 (7.67)	8357.89 (26.16)
	Hired	952.73 (10.10)	7351.92 (23.74)	15225.54 (45.29)	16520.74 (43.37)	8990.80 (28.14)
	Total	18042.1 (61.74)	15202.01 (49.09)	18361.44 (54.63)	19442.82 (51.04)	17348.69 (54.29)
2	Bullock labour	2148.05 (7.35)	1811.28 (5.85)	1872.81 (5.57)	2532.47 (6.65)	2021.56 (6.33)
3	Machine power	391.11 (1.34)	772.4 (2.49)	1078.79 (3.21)	1558.44 (4.09)	826.56 (2.59)
	Total labour cost	20581.3 (70.43)	17785.69 (57.44)	21313.04 (63.411)	23533.73 (61.78)	20196.81 (63.21)
B	Input cost					
4	Seed	1200 (4.11)	1250 (4.04)	1300 (3.87)	1440 (3.78)	1270.51 (3.98)
5	Manure & Fertilizers	4179.1 (14.30)	7801.06 (25.19)	6355.22 (18.91)	7467.53 (19.60)	6310.19 (19.75)
6	Plant protection	1618.04 (5.54)	2395.71 (7.74)	2836.57 (8.44)	3800.78 (9.98)	2438.30 (7.63)
7	Irrigation	1500 (5.13)	1500 (4.84)	1500 (4.46)	1500 (3.94)	1500 (4.69)
8	Interest on working capital	144.27 (0.49)	231.69 (0.75)	306.03 (0.91)	352.45 (0.92)	237.43 (0.74)
	Total Input Cost	8641.41 (29.57)	13178.46 (42.56)	12297.82 (36.58)	14560.76 (38.22)	11756.43 (36.79)
	Total Cost	29222.71 (100)	30964.15 (100)	33610.86 (100)	38094.5 (100)	31953.25 (100)

Note : figure in parenthesis indicate percentages to total.

4.3.15. Cost and returns of onion crop at sample house holds

The cost and returns on the basis of cost concept in the production of onion has been presented in Table 4.22. Table 4.22 shows that average cost-A1, cost-A2, cost-B, cost-C were worked out to Rs.23980.59 per hectare, Rs. 23980.59 per hectare, Rs.42624.06 per hectare, Rs.50981.96 per hectare in the average sample farms. It was noted that rupees Rs.18000 per hectare was considered as imputed rental value of

owned land for crop season, however no case of leased in land was found in study area.

Table.4.22: Break up of Cost based on cost concept. In Rs/hectare

Sl. No	Costs	Marginal	Small	Medium	Large	Average
1	Cost A1	14571.16	23401.248	30909.2	35597.99	23980.59
2	CostA2	14571.16	23401.248	30909.2	35597.99	23980.59
3	Cost B	33216.49	42041.29	49554.39	54242.8	42624.06
4	Cost C	48305.9	49891.4	52690.29	57164.96	50981.96

4.3.16. Measure of Farm profit by size of farm

The farm measure is presented in Table 4.23. The average main production was worked out as 132.69 quintal per hectare which ranges from about 125 quintal per hectare at marginal farms to 146 quintal per hectare at large farms. The average cost of cultivation for onion was Rs.50982.07 per hectare. The average gross income was observed as Rs.145959 per hectare in the study area which ranges from Rs.137500 per hectare at marginal farms to Rs.160600 per hectare at large farms.

On an average net income calculated was Rs.94976.93 per hectare which ranges from Rs.89193.74 per hectare at marginal farms to Rs.103435.04 per hectare at large farms. Net income was found higher at large farms followed by medium, small and marginal farms. Average Family labor income by separating Cost B from gross income was Rs.103334.94 per hectare, which varies from Rs.104283.51 per hectare at marginal farms to Rs.106357.2 per hectare at large farms shows family labor income was higher at large farms followed by marginal, medium and small farms. Average farm business income was Rs.121978.41 per hectare, ranges from Rs.122928.84 per hectare at marginal farms to Rs.125002.01 per hectare at large farms. Farm business income was calculated by separating cost A1 from gross income which was higher at large farms as their Cost A1 was minimum followed by marginal, medium and small farms respectively. Average farm investment income was found to be Rs.77620.41 per

hectare in sample house-holds and table shows large farms has higher farm investment income followed medium, small and marginal farms.

Table: 4.23: Measure of Farm profit of sample house-holds

Sl. No	Particulars	Marginal	Small	Medium	Large	Average
1	Main yield	125	131	138	146	132.69
2	Gross income@1100	137500	144100	151800	160600	145959
4	Cost of cultivation	48306.26	49891.4	52690.29	57164.96	50982.07
6	Net income	89193.74	94208.6	99109.71	103435.04	94976.93
5	Cost of production	386.45	380.85	381.81	391.54	384.22
6	Family labour income	104283.51	102058.71	102245.61	106357.2	103334.94
7	Farm business income	122928.84	120698.75	120890.8	125002.01	121978.41
8	Farm investment income	71839.07	76848.65	81754.9	86079.93	77620.41
6	Input-Output ratio	1:2.85	1:2.89	1:2.88	1:2.80	1:2.86

Average returns per rupees or input – output ratio was 1:2.86 which ranges from 1:2.85 at marginal farm to 1:2.80 at large farms. This was higher at small farms followed by medium, marginal and large farms.

