PRODUCTION AND MARKETING OF MAJOR VEGETABLES IN KALABURAGI DISTRICT- AN ECONOMIC ANALYSIS

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CERTIFICATE

This is to certify that the thesis entitled **"PRODUCTION AND MARKETING OF MAJOR VEGETABLES IN KALABURAGI DISTRICT- AN ECONOMIC ANALYSIS"** submitted by **Mr. MANJUNATHA, P. N.** in partial fulfilment of the degree of **MASTER OF SCIENCE (AGRICULTURE) in AGRICULTURAL ECONOMICS**, College of Agriculture, Raichur, University of Agricultural Sciences, Raichur, is a record of research work done by her during the period of her study in this University under my guidance and supervision and the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

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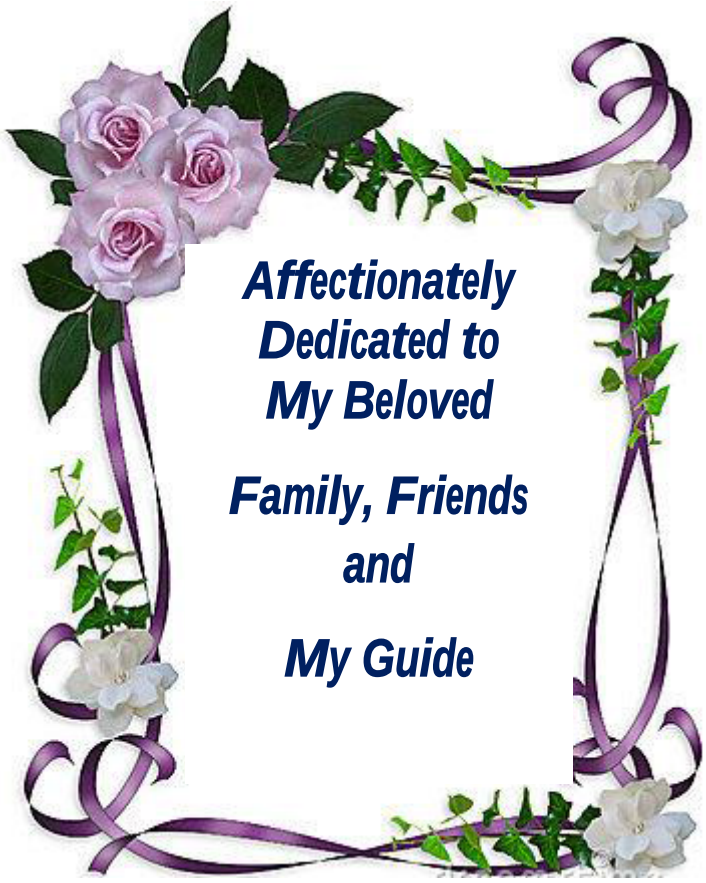
Affectionately
Dedicated to
My Beloved
Family, Friends
and
My Guide

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LIST OF ABBREVIATIONS

Abbreviation	:	**Expansion**
Ha	:	Hectare
Ac	:	Acre
Q	:	Quintal
T	:	Tonnes
TL		Tractor load
Lt	:	Litre
%	:	Per cent
₹	:	Rupees
/	:	Per
N	:	Sample size
No.	:	Number
Fig.	:	Figure
Viz.	:	Namely
MT	:	Metric Tonnes
Sq.	:	Square
MVP	:	Marginal Value Product
kg	:	Kilo gram
MD	:	Manday
PD		Pair Day

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Introduction

I. INTRODUCTION

Agriculture occupies the central place in rural life. Although, the share of agriculture in overall Gross Domestic Product (GDP) has declined over the years from around 38 per cent in 1980-81 to about 15.41 per cent in 2018-19 (Reddy *et al*., 2020), the proportion of the population dependent upon agriculture still remains large at almost 60 per cent. This reveals the important role of agriculture in the Indian economy. The progress of other sectors of the economy is very much rests on the progress achieved in agriculture while horticulture is on important industry among the land based agriculture systems.

India has a wide variety of climate and soils on which a large number of horticultural crops such as fruits, vegetables, ornamentals, medicinal and aromatic plants, plantation crops and spices are grown. After attaining independence in 1947, the Government of India assigned a major emphasis on achieving self-sufficiency in food production especially in cereals. After the Green Revolution of the 1960's, it was realized that Indian topography and agro-climatic conditions are well suited for horticultural crops and these crops would help in achieving sustainability of farmers with small holdings. However, the need for diversification was acknowledged by Government of India only in the mid 1980's to make agriculture more profitable in general and horticulture in particular, through efficient land use options, expansion in irrigation, institutional development for creating gainful employment for rural masses and women through optimizing the utilization of natural resources. Past efforts initiated during planning process have been rewarding in terms of increased production and productivity of horticultural crops (Anon., 2007).

Horticulture sector is fast emerging as the most remunerative sector for changing the age old subsistence farming specially in the rainfed dry lands, hills, arid and coastal agro-ecosystems. Horticultural crops are characterized by high productivity, higher returns, higher potential for employment generation and exports, comparatively lower requirement of water and easy adaptability to adverse soils and waste land situations. The input-output ratio in most of the horticultural crops is much higher than that in the field crops and their role in improving the environment is an added advantage (Chadha and Pareek, 1993).

Horticultural crops not only provide nutritional and healthy foods, but also generate cash income to the growers. They have full potential to become alternative cash crops for sugarcane, cotton and oilseeds. On the one hand, all countries are moving towards self-reliance in food grains, on the other, the demand for fruits and vegetables is steadily increasing over the years. This trend may lead to gradual reduction in food grain exports. India has the unique distinction of being able to grow almost all fruits and vegetables under diverse production conditions. However, export-oriented production is still at the planning stage and most Indian producers are yet to adopt world standards of quality (Maini *et al*., 2000).

Vegetables are essential constituents of nutritional security and their economic viability, nutritional affluence, high yield and ability to bring for the on-farm as well as off-farm employment. It is become alternative farming for small and marginal farmers. It is one of the most important and fast growing sub-sectors of the food processing sector. The huge geographical area and in numerable agro-climatic niches in India exert a substantial influence on the supply of most of the agricultural commodities. This is especially true for the vegetable crops due to wide ecological amplitude and the shorter growth periods as compared to many other crops. Incremental per capita income, urbanization, health awareness, transformation of farmers preference to high value crops is the important element for fuelling the vegetable growth in the country. A noticeable change is observed in the consumption pattern which is characterized by decreasing share of food grains and increasing share of non-food grains, particularly vegetables and fruits in the consumption baskets (Vanita *et al.,* 2013).

Vegetables are rich and comparatively cheaper source of vitamins. Consumption of these items provides taste, palatability, increases appetite and provides fibre for digestion and prevents constipation. Their consumption in plenty provides or supplies fair amount of protein. And also play a key role in neutralizing the acids produced during digestion of pretentious and fatty foods and also provide valuable roughages which help in movement of food in intestine.

Some of the vegetables are good sources of carbohydrates, proteins, vitamin A, Vitamin B, vitamin C and minerals. As per dietician, daily requirement of vegetables is 75 to 125 gram of green leafy vegetables, 85 gram of other vegetables and 85 gram of roots and tubers with other food. Vegetables are mostly consumed as fresh, cooked and in

preserved forms. The daily meal of a common man without vegetables will not be considered complete.

Consumer's preferences have also shifted away from cereals and moved towards high-value agricultural produce like vegetables. With increase in economic standards, urbanization of growing Indian villages, international market integration and trade liberalization, the demand for horticultural products is expected to increase even further. On the production side, if cereal pricing is left to market forces, land will be released from traditional cultivation to meet the growing demand for non-cereal crops such as oilseeds, fruits and vegetables in accordance with the diversification in consumption pattern (Mittal, 2006). Thus, in a holistic way, horticulture can be promoted as a means of agro diversification for the second green revolution, providing the much needed impetus to the growth of agricultural sector, through increase in trade, income and employment. Presently, Indian agriculture is diversifying into the production of high value commodities and also providing an increasing role to small holding farmers. Indian rural economy had been facing the challenge of inability to manage the problems involved with transition of agriculture from a supply-driven value chain to a demand-led market-oriented supply chain (Viswanadham, 2006). Thus, for improve income, provide gainful employment and save natural resources from further degradation, diversification from grain crops to high-value crops like vegetables has emerged as an important strategy for agricultural growth (Sekhon and Kaur 2004).

In the world, the important vegetable producing countries are China, India, USA, Turkey, Nigeria, Vietnam, Mexico and Egypt. India stands as the largest producer of vegetables after China, producing of about 13 per cent of world vegetable production. India has about 7.50 million hectares of area under vegetable cultivation with a production of 97.50 million tonnes. Moreover, India ranks first in the production of cauliflower followed by onions and cabbage in the year 2017-18 (Annon, 2018).

India can claim to grow the largest number of vegetable crops compared to any other country of the world and as many as 61 annual and 4 perennial vegetable crops belonging to different groups, namely, solanaceous, cucurbitaceous, leguminous, cruciferous (Cole crops), root crops and leafy vegetables are grown in India in tropical, sub-tropical and temperate regions. Important vegetable crops grown in the country are potato, onion, tomato, brinjal, cabbage, cauliflower, okra and peas.

The production of vegetables being seasonal and face tremendous uncertainties on several counts. Further, vegetables are extremely perishable in nature and require speedy and efficient marketing. This gives rise to various problems to vegetable growers. High marketing cost, quantitative and qualitative losses at various stages, high level of price spread and unpredictable behaviour of prices are some problems. Low marketed surplus, market imperfections and poor infrastructural facilities add to these problems. Therefore, in the backdrop of the situation it becomes worthwhile to conduct studies on marketing of vegetables so as to identify remedial measures for better management and to earn higher returns from vegetable crops(Joshi, 2011).

Major vegetable growing states of the country in were Uttar Pradesh (1457.2 thousand hectares area and 28316.4 thousand metric tonnes of production), West Bengal, Madhya Pradesh, Bihar, Maharashtra, Odisha, Gujarat, Chhattisgarh and Karnataka (483.2 thousand hectares area and 8394.1 thousand metric tonnes of production) (Annon., 2018).

Over the years, horticulture has emerged as one of the potential agricultural enterprise in accelerating the growth of economy. Its role in the country's nutritional security, poverty alleviation and employment generation programmes is becoming increasingly important. It offers not only a wide range of options to the farmers for crop diversification, but also provides ample scope for sustaining large number of agro-industries which generate huge employment opportunity. Karnataka vegetable production was 483.2 thousand hectares and production was 8394.1 thousand metric tonnes. Karnataka state stands at ninth position in production of major vegetable crops viz., onion, potato, tomato, chilli, brinjal, gourd varieties, cole crops etc. While, Belgaum district as highest production (7.18 lakh MT) of vegetables, followed by Dharwad, Kolar, Hassan, Chitradurga, Haveri, Bijapur and Bangalore. Whereas North-Eastern Karnataka is not realized importance and profitability of vegetables farming. In North-Eastern Karnataka, Kalaburagi district is the major producer of vegetables viz., green chilli, onion, brinjal, tomato, leafy vegetables, etc., and no much research has been conducted on production and marketing of vegetables in Kalaburagi district. Kalaburagi with varied agro-climatic conditions is suitable for growing horticultural crops in general and vegetables in particular.

The technological breakthrough in Indian agriculture has brought about rapid increase in the productivity levels of crops. This has generated new problems in marketing for which adequate attention has not been paid even though it has been recognized that the solution for these problems is a requisite condition for agricultural prosperity. For the farmers, disposal of his produce has become as important as the adoption of new agricultural technology for improving his income from agriculture. Unless marketing system is improved, no incentive to increase production will attract the cultivators. It is often complained that the farmers do not get remunerative prices for their produce while the consumers have to pay higher prices. Further, as a result of the breakthrough in the agricultural production, there has been a spectacular increase in the marketable surplus, which has exposed the inadequacies in handling, transportation, storage, grading and standardization of the produce. This in turn, has adverse effects on the farmers. This calls for the development of a sound marketing system on the more scientific lines to enable the farmers to get more remunerative prices for their produce. Grading of vegetable produce is one of the crucial factors in fetching remunerative prices to the producer-sellers.

There are many hindrance found in the efficient functioning of the markets in a developing economy like India (Beag and Singla 2014). In case of vegetables, there are considerable seasonal price variations as well as spacio-temperol price variations. Voliatality in vegetable prices were frequently observed not only from year to year but also during the same marketing period. Long-term perspective shows that changes of supply and demand in vegetables will provide the driving force for price rise and the capitalization trend will result in the existence of frequent price fluctuations in vegetables. When the distance between the vegetable markets become longer, the integration between those markets become weaker and vice versa. Market imperfections, improvement of vegetable production risk management system, innovations in control measures of vegetables market risk, strengthening the monitoring system of vegetables, appropriate marketing policies, government intervention and determinants of marketing efficiency had always been remained major debatable issues. The efficiency of marketing for vegetables in India has been of significant concern in the recent years. Poor efficiency in the marketing channels and inadequate marketing infrastructure are believed to be the cause of not only high and fluctuating consumer prices, but also to lesser share of consumer rupee reaching to the farmer. Indian farmers

typically depend heavily on middlemen particularly in fruits and vegetables marketing. The producers and the consumers often get a poor deal and the middlemen control the market, but do not add much value. There is also massive wastage, deterioration in quality as well as frequent mismatch between demand and supply both spatially and over time (Mukhtar and Javed 2007).

Marketing of vegetable crops is quite complex and risky due to the perishable nature of the produce, seasonal production and bulkiness. The spectrum of prices from producer to consumer, which is an outcome of demand and supply of transactions between various intermediaries at different levels in the marketing system, is also unique for vegetables. Moreover, the marketing arrangements at different stages also play an important role in price levels at various stages i.e. from farm gate to the ultimate user. These features make the marketing system of vegetables to differ from other agricultural commodities, particularly in providing time, form and space utilities. While the market infrastructure is better developed for food grains but fruits and vegetables markets are not that well developed and markets are congested and unhygienic. The markets in many of the major cities in some states are not covered by market legislation and continue to function under civic body as well as private ownership. There is a clear economic advantage in producing vegetables as compared to the traditional crops, but lack of price assurance has been the major impediment. Transportation costs and marketing margins of both retailers and wholesalers were identified as the major reasons for high marketing costs of vegetables, adversely affecting the profitability of such crops (Kumar *et al.,* 2004).

Proper marketing of produce is also of an equal importance to generate reasonable profit margins to the producers. Being perishable in nature, vegetables require an efficient marketing and storage system. The lack of proper marketing infrastructures results into lower producer's share in the consumer's rupee because of high marketing costs, margin of middlemen and spoilage during marketing. The time of sale, price and agency through which vegetables are sold some of the factors that influence the net price received by the farmer for their surplus vegetables. High transport and packing costs, malpractices by the middlemen and existence of a large number of intermediaries curtail the producer's share in the consumer's rupee. There is a need to bring improvement in the marketing efficiency for vegetables. The Government

has undertaken various programmes to improve the marketing system from time to time in order to increase the producer's share in the consumer's rupee in the case of food grains, oilseeds and fiber crops to great extent but very little has been done for improving the marketing efficiency of vegetables. Vegetables growing had been known for its better productivity and much higher net returns from a unit area, besides raising farm income, improving prospects for employment. The perishability of vegetables for an efficient and quick marketing system to watch the interests of both consumers and producers (Reddy *et al.*, 2012).

In spite of the fact that vegetables provide a regular inflow of income, employment and also important component of the balanced diet, studies on their economic aspects like production and marketing have received scanty attention of the researchers. The vegetables growers are confronted with a number of problems in their marketing. The important ones are higher cost of marketing, greater fluctuations in their prices and high percentage of wastage in their handling and transportation. Most of the rural markets do not have the basic necessary facilities such as auction platforms, godowns, cold storages etc. for orderly marketing of perishable crops. All these problems result in low producer's share to vegetable growers and lower income levels from the farm enterprise. Efforts have been made in the state/country from time to time to improve the marketing system in order to increase the producer's share in the consumer's price. Marketing of perishable commodities involves a large number of intermediaries for performing the different functions and they take away high margin from the price paid by the consumers.

The produce of vegetable is marketed through different marketing channels involving a large number of intermediaries. There are wide variations in the prices of vegetables from producer to consumer. Due to this reason, farmers are not getting remunerative prices of their produce. On the other hand, consumers have to pay more in market. In this way, the interests of producer as well as of consumer are not safeguarded. Therefore, it is necessary to examine the production costs, marketing costs, margins, price spread and marketing practices used in different channels from time to time. Study of these aspects may benefit the producers as well as consumers of the study area.

Kalaburagi with varied agro-climatic conditions is suitable for growing vegetables in general and vegetables in particular.

In the light of these above facts, the present study entitled that Production and marketing of major vegetables in Kalaburagi district–an economic analysis is undertaken with the following specific objectives.

The specific objectives of the study are:

1. To study the socio-economic profile of vegetable growers.
2. To study the cost and returns of selected vegetables.
3. To study the existing marketing system for selected vegetables.
1. To document the constraints in production and marketing of vegetables.

The hypotheses of the study are:

1. Socio-economic profile of vegetable growers is better.
2. Cultivation of vegetable is profitable.
3. The existing marketing system for vegetable is efficient.
4. Farmers face considerable constraints in production and marketing of vegetables.

Limitation of the study

Due to the limitation of the time and other resources, the present investigation has been restricted to the Kalaburagi district, sample size and the variables. Hence, the findings have to be viewed in specific context of the conditions prevailing in the study area and cannot be generalized for wider geographical area. However, careful and rigorous procedures have been adopted in carrying out the research as objectively as possible. In spite of the individual bias made by the respondent farmers in eliciting the necessary responses, it is believed that the findings and conclusions drawn in the present study would form the basis for future research study.

Presentation of the study

The entire study has been presented in six chapters,

- Introduction: The nature and importance of research problem, specific objectives and hypotheses of the study and limitations of the study have been presented in this chapter.

- Review of Literature: It deals with the review of the relevant concepts and past studies useful for the present study.

- Methodology: This chapter highlights overview of the study area, the nature and sources from where relevant data have been collected, the analytical tools employed for evaluating objectives of the study.

- Results and Discussion: The results of the study, their analysis and interpretation of the results and attempts to establish relationships between certain variables and their outcomes have been presented in this chapter in the form of tables, figures and graphs.

- Summary and Conclusion: Brief summary of the major findings of the study along with policy recommendations drawn from the findings have been presented.

- References: The list of journals, books, thesis, websites etc. referred are presented in this chapter.

Review of Literature

II. REVIEW OF LITERATURE

There are number of theoretical and empirical studies on the various aspects of production and marketing of agricultural commodities in general and vegetables in particular. In this chapter, the most relevant literature is presented keeping in view the objectives and methodology of the present study. The review of past studies are presented under the following headings.

2.1 Socio-economic profile of vegetable growers

2.2 Costs and returns structure

2.3 Marketing performance

2.4 Constraints in production and marketing

2.1 Socio-economic profile of vegetable growers

Madhavareddy (2001) examined peoples' participation in watershed development programme implemented by government and non-government organization. Results revealed that equal percentage of respondents (38.30% each) belonged to the middle age category in both government organization and non-government organization watershed. Higher per cent of farmers (38.30%) of government organization watershed belong to young age category compared to old age group(23.30%).

Patange *et al.* (2001) analyzed that 70.62 per cent of respondents had farming as main occupation and animal husbandry and dairy as subsidiary occupation. It was also observed that 11.87 and 11.64 per cent of the respondents participated in dairy business along with service and other business with farming, respectively.