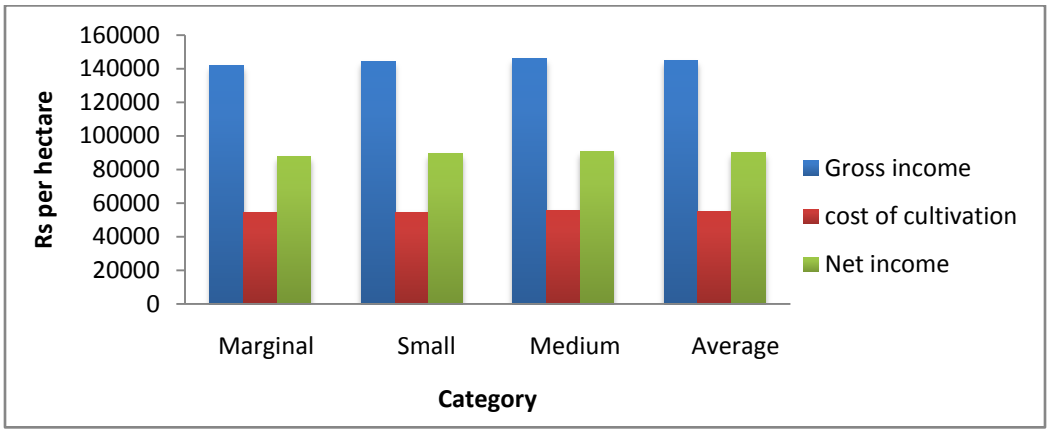

Fig.4.18: Gross income, cost of cultivation, net income of tomato

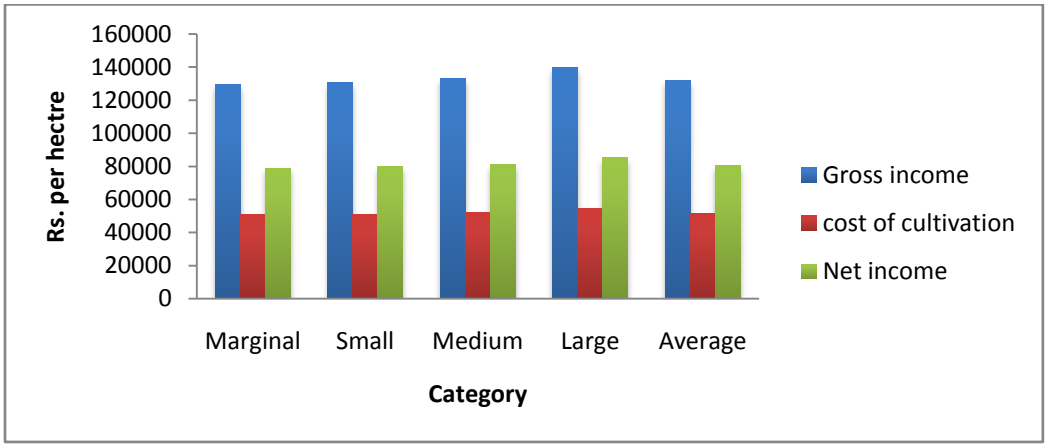

Fig.4.19: Gross income, cost of cultivation, net income of brinjal

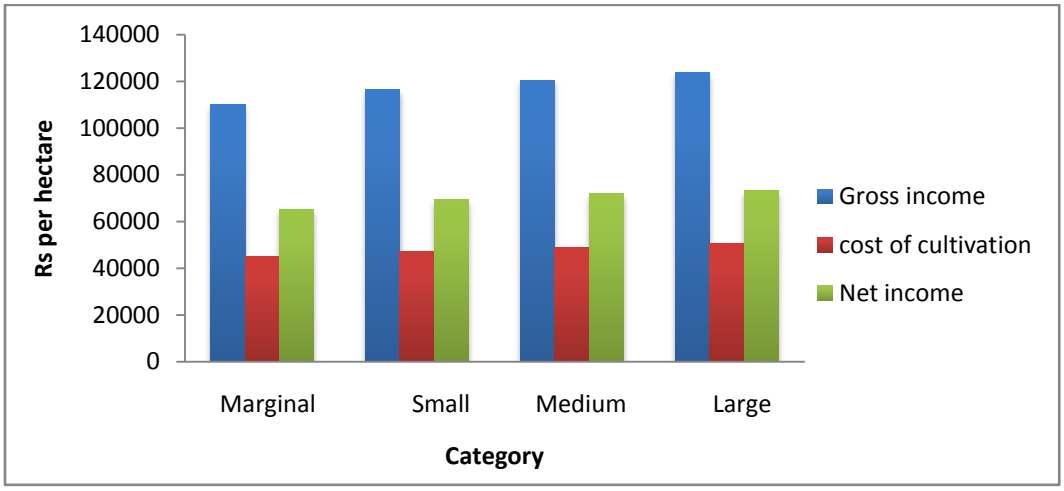

Fig.4.20: Gross income, cost of cultivation, net income of cabbage

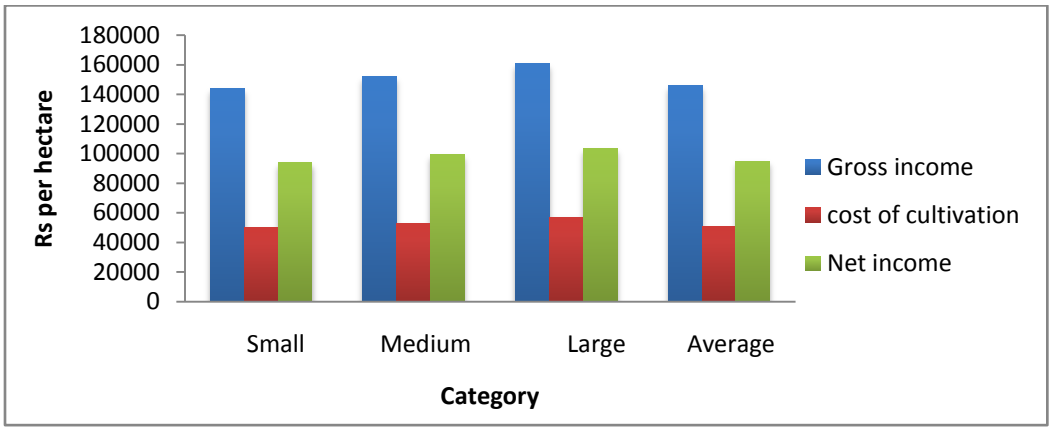

Fig.4.21: Gross income, cost of cultivation, net income of onion

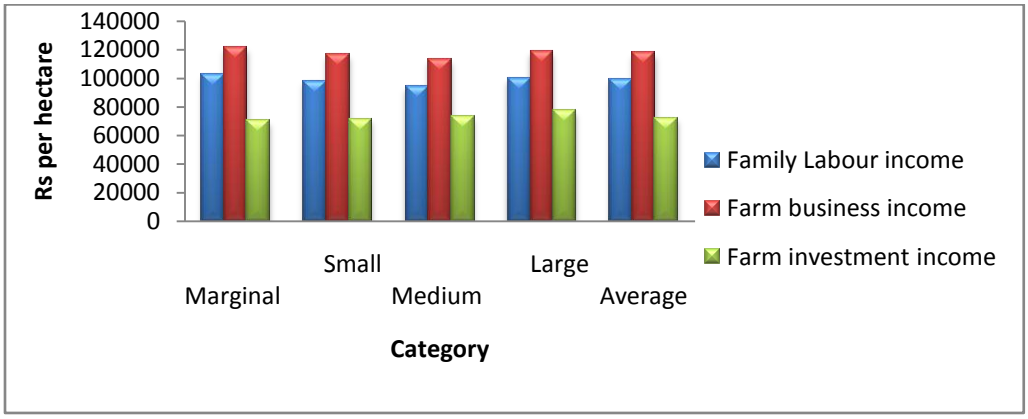

Fig4.22 Family labour income, farm business income, farm investment income of tomato

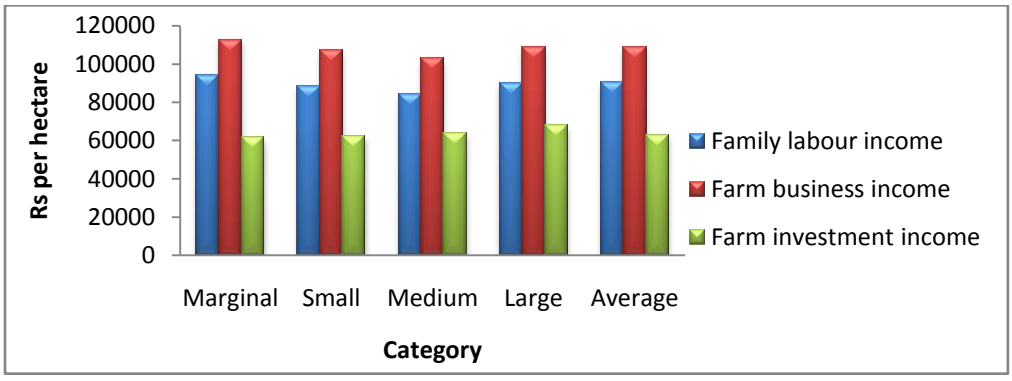

Fig4.23 Family labour income, farm business income, farm investment income of brinjal

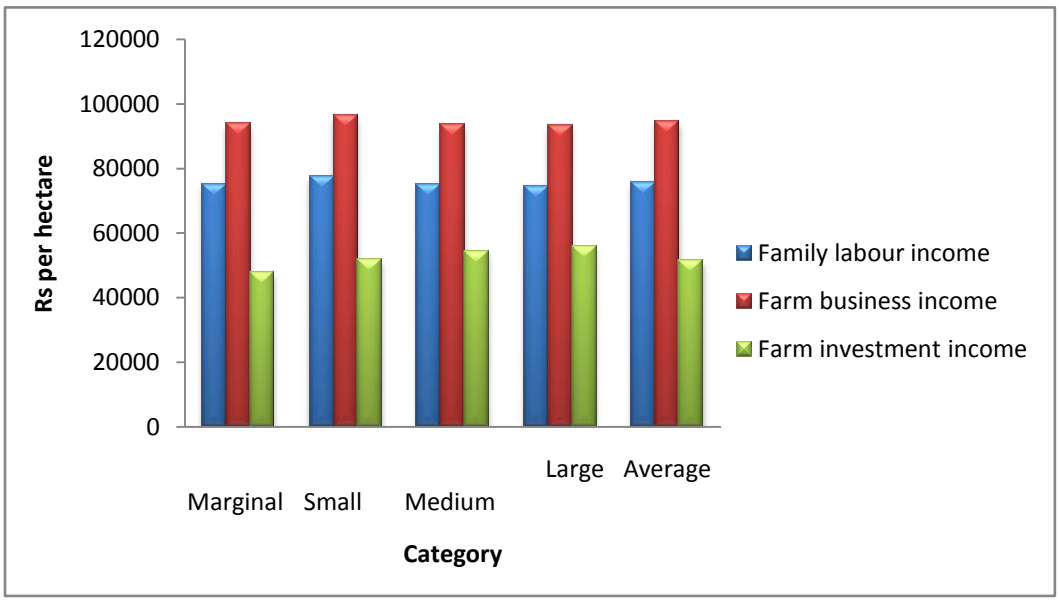

Fig4.24 Family labour income, farm business income, farm investment income of cabbage

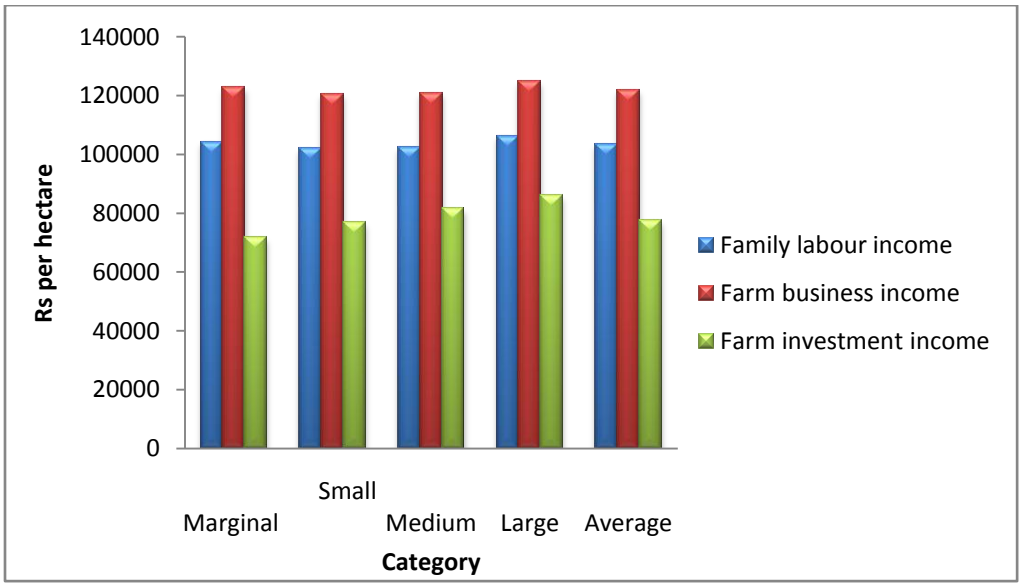

Fig4.25 Family labour income, farm business income, farm investment income of onion

4.4. MARKETING OF VEGETABLES:

A study of the vegetable marketing system is necessary to understand the complexities involved and to identify bottleneck with a view of providing efficient services in the transfer of farm producer and input from producer to consumer. An efficient marketing system minimizes costs and benefits to all section of society. Thus marketing of any product is the ultimate stage of any production system. A marketing system should be such that the produce should reach to consumer in good state without damage with least cost and within a shortest time after harvest.

4.4.1 Marketing Channel:

Like other agricultural commodities, marketing is playing very important role for the disposal of tomato, brinjal, cabbage and onion crops.

Keeping in view the importance of different marketing channels in the disposal of produce, the following three widely used marketing channels were selected for the study

Channel – I: Producer – Consumer

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

Channel -111: Producer- Retailer-Consumer.

During the course of study, producers, village merchants, wholesalers and retailers were generally engaged in assembling of tomato, brinjal, cabbage and onion and their marketing.

4.4.2 Marketable Surplus:

Tomato, brinjal and cabbage are highly perishable commodities. Being highly perishable in nature they cannot be stored at household level for a longer period without losses. Lack of infrastructural facility is another reason that forces farmers to sell their produce in the market immediately after their harvest. Table4.24. to

4.27 clearly reveals that the estimated marketable surplus with marginal, small, medium, large farmers was 11.28, 29.5, 44.12, 61.35 quintals per farm for tomato, 9.83, 23.7, 67.6, 57.8 quintals per farm for brinjal, 12.11, 28.72, 31.99, 104.48 quintals per farm for cabbage and for onion 6.6, 11.29, 19.86, 44.49 quintals per farm respectively.

Table 4.24: Marketable surplus of Tomato crop at sample household in q/farm

Sl. No	Particulars	Farm Size				
		Marginal	**Small**	**Medium**	**Large**	**Average**
1	Total quantity produced (q)	11.64 (100)	29.8 (100)	44.46 (100)	61.75 (100)	31.67 (100)
2	Quantity paid for wages	0.2 (1.72)	0.1 (0.33)	0.2 (0.45)	0.2 (0.32)	0.17 (0.54)
3	Quantity used for home	0.16 (1.34)	0.2 (0.67)	0.14 (0.31)	0.2 (0.32)	0.17 (0.54)
4	Total quantity utilized	0.36 (3.14)	0.3 (1.01)	0.34 (0.76)	0.4 (0.65)	0.34 (1.07)
5	Marketable surplus	11.28 (96.91)	29.5 (98.99)	44.12 (99.23)	61.35 (99.35)	31.33 (98.93)

Note : figure in parenthesis indicate percentages to total.

Table 4.25: Marketable surplus of brinjal crop at sample household in q/farm

Sl. No	Particulars	Farm Size				
		Marginal	**Small**	**Medium**	**Large**	**Average**
1	Total quantity produced (q)	10.2 (100)	24.09 (100)	67.98 (100)	58.28 (100)	29.05 (100)
2	Quantity paid for wages	0.2 (1.96)	0.18 (0.75)	0.23 (0.34)	0.26 (0.45)	0.20 (0.69)
3	Quantity used for home	0.17 (1.67)	0.21 (0.87)	0.15 (0.22)	0.22 (0.38)	0.19 (0.65)
4	Total quantity utilized	0.37 (3.62)	0.39 (1.62)	0.38 (0.56)	0.48 (0.82)	0.39 (1.34)
5	Marketable surplus	9.83 (96.37)	23.7 (98.38)	67.6 (99.44)	57.8 (99.18)	28.66 (98.66)

Note : figure in parenthesis indicate percentages to total.

Table 4.26. Marketable surplus of Cabbage crop at sample household in q/farm

Sl. No	Particulars	Farm Size				
		Marginal	**Small**	**Medium**	**Large**	**Average**
1	Total quantity produced (q)	12.47	29.12	32.38	104.97	33.17
		(100)	(100)	(100)	(100)	(100)
2	Quantity paid for wages	0.2	0.18	0.23	0.26	0.21
		(1.60)	(0.62)	(0.71)	(0.25)	(0.63)
3	Quantity used for home	0.16	0.22	0.16	0.23	0.18
		(1.28)	(0.75)	(0.49)	(0.22)	(0.54)
4	Total quantity utilized	0.36	0.4	0.39	0.49	0.39
		(2.89)	(1.37)	(1.20)	(0.47)	(1.17)
5	Marketable surplus	12.11	28.72	31.99	104.48	32.78
		(97.11)	(98.63)	(98.79)	(99.53)	(98.82)

Note : figure in parenthesis indicate percentages to total.

Table 4.27: Marketable surplus of Onion crop at sample household in q/farm

Sl. No	Particulars	Farm Size				
		Marginal	**Small**	**Medium**	**Large**	**Average**
1	Total quantity produced (q)	6.98	11.69	20.24	44.97	16.48
		(100)	(100)	(100)	(100)	(100)
2	Quantity paid for wages	0.21	0.18	0.23	0.25	0.21
		(3.0)	(1.54)	(1.14)	(0.55)	(1.27)
3	Quantity used for home	0.17	0.22	0.15	0.23	0.19
		(2.43)	(1.89)	(0.74)	(0.51)	(1.15)
4	Total quantity utilized	0.38	0.4	0.38	0.48	0.40
		(5.44)	(3.42)	(1.88)	(1.07)	(2.43)
5	Marketable surplus	6.6	11.29	19.86	44.49	16.08
		(94.55)	(96.57)	(98.12)	(98.93)	(97.57)

Note : figure in parenthesis indicate percentages to total.

4.4.3 Marketing cost

4.4.3.1 Marketing cost of tomato crop

Marketing charges paid by various intermediaries in different marketing channels of tomato is presented in Table 4.28. The total marketing charges incurred by producer was Rs.68.56 per quintal and Rs.176.84 per quintal and Rs.160 per quintal in

channel 1, channel 2 and channel 3 for different performances respectively in which higher cost of marketing cost spend by producer was in channel 1.