Sivanarayana and Reddy (2002) conducted study on sources of information utilized by cotton and chilli growers of Warangal district, Andhra Pradesh. The study was conducted by using ex-post facto research design duly following the random sampling procedure in three villages namely Elukarthy, Nachinapally and Katrapally. A total sample size of 104 farmers was interviewed for the study from Elukarthy, Nachinapaily and katrapally villages. The results revealed that majority of farmers i.e, 50.00 per cent belonged to the age group of less than 35 years followed by 42.3 per cent of them in age

group of 36-54 years and 7.69 per cent farmers in the age group of more than 55 years. With regard to level of education, 37.50 per cent of farmers were illiterate followed by 28.85 per cent had high school education, 20.19 per cent had primary ducation, 8.65 per cent had intermediate education and 4.81 per cent were graduate. With respect to experience in farming, 53.85 per cent of farmers had 11 to 25 years of experience followed by 35.57 per cent had less than 10 years of experience and 10.85 per cent had more than 26 years of experience in farming.

Dhamdhere (2003) studied production and marketing management of kharif onion in Pune district. The study revealed that the socio-economic characteristics of the selected samples.The average size of family at the overall level was 6 persons consisting of 28 per cent adult males, 28 per cent adult females and 46 per cent children. On an average 19 per cent of the heads of the families were illiterate, 48 per cent were educated upto 4^{th} standard, 20 per cent were educated upto 10^{th} standard and only 13 per cent had completed their college education. On an average 67.77 per cent of the family heads were working as agriculturist. The number of family heads engaged in dairy, service and business were about 14.44, 8.88 and 7.77 per cent respectively.

Ghumatkar (2003) conducted study on economics of production and marketing of garlic in Pune district of Maharashtra state. Results of the study revealed that most of the garlic growers (68.88 per cent) were in middle age group. It is important to note that the majority of garlic growers were educated up to high school level (30 %) followed by primary level(16%) and about 14.14 per cent farmers up to college level.

Kulkarni (2003) reported that nearly two-third families of beneficiary women (64.17%) had agriculture as their main occupation, 15.88 per cent had service while relatively small portion of the families of beneficiary women were labourers (6.47%), 5.30 per cent were engaged in dairy and 5.88 per cent had business and other activities as their main occupation, respectively.

Swami (2004) conducted study on economics of production and marketing of turmeric in Hingoli district of Maharashtra. The results of the study revealed that the per cent of literacy i.e, educated up to primary, secondary and higher level were 25.55,20 and 12.23, illiteracy percentage of group 1,11 and III were 63.33, 26.67 and 36.66, respectively. The higher illiteracy was observed in group I as compared to group n and m.

Ninga Reddy (2005) in his study on knowledge, extent of participation and benefits derived by participant farmers of the watershed development programme in Raichur district of Karnataka reported that 30.00 per cent of the respondents had education upto high school followed by middle school (28.00%) and primary school (27.33%). Nearly 12.00 per cent of them were illiterates, while a meager of 4.00 per cent of them had education upto college and degree programme. Further, more number of farmers (64.00%) belonged to semi medium land holding category, followed by medium category(22%), whereas 10.67 per cent of them had small land holding and a meager 3.33 per cent of them belonged to big land holding category.

Hanumanaikar *et al.* (2006) studied socio-economic status, constraints faced and suggestions expressed by the chilli growers in optimum use of pesticides in Tungabhadra project (TBP) area in Bellary district of Karnataka. Bellary taluka was purposively selected as it ranks first in chilli production. Ten villages were selected from this taluka and a total sample of 200 farmers were selected among these villages for the study. The results revealed that, slightly more than half i.e., 53 per cent of the respondents were middle aged, followed by about a quarter of them i.e., 24 per cent belong to old age and 23 per cent of them belong to young age group. The information about size of the family indicated that 22.50 per cent of respondents had 1 to 6 members in their family. This might be due to the realization of the advantages of small families for comfortable life. About 42.50 per cent of the respondents had family size of 7 to 10 members and 35 per cent of the respondents had more than 10 members in the family. Majority of the respondent's i.e., 59 per cent possessed large land holdings and the respondents possessing small land holdings which were about 41 per cent. The possible reason that could be attributed to this was that farmers always try to possess more land as it augments their income or they might have inherited the land from their ancestors.

Patel *et al.* (2012) reported that economic condition of a farmer greatly depends on the availability of production resources and irrigation as one of them. Increase or decrease in production directly correlated with irrigation. The result showed that, out of the total respondents, majority of the respondents (39.17%) had medium source of irrigation followed by high (30.83%) and low (30.00%), respectively.

Hasan *et al.* (2014) studied profitability of important summer vegetables in Keranigonj upazilla of Bangladesh. Data was collected from 20 bottle gourd farmers, 30

brinjal farmers and 20 cucumber farmers by using purposive sampling method and observed that 35 per cent of the bottle gourd and 47 per cent of the brinjal growing farmers belonged to the age group of 31-40 years. 55.00 per cent of the cucumber farmers belonged to the age group 41-50 years. It was rare that age group of 61 and above farmers produce vegetables. It was also found from the study that the occupation of the most of farmers was agriculture and they depend only on agriculture. It is also evident from the study that most of vegetable farmer's educations ws primary and secondary level. Only few farmers were educated upto higher secondary or graduation level. It is also evident from the study that most of the vegetable growing farmers had ten years of experience.

Mishra and Ghadei (2015) examined the personal and socio-economic profile of vegetable growing farmers of eastern Uttar Pradesh of India. The findings of the study revealed that, 36 per cent of the vegetable growers had high school education. Among the sample, about 58 per cent of farmers were marginal. With respect to farming, about 62 per cent had medium level of farming experience. As far as social participation is concerned, about 25.37 per cent of vegetable growers were the member of two organizations. The annual income of vegetable growing farmers revealed that about 57 per cent were found in the medium income category ranging from Rs. 55,001 to Rs 1,90,000. The study revealed that 57 per cent of vegetable growers had medium level of socio-economic status.

Kaur *et al.* (2016) explored the impact of various socio-economic characteristics of farmers affecting the adoption behavior of net house and open field vegetable cultivation in Mohali district in Punjab. The socio-economic variables considered for analysis were age, family size, farm size, education, income, extension contracts and membership of professional societies. The study revealed that among the sample household's maximum concentration of farmers was in the age group of 41-50 years among both categories of vegetable growers, the average age ofnet house and open field vegetable cultivators was 48 and 45 years, respectively.

Maurya *et al.* (2017) studied the socio-economic status of brinjal growers in Bulandshahr district of western uttar Pradesh, India. The study depicted that the majority of brinjal growers were found upper middle age category group of 46-60 years. It was also observed that maximum respondents were having small dairy.

Chavan *et al.* (2018) studied and examined the socio-economic characteristics of exported onion growers and non-exported onion growers in Nasik District of Maharashtra. It was found that the average age of non -exported onion growers was 41 years and that of exported onion growers was 43 years. The middle aged farmers (35 – 45 years) mostly preferred domestic marketing of their onion produce. Whereas the young age group of farmers were seen to export the onion. The farmers more than 45 years of age were seen to be moving towards export farming. The educational status of exported and non-exported onion growers shows that, even if the literacy rate was cent per cent in both the cases, the exported onion growers were more educated than the non-exported onion growers. According to the quantum score analysis, the non-exported onion growers had 3.53 score, and the exported onion growers had 3.93 score out of 5. The family size in exported and non-exported onion growers was same i.e., 5 members.

2.2 Costs and return structure

Balappa Shivaraya (2000) studied the economic performance of production, marketing and export of vegetables in north Karnataka and found that the extent of inputs use and cost of cultivation in brinjal (Rs.70345.41/ha) and tomato (Rs.59880.80/ha) were higher than the potato (Rs.25973.07/ha) and onion {Rs.24400.38/ha). Further, majority of the farmers were operating at medium level efficiency as they used 28to 84 per cent of excessive inputs to achieve the existing level of output. However, the benefit cost ratio was higher in onion (2.08) and potato (1.71), compared to tomato (1.68) and brinjal (1.47) mainly because of lower level of inputs used in these enterprises.

Balappa and Hugar (2003) in their study on economic evaluation of onion and its marketing system in Karnataka found that, farmers incurred a total cost of cultivation of Rs. 24,400 per hectare, of which variable cost accounted for more than 90 per cent. Among the variable costs, expenditure on human labour (37.91%) constituted major item of total cost of cultivation followed by expenditure on fertilizers (12.89%), farm-yard manure (10.64%), irrigation (9.82%), seeds (8.14%) and bullock labour (6.82%). This clearly indicates that the vegetables were cultivated with traditional practices which are labour intensive.

Sidhu *et al.* (2010) examined a study in Rajpura block of Patiala district in Punjab with a sample of 50 vegetable growers and reported that the total cost of cultivation was estimated at Rs.49563/- per ha for onion and Rs.34840/- per ha for cauliflower. The net returns were found higher for onion (Rs.74597/- per ha) as compared with cauliflower (Rs.38072/- per ha).

Yakasai (2010) in his study on the cost and returns in the production of cassava in Wudil Kano state of Nigeria revealed that farmers incurred a total cost of Rs.2,33,924/- per ha in which variable cost accounted for cent per cent and with a gross return of Rs.4,49,353/- per ha. The labour cost accounted for 55 per cent of cassava production cost, indicating cassava production was labour intensive.

Bhat *et al.* (2012) while studying the economics of production of ginger in Uttara Kannada District of Karnataka found that the total cost of cultivation of ginger for small farmers was Rs. 89,435.17/-, medium farmer was Rs. 87,203.30/- and large farmer was Rs. 87,015.34/-. The benefit cost ratios were 4.78, 5.13, 5.34 and 4.92 for small, medium, large and pooled farms, respectively. However, there were no substantial differences in the cost of cultivation among all category of farmers. It was mainly because of high cost of rhizome material and higher use of labour and fertilizers which were more or less same for per unit area irrespective of size groups.

Bala *et al.* (2011) in his study on the costs and returns structure for the production of major off-season vegetables in Kullu found that per hectare cost A1 was highest for tomato followed by cabbage, cauliflower and lowest for peas. However, cost of cultivation was found to be highest for peas followed by cauliflower, tomato and cabbage. Costs on plant protection was the major constituents of cost A1 in all the crops followed by expenditure on seed and fertilizers. Vegetables; the labour intensive crops, incurred significantly high costs on human labour, Rs.13,200/- to Rs.15,600/- per ha. Gross returns as well as net returns per hectare was highest for tomato followed by cauliflower, cabbage and peas.

Chandraprabha (2012) studied the production and marketing dynamics of tomato in Karnataka and found that the per acre cost of cultivation of tomato across small, medium, and large category of farmers was Rs. 86,658/-, Rs. 86,676/- and Rs. 90,573/-, respectively. Out of total cost, the variable cost amounted to Rs.72,351/-, Rs.70,591/- ,

Rs. 70,395/- and Rs. 71,111/- for small, medium, large and pooled farm categories, respectively. The marketing cost was the major item of expenditure which accounted for 24 per cent of the total cost of cultivation. The average yield of tomato was 251, 254 and 269 quintal per acre in small, medium and large farms, respectively. The average net returns per acre over variable cost were Rs.83, 520/-, Rs. 89,429/- and Rs. 1, 03,648/- for small, medium and large farm category respectively. The net returns over all cost (considering fixed, variable and marketing cost) for small, marginal and large farmers category was Rs. 41,213/-, Rs. 44,544/- and Rs. 56,915/- per acre, respectively. The pooled category earned Rs. 86,137/- as net returns per acre over total variable cost. Further, the study indicated that the cost of producing a quintal of tomato was Rs.345.25/- . Rs. 341.24/- and 336.70/- in small, medium and large farmers, respectively. The respective net return per quintal worked out to Rs.164.20/-, Rs. 175.37/- and Rs.211.58/- for small,medium and large farmers respectively. Thus, the average cost of producing a kilo of tomato was around Rs. 4.04/- excluding the cost of management.

Hile *et al.* (2012) examined the economics of production and marketing of summer capsicum in Nasik District of Western Maharashtra and found that per hectare cost of cultivation was Rs.76,299.80/- and the yield was 108.83 qt. at the overall level. The yield per hectare was highest (112 quintals) in large size farmers followed by medium (107 quintals) and small size farmers (105 quintals), respectively. The per hectare net income was highest and per quintal cost was the lowest in large size group. At the overall level, the benefit cost ratio was 1.71 at total cost of cultivation. The highest benefit cost ratio at variable cost, fixed cost was recorded in large size group and it was 4.14 and 2.45, respectively.

Ogunniyi *et al.* (2012) studied the efficiency index of cassava production in Nigeria and the results showed that fertilizer had the highest efficiency index of 15.7 followed by farm size (10.8), labour (4.0), cassava cuttings (1.6) and herbicide (0.034). The value of efficiency index was < 1 indicating Farm size, labour, fertilizer and cassava cuttings were underutilized. This implied that additional income could be made from the production of cassava by using more of these inputs. There was over utilization of herbicide since the efficiency index was found to be more than one. Therefore, reducing the usage of herbicide could make more income. The non- negative MVP's of all the

inputs showed that cassava farmers used the resources within the economical range, but not at optimistical level.

Maikasuwa and Ala (2013) studied the cost and returns in the production of yam per ha in Nigeria and found that 64.42 per cent of the total cost was spent on variable cost and the remaining (35.58%) on fixed cost. This implied that the variable cost was considered as the most important cost in yam production in the study area compared to the fixed cost. Among, the variable cost, 45.97 per cent of the total costs was spent on labour. This also implied that labour was the most important variable cost item in yam production. The result of the MVP/MFC ratio test revealed that both farm size, fertilizers and farm labour were underutilized by the yam producing women farmers. They concluded that even the yam production activity of the women was profitable, but the level of productivity was not at optimum level. In order to produce at optimum level, the level of farm size, fertilizers and farm labour should be increased.

Sunny *et al.* (2013) studied the per hectare total cost of cultivation among the selected vegetables and found it varied between Rs.1,12,955/- for cauliflower to Rs.80,867/- for potato. Among the selected vegetables, the costs were observed to be the highest for cauliflower, which varied from cost A1 (Rs.79,453/-) to cost C2 (Rs.1,12,955/-) respectively. In the case of potato, costs increased from cost A1 (Rs.57,245/-) to cost C2 (Rs.80,867/-) respectively. The benefit-cost ratio was found to be highest for cauliflower and least for potato.

Bajkani *et al.* (2013) reported the economic analysis of vegetables in districts Loralai, Bolan and Killa Saifullah of Balochistan with a view to determine the production costs, current production system, input-output ratio and gaps in farm practices and finally suggested the way to fill out these gaps. A total of 109 respondents were interviewed from all districts. The additional information gathered were the farm size, average cost of production of vegetable which was separated into four categories i.e.; fixed costs, capital costs, labour costs and marketing costs in the major vegetable growing areas. The results showed that all the vegetable growers irrigated 15-20 times for vegetable crops in the study area. Most of the farmers reported that the production decreased due to non-proper management, electricity problem and shortage of water. Vegetable yield in the province was well below the potential.

Kamal and Gautam (2014) in their study on the economic analysis of commercial organic and conventional vegetable farming in Kathmandu Valley of Nepal found that the average investment in conventional vegetable production was about NPR 1, 00,000/-. The average investment was significantly lesser in organic farming (NPR 70,000/-) for a ropani year. The gross return was higher in conventional farming (NPR 135,000/-), in case of organic farming it was about NPR 1,00,000/-. In case of benefit-cost ratio, organic farming had high benefit-cost ratio of (1.47:1) when compared to conventional farming (1.35:1).

Lokapur and Kulkarni (2014) while studying the cost and returns structure of major vegetables in the Belgaum district which had high concentration of area under vegetables found that the average per hectare utilization of human labour was the highest in case of potato farms (78.77 man days) followed by onion farms (70.25 man days), tomato farms (66.37 man days) and green chilli farms (48.13 man days). The total cost incurred by farmers on potato cultivation was high (Rs.47,299.86/- per ha) when compared to onion (Rs.31,240.2/- per ha), green chilli (Rs. 25,797.37/- per ha), and tomato (Rs.27,532.42/- per ha). The high cost in potato was attributed due to high seed rate. The gross returns was also highest in potato (Rs.1, 30,410.60/- per ha) followed by onion (Rs.1, 24,518.60/- per ha), tomato (Rs.64, 969.70/- per ha), and chilli (Rs.55250/- per ha). The net returns were highest in onion (Rs.93, 278.43/- per ha) and lowest in green chilli (Rs.29, 452.63/- per ha). Onion contributed higher returns per rupee of expenditure (3.99) due to the high price and high productivity. The study indicated that cultivation of vegetables was found to be profitable as indicated by high net returns and benefit-cost ratio.

Mohammed *et al*. (2016) studied profitability in chili pepper production in Kaduna state of Nigeria. They collected primary data from 200 chili pepper growers using multistage sampling procedure. They stated that 72 per cent of the chili growers had not participated in any cooperative associations. The cost of fertilizer constituted about 59 per cent of total cost. The total revenue was about N 111,857 while total cost was about N 49,000. The highest benefit-cost ratio was 3.9:1 which denoted higher profitability in chili production. The R2 was 0.52. The co-efficient of education was found to be positively related to profitability and had significant relationship to profitability at one per cent level.

Jorwar *et al.* (2017) studied the economics of production and marketing of tomato in Amravati district and found that the per hectare cost of cultivation of tomato was highest in the large group i.e. Rs. 1,48,613/- followed by medium group Rs. 1,42,777/- and small group Rs. 136110/-. The average yield and gross returns per hectare increased with the increase in size of farms. Cost of cultivation at overall level, variable cost, fixed cost and labour cost were Rs. 97,994/-, Rs. 1,28,462/- and Rs. 1,41,028/-, respectively. The net return at labour cost in small, medium and large size group were Rs. 6,300/-, Rs. 14,110/-, and Rs. 24,202/-, respectively. An input-output ratio for overall size groups at variable cost, fixed cost and labour cost were 1.56, 1.19 and 1.09, respectively.

Salve *et al.* (2017) studied on cultivation and production cost of cumin in Banaskantha District of North Gujarat and found that the per hectare average total cost of cultivation of cumin was Rs. 48,905/- per hectare and net income was Rs. 39,852/-. Major inputs cost was 33.09 per cent to the total cost of cultivation which was 8.60, 20.34 and 4.15 per cent, for seed, human labour, and fertilizer, respectively. The cost of cultivation of cumin for small farmers was higher as compared to medium and large size farmers.

Tambe *et al.* (2018) conducted a study in Rahuri, Newasa, Akole and Sangmner tehsils of Ahmednagar district to estimate the cost of cultivation in production of summer tomto. The average per hectare cost of cultivation of summer tomato was estimated to 259279.62. Amongst the different items of cost, rental value of land was the major item of cost followed by hired human labour, staking charges, seedlings, family human labour, fertilizers, manures, machine power, plant protection charges. The study revealed that, farmers obtained an average yield of 980.08 qtl with a gross returns of Rs. 4,70,794/-, per hectare.

Patluri *et al.* (2018) studied economic analysis of production and marketing of dry Chilli in Guntur district of Andhra Pradesh. The cost incurred by small, medium and large size farms was Rs.151378.30/ha, Rs.150603.80/ha and Rs.148114.50/ha respectively. The gross Returns obtained per hectare by small, medium and large was Rs.517500/ha and Rs. 487800/ha and Rs.459000/ha, respectively and net returns per hectare small, medium and large farms Rs.366121.70/ha and Rs.337196.20/ha and Rs.310885.50/ha respectively. The per ha input-output ratio was highest for small (2.41), medium (2.23) and large (2.09) farms.

2.3 Marketing performance

Balappa Shivaraya (2000) studied the economic performance of production, marketing and export of vegetables in north Karnataka and found that farmers realised returns less than 70 per cent of the consumers rupee. However, the magnitude of price spread in tomato (48.85%) and brinjal (47.93%) was higher than onion (31.49%) and potato (31.43%).

Hugar *et al.* (2001) conducted study on dynamics of consumer behaviour in vegetable marketing and reported that the quantity of tomato actually purchased (0.85 Kg) declined over its planned quantity (2.55 Kg) due to higher levels of prices (Rs. 3.0 Kg) in the market (actual price) over its planned price (Rs. 2.05 Kg) as perceived by the consumer before going into the market for purchase of vegetables.