Table 4.28: Marketing cost of tomato crop in Rs/q

Sl. No	Marketing cost	Channels		
		Channel 1	**Channel 2**	**Channel 3**
A	**Producer**			
1	Transport charge	50		30
2	Mandi fees	0		5
3	Loading-unloading	8.56		5
4	Others (include commission)	10	24	20
	Sub total	68.56 (100)	24 (13.57)	60 (37.5)
B	**Village Merchant**			
1	Transport charge		40	
2	Mandi fees		5	
3	Loading-unloading		8.56	
	Subtotal		53.56 (30.29)	
C	**Whole seller**			
1	Transport charge		7.16	
2	Packaging / Weighting		5	
3	Mandi fees		5	
4	Loading-unloading		8.56	
5	Others		5	
	Subtotal		30.72 (17.37)	
D	**Retailer**			
1	Transport charge		40	70
2	Loading-unloading		8.56	10
3	Mandi fees		5	5
4	Packaging		5	5
5	Other		10	10
	Subtotal		68.56 (38.77)	100 (62.5)
	Total	68.56 (100)	176.84 (100)	160 (100)

Note: Figure in parenthesis indicate percentages to total

The total cost incurred in marketing channel 2 was 176.84 per quintal. The highest cost incur in channel 2 was retailer (38.77 percent) followed by village merchant (30.29 percent) and wholesaler (17.37 percent). The total marketing cost incurred in channel 3 was Rs.160 per quintal in which cost incurred by producer was Rs.60 per quintal and by retailer was Rs.100 per quintal. It is clear from the table that marketing cost incurred was higher in channel-2 followed by channel-3 and channel-1 (direct marketing of produce to consumer by producer). Transportation charges were higher cost spent in every marketing channel followed by loading and unloading.

4.4.3.2 Marketing cost of brinjal crop

Marketing charges paid by various intermediaries in different marketing channels of brinjal is presented in Table 4.29. The total marketing charges incurred by producer was Rs.73.56 per quintal, Rs.185.68 per quintal and Rs.140 per quintal in channel-1, channel-2 and channel-3 for different performances respectively in which higher cost of marketing cost spend by producer was in channel-1 (Rs.73.56) followed by channel-3(Rs.60). Higher cost incurred in marketing by channel-2 which was 185.68 per quintal. The highest cost incur in channel 2 was village merchant (28.84 percent) followed by whole seller (26.15 percent) and retailer (26.15 percent). The total marketing cost incurred in channel 3 was Rs.140 per quintal in which cost incurred by producer was Rs.60 per quintal, followed by retailer was Rs.80 per quintal. It was clear from the Table 4.29 that marketing cost incurred was higher in channel 2 followed by channel 3 which followed by channel 1 (direct marketing of produce to consumer by producer). Transportation charges were higher cost spent in every marketing channel followed by loading and unloading.

Table 4.29: Marketing cost of brinjal crop in Rs/q

Sl. No	Marketing cost	Channels		
		Channel 1	**Channel 2**	**Channel 3**
A	**Producer**			
1	Transport charge	50		40
2	Mandi fees	0		5
3	Loading- unloading	8.56		5
4	Others (include commission)	15	35	10
	Sub total	73.56 (100)	35 (18.85)	60 (42.86)
B	**Village Merchant**			
1	Transport charge		40	
2	Mandi fees		5	
3	Loading-unloading		8.56	
	Subtotal		53.56 (28.84)	
C	**Whole seller**			
1	Transport charge		20	
2	Packaging / Weighting		5	
3	Mandi fees		5	
4	Loading-unloading		8.56	
5	Others		10	
	Subtotal		48.56 (26.15)	
D	**Retailer**			
1	Transport charge		20	50
2	Loading-unloading		8.56	10
3	Mandi fees		5	5
4	Packaging		5	5
5	Other		10	10
	Subtotal		48.56 (26.15)	80 (57.14)
	Total	73.56 (100)	185.68 (100)	140 (100)

Note: Figure in parenthesis indicate percentage to total

4.4.3.3. Marketing cost of cabbage crop

Marketing charges paid by various intermediaries in different marketing channels of cabbage is presented in Table 4.30.

Table 4.30: Marketing cost of Cabbage crop **in Rs/q**

S.N.	Marketing cost	Channels		
		Channel 1	**Channel 2**	**Channel 3**
A	**Producer**			
1	Transport charge	40		30
2	Mandi fees	0		5
3	Loading-unloading	3		3
4	Others (include commission)	10	30	20
	Sub total	53	30	58
		(100)	(21.58)	(46.77)
B	**Village Merchant**			
1	Transport charge		30	
2	Mandi fees		5	
3	Loading-unloading		3	
	Subtotal		38	
			(27.34)	
C	**Whole seller**			
1	Transport charge		10	
2	Packaging / Weighting		5	
3	Mandi fees		5	
4	Loading-unloading		3	
5	Others		5	
	Subtotal		28	
			(20.14)	
D	**Retailer**			
1	Transport charge		20	40
2	Loading-unloading		3	6
3	Mandi fees		5	5
4	Packaging		5	5
5	Other		10	10
	Subtotal		43	66
			(30.93)	(53.22)
	Total	53	139	124
		(100)	(100)	(100)

Note: Figure in parenthesis indicate percentage to total

The total marketing charges incurred was Rs.53 per quintal and Rs.139 per quintal and Rs.124 per quintal in channel-1, channel-2 and channel-3 for different performances respectively in which higher cost of marketing spent by producer was in channel-3 followed by channel-1 and channel-2. Total cost incurred in marketing channel-2 was 139 per quintal. The highest cost incur in channel-2 was for retailer (30.93 percent) followed by village merchant (27.34 percent) and whole seller (20.14 percent). The total marketing cost incurred in channel-3 was Rs.124 per quintal in which cost incurred by producer was Rs.58 per quintal, and by retailer was Rs.66 per quintal. It is clear from the Table 4.30 that marketing cost incurred was higher in channel-2 followed by channel-3 which followed by channel-1 (direct marketing of produce to consumer by producer). Transportation charges were higher cost spent in every marketing channel followed by loading and unloading.

4.4.3.4. Marketing cost of onion crop

Marketing charges paid by various intermediaries in different marketing channels of onion is presented in Table 4.31. The total marketing charges incurred was Rs.53 per quintal, Rs.163.16 per quintal and Rs.120 per quintal in channel-1, channel-2 and channel-3 for different performances respectively in which higher cost of marketing spent by producer was in channel-1 followed by channel-3 and channel-2. Total cost incurred in marketing channel-2 was 163.16 per quintal. The highest cost incurred in channel-2 was for retailer (40.45 percent) followed by village merchant (23.90 percent) and whole seller (17.26 percent). The total marketing cost incurred in channel 3 was Rs.120 per quintal in which cost incurred by producer was Rs.50 per quintal and by retailer was Rs.70 per quintal. It was clear from the Table 4.31 that marketing cost incurred was higher in channel-2 followed by channel-3 and channel-1 (direct marketing of produce to consumer by producer). Transportation charges were higher cost spent in every marketing channel followed by loading and unloading.

Table 4.31: Marketing cost of onion crop **in Rs/q**

S.N.	Marketing cost	Channels		
		Channel 1	**Channel 2**	**Channel 3**
A	**Producer**			
1	Transport charge	40		20
2	Mandi fees	0		5
3	Loading-unloading	3		5
4	Others (include commission)	10	30	20
	Sub total	53	30	50
		(100)	(18.39)	(41.67)
B	**Village Merchant**			
1	Transport charge		30	
2	Mandi fees		5	
3	Loading-unloading		4	
	Subtotal		39	
			(23.90)	
C	**Whole seller**			
1	Transport charge		7.16	
2	Packaging / Weighting		5	
3	Mandi fees		5	
4	Loading-unloading		6	
5	Others		5	
	Subtotal		28.16	
			(17.26)	
D	**Retailer**			
1	Transport charge		40	40
2	Loading-unloading		6	10
3	Mandi fees		5	5
4	Packaging		5	5
5	Other		10	10
	Subtotal		66	70
			(40.45)	(58.33)
	Total	53	163.16	120
		(100)	(100)	(100)

Note: Figure in parenthesis indicate percentage to total

4.4.4. Market price spread and margin

4.4.4.1 Market price spread and margin of tomato crop

The difference between price paid by consumer and price received by producers is price spread and the share goes to the different functionaries in the market is marketing margin of commodities.