Balappa and Hugar (2002) studied the trend and variations in arrivals and prices of vegetables in northern Karnataka. The study was conducted in northern part of Karnataka. A critical analysis in trend of arrivals and prices of onion and potato by orthogonal polynomial regression analysis in general showed that there was a marginal increasing trend in arrivals and prices over the year with mild ups and downs in all the selected markets.

Balappa and Hugar (2002) in their study on integration of markets for onion and potato in Karnataka state found that the co-efficient of variation in prices of onion was found to be higher in Bijapur (148.64%), Hubli(140.79%) and Raichur (109.75%) markets as compared to Dharwad (83.78%), Belgaum (80.00%) and Gulbarga (65.93%) markets indicating higher variations in Bijapur market and lowest variations in Gulbarga market.

Singh (2009) examined the economics of production and marketing of vegetables in Madhya Pradesh wherein the marketing cost was highest for potato, followed by onion, tomato, brinjal, okra,and arvi. The marketing margin per quintal was Rs. 215/- for tomato, Rs. 132/- for onion, Rs. 314/- for arvi, Rs. 230/- for okra, Rs. 210/- for brinjal and Rs. 145/- for potato. The producers' share in the consumer's rupee was 60.90 per cent for tomato, 67 per cent for onion, 50.15 per cent for arvi, 61.01 per cent for okra, 60.37 per cent for brinjal and 63.75 per cent for potato.

Singh and Toppo (2010) in their study on the economics of production and marketing of tomato in kanke block of Ranchi district found the existence of three main channels in the marketing of tomato, namely

Channel I: Producer→Consumer

Channel II: Producer→Wholesaler→Consumer

Channel III: Producer→Wholesaler→retailer→Consumer

Of the three channels cent per cent of marginal farmer sold their produce through Channel I. 40 percent small farmers sold through channel III. Overall 35 per cent sample farmers sold their produce through channel I and 25 per cent farmers sold through channel II.

Bahirat and Jadhav (2011) in their study identified three marketing channels for marketing of flowers in Satara District, Maharashtra namely,

Channel- I: Producer→ Consumer

Channel- II: Producer→ Florist→ Consumer

Channel- III: Producer→ Wholesaler cum Commission agent→ Florist→ Consumer

The marketing efficiency was largely affected by the increase in the marketing cost (Channel III then Channel II). Retailer's gross margin was more than that of other agents in the marketing of rose flowers. Out of the total marketed quantity of flowers, the maximum quantity of flowers were sold through channel II. The marketing efficiency index was maximum in the channel I followed by channel II and III. Cultivation of rose was profitable at all the levels of cost.

Joshi (2011) while estimating marketed surplus and price spread of Brinjal in Western Uttar Pradesh identified the following marketing channels

Channel-I: Producer→ Village trader→ Commission Agents/Wholesaler→ Retailer→ Consumers

Channel- II: Producer→ Commission agents→ Wholesaler→ Retailer→ Consumer

Channel- III: Producer→ Wholesaler→ Retailer→ Consumer.

The producers share in consumer's rupee was high in channel III because of prevalence of less number of intermediaries. The marketing cost incurred by the wholesaler in different channels was 5.01 per cent, 6.39 per cent and 7.88 per cent to the consumer price, respectively and their corresponding net margins were 9.68 per cent, 9.61 per cent and 10.23 per cent to the price paid by the consumer.

Hugar and Mahesh (2011) studied on price spreads in the marketing of selected vegetables in Osmania vegetable market in Raichur district of Karnataka and found that commission charges was highest of the total marketing cost, comprising about 57 to 78 per cent of the total costs incurred by the producer-seller. The average net margin per quintal was between Rs.714.28/- (brinjal) and Rs.483.21/- (tomato) for wholesalers, whereas, it was for retailers from Rs. 598/- per quintal (brinjal) to Rs. 361/- per quintal (tomato). Producer's share in consumer rupee ranged from 43.62 per cent (tomato) to 41.67 per cent (brinjal).

Jaypatre *et al.* (2011) identified five channels for marketing of mango in South Gujarat region as given under

Channel I: Producer→Consumer.

Channel II: Producer →Wholesaler/Commission agent →Retailer →Consumer.

Channel III: Producer →Co-Operative Society →Commission Agent →Retailer →Consumer.

Channel IV: Producer→Pre-Harvest Contractor →Commission Agent →Retailer →Consumer

Channel V: Producer→Fruit Merchant →Hawker→Consumer.

Producer's share in consumer's rupees was maximum in channel I (99.42%) and minimum in channel IV (37.64%). The highest price spread was observed in channel IV (62.35%) and lowest in channel I (0.58%). Therefore, it could be concluded that linking farmer/ producer to the consumer directly without any intermediaries could be the most beneficial to farmers. The total market margin of the channels ranged from 6.04 per cent

(Channel II) to 19.63 per cent channels (III and IV). The highest net margin was released by the retailer in channel III and IV (19.63%). In the marketing of mango, the price spread was lowest in channel I (Rs. 1.27/-) and highest in channel IV (Rs. 115.72/-).

Reddy *et al.* (2012) analysed the price trend and integration of wholesale markets for onion in metro cities of India. The magnitude of regression coefficient revealed that an increase in market arrivals by a tonne led to an increase in prices by Rs. 6.00 per ton and Rs. 0.40 per ton in Bangalore and Delhi markets respectively. On the contrary, prices of onion decreased in Ahmedabad (Rs. 6.00), Mumbai (Rs. 10.00) and Kolkata (Rs. 2.00) markets with increase in arrivals by ton.

Jadav *et al.* (2012) conducted a study on producer's share in consumer rupee in marketing of fresh grapes. The study identified two marketing channels.

Channel- I: Producer→ Pre harvest contractor→ Retailer→ Consumer.

Channel- II: Producer→ Wholesaler→ Retailer→ Consumer.

The study revealed that there were two major channels of marketing involving pre-harvest contractors and wholesalers through which the fresh grape moved from producers to consumers. This channel was found to assure greater share to producers in consumer's rupee (79.07%) and efficient with a market efficiency with index of 2.37. The analysis of price spread and marketing margins revealed that pre-harvest contractors accounted for Rs. 3577/- per tonne, while retailers accounted for Rs.2033/- per tonne. The price-spread was higher in channel-I (pre-harvest contractor) due to higher marketing costs and margins. There was the possibility of increasing the producer's share in consumer rupee by scaling down the marketing costs particularly commission charges and transportation charges.

Kulkarni *et al.* (2012) identified three channels of marketing of onion in selected tahsils of Amravati District namely,

Channel- I: Producer→ Commission Agent→ Primary Wholesaler→ Retailer→ Consumer

Channel- II: Producer→ Primary Wholesaler→ Retailer→ Consumer

Channel- III: Producer→ Consumer

Channel-I was found dominant and mostly preferred channel of marketing as 67.5 per cent of the farmers adopted. Producer's share in consumer's rupee and was found to be 53.86 per cent, 62.70 per cent and 88.21 per cent, respectively. Price spread was found to be Rs.387.65/-, Rs.578.75/- and Rs.115.51/-in channel-I, channel-II and channel-III, respectively. It was observed that farmers who adopted channel-III realised highest share in consumer's rupee.

Sangolkar (2012) identified the following marketing channels for marketing in Wardha district of Maharashtra,

Channel-I: Farmer →Commission agents →Wholesaler →Retailer →Consumer

Channel-II: Farmer →Wholesaler →Retailer →Consumer

Farmers who adopted channel – I received a net price of Rs. 344.27/- per quintal (52.92 % of retailer price). In channel II farmers received a net price of Rs 350/- (52.23 % of retailer price) per quintal and paid higher marketing cost (Rs 30.45/-) especially towards post harvesting, cutting of bunches, transporting from farm to road, compared to farmers adopting channel I. In channel I, commission agent earned Rs. 10/- at marketing cost. Where as in channel II commission agent was not found. The per quintal total marketing cost was higher (Rs.165.65/-) in channel – II compared to channel-I (Rs.138.23/-) and marketing efficiency for channel I was 2.22 and for channel II it was 1.93 and indicating that channel II was more efficient compared to channel I.

Sashimatsung *et al.* (2013) studied on marketable surplus and price spread of tomato in Mokokchung district of Nagaland and identified different marketing channels; Channel-I (Producer-Consumer), channel-II (Producer – Retailer/Shopkeeper – Consumer), channel-III (Producer – Wholesaler – Consumer) and channel-IV (Producer – Local trader – Retailer – Consumer). The results of the study revealed that the most effective marketing channel for tomato was channel -III (65.16 %) followed by channel -IV (20.4 %), channel-II (9.32 %) and channel-I (5.08 %). In channel-I, producers incurred all the expenses and sold fresh tomatoes directly to consumers. The producers share in consumer's rupee was the highest in channel-I (94 %) and the lowest was in channel-IV (48.07 %). The percentage share of gross marketing margin in consumers rupee was 6 %,

27.78 %, 43.78 % and 51.93 % respectively for channels-I, II, III and IV. Marketing efficiency ratio was found to be highest in channel I.

Chinmayee and Vishnu (2014) studied on the impact of corporate retailing on price spread of cauliflower in Odisha and identified three main channels namely, channel I: producers – commission agent – wholesaler-retailer – consumer, channel II: producer – wholesaler – retailer – consumer and channel III: producer – corporate market collection centre – corporate retail market's city processing center- retail outlet – consumers. Marketing cost (Rs. 25,162.86/-) was the highest for the channel- I and lowest for the channel- III and it was Rs. 9390/- per ha. Producers supplying their produce to corporate retail market's collection center i.e. channel-III were getting the highest profit (Rs 3.49/- per Kg) than other two market channels. In channel-I, producer's share in consumer's rupee was 32.93 percent. In channel-II producer's share in consumer rupee was 35.93 percent and in the channel- III producer's share in consumer rupee was the highest (51.66 %). Net margins of intermediaries were highest in channel-I (36.5 %) and it was least in channel-III (22.5 %) indicating that marketing efficiency was the highest for channel III.

Naveen *et al.* (2015) identified three important marketing channels for banana in Chikkaballapur district of Karnataka, the main players in channel-I were producer, village level trader, wholesaler, retailer and consumer, in channel-II: producer, village level trader, retailer, consumer whereas in Channel-III: producer, village level trader, vendor, the consumer. The share of the producer in the consumer rupee was higher (50.90 %) in channel-III, as compared to channel-II (46.80 %) and channel-I (41.59 %). Farmers preferred channel-I because they relished (received) cash immediately after the sale of the produce to village level trader at the farm gate itself. Further, in channel-I, the risk of violent price fluctuation in the open market could be avoided.

Rachana (2017) in her study on marketing channel of grapes in Maharashtra found that the higher scope and potential for marketing of grapes in India. There was not much significant growth in the grape industry over the years compared to demand. There was no price stability in the market for grapes. There was various channels of grapes distribution. However, Producer→ Commission agent/Wholesaler→ Retailer→ Consumer was the major channel of distribution followed by direct marketing by farmers to consumers. From the price spread, it could be seen that the producer's share in

consumer rupee was 40.00 per cent. It meant that the producers got the maximum share in the consumer rupee.

Yesdhanulla and Aparna (2018) studied Marketing channels and price spread of tomato in Chittoor district of Andhra Pradesh. Price spread analysis and marketing efficiency indices were worked out across the two marketing channels. Net price received by producer was Rs. 725.95 in channel-I and Rs. 717.80 in channel-II. Total marketing costs in consumer's rupee was (23.31) per cent and (27.53) per cent in channel-I and Channel-II and percentage share marketing margin in consumers rupee was (29.85 per cent and (32.58) per cent in channel-I and channel-II respectively. The producers share in consumer's rupee was the highest in channel-I (46.84 per cent and the lowest was in channel-I (39.88 per cent) Marketing efficiency ratio was found to be highest in channel-I.

Jorwar *et al.* (2018) studied economics of production and marketing of chilli in Amravati district. To study the existing marketing channels of chilli there are three channels were found viz.Channel-I Producer-Consumer Channel-II Retailer-Consumer Channel-III Producer-Wholesaler-Retailer-Consumer. In case of chilli the price spread through channel-I were Rs. 214.80 per quintal. In case of channel-III the price spread of chilli was Rs. 923.26 per quintal. The marketing efficiency of chilli in channel-I was 24.02. In case of channel-III marketing efficiency of chilli was 8.24.The total marketing cost of chilli observed in channel -I was Rs 107.40 per quintal. In channel–II 264.06 per quintal and in channel–III 290.66 per quintal respectively. The producer share in consumer rupee highest in channel-I i.e. 92.31per cent to the consumer rupee. As regard to the marketing efficiency, it is observed that the marketing efficiency for the channel I, II and III comes out to 24.02, 9.17, and 8.24 respectively.

2.4 Constraints in production and marketing

Dhaka and Poonia (2010) identification of constraints encoutred by the farmers in production and marketing of vegetables in Bundi district of Rajasthan and revealed that the production of vegetable was constrained by insufficient knowledge about production practices, high incidence of pest and disease and high cost of inputs. Further, perishablity of vegetables, small quantity of produce and price fluctuation of vegetable was the major impediments in marketing of vegetable.

Nath and Biswas (2011) in his study on the constraints in vegetable cultivation in West Tripura found that lack of knowledge of scientific crop production ranked I (79.52%), followed by lack of frequent visit by extension personnel to villages ranked II (76.67%) and poor fertility of soil ranked III (72.38%),occurrence of pest and diseases (64.76%), crop damage due to early monsoon (54.28%), poor seed germination due to low soil moisture at the time of sowing (48.57%), moisture stress during crop growth period (46.67%) ranked IV, V, VI and VII respectively. As regards to the infrastructural constraints, less cultivable land ranked I (92.86%), non-availability of quality seed ranked II (90.48%) and non-availability of processing industries (value addition) ranked III (85.23%) followed by non-availability of agricultural chemicals in time (80.95%), Inability to purchase modern agricultural Implements (75.71%), lack of irrigation facilities (54.76%), crop damage due to free grazing (42.38%) ranked IV, V, VI, VII respectively. Of the economical constraints, non-availability of labour during peak period ranked I (91.42%) and non-availability of timely credit facilities ranked II.

Goyal and Singh (2012) in their study on the production related problems of vegetable growers in Punjab found that the biggest problem faced by vegetable growers found to be a loss of vegetable at farm level which was revealed to be 69 per cent of the growers. It was followed by the high cost of labour as reported by 46.67 per cent of the vegetable growers at an overall level. The respective figures for loss of vegetable at farm level and the high cost of labour were 58.33, 66.67, 50.00, 43.75, 47.62, 28.57, 38.46 and 15.38 per cent in case of marginal, small, medium and large vegetable farmers. Similarly, the high cost of seed and lack of quality seed in vegetable cultivation was a major problem in marginal farmers compared to the large farmers.

Shennewad and Shelke (2013) conducted a study on constraints and suggestions of papaya growers in Marathwada region of Maharashtra state. The major problems faced by papaya growers were marketing they were fruits when more perishable 28.33 per cent, while 98.33 per cent complained about the highrate of commission charges. The damage of fruit during transportation was reported by 15 per cent farmers. Whereas, 83.33 per cent of farmers, reported high cost of transportation was major constraints. It was observed that about 91.66 per cent sample growers opined that they were not getting remunerative price. About, 60.20 per cent sample growers complained about lack of

knowledge of processing of fruits. The absence of co-operative marketing, market information and grading facilities were other problems in marketing of papaya.

Farida and Fariya (2014) reported the lack of credit has the least mean score and the one with the least mean score was the most serious problem that the tomato farmers were facing, followed by the high cost of inputs, pest and diseases, high land rent and lastly cost of water. Their mean scores was; 1.62, 2.50, 2.54, 4.07, and 4.28, respectively. The major production problem the farmers face was lack of access to credit. Lack of reliable market was the major problem the farmers face with the lowest mean score, followed by low price, cheating by market queens, lack of enough funds by the processing factory with mean scores of 1.82, 1.93, 2.83 and 3.42, respectively.

Matsane and Oyekale (2014) identified the factors affecting marketing of vegetables among small-scale farmers in Mahikeng local municipality, North - West Province, South Africa. Agricultural produce from small-scale farmers was often lost after production due to many marketing challenges which made it difficult for small-scale farmers to explore full market potentials and they also reduced incentives of participation in formal (commercial) or high-value markets. The study revealed that prominent constraints of marketing vegetables among the small-scale farmers were, lack of access to credit, lack of access to storage facilities, lack of market information, lack of finance for farming, poorly developed village markets, poor producer prices, high perishability of produce, low patronage, inadequate access roads, small size of transport and high transportation costs. The study made recommended, enabling accessibility through the development of better infrastructure in the form of storage facilities, roads for transportation and communication systems; and the formation of marketing co-operatives to overcome high transportation costs, small size of transport and individual small marketing output problems.

Maru and Gibramu (2014) reported the major constraints of onion production which indicated that from all respondents, 59.00 per cent of them revealed that onion disease was the major constraints, 32.00 per cent of the respondents responded that water shortage was the major constraints of onion production and 6.00 per cent were responded climatic suitability was the major constraints of onion production and 3.00 per cent were responded marketing of onion bulb was the major problem.

Shreedevi (2014) in her study on the production and marketing constraints of vegetable growers in Karnataka identified important problems faced by the farmers in the marketing of vegetables were high transport charges (54.00%), high wage rate (19.76%), high incidence of pests and diseases (39.61%), non-availability of skilled labour (36.84%), high cost of maintenance (35.12%), and lack of technical guidance (69.71%). The other problems experienced by vegetable growers were improper weighing practices, delay in sale and payment and lack of effective regulation of markets.

Dhurwey *et al.* (2015) studied constraints faced by farmers in production and marketing of major cole vegetable crops in Bemetara district of Chhattisgarh state. And identified that 80.00 per cent of farmer respondent stated that non-availability of timely labour was the major problem. However, 75.00per cent of farmers expressed loss due to pests and diseases followed by 56.00 per cent due to lack of adequate training facility, 49.00 per cent due to technical knowledge and 35.00 per cent reported lack of soil testing facilities. Further, they faced non-availability of timely input 32.00 per cent, lack of financing at reasonable interest rate 31.00 per cent. In case of marketing, lack of proper methods applied for the harvesting of crop 72.00 per cent was the major constraints and the second most important constraint reported by the farmers was lack of information regarding grading and standardization and the post-harvest management 52.00 per cent.

Roopa and Sameer (2015) analyzed the problems in production and marketing of cauliflower in Belgaum district of Karnataka. The study revealed that the major problems faced by the farmers in cauliflower production were non-availability of labour was the major problem expressed by most of the farmers which shared a highest Garrett's score (77.83) followed by high incidence of pest and diseases (70.17), the high cost of plant protection chemicals (66.50). The seeds of high yielding varieties were usually high priced as expressed by 60.00per cent of sample farmers. Besides farmers expressed that non-availability of organic manure (59.11), irregular power supply (54.56) and non-availability of pesticide and insecticides during peak season (43.15) as other problems in cauliflower production.

Anapet *et al.* (2016) studied constraints faced by banana growers in the production of banana in Wardha District of Maharashtra. The study revealed that based on various types of problems faced by the growers, it was depicted that 93.33 per cent of banana grower faced load shading in electricity. Further considerable number of respondents

(76.66%) faced losses due to high temperature. It was followed by of high fertilizer costs (71.11%), labour wages were high and labour are inefficient in work (71.11%). And more than 61.11 per cent respondents faced the constraint like initial charges for drip irrigation was very high and delay in subsidy by government, followed by 52.22 per cent recorded constraints like non-availability of suckers in large quantity and quality. And 45.55 per cent respondents recorded constraint like timely availability of labour and followed by 42.22 per cent respondent recorded problem like inadequate technical assistance.