Table 4.32: Tomato price spread and margin. In Rs/q

S. No	Particulars	Channel 1	Channel 2	Channel 3
1	Gross price received by producer	1000 (83.33)	800 (53.33)	850 (70.83)
2	Market cost incurred by producer	68.56 (5.71)	24 (1.6)	60 (5)
3	Net price received by producer	931.44 (77.62)	776 (51.733)	790 (65.83)
	Village merchant			
1	Purchase price	–	800 (53.33)	–
2	Market cost incurred	–	53.56 (3.57)	–
3	Net price	–	853.56 (56.90)	–
4	Selling price	–	1000 (66.67)	–
5	Profit	–	146.44 (9.76)	–
6	Market margin	–	200 (13.33)	–
	Wholesaler			
1	Purchase price	–	1000 (66.67)	–
2	Market cost incurred	–	30.72 (2.05)	–
3	Net price	–	1030.72 (68.71)	–
4	Selling price	–	1250 (83.33)	–
5	Profit	–	169.28 (11.28)	–
6	Market margin	–	250 (16.67)	–

		Retailer		
1	Purchase price	–	1250 (83.33)	850 (70.83)
2	Market cost incurred	–	68.56 (4.57)	100 (8.33)
3	Net price	–	1318.56 (87.90)	950 (79.17)
4	Selling price	–	1500 (100)	1200 (100)
5	Profit	–	181.44 (12.09)	250 (20.83)
6	Market margin	–	250 (16.67)	350 (29.17)
	Consumer price	1000 (100)	1500 (100)	1200 (100)

Note: Figure in parenthesis indicate percentage to total

The price spread and marketing margin is worked out with use of theoretical concept and presented in table 4.32. It was noticed that price received by tomato producer was Rs.1000, 800, 850 in channel-1, 2 and 3 respectively. Net price received by tomato producers was higher in channel-1 followed by channel-3 and channel-2. The higher marketing cost incurred in channel-2 followed by channel-3 and channel-1. The marketing margins were noticed to be 13.33 and 16.67 and 16.67 percent by village merchant, wholesaler and retailer in channel-2 where in channel-3 only retailer involved after producer and his margin was 29.17 percent. It will be seen from table that from both side of production and consumption channel-1 was good followed by channel-3 and channel-2.

4.4.4.2. Market price spread and margin of brinjal crop

The difference between price paid by consumer and price received by producers is price spread and the share goes to the different functionaries in the market is marketing margin of commodities. The price spread and marketing margin is worked out with use of theoretical concept and presented in table 4.33. It was noticed that price received by brinjal producer was Rs.1200, 800, 900 in channel-1, 2 and 3 respectively. Net price received by brinjal producers was higher in channel-1 followed

by channel-3. The higher marketing cost incurred in channel-1 followed by channel-3 and channel-2. The marketing margins were noticed to be 13.33 and 13.33 and 20 percent by village merchant, wholesaler and retailer in channel-2 where as in channel-3 only retailer involved after producer and his margin was 25 percent. It will be seen from table that from both side of production and consumption channel-1 was good.

Table 4.33: Price spread of Brinjal **In Rs/q**

S.No	Particulars	Channel 1	Channel 2	Channel 3
1	Gross price received by producer	1200 (100)	800 (53.33)	900 (75)
2	Market cost incurred by producer (include commission)	73.56 (6.13)	35 (2.33)	60 (5)
3	Net price received by producer	1126.44 (93.87)	765 (51)	840 (70)
	Village merchant			
1	Purchase price	–	800 (53.33)	–
2	Market cost incurred	–	53.56 (3.57)	–
3	Net price	–	853.56 (56.90)	–
4	Selling price	–	1000 (66.67)	–
5	Profit	–	146.44 (9.76)	–
6	Market margin	–	200 (13.33)	–
	Whole seller			
1	Purchase price	–	1000 (66.67)	–
2	Market cost incurred	–	48.56 (3.24)	–
3	Net price	–	1048.56 (69.90)	–
4	Selling price	–	1200 (80)	–
5	Profit	–	151.44 (10.09)	–
6	Market margin	–	200 (13.33)	

		Retailer		
1	Purchase price	–	1200 (80)	900 (75)
2	Market cost incurred	–	48.56 (3.24)	80 (6.67)
3	Net price	–	1248.56 (83.24)	980 (81.67)
4	Selling price	–	1500 (100)	1200 (100)
5	Profit	–	251.44 (16.76)	220 (18.33)
6	Market margin	–	300 (20)	300 (25)
	Consumer price	1200 (100)	1500 (100)	1200 (100)

Note: Figure in parenthesis indicate percentage to total

4.4.4.3. Market price spread and margin of cabbage crop

The difference between price paid by consumer and price received by producers is price spread and the share goes to the different functionaries in the market is marketing margin of commodities. The price spread and marketing margin is worked out with use of theoretical concept and presented in table 4.34. It was noticed that price received by cabbage producer was Rs.1000, 800, 850 in channel-1, 2 and 3 respectively. Net price received by cabbage producers was higher in channel-1 followed by channel-3. The higher marketing cost incurred in channel-1 followed by channel-3 and channel-1. The marketing margins were noticed to be 13.33 and 16.67 and 16.67 percent by village merchant, wholesaler and retailer in channel-2 where in channel-3 only retailer involved after producer and his margin was 34.61 percent. It will be seen from table that from both side of production and consumption channel-1 was good followed by channel-3.

Table 4.34. Price spread of Cabbage in Rs/q

Sl. No	Particulars	Channel 1	Channel 2	Channel 3
1	Gross price received by producer	1000 (83.33)	800 (60.67)	850 (76.92)
2	Market cost incurred by producer(include commission)	53 (5.3)	30 (2)	58 (4.46)
3	Net price received by producer	947 (94.7)	770 (51.33)	790 (60.77)
	Village merchant			
1	Purchase price	–	800 (53.33)	–
2	Market cost incurred	–	38 (2.53)	–
3	Net price	–	838 (55.87)	–
4	Selling price	–	1000 (60.67)	–
5	Profit	–	162 (10.8)	–
6	Market margin	–	200 (13.33)	–
	Whole seller			
1	Purchase price	–	1000 (60.67)	–
2	Market cost incurred	–	28 (1.87)	–
3	Net price	–	1028 (68.53)	–
4	Selling price	–	1250 (83.33)	–
5	Profit	–	222 (14.8)	–
6	Market margin	–	250 (16.67)	–
	Retailer			
1	Purchase price	–	1250 (83.33)	850 (65.38)
2	Market cost incurred	–	43 (2.87)	66 (5.08)
3	Net price	–	1293 (86.2)	916 (70.46)
4	Selling price	–	1500 (100)	1300 (100)

5	Profit	–	207 (13.8)	384 (29.53)
6	Market margin	–	250 (16.67)	450 (34.61)
	Consumer price	1000 (100)	1500 (100)	1300 (100)

Note: Figure in parenthesis indicate percentage to total

4.4.4.4. Market price spread and margin of onion crop

The difference between price paid by consumer and price received by producers is price spread and the share goes to the different functionaries in the market is marketing margin of commodities. The price spread and marketing margin is worked out with use of theoretical concept and presented in table 4.35. It was noticed that price received by onion producer was Rs.1000, 1200, 1100 in channel-1, 2, and 3 respectively. Net price received by onion producers was higher in channel-2 followed by channel-3 and channel-1. The higher marketing cost incurred in channel-2 followed by channel-3 and channel-1. The marketing margins were noticed to be 11.11 and 11.11 and 11.11 percent by village merchant, wholesaler and retailer in channel-2 where as in channel-3, only retailer involved after producer and his margin was 15.38 percent. It will be seen from table that from both side of production and consumption channel-1 was good followed by channel-3.

Table 4.35. Price spread of onion crop **in Rs/q**

Sl.No	Particulars	Channel 1	Channel 2	Channel 3
1	Gross price received by producer	1000 (100)	1200 (66.67)	1100 (84.61)
2	Market cost incurred by producer(include commission)	53 (5.3)	30 (1.67)	50 (3.85)
3	Net price received by producer	947 (94.7)	1170 (65)	1050 (80.77)
	Village merchant			
1	Purchase price	_	1200 (66.67)	_
2	Market cost incurred	_	39 (2.17)	_

3	Net price	_	1239 (68.83)	_
4	Selling price	_	1400 (77.78)	_
5	Profit	_	161 (8.94)	_
6	Market margin	_	200 (11.11)	_
	Whole seller			
1	Purchase price	_	1400 (77.78)	_
2	Market cost incurred	_	28.16 (1.56)	_
3	Net price	_	1428.16 (79.34)	_
4	Selling price	_	1600 (88.89)	_
5	Profit	_	171.84 (9.55)	_
6	Market margin	_	200 (11.11)	_
	Retailer			
1	Purchase price	_	1600 (88.89)	1100 (84.61)
2	Market cost incurred	_	66 (3.67)	70 (5.38)
3	Net price	_	1666 (92.56)	1170 (90)
4	Selling price	_	1800 (100)	1300 (100)
5	Profit	_	134 (7.44)	130 (10)
6	Market margin	_	200 (11.11)	200 (15.38)
	Consumer price	1000 (100)	1800 (100)	1300 (100)

Note: Figure in parenthesis indicate percentage to total

4.5 Constraints faced in production of vegetable crops

The constraints involved in the cultivation of vegetables were placed most important, important and least important category based on the perception of respective farmers and percent was taken upon total number of respondents. The constraints in production of vegetable are presented in Table 4.36. The most important constraints faced by the farmers was high cost of inputs and irrigation facilities which were 90 percent to the total respondent, the inputs required for production must be provide based on requirement and at subsidized rate was the suggestions given by the respondent in the study area. Followed by capital availability (86 percent), pest and disease problem (85 percent), labour availability in time (80 percent) and low out-put price (75 percent) were most important constraints in cultivation of major vegetables. Seed quality and machine labour and high charges were important constraints faced in the study area by respondents.

Table 4.36: Constraints involved in cultivation of vegetables in sample household.

S.No.	Constraints	Most important	Important	Least important
1	Seed quality	61	29	
2	Irrigation Facility	90	10	
3	Human Labor	80	37	
4	Machine Labor	57	39	4
5	Pest and Disease problems	85	12	1
6	Capital Availability	86	11	
7	High cost of inputs	90	10	
8	High cost of labor	68	32	
9	Low output Price	75	30	

4.5.1 Constraint faced in marketing of vegetables

Table 4.37 show constraints pertaining to marketing of vegetables in yes or no farm. Lack of storage facilities (83 percent) was reported as the most important constraints. The second most important constraints reported by the grower. Lack of information regarding proper regulated market and large number of intermediaries (81percent). The post harvest management and processing unit facilities was 80 per cent followed by lack of transportation 76 percent, lack of awareness about market news and intelligence 70 percent, were the other prominent constraints reported by the growers in sampled areas.

The vegetable growers encountered many problems in marketing of vegetables. Looking to this, there is a need to create cold storage facilities for preservation of vegetables, the farmer also need to be informed about standardization and grading and post harvest management procedure so as to improve marketing of vegetables in addition to creating these facilities in the region. Increased extension effort is required to enhance marketing news, information and intelligence on different aspects of production and marketing of vegetables and also improving infrastructure facilities such as roads and transportation was other important constraint encountered.

Table 4.37: Constraint faced in marketing of vegetables in sample house holds.

S. No.	Particulars	Percent
1	Lack of information regarding standardization and grading	60
2	Lack of transportation	76
3	Lack of regulated and cooperative market	81
4	Lack of storage facilities	83
5	Lack of awareness about market news and intelligence	70
6	Lack of post harvest management	80
7	Lack of processing unit	80
8	Low demand and small quantity produced	65

CHAPTER V

SUMMARY AND CONCLUSIONS

5.1 Summary

The growing importance of vegetables in Indian economy can be well appreciated in terms of their rising domestic demand on account of increase in population and per capita income; their increasing export potential and increased vegetable consumption urban and rural area; need for providing employment opportunities in the rural area, and vegetables being relatively more remunerative crops. It can be grown within a short time period and more than one crop can be grown within a crop season. There are a large number of vegetables having different varieties, which can be grown throughout the year. However, the largest numbers of vegetables are grown according to climatic condition and irrigation facilities.

Under various horticultural crops during the year 2012-13, area of fruit was 1.990 lakh ha and production of 1.730 lakh tonne, area of vegetable crops was 3.772 lakh ha and production of 4.965 lakh ton, area of spice crops was 92.7 thousand ha and production of 63.2 thousand tonne, area of flower was 8.44 thousand ha and production of 50.24 thousand metric tonne and area of medicinal and aromatic crops. (Deptt. Of Horticulture, Government of Chhattisgarh).

Horticultural crops are mostly labour intensive in India and provide substantial employment, not only in production but also transportation, processing and marketing (Sharma 1991). A new farmer centric, industry driven knowledge based strategy may bring about desired results. It is the need of the hour to identify doable programs and implement them in a time bound manner. The information regarding current production, productivity and profitability will helpful to stakeholders, to enhance productivity and profitability from agriculture. It will also be required to provide inputs of knowledge and scientific research, access to markets, credit support

and insurance coverage and management techniques for effective utilization of various resources for running farming as successful business operation.

The marketing of horticultural crops is also quite complex and risky due to their perishable nature, seasonal production and bulkiness. So the study on "An economic analysis of production and marketing of major vegetables in Mahasamund district of Chhattisgarh" have manifold importance. It is not enough just to produce vegetables; it must be produced efficiently and marketed successfully. It is necessary to improve the marketing system to aid development. A study of the vegetable marketing system is necessary to understand the complexicity involved and to identify bottleneck with a view to provide efficient services in transfer of farm produce and input from producers to consumers. An efficient marketing system minimizes costs and benefits in all sections of society. In light of the above facts the following specific objectives are being undertaken to fulfill the study.

Objectives

1. To estimate the growth rate in area, production and productivity of major vegetables in Mahasamund district and Chhattisgarh state.
2. To workout the cost and return of major vegetables in the study area.
3. To examine the marketing pattern of major vegetables in the study area.
4. To identify the constraints in production and marketing of major vegetables and suggest some suitable measures to improve the production and marketing of vegetables.

The study was conducted purposively in Mahasamund district of the Chhattisgarh state. Out of 5 block of Mahasamund district, Mahasamund and Baghbahra block has been selected purposively. Mahasamund Block comprises of 189 villages, out of which five villages were purposively selected whereas Baghbahra Block comprises of 235 villages, out of which five villages were selected purposively. From each village

respondent were selected not less than ten, according to size of holding by purposively.

5.2 Major findings of the study

1. The average family size was 6.09 and average literacy percentage was 59 percent in the study area.
2. The average cropping intensity observed in the study area was 176.65 per cent.
3. The average net cropped area of vegetable growers was 1.97 hectares. It varied from 0.49 hectare on marginal farms to 6.4 hectares on large farms.
4. The cultivated area was observed to be 0.49 hectares, 1.48 hectares, and 3.17 hectares, 6.4 hectares at marginal, small, medium and large farms, respectively

5. The compound growth rate of tomato, brinjal, cabbage and onion in case of area is estimated as 28.04, 29.72, 30.71, 40.91 percent and 7.21, 9.22, 14.86, 16.45 per cent in the Mahasamund district and Chhattisgarh state respectively which is highly significant for a total period of 10 years. The compound growth rate for the production 19.02, 31.56, 31.61, 40.91 and productivity -7.04, 1.42, 0.69, 32.16 is significantly increased in this district only for the period under study.

6. On an average the cost of cultivation per hectare of tomato, brinjal, cabbage, and onion was calculated as Rs. 55090.26, Rs 51452.92, Rs 47061.59 and Rs 50982.07 respectively. The cost of cultivation per hectare showed rising trend with the rise in farm size.
7. The cost of production per quintal of tomato, brinjal, cabbage, and onion on an average was worked out to Rs 302.82, Rs 389.60, Rs.405.91 and Rs.384.22 .It came to for marginal, small, medium and large farm size respectively.
8. On an average the input –output ratio of tomato, brinjal, cabbage, and onion came to 1:2.63, 1:2.56, 1:2.46, and 1:2.86 respectively on the sample farms.