Ashok and Aski (2016) studied constraints faced by cabbage growers and nature of marketing in North Karnataka. 57.50 per cent of cabbage growers got the market information from the others who visited market followed by mobile (32.50%) and personally visiting the market (10.00%), respectively. Exactly equal (40.00%) per cent of the respondents were using mini tempo and truck as the means of transport. The problem of pest and disease in production and fluctuation in market price in marketing ranked first in constraints faced by the cabbage growers

Daundkar *et al.* (2017) studied on problems of rabi potato production and marketing in Pune district of Maharashtra. Problems faced by farmers were non-availability of loans at a low interest rate at the time of sowing (54.17%), lack of good quality seed (73.00%), High seed price was also a commonly reported by 65 per cent of farmers. Another major problem was high wage rates (60.00 %),. The transportation was a major bottle neckin the efficient marketing of potatoes. About 70.00per cent farmers complained that transportation charges were high. The price fluctuation emerged as an important problem as 66.37 per cent farmers complained about it. About 63.00 per cent farmers faced the problems of high commission charges.

Mohan and Reddy (2017) conducted a study on constraints in production and marketing of papaya in Kadapa district of Andhra Pradesh. The study revealed that majority of papaya farmers expressed that severity of virus attack i.e., (100.00 %) along with labour intensiveness (92.50%) and lack of improved varieties to insect and virus attacks (91.25%) for papaya cultivation. The other problems were lack of extension services (87.50%), followed by inadequate institutional credit (76.25%), non-availability of quality seedlings (71.25%), the high cost of seedlings (68.75%) and the high cost of fertilizers (60.00 %). While in marketing of papaya it could be seen that all the respondents opined that wide price fluctuations, over 90.00per cent of farmers opined that

inadequate market information was another major problem and exploitation of middlemen (87.50%), high commission charges (71.11%), storage problem (67.50%), lack of regulated market (66.25%), high transportation charges (55.55%),damage of fruit during transportation (55.55%.) were observed.

Kumar *et al.* (2018) conducted a study in Almora and Nainital districts of Uttarakhand to find out marketing behaviour of the vegetable growers and constraints in marketing of vegetable produce. Results revealed that distant mandi was a major choice for sale of the produce. The major marketing constraints were higher commission rate of middlemen, fluctuating market rate, non-availability of nearby market, high transportation charges and high cost of packaging material. The solution lies in creation of horticulture based self-help group at village level, organization of weekly Hat, strict compliance of rules and regulation of regulated market, guidance on market avenues from time to time to the vegetable growers.

Methodology

III. METHODOLOGY

In this chapter, methodological aspects of the study are presented under the following headings.

3.1 Description of the study area

The present study is conducted in Kalaburagi district of Karnataka state during 2019-20, which is the largest producers of redgram and contributes 50.68 per cent of state production and having 278 redgram processing units. The major vegetables grown in the district are green chilli, onion, brinjal, tomato, leafy vegetables. The Kalaburagi district falls under the agro-climatic Zone-1 and 2 namely North Eastern Transitional Zone (Zone-1) partly and North Eastern Dry Zone (Zone-2) of Karnataka state. It lies between North latitude 17° 101 and 17° 451 and between East longitude 76° 101 and 77° 451 with geographical area of 10,954 square kilometers. The Kalaburagi is a biggest district in the state covering 8.49 per cent of the area and 5.90 per cent of population of the state. It has Bijapur district of Karnataka and Sholapur district of Maharashtra on the west, on the north by Bidar district of Karnataka and Osmanabad district of Maharashtra. Yadagir district of Karnataka is on south of Kalaburagi. The district economy depends mainly on agriculture which contributes 31.70 per cent of district income and provides employment to 67 per cent of the population.

Source: Kalaburagi District at a Glance, 2018-19.

3.1.1 Population and demography of the district

The district spreads in seven taluks with 10 towns, 32 hoblies and 220 gram panchayats and 918 inhabited villages. The population of the district as per 2011census was 21,74,742 and has sex ratio of 935 of females for every 1000 males. The population growth rate over the decades (2001-2011) was 2.56 per cent. Out of total population in the district, 14.85 lakh were in urban and semi urban area, the overall population density of the district being 197 per sq. km. Kalaburagi has an average literacy rate of 51 per cent which is lower than the state average. The district has seven taluks viz., Kalaburagi, Aland, Afzalpur, Chincholi, Chittapur, Jewargi and Sedam. The general features of the district are given in Table: 3.1.

Table 3.1: Geographic and demographic profile of study area

Sl. No.	Particulars	Karnataka State	Kalaburagi District
1	Geographic area (Km²)	1,91,791	10,954
2	Taluks (No.)	176	7
3	Rural population (lakh)	375 (61.33)	6.89
4	Urban population (lakh)	236 (38.67)	14.85
5	Total population (lakh)	611	21.74
6	Decadal population growth rate (%)	15.60	2.56
7	Density of population (per Km²)	319	197
8	Literacy ratio (%)	75.36	51
9	Sex ratio	973	935
10	Average rainfall (mm)	1165	832
11	Cultivable land (Lakh ha)	133.2	12.72
12	Net irrigated area (Lakh ha)	36.59	2.19

Source: Kalaburagi District at a Glance, 2018-19.

3.1.2 Climate, rainfall and soil type

The weather in Kalaburagi district comprises of 3 main seasons. The summer spans from late February to mid June, followed by the south west monsoon, which spans from late June to late September then followed by dry winter weather until mid January. Barring the hot summer months, the salubrious weather of Kalaburagi makes a visit to this historic city a pleasant one. Temperature during different seasons ranges from 38° to 44° c in summer, 27° to 37° C in winter. The district is drought prone area. The annual average rainfall is 777 mm and the normal rainy days are 46 in a year. The climate is very hot during the summer which adversely affects the working capacity of the people. The period from December to May is driest part of the year. The soils of the district are deep to very deep black, medium black, sandy loam and are light textured soils, whereas some parts are having light black, red and black sandy soils. The soils are varied in the zone

which facilitates growing of variety of crops in both kharif and rabi seasons. The important crops grown in the district are redgram (tur), greengram, blackgram, bengalgram, Jowar, bajra, wheat, groundnut, sunflower, sesamum, cotton and sugarcane.

Table 3.2: Proportion of horticultural cropped area to total area in Kalaburgi district during 2018-19

Sl. No.	Taluks	Geographical area (ha)	Cultivable area (ha)	Net area sown (ha)	% age of CA to GA	Area under horti. crops	%age of Hort. cropped area to CA	%age of HCA to NAS
1	Afzalpur	130479	129574	117520	99.31	3155	2.43	2.68
2	Aland	173417	156360	144349	90.16	3746	2.40	2.59
3	Chincholi	155854	139231	103537	89.33	2702	1.94	2.61
4	Chittapur	176447	141413	115726	80.14	2397	1.70	2.07
5	Kalaburagi	173165	93608	81474	54.06	4832	5.16	5.93
6	Jewargi	182313	152590	131962	83.70	3654	2.39	2.77
7	Sedam	102445	92468	72784	90.26	725	0.78	1.00
Total		**1094120**	**905244**	**767352**	**586.96**	**21211**	**2.40**	**19.66**

Source: District horticulture office, Kalaburagi, 2018-19.

Table 3.3: Area, production and productivity of vegetables in Kalaburagi district during 2019

Sl. No.	Name of the Taluk	Vegetable Crops			
		Area(ha)	Prodn.(tons)	Yield(tons)	Value(lakh)
1	Afzalpur	1451.00	24701.60	17.02	914.26
2	Aland	2766.00	39161.76	14.16	1634.79
3	Chincholi	1261.00	15324.45	12.15	1308.45
4	Chittapur	1855.00	23334.50	12.58	1147.87
5	Kalaburgi	2601.00	30243.81	11.63	1614.77
6	Jevargi	2524.00	24260.70	9.61	1081.76
7	Sedam	431.00	5018.63	11.64	503.42
Total		12889.00	146412.76	11.36	6620.13

Source: District horticulture office, Kalaburagi, 2018-19.

3.2 Selection of crops

Kalaburagi district with varied agro-climatic conditions is suitable for growing one or the other horticultural crops in general and vegetables in particular. Though variety of vegetables are grown in Kalaburagi district, important vegetables are considered for the present study. The selection of major vegetables is based on their highest area under cultivation, degree of perishability and commercial importance of the vegetables. As such, tomato, onion, brinjal and green chilli were choosen for the present study.

Table 3.4: Area under vegetables in Kalabuiragi district during 2018-19

Sl. No.	Vegetables	Area (ha)	Production (t)	Yield (t)
1	Onion	4527	78305.75	17.30
2	Green chilli	3509	28235.89	8.05
3	Tomato	1705	46228.76	27.11
4	Brinjal	461	10919.56	23.69
5	Drum stick	376	1006.23	3.42
6	Lady's finger	304	2456.96	8.08
7	Palak	208	1976.64	9.50
8	Ridge gourd	179	1366.42	7.63
9	Radish	174	1378.40	7.92
10	Menti	166	1469.20	8.85
11	Others	1244	10840.27	8.45

Source: District horticulture office, Kalaburagi, 2018-19.

3.3 Sampling design

The multistage random sampling technique was adopted in design sample size. In the first stage, Kalaburagi district was purposively selected. In the second stage, three taluks were selected based on potentiality and highest area under selected vegetables. In the third stage, 30 farmers for each selected vegetables will be chosen at random, in view of spread out of vegetable growers in different villages. Thus, the sample size constituted of 30 for each crop and 120 for the study as a whole. Further, while selecting the villages in the selected taluks for identifying the potentiality as well as concentration of vegetables growers, experience of the officers of Horticulture/Agriculture/Marketing Departments at district/taluka level along with those of market intermediaries were taken by consultation.

Table 3.5: Distribution of sample respondents in the study area

Taluks	Onion	Green chilli	Tomato	Brinjal	Total
Aland	10	10	10	10	40
Kalaburgi	10	10	10	10	40
Afzalpur	10	10	10	10	40
Total	30	30	30	30	120

Table 3.6: Distribution of sample market intermediaries in the study area

SI. No.	Intermediaries	Total
1	Village merchant	5
2	Commission agent	5
3	Commission agent-cum wholesaler	5
4	Retailers	5
Total		20

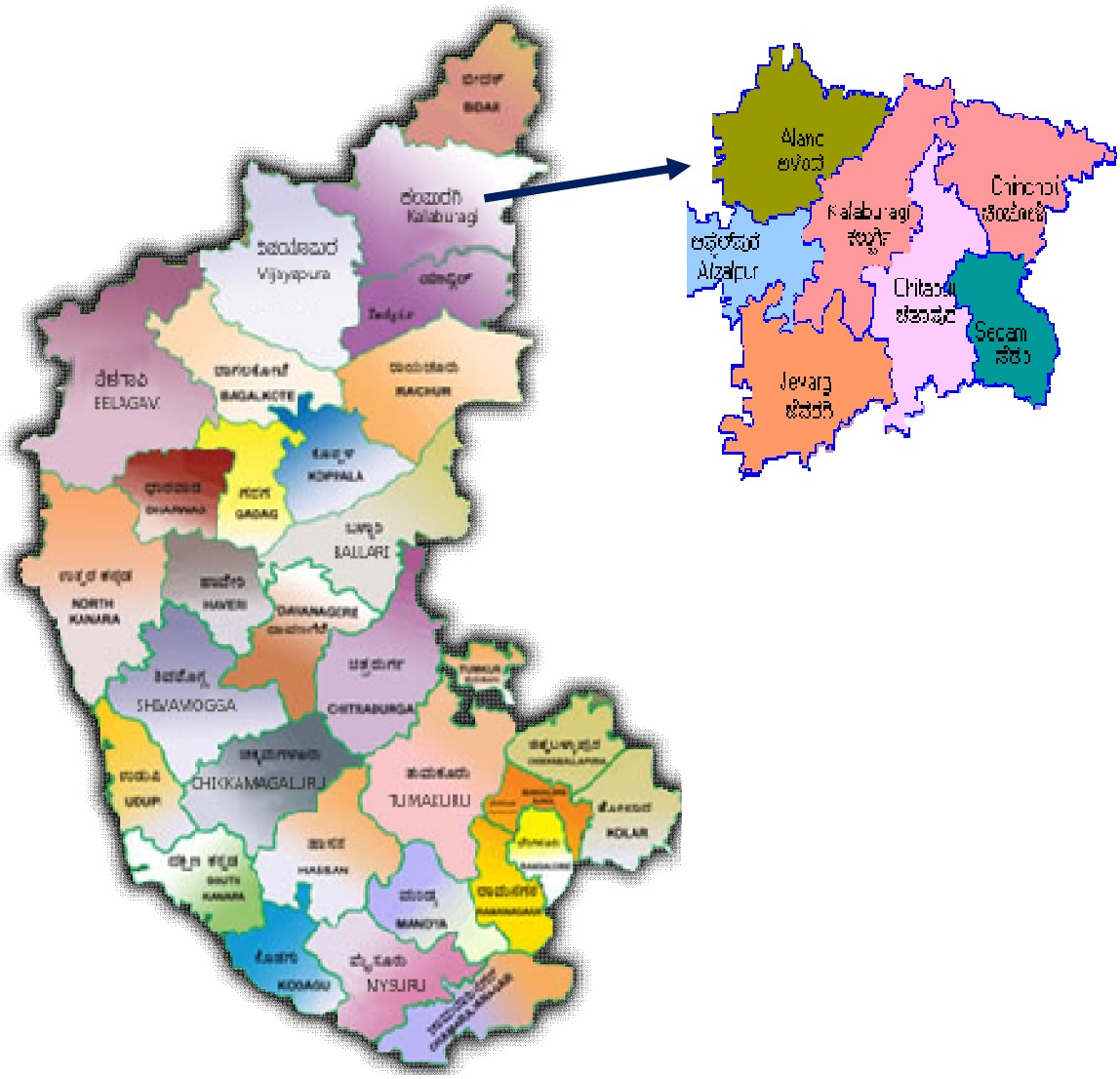

Fig. 3.1: Map showing the study area in Karnataka

3.4 Nature and sources of data

For estimating the specific objectives of the study, both primary and secondary data were used. Primary data relating to costs, returns involved in production of major vegetables, including marketing cost incurred by farmers. For this purpose, pre-tested and well-structured questionnaires were used to obtain rational information from farmers and market intermediaries.

Secondary data about area, production and other useful information for the study were collected from concerned government statistical sources such as Directorate of Horticulture, Bangalore, District Statistical Office, Kalaburagi and District Horticulture Office.

3.5 Analytical tools and techniques employed

The analytical techniques used to evaluate the objectives of the present study are summarized below.

3.5.1 Tabular presentation techniques

The data collected were presented in tabular form to facilitate easy comparisons. The tabular presentation technique was followed to study the socio-economic characteristics of sample farmers, such as size of land holding, cropping pattern, costs and returns in relation to production of major vegetables and for analyzing the data elicited through opinion survey from the sample farmers on the problems encountered in the production and marketing of vegetables.

The data were summarized with the aid of statistical tools like averages, percentages etc. to obtain the meaningful results.

3.5.2 Timmer measures of technical efficiency

To capture the ability of the farmers to achieve the maximum realisable crop output with minimum level of inputs under the existing situation and given technologies, careful examination of farm specific technical efficiency and input specific allocative efficiency of the farmers is necessary.

Technical efficiency evaluates the farm's ability to obtain the maximum possible output from a given set of resources, while allocative efficiency explores the needed adjustments in equating the marginal revenue with the marginal cost for maximising profitability.

The Cobb-Douglas production function does not distinguish between technical efficiency and allocative efficiency. It ignores the problem of technical efficiency by assuming that all the techniques of production are identical across farms and each farmer is technically efficient, which many times is untrue.

Timmer (1971) modified the procedure in a number of ways and imposed a Cobb-Douglas type specification on the frontier and evolved an output based measure of efficiency.

The Timmer's measure of technical efficiency of farm ‘i’ is the ratio of actual output to the potential output on the production function given the level of input use on farm 'i'.

$$\text{Timmer's measure} = Yi \ / \ Y\,i^*$$

Where,

Yi = Actual output of $_i^{th}$ farm

Yi* = Maximum output obtainable by the $_i^{th}$ farm for given levels of input

To classify the efficiency achieved by the farmers following criteria was used.

The arithmetic mean and standard deviation of output of the overall farmers were calculated in order to democrate the boundaries between efficient farmers category.

High efficiency farmer : mean plus 0.425 standard deviation ($\overline{X}$ + 0.425σ) of overall output is the value to demarcate the lower range of high efficiency.

Low efficiency farmer : mean minus 0.425 standard deviation ($\overline{X}$ - 0.425σ) of overall output is the value to demarcate the upper range of low efficiency.

Medium efficiency farmer : Farmer whose output was lies between mean plus or minus 0.425 standard deviation ($\overline{X} \pm 0.425\sigma$).

3.5.3 Marketing Efficiency

Marketing efficiency is a measure of market performance. The movement of goods from producers to the ultimate consumers at the lowest possible cost consistent with the provision of service desired by the consumers is termed as efficient marketing.

a) Shepherd's Index

Efficiency of supply chain was calculated with the help of the following formula. The higher the ratio, higher would be the efficiency and vice versa. This can be expressed in the following form:

$$ESC = [(V/I)-1]$$

Where,

ESC = Index of efficiency of supply chain

V = Value of goods sold

I = Total marketing cost

b) Calkin's index

Efficiency of supply chain was calculated with the help of the following formula. The lower the value of the index, higher would be the efficiency.

The Calkin's index of marketing efficiency is estimated using the following formula.

Marketing efficiency= 1+ (Sum of profit or margin/ Sum of marketing cost)

3.5.4 Garrett's ranking technique

To know the acceptance of farmers and constraints in cultivation and marketing of vegetables, Garrett's ranking technique was employed. Basically it gives the change of orders of constraints and advantages into numerical scores. The major advantage of this technique as compared to simple frequency distribution is that the constraints and

advantages are arranged based on their importance from the point of view of respondents. Hence, the same number of respondents on two or more constraints may have been given different rank.

Garrett's formula for converting ranks into per cent was given by

Per cent position=100*(Rij-0.5)/Nj

Where

Rij= rank given for ith factor by jth individual

Nj= number of factors ranked by jth individual

The per cent position of each rank then converted into scores. For each factors, the scores of individual respondents were added together and divided the total number of the respondents for whom scores were added. These mean scores for all the factors were arranged in descending order, ranks were given and most important factors were identified.

Definition of terms and concepts used in the study

Village merchant: A village merchant is a person, who purchases the produce in the village directly from the producers or farmers for the purpose of subsequent selling in regulated markets or other places. The village merchant also pay commission to commission agent while selling the produce in the wholesale market.

Commission agent: He is a person who on behalf of his principal and in consideration of commission upon the amount involved in each transaction, keeps in his custody the goods of his principal and sells the same and holds himself liable to deliver to the buyer and to make payment of its price to his principal. He will incur expenses on shop rent, salary and wages of permanent and temporary employees, licence fee, telephone and electricity charges, cost of stationary articles, taxes and miscellaneous expenses.

Commission agent-cum-wholesalers: When the commission agent performs the duties of wholesaler in buying and selling of the commodities in bulk at wholesale market, he is called commission agent-cum-wholesaler. He will incur expenses which are mentioned earlier.

Retailer: The retailer is a person who purchase produce directly from producers or village merchants in the retail market or purchases the produce through commission agent-cum-wholesaler in the wholesale market and sell them to consumer in the retail market.

Variable costs: The variable costs include cost on seeds, manure, fertilizer, wages of human and bullock labour, plant protection chemicals, irrigation, staking materials, interest on operational capital and repairs and maintenance charges.

Seeds: The cost of purchased seeds was based on the actual amount paid by the respondents. The farm-produced seeds were imputed based on the prices which prevailed at the time of sowing.

Farm yard manure: The prevailing price per tractor load was used to impute the value of a farm yard manure produced at the farm.

Fertilizers and plant protection chemicals: The cost of fertilizers and plant protection chemicals was based on the actual prices paid by the sample farmer including the cost of transportation and other incidental charges, if any.

Labour: The cost of hired labour was calculated at the prevailing wage rates paid per day (8 hours) in the study area for men, women and bullock pairs during the study period. The same wage rates were imputed for family labour. While expressing labour in mandays, women days were converted into mandays by taking 1.33 women days equal to one manday.

Irrigation cost: There was a practice of hiring irrigation water in the study area and hence the cost of irrigation was calculated at the prevailing irrigation rate per unit of time / once irrigation in the study area. The own source of irrigation was also imputed based on the prices which prevailed at the time of crop production.

Staking materials: The staking materials mainly include sticks and gunny twine. The cost of staking sticks was based on the actual amount paid by the respondents. The imputed value of farm produce being used since staking sticks was based on the prices which prevailed at the time of crop grown. About 50 per cent of the total cost of staking

sticks was considered as staking sticks usually last for two crops. The cost of gunny twine was based on the actual amount paid by the respondents.

Interest on operational capital: The working capital consists of the expenditure on labour, seeds, farm yard manure, fertilizers and plant protection chemicals, irrigation and staking materials. The interest on operational capital was calculated at the rate of 7 per cent per annum (the rate at which commercial banks advance short-term and medium-term loans) for 50 per cent of the operational capital since this capital was used at different stages of crop production and was apportioned to the crop based on the duration of crop.

Repair and maintenance charges: Repair and maintenance charges of implements and machinery used in the cultivation were computed on the basis of actual expenses incurred by the respondents. The amount of these expenses was apportioned to these crops based on the acreage.

Fixed costs: The fixed cost includes depreciation on farm implements and machinery, interest on fixed capital, land revenue and rental value of land.

Depreciation charges: Depreciation on each capital equipment and machinery owned by the farmers and used for dry land cultivation was calculated for each individual farmer separately based on the purchase value and using the straight line method. The average life of the asset as indicated by each farmer was used in the computation of the depreciation. The average value of the asset after its useful life as estimated by respondents was considered for calculation of junk value. The depreciation cost of each equipment was apportioned to the crop based on its percentage use.

Interest on fixed capital: Interest on fixed capital was calculated at the rate of 12 per cent, as the fixed deposits in commercial banks would fetch this rate of interest. The items considered under fixed capital were implements and machinery. Interest was considered on the value of these assets after deducting the depreciation for the year. No interest was charged on the land value since the rental value of owned land was considered. Then the amount so calculated was apportioned to the crop acreage based on duration of the crop.

Land revenue: Land revenue was taken at the rates levied by the government.

Rental value of land: Rental value of land was calculated at the prevailing rate per hectare per annum in the study area and was apportioned to the respective crop.

The costs and returns per quintal of onion, potato, tomato and brinjal were calculated by using the following ratio's

1. Gross returns per rupee of investment = Gross return/ Total cost

2. Cost of cultivation = Total cost (Rs.) /unit area

3. Gross returns per quintal = Gross returns (Rs./ha) /Yield (quintal/ha)

Price spread (PS) or marketing margin (MM)

The price spread is referred to the difference between producer's net price (PNP) and retailer's selling price (RP). PS or MM = RP - PNP

In other words, it includs (i) the total costs of marketing (TMC) incurred by producer-sellers and market intermediaries excluding the commission charges paid to the commission agent-cum-wholesaler, and (ii) the net profit (NP) accrued to the intermediaries in the process of moving the produce from producer-seller to the consumer.

$$PS = TMC + NP$$

Producer's share in consumer's rupee: This refers to the farmer's net price expressed as percentage of the retailer's sale price of the produce.

$$PSCR = PNP/ RP X 100$$

Producer's net price: This refers to the price per unit of output that a producer realises after deducting the marketing costs from the gross price, which is the price that he receives from the market intermediaries when he sells his produce.

Marketing channel

The marketing channel consisted of agencies who perform various marketing functions in a sequence as the produce moves from producer-seller to the ultimate consumer.

However, marketing channel-IV was not popular among vegetables growers. Therefore, while working out marketing costs and margins, this channel was not considered. Though these channels were prevailing in the study area, channel- III was predominant in the case of green chilli, tomato and brinjal, while channel-I and channel-II were dominant in marketing of onion. However, channel-III is taken in to consideration to work out producer share in consumers rupee for green chilli, tomato and brinjal. Similarly, channel-I and channel-II were chosen for onion.

Marketing channels prevailing in the study area

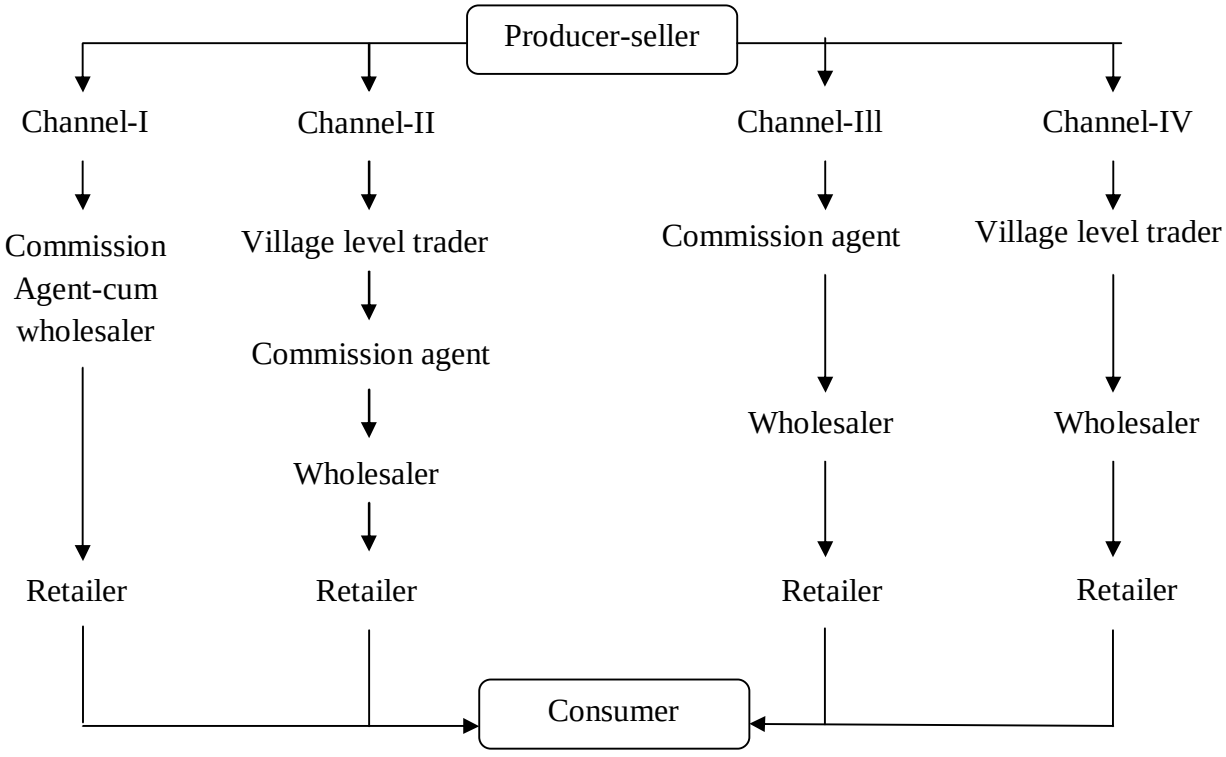

Plate 1. Primary data collection by researcher from farmer

Plate 2. Primary data collection by researcher from retailer

Results and Discussion

IV. RESULTS AND DISCUSSION

The findings of the study are presented in this chapter under the following headings in consistence with the objectives of the study.

4.1 Socio-economic characteristics of vegetable growers

4.1.1 Characteristics features of sample farmers

4.1.2 Economic status of vegetable growers

4.1.3 Social composition of vegetable growers in the study area

4.2 Costs and returns in vegetable production

4.2.1 Costs and return structure

4.2.2 Cost of production

4.2.3 Technical efficiency

4.3 Marketing performance of vegetables in the study area

4.3.1 Marketing costs incurred by the producers

4.3.2 Marketing costs, marketing margins and price spread in vegetables

4.3.3 Marketing efficiency in different vegetables

4.4 Constraints in production and marketing of vegetables

4.1 Socio-economic characteristics of sample farmers

4.1.1 Characteristics of sample farmers

The general characteristics of the sample farmers (Table 4.1) revealed that majority of the vegetable growers (40.83%) are between the age group of 21-40 years followed by 41-60 years age group (38.34%), below 21 years age group (10.83%) and above 60 years age group (10.00%) . It is also noticeable from the table that the

Table 4.1: Socio-economic characteristics of vegetable growers

(n=120)

SI. No.	Particulars	Number	Per cent
I.	**Age group**		
1.	< 21 years	13	10.83
2.	Between 21-40 years	51	40.83
3.	Between 41-60 years	46	38.34
4.	> 60 years	12	10.00
5.	Average age in years	44	
II.	**Education level**		
1.	Illiterate	28	23.33
2.	Primary level	22	18.34
3.	High School	32	26.67
4.	PUC	28	23.33
5.	Degree and above	10	8.33
III.	**Family Size**		
1.	Small (< 4 members)	32	26.67
2.	Medium (betn 4-6 members)	82	68.33
3.	Large (> 6 members)	6	5.00
4.	Average family size	6	
IV.	**Landholding**		
1.	Small farmers (< 5 acres)	64	53.34
2.	Medium farmers (betn 5-10 acres)	28	23.33
3.	Large farmers (> 10 acres)	28	23.33
4.	Average land holding (acres)	4.90	

producers involved in vegetable cultivation had an average age of 44 years in the study area.

It is important to note that, majority of vegetable growers had completed high school education (26.67%) and 23.33 per cent had PUC and 23.33 per cent were illiterate, followed by primary (18.34%) and graduates (8.33%) education.

The majority of the sample producers were having medium (4-6 members) family size (68.33%) followed by small (26.67%) and large (5%) family size in the study area. On an average vegetable growers are having around 6 family members in their household.

With respect to land holding, majority of the vegetable growers were small farmers (53.34%) followed by medium (23.33%) and large (23.33%) size holdings with an average size of land holding of 4.90 acres.

4.1.2 Economic status of vegetable growers

The economic status of vegetable growers is presented in Table 4.2 and Fig. 4.1 indicated that, on an average, vegetable growers are having annual income of ₹2,87,354.

Majority of vegetable growers (45.00%) were having annual income in the range of ₹ 2-3 lakhs. However 24.16 per cent of farmers were having annual income between ₹ 3-4 lakhs, 15.84 per cent of producers are earning income between ₹ 4-5 lakhs and 11.67 per cent of the producers were having annual income of above ₹ 5 lakhs. Hardly 3.33 per cent of farmers were having income of less than ₹ 2 lakhs per annum.

4.1.3 Social composition of vegetable growers

The information on distribution of farmers according to their social class is furnished in Table 4.3 and Fig. 4.2. In the study area, out of the total respondents, about 71.67 per cent belonged to backward classes (OBCs) followed by general category (16.67%), scheduled tribe (6.66%) and scheduled caste (5.00%).

In general socio-economic characteristics of the sample farmers showed that majority of the producers fall in the age group of 21-40 years. Majority of

Table 4.2: Economic status of vegetable growers in Kalaburagi district

(per annum)

SI. No.	Income category(₹)	Number	Per cent
1	< 2 lakh	4	3.33
2	Between 2-3 lakh	54	45.00
3	Between 3-4 lakh	29	24.16
4	4-5 lakh	19	15.84
5	>5.0 lakh	14	11.67
6	Average income (₹)	2,87,354/-	100.00

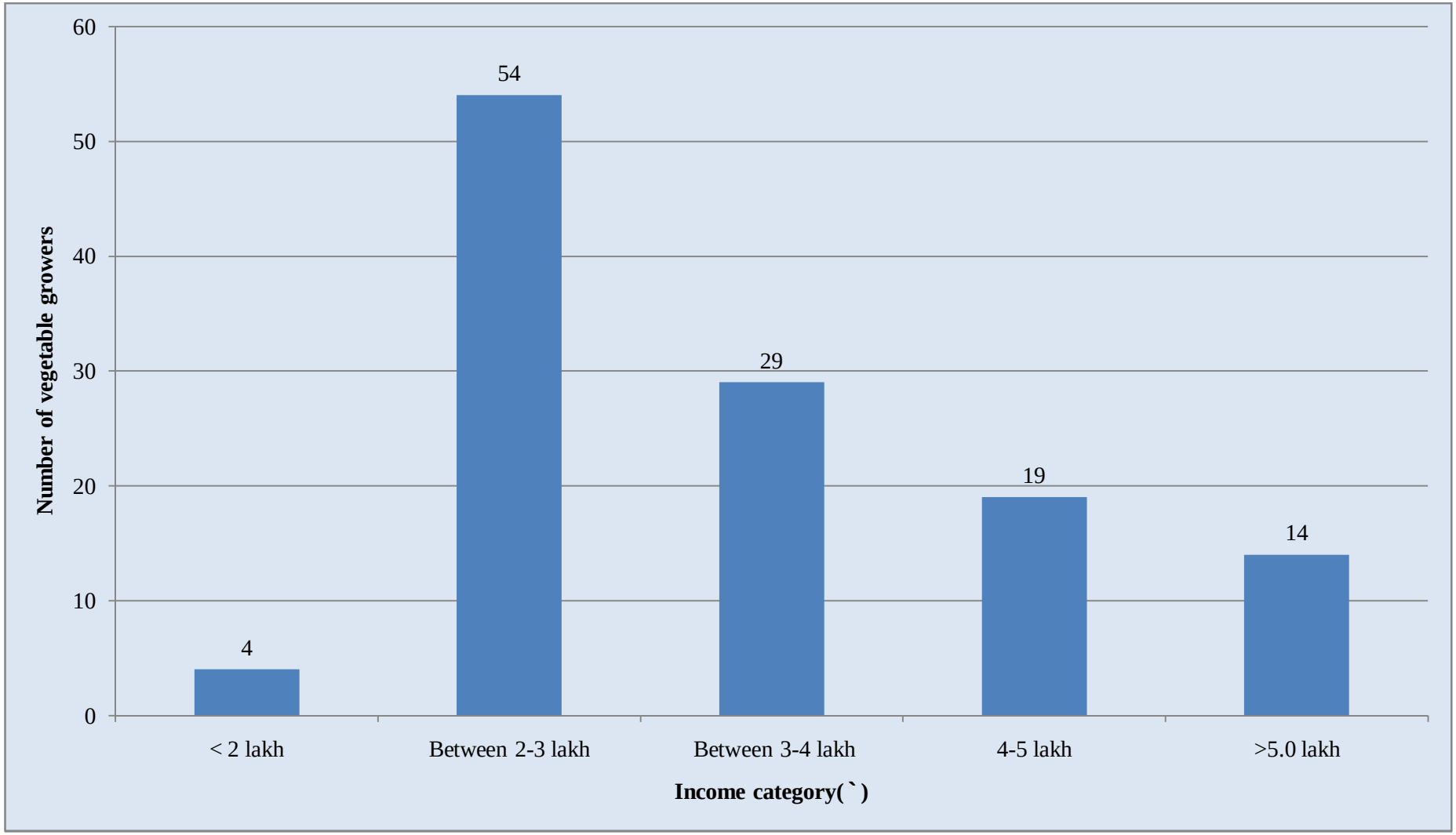

Fig. 4.1: Economic status of vegetable growers in Kalaburagi district

Table 4.3: Social composition of vegetable growers in Kalaburagi district

SI. No.	Particulars	Number	Per cent
1	Scheduled Caste (SC)	06	05.00
2	Scheduled Tribe (ST)	08	6.66
3	Other Backward Classes (OBC)	86	71.67
4	General (GM)	20	16.67
5	Total	120	100.00

Fig. 4.2: Social composition of vegetable growers in Kalaburagi district

farmers had high school level education followed by PUC. The farmers had medium family size of 4-6 members and majority of them were small farmers (< 5 acre). Thus it was clear that of vegetable growing attracted less educated small and marginal farmers to lead their sustainable livelihood. The economic status of the producers indicated that they had annual income of around ₹ 3 lakhs. Most of the vegetable growers belong to backward community followed by general and scheduled tribe (ST). The vegetable cultivation is popular among the other backward class category in north Karnataka to sustain their livelihood.

4.2 Costs and returns in vegetable production

4.2.1 Cost and return structure

Onion

The cost and return structure of onion is presented in Table 4.4. The cost of seeds was the highest, in the cultivation of onion. The quantity of seeds used was 5 Kg per acre. The utilization of human labour was found to be 45 mandays/acre of bullock labour was 5 pairdays/acre The farmers of Kalaburagi district have obtained the overall average of 59.17 q./acre yield. It was observed that there is a common practice of using farm yard manure of 1.50 tonnes per acre where may be because of on farm availability of farm yard manure.

Onion was cultivated under irrigated conditions in Kalaburagi district.

The farmers incurred the overall cost of cultivation of ₹ 55,661 per acre, of which variable expenditure accounted for 83 per cent (Table 4.4). Among the variable costs, expenditure on seeds (22.48%) constituted foremost item of overall cost of cultivation followed by human labour (21.59%), cost on fertilizers (11.71%) and farmyard manure (10.76%). The rental value of land formed main component (14.36%) of the total cost of cultivation in fixed costs.

The overall average net returns obtained by onion producers workedout to be ₹ 38,715 per acre with gross returns of ₹ 94,376 per acre.

Table 4.4: Costs and return structure of onion in Kalaburagi district

(₹/acre)

SI. No.	Particulars	Unit	Qty.	Value (₹)
I.	**Variable Cost**			
1.	FYM	TL	1.50	5990 (10.76)
2.	Seeds	Kgs	5	12511 (22.48)
3.	Chemical Fertilizers	Kgs	350	6515 (11.71)
4.	PPC	Lt	3	2254 (4.05)
5.	Bullock labour	PD	5	1450 (2.61)
6.	Human labour	MD	45	12015 (21.59)
7.	Irrigation	₹	-	2015 (3.62)
8.	Maintenance and repairs	₹	-	403 (0.72)
9.	Interest on working capital @ 7% p.a	₹	-	3021 (5.43)
Sub-total (I)		₹	-	**46174 (82.99)**
II.	**Fixed Cost**			
1.	Land revenue	₹	-	28 (0.05)
2.	Depreciation	₹	-	435 (0.78)
3.	Rental value of land	₹	-	7994 (14.36)
4.	Interest on fixed capital @ 12% p.a	₹	-	1015 (1.82)
Sub-total (II)		₹	-	**9472 (17.01)**
III.	**Total Cost (I+II)**	₹	-	**55661 (100.00)**
IV.	**Returns**			
1.	Yield	Qts	-	59.17
2.	Sale price	₹/q.	-	1595
3.	Gross return	₹	-	**94376**
4.	Net return	₹	-	**38715**

Note: Decimal values are rounded to its nearest value

Green chilli

The per acre yield realised and inputs used in green chilli (Table 4.5) revealed that, the overall use of seeds was institute to be 98 g per acre. The use of human labour was found to be 52 mandays/acre in Kalaburagi district. Similar pattern of input use of farmyard manure, chemical fertilizers and plant protection chemicals was observed. In case of yield, farmers obtained output level of 40.73q./acre.

The farmers of green chilli cultivation (Table 4.5) incurred a total cost of ₹ 51,545 per acre, out of which ₹ 42,074 (81.63%) was constituted by variable costs. Out of the total cost of cultivation, the costs on human labour (27.41%) formed major component followed by fertilisers (13.80%), plant protection chemicals (12.50%), seeds (9.70%) and farmyard manure (5.72%). The rental worth of land formed major (15.50%) cost of cultivation in fixed costs.

It is remarkable to note on the whole average net returns realised by green chilli growers amounted to ₹ 45,637 per acre with gross returns of ₹ 97,182 per acre.

Tomato

A glance of Table 4.6 shown that the overall use of seedlings was establish to be 4025 per acre in tomato production. The application of farmyard manure was found to be 1.5 tractor load/acre. The application of chemical fertilizers was found to be 950 kg/acre. Similar trend was pragmatic in case of staking sticks and bullock labour. The use of plant protection chemicals observed to be 24 litres/acre. In case of human labour, on an average,76 mandays per acre were used in tomato cultivation. The producers in the study area harvested about 196.23 quintals of tomato per acre.