9. The cost and return on the basis of cost concept in the production tomato on the sample farm of different size group an average Cost A1, Cost A2, Cost B and Cost C were worked out to Rs. 27272, Rs. 27272, Rs 45914.58, and Rs. 55090.26 per hectare respectively on the sample farms.
10. The cost and returns on the basis of cost concept in the production brinjal on the sample farm of different size groups have been average Cost A1, Cost A2, Cost B and Cost C were worked out to Rs. 22823.09, Rs. 22823.09, Rs 41465.96, and Rs. 51452.92 per hectare respectively on the sample farms .
11. The cost and returns on the basis of cost concept in the production Cabbage on the sample farm of different size groups an average Cost A1, Cost A2, Cost B and Cost C were worked out to Rs. 21501.59, Rs. 21501.59, Rs 40149.38, and Rs. 47061.59 per hectare respectively on the sample farms rupees.
12. The cost and returns on the basis of cost concept in the production onion on the sample farm of different size groups have been an average Cost A1, Cost A2, Cost B and Cost C were worked out to Rs. 23980.59, Rs. 23980.59, Rs 42624.06, and Rs. 50981.96 per hectare respectively on the sample farms.
13. There were three marketing channels found for the marketing of vegetables:
    a. Channel-I: Producer – Consumer.
    b. Channel-II**:** Producer – Village merchant- wholesaler- Retailer-Consumer
    c. Channel-III: Producer – Retailer-Consumer.
14. On an average marketable surplus in tomato, brinjal, cabbage, and onion, was worked out to be 31.33 per cent, 28.66 percent, 32.78 per cent and 16.08 percent respectively to total production.
15. The marketing cost of tomato, brinjal, cabbage and onion in channel-1 was found to be Rs. 68.56, Rs. 73.56, Rs. 53 and Rs. 53 per quintal and channel-2 it was observed as Rs. 176.84, Rs. 185.68, Rs. 139 and Rs.163.16 per quintal and in channel-3 it was Rs. 160, Rs. 140, Rs. 124 and Rs.120 per quintal.
16. Irrespective of crop selected (tomato, brinjal, cabbage and onion), the marketing cost was higher in channel-2 as the intermediaries were more followed by channel-3 and channel-1.

17. The producer share in consumer rupee and margin of producer of tomato, brinjal, cabbage and onion was fond to be higher in channel-1 followed by channel-3 and channel-2, except onion crop where it was observed higher in channel-2 followed by channel-3 and channel-1.
18. The major constraints pertaining to cultivation of vegetables were irrigation facilities, high cost of inputs followed by capital availability and pest and disease problem.
19. The major constraints of marketing of vegetables were lack of storage facilities, lack of regulated and cooperative market, lack of processing units, lack of post harvest management followed by lack of transportation and lack of awareness about market news and intelligence.

5.3 Suggestions emerged from study

1. Varieties capable of resisting disease and pest should be grown.

2. Irrigation facilities are to be developed in the proper way so that farmers can adopt improved technologies with assured irrigation facilities.

3. Marketing infrastructure should improve to maintain hygienic condition.

4. Market related information such as daily and weekly price of horticultural products should be disseminated among those needing this information.

5. Extension agencies should provide information on new varieties and package of practices as well as procedures of standardization and grading of produce and their benefits

6. Banking institution provides finance/credit with less formality to meet credit requirement.

7. Market regulatory authorities should address the issues of unfair deduction at the market places.

8. Horticultural crop producer's cooperative societies should be formed for better performance and achievement.

9. Some specific minimum prices should be declared for vegetables to ensure benefit for the producers.

10. Government should encourage partnership between research institutions, agricultural universities, NGO's and private industries to address constraints and link vegetable farmers to markets.

11. The government should assist in the development of market and create more awareness of the importance of safe vegetable in diet.

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APPENDIX

APENDIX-A

DEPARTMENT OF AGRICULTURAL ECONOMICS

INDIRA GANDHI KRISHI VISHWAVIDLAYA RAIPUR (C.G.)

AN ECONOMIC ANALYSIS OF PRODUCTION AND MARKETING OF MAJOR VEGETABLES IN MAHASAMUND DISTRICT OF CHHATTISGARH

SCHEDULE FOR INTERVIEW

Date	

Advisor: - Dr. B.C. Jain

Investigator: - Manisha Sonwani

Farmer Schedule

A. General information

1. Name of farmers ----------

2. Age ----------3. Education ----------

4. Caste (Gen./SC/ST/OBC)----------5. Village ----------

6. Post ----------7. Tehsil ----------

8. District ----------9. State ----------

10. Occupation 1.Agricultural----------2.Others ----------

B. **Details of the family**

S. N.	Name of family member	Relation to head	Sex M/F	Age	Education
	Total				

* I =Illiterate, 2 = Primary, 3 =High School, 4 =College, 5 = University

C. Details of land holding

Land use

Particulars		Area (ha)	Irrigation		Soil type	Land quality #
			Irrigated	Un-irrigated		
Owned land	i. Cultivated					
	ii. Homestead					
Leased in						
Leased out						
Total land						

D Cropping pattern

Season	Crops	Variety	Area (ha.)		Production (quintal)	Value (Rs)
			Irrigated	Un-irrigated		
Kharif						
Rabi						
Summer or Zaid						

E. Source of irrigation

S. No.	Particulars	Area (ha)	Irrigation charges
1. 2. 3. 4. 5.	Tank Canal Tube well Bore well Stop dam Other		
	Total		

F. Economics of Production.

1. Cost of cultivation

Crop ----------Variety ----------Area ----------

----------Irrigated---------- Unirrigated) ----------

a. Operational cost

S.N.	Operation	Family human labour (days)			Hired human labour (days)			Bullock power			Machine power			Total Cost at Particular operation
		M	F	T	M	F	T	O	H	R	O	H	R	
1.	Field preparation													
2.	Application of Manure & fertilizers													
3.	Nursery bed preparation													
4.	Sowing/ Transplantation													
5.	Intercultural operations													
6.	Irrigation													
7.	Plant protection													
8.	Harvesting/ Picking													
9.	Cleaning													
10.	Grading													
11.	Packing/ Transportation													
12.	Miscellaneous/Staking													
	Total													

M= Male, F = Female, T = Total, O = Family labour, H = Hired labour, R= Rate/unit (Rs.)

b. **Input cost**

S.N.	Input	Quantity	Quantity rate (Rs./ unit)	Total value (Rs.)
1.	Seed a. b.			
2.	FYM			
3.	Fertilizers 1.Nitrogen 2.Potash 3.Phosphorus 4.others			
4.	Plant protection chemicals 1 2			
Total				

B. Irrigation charges ----------per hec

C. Interest on working capital ----------

D. Fixed cost

a) Rental value of land / leased in land (Rs.) ----------

b) Land revenue (Rs.) ----------

2. Cost of cultivation

Crop ----------Variety ----------Area ----------
----------Irrigated---------- Unirrigated) ----------

a. Operational cost

S. N.	Operation	Family human labour (days)			Hired human labour (days)			Bullock power			Machine power			Total Cost at Particular operation
		M	F	T	M	F	T	O	H	R	O	H	R	
1.	Field preparation													
2.	Application of Manure & fertilizers													
3.	Nursery bed preparation													
4.	Sowing/Transplantation													
5.	Intercultural operations													
6.	Irrigation													
7.	Plant protection													
8.	Harvesting/ Picking													
9.	Cleaning													
10.	Grading													
11.	Packing/Transportation													
12.	Miscellaneous/Stacking													
	Total													

M= Male, F = Female, T = Total, O = Family labour, H = Hired labour, R= Rate/unit (Rs)

b. **Input cost**

S.N.	Input	Quantity	Quantity rate (Rs./ unit)	Total value (Rs.)
1.	Seed a. b.			
2.	FYM			
3.	Fertilizers 1.Nitrogen 2.Potash 3.Phosphorus 4.others			
4.	Plant protection chemicals 1 2			
Total				

c. **Irrigation charges** ----------per hec

d. **Interest on working capital** ----------

e. Fixed cost

a) Rental value of land / leased in land (Rs.) ----------

b) Land revenue (Rs.) ----------

G. Constraints faced in cultivation of Tomato, Brinjal, Cabbage and Onion crops (percentage of households)

1. Crop Name_____

S. No	Constraints		Most Important	Important	Least Important
1	Seed quality				
2	Irrigation Facility				
3	Labour	Human			

		Mchine			
4	Pest and Disease problems				
5	Capital Availability				
6	High cost of inputs	High cost of inputs such as fertilizers, weedicide, pesticides etc.			
		High cost of labour			
7	Low output Price				