In case of tomato (Table 4.6), the overall total cost of cultivation amounted to ₹ 1,02,808 per acre of which ₹ 93,299 (90.75%) was incurred on variable costs. Out of the total cost of cultivation, the expenditure on human labour (19.94%) formed the major constituent followed by chemical fertilizers (18.77%) and cost lying on plant protection chemicals (17.63%). The expenditure on staking sticks (8.32%) , farmyard manure (6.03%) and gunny twigs (5.55%) were the other important variable costs while rental value of land (7.79%) formed major cost of cultivation in fixed costs.

Table 4.5: Costs and return structure of green chilli in Kalaburagi district

(₹/acre)

SI. No.	Particulars	Unit	Qty.	Value (₹)
I.	**Variable Cost**			
1.	FYM	TL	0.75	2950 (5.72)
2.	Seeds	Gs	98	4997 (9.70)
3.	Chemical Fertilizers	Kgs	350	7115 (13.80)
4.	PPC	Lt	8.50	6442 (12.50)
5.	Bullock labour	PD	4	1250 (2.42)
6.	Human labour	MD	52	14130 (27.41)
7.	Irrigation	₹	-	2016 (3.91)
8.	Maintenance and repairs	₹	-	421 (0.81)
9.	Interest on working capital @ 7% p.a	₹	-	2753 (5.34)
Sub-total (I)		₹	-	**42074 (81.63)**
II.	**Fixed Cost**			
1.	Land revenue	₹	-	28 (0.05)
2.	Depreciation	₹	-	438 (0.85)
3.	Rental value of land	₹	-	7990 (15.50)
4.	Interest on fixed capital @ 12% p.a	₹	-	1015 (1.97)
Sub-total (II)		₹	-	**9471 (18.37)**
III.	**Total Cost (I+II)**	₹	-	**51545 (100.00)**
IV.	**Returns**			
1.	Yield	Qts	-	40.73
2.	Sale price	₹/q.	-	2386
3.	Gross return	₹	-	**97182**
4.	Net return	₹	-	**45637**

Note: Decimal values are rounded to its nearest value

Table 4.6: Costs and return structure of tomato in Kalaburagi district

(₹/acre)

SI. No.	Particulars	Unit	Qty.	Value (₹)
I.	**Variable Cost**			
1.	FYM	TL	1.50	6205 (6.03)
2.	Seeds	No.	4025	5632 (5.47)
3.	Chemical Fertilizers	Kgs	950	19299 (18.77)
4.	PPC	Lt	24	18128 (17.63)
5.	Bullock labour	PD	2	812 (0.78)
6.	Human labour	MD	76	20504 (19.94)
7.	Irrigation	₹	-	2019 (1.96)
8.	Gunny and other twigs	Kgs	48	5705 (5.55)
9.	Staking sticks	No.	1711	8556 (8.32)
10.	Maintenance and repairs	₹	-	335 (0.32)
11.	Interest on working capital @ 7% p.a	₹	-	6104 (5.93)
Sub-total (I)		₹	-	**93299 (90.75)**
II.	**Fixed Cost**			
1.	Land revenue	₹	-	31 (0.03)
2.	Depreciation	₹	-	445 (0.43)
3.	Rental value of land	₹	-	8014 (7.79)
4.	Interest on fixed capital @ 12% p.a	₹	-	1019 (0.99)
Sub-total (II)		₹	-	**9509 (9.25)**
III.	**Total Cost (I+II)**	₹	-	**102808 (100)**
IV.	**Returns**			
1.	Yield	Qts	-	196.23
2.	Sale price	₹/q.	-	965
3.	Gross return	₹	-	**189362**
4.	Net return	₹	-	**86554**

Note: Decimal values are rounded to its nearest value

In case of returns, farmers of Kalaburagi district obtained net returns of ₹ 86,554 per acre with gross returns of ₹ 1,89,362 per acre.

Brinjal

The per acre input use pattern (Table 4.7) revealed that the use of seeds in the study area was 180 gm. The application of farmyard manure was found to be one tractor load per acre. Whereas, application of chemical fertilisers by the farmers of Kalaburagi district were institute to be 425 kg/acre and on an average. 20.25 litres per acre of plant protection chemicals were found in the overall study area. It is important to note that the extent of use of human labours were found to be 49 man days per acre of the study area as a whole. In case of output, farmers of Kalaburagi district obtained an average yield of 177.15 q./acre.

In the case of brinjal (Table 4.7), the overall total cost of cultivation amounted to ₹ 68,034 per acre of which ₹ 58,542 (86.05%) was incurred on variable costs. Out of the total cost of cultivation, the cost on plant protection chemicals (35.50%) formed the major component followed by expenditure on human labour (19.94%) and chemical fertilisers (10.04%). Farmyard manure (6.61%) and seeds (3.27%) were the other important variable costs while rental value of land (11.76%) formed major cost of cultivation amongst fixed costs.

On an average, farmers obtained per acre net returns of ₹ 75,989 with gross returns of ₹ 1,44,023.

4.2.2 Per quintal costs and returns of vegetables

Onion

The comprehensive average total cost worked out to be Rs.1236 per quintal in onion (Table 4.8), of which cultivation cost (₹ 940/q.) was higher than its marketing cost (₹ 296/q.).

The per quintal gross returns for the overall study area comes to ₹ 1595 resulting a net returns of ₹ 815 over variable cost and ₹ 655 over cultivation cost with returns per rupee of investment of 1.29.

Table 4.7: Costs and return structure of brinjal in Kalaburagi district

(₹/acre)

SI. No.	Particulars	Unit	Qty.	Value (₹)
I.	**Variable Cost**			
1.	FYM	TL	1	4502 (6.61)
2.	Seedlings	Gms	180	2228 (3.27)
3.	Chemical Fertilizers	Kgs	425	6834 (10.04)
4.	PPC	Lt	20.25	24152 (35.50)
5.	Bullock labour	PD	4	1346 (1.97)
6.	Human labour	MD	49	13181 (19.37)
7.	Irrigation	₹	-	2023 (2.97)
8.	Maintenance and repairs	₹	-	446 (0.65)
9.	Interest on working capital @ 7% p.a	₹	-	3830 (5.63)
Sub-total (I)		₹	-	**58542 (86.05)**
II.	**Fixed Cost**			
1.	Land revenue	₹	-	30 (0.04)
2.	Depreciation	₹	-	440 (0.64)
3.	Rental value of land	₹	-	8005 (11.76)
4.	Interest on fixed capital @ 12% p.a	₹	-	1017 (1.49)
Sub-total (II)		₹	-	**9492 (13.95)**
III.	**Total Cost (I+II)**	₹	-	**68034 (100)**
IV.	**Returns**			
1.	Yield	Qts	-	177.15
2.	Sale price	₹/q.	-	813
3.	Gross return	₹	-	**144023**
4.	Net return	₹	-	**75989**

Note: Decimal values are rounded to its nearest value

Table 4.8: Cost of production of onion in Kalaburagi district

(₹/Qtl)

SI. No.	**Particulars**	**Value** (₹)
A.	**Costs**	
1.	Variable costs	780
2.	Fixed costs	160
3.	Cultivation costs	940
4.	Marketing costs	296
5.	Total costs	1236
B.	**Returns**	
1.	Gross return	1595
2.	Net return over	
i.	Variable costs	815
ii.	Cultivable costs	655
iii.	Total costs	359
3.	Returns per rupee of investment	1.29

Note: Decimal values are rounded to its nearest value

Green chilli

The per quintal costs and returns in green chilli production (Table 4.9) revealed that the net returns realised over total cost (₹ 1598/q.) amounted to ₹ 788 with gross returns of ₹ 2386. Of which cultivation cost (₹ 1266/q.) was higher than its marketing cost (₹ 332/q.).

Similarly, the returns per rupee of investment in Kalaburagi district was found to be 1.49.

Tomato

In case of tomato (Table 4.10), the per quintal total cost amounted to ₹ 699 out of which cultivation cost (₹ 524/q.) was considerably higher than that of marketing cost (₹ 175/q.).

The per quintal gross returns for the overall study area comes to ₹ 965 resulting a net returns of ₹ 490 over variable cost and ₹ 441 over cultivation cost with returns per rupee of investment of 1.38.

Brinjal

A perusal of Table 4.11 revealed that the per quintal overall average net returns realised in brinjal production worked out to ₹ 260 with gross returns of ₹ 813 and total cost of ₹ 553, resulting in returns per rupee of investment of 1.47.

However, net returns per quintal over variable cost (₹ 483) and cultivation cost (₹ 429) were found in Kalaburagi district.

Comparison of cost and return structure and per quintal costs and returns of vegetables

The pattern of input use, in general, indicated that the extent of use of all inputs except seeds in the cultivation of tomato and brinjal were higher than those of onion and green chilli in the study area (Tables 4.4 through 4.11). Consequently, the cost of cultivation was also higher in tomato and brinjal as compared to onion and green chilli. The total cost of cultivation per acre in tomato and brinjal was found to be ₹ 102808 and ₹ 68034 as against ₹ 55661 and ₹ 51545 in onion and green chilli. Inspite of higher levels

Table 4.9: Cost of production of green chilli in Kalaburagi district

(₹/Qtl)

SI. No.	**Particulars**	**Value** (₹)
A.	**Costs**	
1.	Variable costs	1033
2.	Fixed costs	233
3.	Cultivation costs	1266
4.	Marketing costs	332
5.	Total costs	1598
B.	**Returns**	
1.	Gross return	2386
2.	Net return over	
i.	Variable costs	1353
ii.	Cultivable costs	1120
iii.	Total costs	788
3.	Returns per rupee of Investment	1.49

Note: Decimal values are rounded to its nearest value

Table 4.10: Cost of production of tomato in Kalaburagi district

(₹/Qtl)

SI. No.	**Particulars**	**Value** (₹)
A.	**Costs**	
1.	Variable costs	475
2.	Fixed costs	49
3.	Cultivation costs	524
4.	Marketing costs	175
5.	Total costs	699
B.	**Returns**	
1.	Gross return	965
2.	Net return over	
i.	Variable costs	490
ii.	Cultivable costs	441
iii.	Total costs	266
3.	Returns per rupee of Investment	1.38

Note: Decimal values are rounded to its nearest value

Table 4.11: Cost of production of brinjal in Kalaburagi district

(₹/Qtl)

SI. No.	Particulars	Value (₹)
A.	**Costs**	
1.	Variable costs	330
2.	Fixed costs	54
3.	Cultivation costs	384
4.	Marketing costs	169
5.	Total costs	553
B.	**Returns**	
1.	Gross return	813
2.	Net return over	
i.	Variable costs	483
ii.	Cultivable costs	429
iii.	Total costs	260
3.	Returns per rupee of Investment	1.47

Note: Decimal values are rounded to its nearest value

of input use and costs incurred, the extent of output obtained was also found to be higher in tomato and brinjal. Thus, the returns realised by the tomato and brinjal growers were found to be higher than onion and green chilli cultivators mainly because of the fact that additional output obtained was more than proportionate increase in input use and costs incurred. Similar results were obtained for vegetables production in Jabalpur by Lokapur and Kulkarni (2014).

It is worth noting that the benefit cost ratios in all the vegetables at all locations were more than one clearly indicating the profitability of vegetables cultivation. However, the magnitude of returns per rupee of investment in green chilli and brinjal was found to be higher than that of onion and tomato mainly because of lower levels of input use and costs incurred especially the major inputs such as human labour, plant protection chemicals and chemical fertilizers as stated earlier.

Out of the total cost of cultivation, expenditure on variable inputs formed more than 80 per cent and remaining 20 per cent constituted by fixed costs in all the vegetables in the study area. It is worth noting that the expenditure on human labour formed the major constituent of total variable costs in all the vegetables except brinjal. This clearly indicates that the vegetables were cultivated with traditional practices which are labour intensive. However, the availability of labour especially during peak seasons was inadequate as perceived by the farmers during their opinion survey. Therefore, in order to reduce the cost of cultivation, there is immediate need to develop the labour saving practices such as use of weedicides, improved tools for planting, harvesting, etc. Further, appropriate extension methods may be adopted to educate the farmers on optimum use of inputs.

In case of onion, the magnitude of cost incurred on seeds (22.48%) was higher than that of labour (21.59%) mainly due to higher dose of seed rate coupled with higher price of seeds. Lokapur and Kulkarni (2014) found similar findings in onion production at Belgaum district of Kamataka. In case of brinjal, the magnitude of cost incurred on plant protection chemicals (35.50%) was higher than that of labour (19.37%) mainly due to severe incidence of pests and diseases. As such, total cost of cultivation was also higher under tomato. Interestingly, the magnitude of returns from tomato was also considerably higher inspite of higher levels of costs incurred.

The cost on chemical fertilizers and manures also shared a major component of the total cost of cultivation incurred by the farmers in vegetable production. This is in confirmation with results obtained by Mohammed *et al*, (2016). This clearly indicates that farmers applied higher quantity of fertilizers eventhough it was not influencing the output mainly due to their belief that vegetable yields are very much responsive to high doses of fertilizers. It was also noticed during survey that farmers applied chemical fertilizers on their own experience and on the advice of the fertilizer dealer. Therefore, there is need to strengthen the extension service to educate the farmers on soil fertility and importance of recommended dose of fertilizer.

In case of plant protection chemicals, the magnitude of costs incurred in brinjal (35.50%) and tomato (17.63%) were found to be substantial, compared to onion (4.05%) and green chilli (12.50%) mainly due to severe incidence of insect pests and diseases namely fruit borers, thrips, leaf curl and blight both in brinjal and tomato. Similar results were obtained for vegetable production in Himachal Pradesh by Bala *et al*.(2011). As expressed by farmers, spraying of pesticides was taken up on every alternative day in brinjal. It was also observed during survey that very few farmers approached Horticulture/ Agriculture Department for technical guidance while input dealers farmed their major source of guidance.

4.2.3 Timmer measures of technical efficiency

This analysis was carried to know the level of technical efficiency with which farmers were operating with the given level of resources and available technology for the selected vegetables in Kalaburagi district. The frequency distribution of the farm specific technical efficiency was presented in Table 4.12.

It is clear from the table that on the overall farms, the proportion of the onion sample farmers in the medium efficiency level were higher (76.67%) than those in the low (16.67%) and high efficiency (6.66%) levels. It is worth noting that the farmers achieving average level of efficiency was found to be 46.67 per cent in Kalaburagi district.

In the case of green chilli, farmers operating in medium efficiency levels were found to be maximum (76.67%) followed by high (13.33%) and low (10.00%) level efficiency categories in the study area.

Table 4.12: Technical efficiency of vegetable farms in Kalaburagi district

SI. No.	Onion	Number	Percent
1	Low efficiency farmer(>83)	5	16.67
2	Medium efficiency farmer(83-56)	23	76.67
3	High efficiency farmer(<56)	02	6.66
4	Average efficiency farmer(70)	14	46.67
5	Total	30	100.00
SI. No.	**Green chilli**	**Number**	**Percent**
1	Low efficiency farmer(>84)	03	10.00
2	Medium efficiency farmer(84-58)	23	76.67
3	High efficiency farmer(<58)	04	13.33
4	Average efficiency farmer(71)	16	53.33
5	Total	30	100.00
SI. No.	**Tomato**	**Number**	**Percent**
1	Low efficiency farmer(87)	04	13.33
2	Medium efficiency farmer(87-62)	24	80.00
3	High efficiency farmer(<62)	02	6.67
4	Average efficiency farmer(74)	15	50.00
5	Total	30	100.00
SI. No.	**Brinjal**	**Number**	**Percent**
1	Low efficiency farmer(88)	04	13.33
2	Medium efficiency farmer(88-65)	21	70.00
3	High efficiency farmer(<65)	05	16.67
4	Average efficiency farmer(76)	13	43.33
5	Total	30	100.00

In the case of tomato, the proportion of farmers were considerably higher in medium efficiency level (80.00%) followed by those in low (13.33%) and high efficiency (6.67%) levels in the study area. The farmers achieving average level efficiency was found to be 50.00 per cent in Kalaburagi district.

In the case of brinjal, the farmers operating in medium levels of efficiency were found to be maximum (70.00%) followed by high (16.67%) and low (13.33%) level efficiency categories in study area.

The results of the timmer measures of technical efficiency, in general, revealed that majority of the farmers were operating in medium level efficiency in all the vegetables in the study area which was mainly due to practice of traditional cultivation methods. The lack of technical knowledge about improved package of practices, indiscriminate use of inputs and non-availability of recommended inputs timely also might have contributed for this phenomenon. This clearly indicated that there is a scope to improve the operation of farmers and move into highly technical efficiency level by adopting suitable cultivation practices.

It is worth noting that farmers operating in high efficiency category were already in higher number while those operating in low efficiency category were least in all the vegetables under study except in onion and tomato. In case of onion, only 6.66 per cent of farmers achieved higher level efficiency. This may be attributed to the cultivation of onion and tomato under irrigated condition, traditional practices were continued to be adopted as observed during the study.

In case of green chilli and brinjal, maximum number of farmers achieved high efficiency level. This may be due to better management practices with intensive use of resources as reflected by higher levels of employment of human labour, use of plant protection chemicals, etc. The performance of green chilli and brinjal growers in Kalaburagi district would act as a lesson to farmers of other districts to achieve higher level of efficiency in all the vegetables.

4.3 Marketing performance of vegetables

The selection of marketing channel becomes imperative for the farmers since the important benefit accrued to them is especially depends upon the selection of agency and

channel for disposal of their produce. The channel selected by them must account for minimum marketing cost and ensure higher share of consumer's rupee. The choice of marketing channels depends upon quantity of marketable surplus available with the farmer, withholding capacity of the farmer, price structure, availability of infrastructure facilities, etc.

In the study area, following four important marketing channels were identified in marketing of vegetables in the study area.

Channel I : Producer-seller -> Village merchant -> Wholesaler -> Retailer -> Consumer

Channel II : Producer-seller -> Commission agent -> Wholesaler -> Retailer -> Consumer

Channel III: Producer-seller -> Commission agent-cum-Wholesaler -> Retailer -> Consumer

Channel IV: Producer-seller -> Consumer

However, marketing channel IV was not popular among vegetables growers as only 2 to 5 per cents of them marketed their produce through this channel. Therefore, while working out marketing costs and margins, this channel was not considered. Marketing channel-I and channel-II are the major channels considered by the farmers in marketing of onion whereas, marketing channel-III is predominant in marketing of green chilli, tomato and brinjal hence these channels are considered for respective crops. It has been observed that the price spread varied between the different channels of marketing for the same vegetable and within the different vegetables themselves.

4.3.1 Marketing costs incurred by the producers

Onion

The average cost of marketing incurred by the producer-seller in onion (Table 4.13) in the study area accounted to ₹ 296 per quintal in Kalaburagi market. ₹ 17,514 was accounted in cost of marketing incurred by the farmers per acre.

Out of the total cost of marketing incurred by the producer-seller, the commission charge (54.06%) accounted for foremost component followed by expenditure on transportation (16.55%) and cost of packing (13.51%) in the general study area.These

Table 4.13: Marketing costs incurred by onion producers

(₹/Qtl)

SI. No.	Particulars	Value (₹)
I.	**Transactions**	
1.	Sold quantity (q)	59.17
2.	Sale price (₹/q)	1595
3.	Net price recieved (₹/q)	1299
4.	Total sale value	94376
II.	**Costs**	
1.	Packing cost	40 (13.51)
2.	Loading and unloading costs	8 (2.70)
3.	Cost of transportation	49 (16.55)
4.	Commission charges	160 (54.06)
5.	Hamali charge	10 (3.38)
6.	Market cess	24 (8.11)
7.	Weighment cost	2 (0.68)
8.	Other expenses	3 (1.01)
Total cost		**296** **(100.00)**
Total marketing cost (₹/acre)		**17514**

three components alone accounted for about 84.12 per cent of the total cost of marketing incurred by the producers.

Green chilli

In case of green chilli (Table 4.14), marketing cost incurred by the producers in the study area was ₹ 332/q. When cost of marketing incurred by the producers per acre is taken into account, it was worked out to be ₹ 13,522.

The commission (71.70%) charge followed by market cess (10.84%) and transportation (7.23%) cost formed major components of total marketing cost incurred by farmers, together accounting for 89.77 per cent of the total marketing cost. Whereas, cost on packing, expenditure on loading and unloading, hamali charges, weighing charges, market cess and miscellaneous expenditure accounted for only 10.23 per cent.

Tomato

A perusal of Table 4.15 revealed that the marketing cost incurred by the producers in the overall study area was found to be ₹ 175/q.

Out of the total cost of marketing incurred by the farmers, commission charges shared 54.96 per cent followed by cost on transportation (13.34%) and packing cost (9.91%) in the study area. The per acre cost of marketing incurred by the farmers worked out to be ₹ 34,340 in Kalaburagi district.

Brinjal

In the case of brinjal, the marketing cost incurred by the farmers was ₹ 169 per quintal (Table 4.16) in the study area.

Out of the total cost of marketing incurred by farmers, commission charges shared 47.93 per cent followed by cost on transportation (16.57%) and packing cost (12.43%) in the study area (Fig. 4.3). The per acre cost of marketing incurred by the farmers found to be ₹ 29,938 in Kalaburagi district.

Table 4.14: Marketing costs incurred by green chilli producers

(₹/Qtl)

SI. No.	Particulars	Value (₹)
I.	**Transactions**	
1.	Sold quantity (q)	40.73
2.	Sale price (₹/q)	2386
3.	Net price recieved (₹/q)	2054
4.	Total sale value	97182
II.	**Costs**	
1.	Packing cost	12 (3.61)
2.	Loading and unloading costs	9 (2.71)
3.	Cost of transportation	24 (7.23)
4.	Commission charges	238 (71.70)
5.	Hamali charge	8 (2.41)
6.	Market cess	36 (10.84)
7.	Weighment cost	3 (0.90)
8.	Other expenses	2 (0.60)
Total cost		**332** **(100.00)**
Total marketing cost (₹/acre)		**13522**

Table 4.15: Marketing costs incurred by tomato producers

(₹/Qtl)

SI. No.	Particulars	Value (₹)
I.	**Transactions**	
1.	Sold quantity (q)	196.23
2.	Sale price (₹/q)	965
3.	Net price recieved (₹/q)	790
4.	Total sale value	189362
II.	**Costs**	
1.	Packing cost	17 (9.91)
2.	Loading and unloading costs	12 (6.45)
3.	Cost of transportation	23 (13.34)
4.	Commission charges	96 (54.96)
5.	Hamali charge	9 (5.24)
6.	Market cess	15 (8.87)
7.	Weighment cost	2 (1.17)
8.	Other expenses	1 (0.06)
Total cost		**175** **(100.00)**
Total marketing cost (₹/acre)		**34340**

Table 4.16: Marketing costs incurred by brinjal producers

(₹/Qtl)

SI. No.	Particulars	Value (₹)
I.	**Transactions**	
1.	Sold quantity (q)	177.15
2.	Sale price (₹/q)	813
3.	Net price recieved (₹/q)	644
4.	Total sale value	144023
II.	**Costs**	
1.	Packing cost	21 (12.43)
2.	Loading and unloading costs	12 (7.10)
3.	Cost of transportation	28 (16.57)
4.	Commission charges	81 (47.93)
5.	Hamali charge	12 (7.10)
6.	Market cess	12 (7.10)
7.	Weighment cost	2 (1.18)
8.	Other expenses	1 (0.59)
Total cost		**169** **(100.00)**
Total marketing cost (₹/acre)		**29938**

Comaprison of per quintal marketing costs incurred by vegetable producers

It was evident from Table 4.14 that per quintal marketing costs incurred by producers in green chilli (₹ 332) was relatively higher than that of onion (₹ 296), tomato (₹ 175) and brinjal (₹ 169), irrespective of channel used. The results of the study are found smilar with Sangeetha and Banumathy (2011). However, there was marginal difference in the marketing costs incurred by farmers in the selected vegetables studied except green chilli and onion.

The extent of marketing costs incurred by producers in case of onion was found to be higher in Kalaburagi (₹ 296) district largely due to higher commission paid by them. Majority of the producers of the study area sold their produce in the Hyderabad market (Telangana) due to higher price existing in that market and pay commission charges in Kamataka.

An assessment of constituents of marketing costs plainly revealed that commission charge formed the most significant constituent of the total marketing cost incurred by the farmers. Similar results were obtained for vegetables in Sangli district of Maharastra by Shejal (2013). This was mainly due to abnormally higher rate of commission charged by the commission agent/commission agent-cum wholesaler, which is 10 per cent of the value of the produce sold. However, the commission charge also formed major component of marketing cost in onion because of higher commission paid by the farmers since majority of them sold their produce in neighbouring states as presented earlier. Therefore the commission charges can be regulated and brought down for the benefit of the farmers.

The cost on transportation also formed a major component of the total marketing cost incurred by the farmers in all the vegetables particularly in onion. The vegetables growers in all district under study sold their produce in distant markets in the state as well as outside the state for better prices resulting higher cost on transportation. Further, lack of cheap and timely transportation facilities might be other reasons for higher transportation cost as expressed by majority of the farmers in the opinion survey. Therefore, it is suggested that transportation cost could be substantially reduced through the device of 'pooling' small, scattered and isolated individual lots/packings at specially sponsored collection centres, from where they could be lifted to the market.

The cost on packing constituted next important component of total marketing cost incurred by the farmers specially in onion and brinjal in the study area. However, the magnitude of packing cost in onion and brinjal was considerably higher in Kalaburagi (12.97%) district. This may be attributed to the fact that the farmers were required to sell their produce along with their own gunny bag (packing material) costing ₹ 21 to ₹ 40 per quintal. Whereas, in Kalaburagi district commission agent-cum-wholesalers supply the empty gunny bags for which nominal rent was charged. The packing costs could, however, be reduced by statutory provisions to effect the return of gunny bags by the commission agents/wholesalers to the farmers or an equivalent amount.

In case of tomato and brinjal, the cost on wastages accounted for more than one per cent of the total marketing cost incurred by the farmers mainly due to their highly perishable nature which might have caused higher damage to the produce during handling, transportation, etc.

In order to regulate the expenditure on commission, transportation and packing, efforts should be made to develop the necessary infrastructure for the marketing of vegetables in the state. Alternatively, it is suggested to develop the farmer's markets for vegetables.

4.3.2 Marketing costs, margins and price spread

A systematic analysis of costs and returns of various intermediaries involved in marketing of vegetables would help to know the various services rendered by these intermediaries and their economic performances in the marketing of vegetables.

The price spread is one of the measures of marketing efficiency as it indicates the increase in the price of a commodity as it changes hands from one intermediary to another in the marketing set up. The price spread includes marketing cost incurred and margins obtained by various market intermediaries and producers. The marketing costs and margins of different market functionaries were worked out as percentages to consumers price for effective comparison.

From the table 4.17 marketing channel IV was not popular among vegetables growers as least percent of them marketed their produce through this channel. Therefore, while working out marketing costs and margins, this channel was not considered.

Table 4.17: Marketing channels followed by vegetable growers

SI. No.	Vegetables	Ch-I	Ch-II	Ch-III	Ch-IV
1.	Onion	13	14	3	0
2.	Green chilli	2	3	23	2
3.	Tomato	3	2	24	1
4.	Brinjal	2	2	25	1

Marketing channel-I(13) and channel-II(14) are the major channels considered by the farmers in marketing of onion whereas, marketing channel-III is predominant in marketing of green chilli(23), tomato(24) and brinjal(25) hence these channels are considered for respective crops.

Onion

In general, the price spread in the selected market was found to be marginally higher in Channel-I, compared to Channel-II (Table 4.18). However, the magnitude of price spread was found to be lowest in Channel-I (63.48%), compared to Channel-II indicating higher share of producer's in consumer's price (64.22%). Thus, producer's share in the price paid by the consumer varied marginally among different channels.

Out of the price spread, the total cost of marketing incurred by different market functionaries formed major components in both the channels (24.91% to 25.44%) followed by total margins accrued to them (10.34% to 11.61%). The village merchants with higher marketing cost incurred, realised lower margins out of the total marketing margin. Whereas, retailers realised highest margins by incurring higher cost of marketing in both the channels.

Green chilli

A perusal of Table 4.19 clearly indicated that producer's share in consumer's rupee was found to be 57.81 per cent in the market. It is worth noting that out of the price spread (42.19%) in the overall study area, was found to be marginally higher in total marketing cost (21.73%) compared to total margins (20.46%) of different market functionaries.

However, commission agent-cum-wholesaler with minimum cost of marketing (2.77%) realised higher margins (9.08%). Whereas, retailers realised highest margins (11.38%) with highest cost of marketing (9.62%).

Tomato

A perusal of Table 4.20 clearly indicated that producer's share in consumer's rupee was found to be 53.05 per cent in the market. It is worth noting that out of the price

Table 4.18: Costs, margins and price spread in marketing of onion

SI. No.	Particulars	Ch-I	Ch-II
I.	**Sale price of (₹/q.)**		
1.	Farmer at farm level	1290	1305
2.	Farmer at market level	-	1595
3.	Village merchant	1595	-
4.	Wholesaler	1727	1727
5.	Retailer	2032	2032
II.	**Marketing cost of (%)**		
1.	Producer	-	14.26
2.	Village merchant	13.73	-
3.	Commission agent	1.68	1.68
4.	Wholesaler	1.74	1.74
5.	Retailer	7.76	7.76
6.	**Total**	**24.91**	**25.44**
III.	**Profit margins of (%)**		
1.	Village merchant	1.27	-
2.	Commission agent	1.39	1.39
3.	Wholesaler	1.63	1.63
4.	Retailer	7.32	7.32
5.	**Total**	**11.61**	**10.34**
IV.	**Price spread (%)**	**36.52**	**35.78**
V.	**Producer's share in consumer's rupee (%)**	**63.48**	**64.22**

Note : The percent figures are to the consumer price

Table 4.19: Costs, margins and price spread in marketing of green chilli

SI. No.	Particulars	Ch-III
I.	**Sale price of (₹/q.)**	
1.	Farmer at farm level	2054
2.	Farmer at market level	2386
3.	Commission agent-cum-wholesaler	2807
4.	Retailer or consumer	3553
II.	**Marketing cost of (%)**	
1.	Producer	9.34
2.	Commission agent-cum-wholesaler	2.77
3.	Retailer	9.62
4.	**Total**	**21.73**
III.	**Profit margins of (%)**	
1.	Commission agent-cum-wholesaler	9.08
2.	Retailer	11.38
3.	**Total**	**20.46**
IV.	**Price spread (%)**	**42.19**
V.	**Producer's share in consumer's rupee (%)**	**57.81**

Note : The percent figures are to the consumer price

Table 4.20: Costs, margins and price spread in marketing of tomato

SI. No.	Particulars	Ch-III
I.	**Sale price of (₹/q.)**	
1.	Farmer at farm level	790
2.	Farmer at market level	965
3.	Commission agent-cum-wholesaler	1162
4.	Retailer or consumer	1489
II.	**Marketing cost of (%)**	
1.	Producer	11.75
2.	Commission agent-cum-wholesaler	3.60
3.	Retailer	8.31
4.	**Total**	**23.66**
III.	**Profit margins of (%)**	
1.	Commission agent-cum-wholesaler	9.64
2.	Retailer	13.65
3.	**Total**	**23.29**
IV.	**Price spread (%)**	**46.95**
V.	**Producer's share in consumer's rupee (%)**	**53.05**

Note : The percent figures are to the consumer price

spread (46.95%) in the overall study area, both total marketing cost (23.66%) and total margins (23.29%) of different market functionaries shared equally.

However, commission agent-cum-wholesaler with minimum cost of marketing (3.60%) realised higher margins (9.64%). Whereas, retailers realised highest margins (13.65%) with highest cost of marketing (8.31%).

Brinjal

A perusal of Table 4.21 clearly indicated that producer's share in consumer's rupee was found to be 50.47 per cent in the market. It is worth noting that out of the price spread (49.53%) in the overall study area, was found to be marginally lower in total marketing cost (24.42%) compared to total margins (25.11%) of different market functionaries.

However, commission agent-cum-wholesaler with minimum cost of marketing (3.12%) realised higher margins (10.84%). Whereas, retailers realised highest margins (14.27%) with highest cost of marketing (8.06%).

4.3.3 Marketing efficiency in different vegetables

Shepherd’s index of marketing efficiency

The higher this ratio, higher would be the efficiency and vice versa in Shepherd’s index of marketing efficiency.

A perusal of Table 4.22 among all different vegetables green chilli has highest marketing efficiency of 6.19, whereas brinjal has lowest marketing efficiency of 3.81.While onion and tomato are having almost same level of marketing effieciency with 4.39 and 4.51 respectively.

Calkin’s index of marketing efficiency

The lower the value of the index, higher would be the efficiency in Calkin’s index of marketing efficiency.

A perusal of Table 4.23 among the different vegetables, onion has highest marketing efficiency of 3.21 and green chilli has lowest marketing efficiency of

Table 4.21: Costs, margins and price spread in marketing of brinjal

SI. No.	Particulars	Ch-III
I.	**Sale price of (₹/q.)**	
1.	Farmer at farm level	644
2.	Farmer at market level	813
3.	Commission agent-cum-wholesaler	991
4.	Retailer or consumer	1276
II.	**Marketing cost of (%)**	
1.	Producer	13.24
2.	Commission agent-cum-wholesaler	3.12
3.	Retailer	8.06
4.	**Total**	**24.42**
III.	**Profit margins of (%)**	
1.	Commission agent-cum-wholesaler	10.84
2.	Retailer	14.27
3.	**Total**	**25.11**
IV.	**Price spread (%)**	**49.53**
V.	**Producer's share in consumer's rupee (%)**	**50.47**

Note : The percent figures are to the consumer price

Table 4.22: Shepherd's index of marketing efficiency in different vegetables

SI. No.	Vegetables	Value of goods sold	Total marketing cost	Index of efficiency
1.	Onion (Ch-I and Ch-II)	94376	17514	4.39
2.	Green chilli (Ch-III)	97182	13522	6.19
3.	Tomato (Ch-III)	189362	34340	4.51
4.	Brinjal (Ch-III)	144023	29938	3.81

Table 4.23: Calkin's index of marketing efficiency in different vegetables

SI. No.	Vegetables	Sum of profit or margin	Sum of marketing cost	Index of efficiency
1.	Onion (Ch-I and Ch-II)	38715	17514	3.21
2.	Green chilli (Ch-III)	45637	13522	4.37
3.	Tomato (Ch-III)	86554	34340	3.52
4.	Brinjal (Ch-III)	75989	29938	3.54

4.37.While tomato and brinjal have same level of marketing efficiency of 3.52 and 3.54 respectively.

Comparison of marketing costs, margins and price spread in vegeatables

A systematic analysis of costs and returns of various market functionaries in marketing of vegetables would help to know the various services rendered by these intermediaries and their economic performances in the marketing of vegetables. The price spread is one of the measures of market efficiency as it indicates the increase in the price of a commodity as it changes hands from one intermediaries to another in the mariceting set up. The price spread includes marketing costs incurred and margins obtained by various market intermediaries and producers.

In general, farmers realised less than 57 per cent of the price paid by the ultimate consumer indicating higher marketing margin accrued to the intermediaries in the marketing process. However, the magnitude of price spread in case of brinjal (49.53%) and tomato (46.95%) was found to be higher than those of green chilli (42.19%) and onion (36.15%) resulting in lower price to the farmers. Similar results were obtained for vegetables in different locations by Singh (2004) and Kumar *et al.*(2015). One of the causes for higher marketing margin in tomato, brinjal and green chilli layed in the perishable nature of these commodities and consequent risks of loss resulting from wastage and other handling expenses.

In analysis of components of marketing margin/price spread indicated that, marketing costs incurred and margins realised shared equally in the total marketing margin of selected vegetables. However, the proportion of costs and margins of intermediaries in tomato and brinjal were considerably higher than those of onion mainly due to higher risk in handling of tomato, brinjal and green chilli because of their higher perishability.

It is importance to note that the percentage of margins realised by the different market intermediaries were higher than their cost incurred in the marketing of selected vegetables. Amongst the market intermediaries, share of the retailers in the marketing margin was higher than other intermediaries. This might be accredited to the very fact that retailers often incurred losses due to wastage in handling, spoilage with

passage of time, price fluctuations, etc. leading in higher marketing cost and risk in handling.

Amongst the wholesalers, it is interesting to note that the commission agent-cum-wholesalers/commission agents annexed exorbitantly higher net margin disproportionate to their cost incurred within the marketing process largely due to higher commission charged (10 per cent of the value of the produce sold). The margins realised by these commission agents appears to be unreasonable as they don't take title to the goods and bear risk of handling/marketing. In case of wholesalers, eventhough the net margins realised was highest, their costs in marketing process was also higher. Further, wholesalers take the title to the goods and bear the risk of handling unlike commission agents.

The village trader plays a really key part in moving the produce as of village to the market predominantly smaller lots of produce by the producers. However, the net margins accrued to the village traders was significantly less than that of other intermediaries albeit the proportion of cost incurred was higher. Further, the producer's share in consumer's rupee realised in onion in channel-I was approximately equivalent to that of channel-II. In channel-I, albeit a further intermediary of village trader was involved within the chain of marketing system, the producer's share in consumer's rupee have not changed demonstrating the favourable role of village traders in the marketing of vegetables. Consequently, considering the role of village traders particularly in handling tiny lots of small and marginal vegetable growers, it is imperative to encourage the village traders in linking production centres with the wholesale markets of vegetables. It is also vital to take the transactions under regulation to a proper systems of licensing. On the other hand, farmer's markets could also be developed in line with Ryath Bazar/Apni mandi to bring the producers in direct transactions with the consumer's so on benefit both farmers and consumers.

4.4 Constraints in production and marketing of major vegetables

Opinion survey was conducted to make out the constraints in the production and marketing of major vegetables in the study district and was analysed by means of Garrett's ranking technique. The analysis of the constraints percieved by the producers in vegetable production observed ten such problems allied to non-availability of best quality

seeds, high cost of seed materials, high cost of fertilizers, high cost on weeding and other operations, non-availability of labours with higher rate of wages, higher cost of plant protection chemicals, high Incidence of pests, severe incidence of diseases , inadequate storage facilities and delay in institutional credit release. Likewise producers faced problems in the marketing of vegetables were ranked based on the Garrett's score computed.

4.4.1 Onion and Green chilli

Table 4.24 indicates the result of Garrett ranking analysis on the problems related with production of onion. Among the ten problem faced by the farmers, the non-availability of labours with higher rate of wages was most important problem has articulated by majority of the farmers and was specified first rank followed by high cost of seed material (II), high cost on weeding and other operations (III), Inadequate storage facilities (IV), high cost of fertilizers (V), non-availability of best quality seeds (VI), high Incidence of pests (VII), severe incidence of diseases (VIII), high cost of plant protection chemicals (IX) and delay in institutional credit release (X).

In the constraints percieved by the vegetables farmers wide fluctuation in prices was the foremost problem. According to Garrett's ranking, price volatility ranked top followed by low prices during harvesting (II), high commission charges by commission agents (III), high cost for transportation and on storage (IV), delay in payment (V) buyers collusion in market (VI), faulty in weighment process (VII), open auction sale is not satisfactory (VIII), illigal deduction in payment (IX) and lack of market information and intelligence (X).

Table 4.24 indicates the result of Garrett ranking analysis on the problems related with production of green chilli. Among the ten problem faced by farmers, the non-availability of labours with higher rate of wages was most important problem has articulated by majority of the farmers and was specified first rank followed by less withstanding capacity in adverse climatic conditions (II), lack of information and technical knowledge of production (III), high cost of plant protection chemicals (IV), high cost of fertilizers (V), severe incidence of diseases (VI), high Incidence of pests (VII), damping off severity in nursery (VIII), delay in institutional credit release (IX) and poor germination percentage (X).