Marketing cost

Crop ----------

Distance from marketing place ----------

Means of transportation ----------road type……

S. No.	Particulars	Month 1	Month 11	Month 111
1.	Quantity of each time sold/month			
2.	To whom sold			
3.	Selling price			
4.	Price (Rs. /qts.)			
5.	Transportation cost (Rs. /qts.)			
6.	Octroi charges (Rs.)			
7.	Mandi fees (Rs.)			
8.	Transportation cost (Rs. /qts.)			
9.	Loading /Unloading charges (Rs. /qts.)			
10.	Commission charges (Rs. /qts.)			
11.	Cleaning charges (Rs. /qts.)			
12.	Other expanses (Rs.)			
	Total			

* I- First four month, II- Second four month, III- Third four month

1. Sale price of producer (Rs./qts.)----------
2. Actual getting of price of producer (Rs./Qts.)----------
3. Total marketing charges (Rs./qts.)----------

I. Constraints in marketing of crops:

1. Low demand of final product - Y/N

2. Low price paid to farmers due to high marketing margin - Y/N

If yes, what should be done?
1.
2.
3.

3. Lack of transportation facilities and road from village to market - Y/N

4. Whether you face problem because the quantity is small - Y/N
If yes, then
What steps you have taken to pool your produce?
1.
2.
3.

5. Lack of regulated market and co-operative market - Y/N

6. Whether you visit regulated market regularly - Y/N
If no give the reason for not going to the regulated markets
1.
2.
3.

7. Lack of sufficient number of processing unit - Y/N

8. Lack of storage facilities in growing area - Y/N

9. Whether you like to store your produce in storage to get high price? - Y/N

10. Lack of support price .Y/N

11. How to support price will affect the production of crop?
To cropping pattern change
II. Short duration crop
III. Any other
12. Lack of awareness about market news and intelligence - Y/N

13. What media do you have for marketing news?
    1. News paper
    2. Radio
    3. Television
    4. Other (specify)

14. How soon the news in disseminated or spread in producing area
    . i. Within 2 days
    ii. Within 4 days
    iii. within a week

Signature of the interviewer……

APPENDIX-B

DEPARTMENT OF AGRICULTURAL ECONOMICS

INDIRA GANDHI KRISHI VISHWAVIDLAYA RAIPUR (C.G.)

AN ECONOMIC ANALYSIS OF PRODUTION AND MARKATING OF MAJOR VEGETABLES IN MAHASAMUND DISTRICT OF CHHATTISGARH.

NAME OF SAMPLE HOUSEHOLDS

Advisor: - Dr B.C. Jain (Professor)

Investigator: - **Manisha Sonwani**

	MAHASAMUND BLOCK			**BHAGBAHARA BLOCK**	
	LARGE			**LARGE**	
S. N.	Name	Village	S. N.	Name	Village
1.	Jagannath Banjara	Kanekera	1.	Hemant Pradhan	Borabandha
2.	Himmat Lal Suryawanshi	Kanekera	2.	Dinesh singh	Kesekera
3.	Chetan Banjara	Umarada	3.	Dilip Radore	Sukharidabari
4.	Suraj Tondon	Baronda	4.	Dileshwar Chandrakar	Dumardihee
5.	Snder Lal Suryawanshi	Sher	5.	Dilip Shahini	Junwani
	MARGINAL			**MARGINAL**	
S. N.	Name	Village	S. N.	Name	Village
1.	Agraj Ram Tandan	Birkoni	1.	Madan Mahipal	Kesekera
2.	Nand kumar bhagh	Birkoni	2.	Rajuprasad Dhruve	Kesekera
3.	Hiralal Chandrakar	Birkoni	3.	Dhani Ram Dhruve	Kesekera
4.	Puran Baghel	Birkoni	4.	Lakhan Nag	Kesekera

5.	Gopi Lal Sahu	Birkoni	5.	Umesh Joshi	Kesekera
6.	Ashok Chandrakar	Baronda	6.	Balram Chandrakar	Sukharidabari
7.	Manohar Sahu	Baronda	7.	Maheshwar Markam	Sukharidabari
8.	Shankar Manikpuri	Baronda	8.	Bal Ram Tandan	Sukharidabari
9.	Shukhram Yadav	Baronda	9.	Jagdish Markam	Sukharidabari
10.	Basnt Patel	Sher	10.	Bajrang Agrawal	Junwani
11.	Niranjan Dani	Sher	11.	Punit Ram Dubev	Junwani
12.	Shiv Prasad	Sher	12.	Chedilal Tandi	Junwani
13.	Keshav Gupta	Sher	13.	Khageshwar Yadav	Dumardihee
14.	Net Ram Patel	Umarada	14.	Deepak Singh	Dumardihee
15.	Bharat Yadav	Umarada	15.	Mayaram Sonwani	Dumardihee
16.	Ganga Prasad Patel	Umarada	16.	Vipin Das	Borabandha
17.	Ajay Sahu	Kanekera	17.	Krishna Patel	Borabandha
18.	Rajeshwar Banjara	Kanekera	18.	Kartik Nirala	Borabandha
	MEDIUM			**MEDIUM**	
S. N.	Name	Village	S. N.	Name	Village
1.	Vipin Das	Umarada	1.	Hiralal Mahipal	Dumardihee
2.	Chandu Yadav	Umarada	2.	Shivnath Bhgat	Junwani
3.	Santosh Patel	Kanekera	3.	Rajkumar Nishad	Dumardihee
4.	Kanshi Ram Banjara	Kanekera	4.	Bharat parmar	Junwani
5.	Yeshwant Sonwani	Baronda	5.	Omprakas Markam	Kesekera
6.	Durgesh Tandi	Birkoni	6.	Sushil Diwan	Kesekera
7.	Rakesh Sahu	Birkoni	7.	Harish Chandrakar	Kesekera
8.	Anand Ram	Birkoni	8.	Chandu Yadav	Borabandha
9.	Devkumar Sureywanshi	Baronda	9.	Kailash Chauhan	Sukharidabari
10.	Pawan Kashyap	Sher	10.	Ganga Prasad Patel	Sukharidabari
11.	Aghan lal Verma	Sher			

	SMALL			**SMALL**	
S. N.	Name	Village	S. N.	Name	Village
1.	Ramesh Prasad druve	Birkoni	1.	Asish Kumar	Kesekera
2.	Atma Ram Das	Birkoni	2.	Mukesh Yadav	Kesekera
3.	Shashidhar Yadav	Birkoni	3.	Shravan Nagesh	Kesekera
4.	Ravi Tandan	Birkoni	4.	Bhavesh Patel	Kesekera
5.	Yogendra Soni	Umarada	5.	Khagendra Manikpuri	Kesekera
6.	Jitendra Sahini	Umarada	6.	Rajat Dewagan	Sukharidabari
7.	Ghanshyam Chandrakar	Umarada	7.	Lochan Sahu	Sukharidabari
8.	Pankaj Patel	Kanekera	8.	Sukhi Ram Sahu	Sukharidabari
9.	Sandeep Sonwani	Kanekera	9.	Kanti Lal	Sukharidabari
10.	Sukhdev Markam	Kanekera	10.	Chetan Singh	Dumardihee
11.	Deependra Yadav	Sher	11.	Suraj Patel	Dumardihee
12.	Ganesh Dhitlahre	Sher	12.	Charan Chandrakar	Dumardihee
13.	Kailash Babu	Sher	13.	Dhaneshwar Bhagel	Junwani
14.	Deepak Nirala	Baronda	14.	Jagarnath Sonkar	Junwani
15.	Ram Dani	Baronda	15.	Gajanad Diwan	Junwani
16.	Shakti Nag	Baronda	16.	Sanja Verma	Borabandha
			17.	Bipul	Borabandha

VITA

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Professional Experience (If any) :

Membership of Professional Societies (If any) :

Awards / Recognitions (If any) :

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