Table 4.24: Constraints in production and marketing of onion and green chilli

Sl. No.	Variables	Onion		Green chilli	
		Score	Rank	Score	Rank
A.	**Production constraints**				
a.	Non-availability of best quality seeds.	65	VI	-	-
b.	High cost of seed material	86	II	-	-
c.	High cost of fertilizers	73	V	67	V
d.	High cost on weeding and other operations	82	III	-	-
e.	Non-availability of labors with higher wage rate	93	I	89	I
f.	High cost of plant protection chemicals	45	IX	76	IV
g.	High incidence of pests	59	VII	56	VII
h.	Severe incidence of diseases	57	VIII	60	VI
i.	Inadequate storage facilities	75	IV	-	-
j.	Delay in institutional credit release	34	X	42	IX
k.	Lack of information and technical knowledge of production	-	-	84	III
l.	Damping off severity in nursery	-	-	46	VIII
m.	Poor germination percentage	-	-	36	X
n.	Less withstanding capacity in adverse climatic conditions	-	-	86	II
B.	**Marketing constraints**				
a.	Price volatility	87	I	87	I
b.	Low prices during harvesting	83	II	70	V
c.	High cost for transportation and on storage	73	IV	73	IV
d.	High commission charges by CA	79	III	83	II
e.	Faulty in weighment process	53	VII	43	IX
f.	Illigal deduction in payment	41	IX	67	VI
g.	Open auction sale is not satisfactory	48	VIII	64	VII
h.	Delay in payment	67	V	-	-
i.	Lack of market information and intelligence	33	X	-	-
j.	Buyers collusion in market	58	VI	54	VIII
k.	Fluctuation in the prices within the market	-	-	76	III
l.	Inadequate government support for marketing activities	-	-	38	X

In the marketing constraints percieved by the vegetables farmers wide fluctuation in prices was the foremost problem. According to Garrett's ranking, price volatility ranked top followed by high commission charges by commission agents (II), fluctuations in the prices within the market (III), high transportation cost and storage (IV), low prices during harvesting (V) illigal deduction in payment (VI), open auction sale is not satisfactory (VII), buyers collusion in market (VIII), faulty in weighment process (IX) and inadequate support by government for marketing activities (X).

4.4.2 Tomato and Brinjal

Table 4.25 indicates the result of Garrett ranking analysis on the problems related with production of tomato. Among the ten problem faced by farmers, the non-availability of labours with higher rate of wages was most important problem has articulated by majority of the farmers and was specified first rank followed by high cost of plant protection chemicals (II), lack of information and technical knowledge of production (III), less withstanding capacity in adverse climatic conditions (IV), high cost of fertilizers (V), damping off severity in nursery (VI), severe incidence of diseases (VII), high Incidence of pests (VIII), delay in institutional credit release (IX) and poor germination percentage (X).

In the marketing constraints percieved by the vegetables farmers wide fluctuations in prices was the foremost problem. According to Garrett's ranking, price volatility in prices ranked top followed by fluctuations in the prices within the market (II), high commission charges (III), high transportation cost and storage (IV), low prices during harvesting (V), buyers collusion in market (VI), open auction sale is not satisfactory (VII), faulty in weighment process (VIII), inadequate government support for marketing activities (IX) and illigal deduction in payment (X).

Table 4.25 indicates the result of Garrett ranking analysis on the problems related with production of brinjal. Among the ten problem faced by farmers, the non-availability of labours with higher rate of wages was most important problem has articulated by majority of the farmers and was specified first rank followed by poor germination percentage (II), high Incidence of pests (III), high cost of plant protection chemicals (IV), less withstanding capacity in adverse climatic conditions (V), high cost of fertilizers (VI), damping off severity in nursery (VII), lack of information and technical knowledge

Table 4.25: Constraints in production and marketing of tomato and brinjal

Sl. No.	Variables	Tomato		Brinjal	
		Score	Rank	Score	Rank
A.	**Production constraints**				
a.	Lack of information and technical knowledge of production	85	III	57	VIII
b.	Damping off severity in nursery	70	VI	61	VII
c.	Poor germination percentage	40	X	87	II
d.	Less withstanding capacity in adverse climatic conditions	79	IV	73	V
e.	High cost of fertilizers	73	V	67	VI
f.	High cost of plant protection chemicals	87	II	77	IV
g.	High incidence of pests	63	VIII	84	III
h.	Severe incidence of diseases	67	VII	4	X
i.	Lack of institutional credit	53	IX	51	IX
j.	Non-availability of labors with higher wage rate	95	I	94	I
B.	**Marketing constraints**				
a.	Price volatility	88	I	78	III
b.	Fluctuation in the prices within the market	85	II	84	II
c.	Faulty in weighment process	49	VIII	59	VII
d.	High commission charges by CA	79	III	75	IV
e.	Illigal deduction in payment	38	X	63	VI
f.	Low prices during harvesting	68	V	68	V
g.	Open auction sale is not satisfactory	56	VII	51	VIII
h.	Buyers collusion in market	61	VI	88	I
i.	High cost for transportation and on storage	75	IV	46	IX
j.	Inadequate government support for marketing activities	43	IX	37	X

of production (VIII), delay in institutional credit release (IX) and severe incidence of diseases (X).

In the marketing constraints percieved by the vegetables farmers buyers collusion in market was the foremost problem. According by Garrett's ranking of buyers collusion in market ranked top followed by fluctuations in the price within the market (II), price volatility (III), high commission charges (IV), lower product prices (V) illigal deduction in payment (VI), faulty in weighment process (VII), open auction sale is not satisfactory (VIII), high transportation cost and on storage (IX) and inadequate support by government for marketing activities (X).

It is vital that the important constraints percieved by the tiller of the soil in production and marketing aspects to be identified, sorted out and evaluated as the producers hold them as impending factors for optimising production and minimisation of their income. For that reason, an opinion study was carried out to bring out the perceptions of producers on constraints in production and marketing of vegetables and observations are acknowledged in Table 4.24 and Table 4.25.

Comaprison of onion and green chilli constraints

The relative ranking of agro-biological as well as socio-economic constraints as faced by the farmers in production and marketing of onion and green chilli (Table 4.24) varied considerably. Though the farmers used more labour the scarcity of labour with higher wage rate (I-rank) resulted in heavy expenditure on weeding and other agronomical operations (Rank-III) as faced by farmers. Non-availability with higher costs of seeds during sowing period ranked second in the list of agro-biological constraints. This indicated the urgency for production and supply of adequate quantity of seeds by government as well as private agencies which are involved in production and supply of different types of seeds. Similar results were observed in production of major cole vegetable crops by Dhurwey *et al.* (2015). Hence, vegetable growers need to be guided properly to go for use of weedicides and use of improved tools and equipments in various farm operations. Due to inadequate and limited supply of quality seeds (VI-rank) in the district, farmers were compelled to use their own seeds year after year without replacement resulting in poor crop growth and yield. Incidence of thrips in onion and cutworm caused considerable damage. Similarly, altemaria blight, sclerotium and early

blight were the other problematic diseases causing large damages in onion and green chilli. High cost of fertilizers (Rank-V), lack of suitable methods for storage at farm level(Rank-IV) and delay in release of credit from different institutional agencies, if approved, were the other severe socio-economic constraints percieved by farmers as per their perception. The results of the study are in line with Mohan and Reddy (2017).

On marketing aspects, price volatility (I-rank) due to heavy arrivals for the period of harvesting season together by way of low and unremunerative output price (II-rank) were the main constraints as expressed by the farmers within the study area. The storage cost was extremely high, if the farmers choose storage whichever at farm level or market level. Like a result, they were dispirited for storage of the produce which possibly will have caused market surplus particularly during harvesting season. Commission charges (III-rank) and high transportation cost (IV-rank) were the other inconvenience encountered by majority of the producers. Most of the farmers felt that due to prevailence of such constraints in marketing of vegetables, their interest to undertake vegetable cultivation is affected given that they farm nearly 30 to 40 per cent of total outlay on marketing incurred by them.

Comparison of tomato and brinjal constraints

A close examination of constraints faced by farmers in production and marketing of brinjal and tomato (Table 4.25) revealed that the nature and amount of problems faced in both tomato and brinjal were similar. Hence, the problems faced by both of them are discussed together below.

Non-availability of labour particularly with skill in various operations in tomato and brinjal cultivation was the major problem(I-rank). Similarly, the development of improved varieties/hybrids and package of practices for higher yield by Agricultural Universities, and other multinational private companies coupled with launching of promotional programmes in the state, motivated farmers to take up vegetable cultivation intensively particularly in tomato and brinjal. This necessiated the technical knowledge to the farmers in cultivating high yielding improved varieties/hybrids. However, lack of technical knowledge formed one of the major problems as perceived by majority of the growers. The supply of spurious hybrid seeds by dealers as expressed by farmers resulted in poor germination and growth. The incidence of fruit borer, leaf minor and whilefly

pests caused considerable damage in both the vegetables in general and brinjal in particular. Leaf curl, blight and wilt were the other problematic diseases causing large damages. High cost of fertilisers and plant protection chemicals, unenthusiastic the producers to take up vegetable cultivation because of lack of capital and non-availability of credit. Mohan and Reddy (2017) also reported similar contraints in their study lying on constraints in production and marketing of papaya. However, delay and complicated procedure in providing institutional credit, if available, was the other severe socio-economic constraint as perceived by the farmers.

As regards to marketing, the price volitility(I-rank) did not have an effect on the returns of commission agent-cum-wholesalers, since the commission charged was per basket/per bag of produce. Apart from this, high extent of perishability and variations in the each day arrivals of tomato and brinjal resulted in day to day variations in prices and within the same day and market (II-rank). In such a situation, the farmers were helpless victims and forced to sell at whatever prices they could obtain. Majority of the farmers expressed that in the existing method of sale (open auction), there is collusion among buyers. High cost on transportation and illegal deductions during payment of sale proceeds were the other main problems as opined by farmers.

Summary and Policy Implications

V. SUMMARY AND POLICY IMPLICATIONS

Agriculture occupies the central place in rural life. Although, the share of agriculture in overall Gross Domestic Product (GDP) has declined over the years from around 38 per cent in 1980-81 to about 15.41 per cent in 2018-19, the proportion of the population dependent upon agriculture still remains large at almost 60 per cent. Horticulture sector is fast emerging as the most remunerative sector for changing the age old subsistence farming specially in the rainfed dry lands, hills, arid and coastal agro-ecosystems. The input-output ratio in most of the horticultural crops is much higher than that in the field crops and their role in improving the environment is an added advantage.

In the world, the important vegetable producing countries are China, India, USA, Turkey, Nigeria, Vietnam, Mexico and Egypt. India stands as the largest producer of vegetables after China, producing of about 13 per cent of world vegetable production. India has about 7.50 million hectares of area under vegetable cultivation with a production of 97.50 million tones. India can claim to grow the largest number of vegetable crops compared to any other country of the world and as many as 61 annual and 4 perennial vegetable crops belonging to different groups. Important vegetable crops grown in the country are potato, onion, tomato, brinjal, cabbage, cauliflower, okra and peas.

Karnataka state stands at ninth position in production of major vegetable crops and area under vegetable crops in 2017-18 was 483.2 thousand hectares and production was 8394.1 thousand metric tonnes. There are many hindrance found in the efficient functioning of the markets in a developing economy like India . In case of vegetables, there are considerable seasonal price variations as well as spacio-temperol price variations. Voliatality in vegetable prices were frequently observed not only from year to year but also during the same marketing period.

In North-Eastern Karnataka, Kalaburagi district is the major producer of vegetables *viz.*, green chilli, onion, brinjal, tomato, leafy vegetables, etc., and no much research has been conducted on production and marketing of vegetables in Kalaburagi district. Kalaburagi with varied agro-climatic conditions is suitable for growing vegetables in general and vegetables in particular. Though variety of vegetables are grown in Kalaburagi, important vegetables will be considered for the study. Hence, the

study tries to analyse the production potentiality and marketing of vegetables, which would help in reorienting production and marketing policies.

The specific objectives of the study are :

1. To study the socio-economic profile of vegetable growers.
2. To study the cost and returns of selected vegetables.
3. To study the existing marketing system for selected vegetables.
4. To document the constraints in production and marketing of vegetables.

Methodology

Kalaburagi district with varied agro-climatic conditions is suitable for growing one or the other horticultural crops in general and vegetables in particular. Though variety of vegetables are grown in Kalaburagi district, important vegetables are considered for the present study. The selection of major vegetables is based on their highest area under cultivation, degree of perishability and commercial importance of the vegetables. As such, tomato, onion, brinjal and green chilli were choosen for the present study. Both primary and secondary data were utilised in the present study. The primary data from sample farmers and market intermediaries were collected by using pretested questionnaires prepared for the purpose.

The multistage random sampling technique was adopted in design sample size. In the first stage, Kalaburagi district was purposively selected based on the highest area under selected vegetable crops. Similarly, in the second stage, three taluks were selected based on potentiality and highest area under selected vegetables. In the third stage, 30 farmers for each selected vegetables were chosen at random, in view of spread out of vegetable growers in different villages. Thus, the sample size constituted of 30 for each crop and 120 for the study as a whole. Further, while selecting the villages in the selected taluks for identifying the potentiality as well as concentration of vegetables growers, experience of the officers of Horticulture/Agriculture/Marketing Departments at district/taluka level along with those of market intermediaries were taken by consultation.Tabular analysis was used for estimating the costs, returns and margins. The Timmer's measure used for technical efficiency and Shepherd’s formula and Calkin’s

index used for finding marketing efficiency. To know the acceptance of farmers and constraints in cultivation and marketing of vegetables, Garrett's ranking technique was employed..

Findings

The most important findings of the study are summarized below:

1. Majority of the vegetable growers (40.83%) are between the age group of 21-40 years with family size of 4-6 members in households. However, majority of them were literate.

2. Majority of the vegetable growing (53.34%) farmers of small land holding with having a average land holding of 4.90 acres.

3. Vegetable growing farmers are having average annual income of ₹ 2,87,354. Majority of them belonged to backward classes followed by general and scheduled tribe category.

4. The extent of use of inputs in the cultivation of tomato and brinjal were higher than of onion and green chilli. Consequently, the total cost of cultivation per acre was also high in tomato (₹ 102808) and brinjal (₹ 68034) as compared to onion (₹ 55661) and green chilli (₹ 51545).

5. The variable cost incurred by the farmers was found to be more than 80 per cent of the cost of cultivation of vegetables. However, the expenditure on human labour was the major constituent of variable costs in all the vegetables except brinjal wherein, the magnitude of cost incurred on plant protection chemicals (35.50%) was higher than that of labour (19.37%) cost.

6. The per quintal cost of production (including marketing cost) of onion (₹ 1236) and green chilli (₹ 1598) was higher than tomato (₹ 699) and brinjal (₹ 553). However, the magnitude of returns per rupee of investment in green chilli (1.49) and brinjal (1.47) was found to be higher than that of onion (1.29) and tomato (1.38).

7. The farmers operating in medium levels of efficiency were found to be maximum (70.00%) followed by high (16.67%) and low (13.33%) level efficiency categories in study area

8. The per quintal marketing cost incurred by the farmers in green chilli (₹ 332) was relatively higher than that of onion (₹ 296), tomato (₹ 175) and brinjal (₹ 169), irrespective of channel used.

9. The commission paid by the farmers was the most significant constituent of the total marketing cost incurred by the farmers mainly due to abnormal (10% of the sale value) rate of commission charged by the commission agents/commission agents-cum-wholesalers.

10. In general the vegetable growing farmers realised less than 57 per cent of the price paid by the consumers. However, the magnitude of price spread in case of brinjal (49.53%) and tomato (46.95%) was found to be higher than green chilli (42.19%) and onion (36.15%).

11. Market middlemen *viz.* retailer's share was the major constituent of the total marketing margin in all the vegetables. However, the magnitude of their share was much higher in the case of tomato and brinjal compared to onion and green chilli.

12. Among all different vegetables green chilli has highest marketing efficiency of 6.19, whereas brinjal has lowest marketing efficiency of 3.81. While onion and tomato are having almost same level of marketing effieciency with 4.39 and 4.51 respectively.

13. Non-availability of labours with higher wage rate and non-availability of good quality seeds were the major constraints in vegetables cultivation as perceived by the farmers. Less withstanding capacity in adverse climatic conditions and high cost of plant protection chemicals, high incidence of pests and diseases particularly in tomato and brinjal were the other two impediments as expressed by majority of the vegetable growers. Among the marketing problems, wide price fluctuations with a day to day variations and and also variations within the same day especially in highly perishable fresh vegetables like tomato and brinjal were the major constraints as opined by the farmers.

From the foregoing analysis it is imperative that a sincere effort is to be made to develop a policy on vegetables in particular laying down the role of growers, planners and promoters, financial institutions, marketers and consumers involved in this task. Suggestions contained herein may form the basis for evaluating a viable network of policy framework within which all concerned can work for achieving the state goals and national objectives in an integrated manner.

Policy implications

1. Majority of the farmers in the study area used excess quantity of the inputs for vegetable production which lead to decreasing returns to scale. Hence there is a need to strengthen extension efforts to orient the farmers towards optimum use of inputs for realizing higher profits.

2. The findings of the study indicated that the cultivation of vegetables was profitable. At the same time there is a growing demand for organic vegetables and hence SAU's and private companies need to develop pest and disease resistant varieties which may help to reduce the cost on PPCs and also meet the demand of quality vegetables for the consumers.

3. The commission charge was the major component of total cost of marketing which was to the extent of 10 per cent in tomato and brinjal, without providing any compensating services. Hence, there is a need to notify all the vegetables sold in the market area.

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Appendices

Schedule- I

PRODUCTION AND MARKETING OF MAJOR VEGETABLES IN KALABURAGI DISTRICT- AN ECONOMIC ANALYSIS

(Vegetable Grower)

Schedule No_____ Date of interview_____

I. General information :

1. Name of the respondent : …… 8. Level of education : IL/Pri/Hs/Col/Deg/PG

2. Gender : ……9. Family size : Male… Female… Children…..

3. Age : ….....10. Main occupation …….. Income……

4. Caste : …… 11.Subsidary occupation …… ……Income ….

5. Village : …… 12. Annual income ……..

6. Taluka : ……13.Income from vegetables …….

7. District : ……14. Contact No ……...

15. Are you member in any group/ society/ institutions?
Respondent /Any family member / None Group/ Society name :

16. Financial arrangement (Borrowings) :
Institutional source : ₹……
Non-institutional source: ₹……
Relatives and Friends : ₹……

17. Source of input :
Horticulture Department/ Progressive farmers/ Private nurseries/ Others (Specify)

II. Land holdings (acres) :

Particulars	Owned land	Leased land	Total	Rent paid/acre
1. Dry 2. Irrigated 3. Total				

III. Cropping pattern :

Name of the vegetable	Season	Variety	Area (acres)	Yield / acre	Total yield	Dry/ Irrigated

A. Vegetables 1. 2. 3. 4. 5.						
B. Other crops 1. 2. 3. 4.						

IV. Fixed Assets :

Sl. No.	Assets	No.	Value	Sl. No.	Assets	No.	Value
1	Bullock cart			6	Bullock pair		
2	Plough			7	Tractor		
3	Sprinkler			8	Sprayer		
4	Farm building			9	Others		
5	Irrigation pump						

V. A) Cost of cultivation (₹ /Acre) : **Name of the vegetable :**

Particulars	Unit	Quantity			Cost/unit	Total value
		Owned	Purchased	Total		
I. Material cost 1. Seeds 2. Seed treatment 3. Manures 4. Fertilizers 5. P.P. Chemicals 6. Irrigation						

II. Labour Cost: 1.Ploughing 2.Harrowing 3.Manuring 4.Sowing 5.Fertilizer appln. 6.Hand weeding 7.Intercultivation 8.Irrigation 9.P.P.chemical appln. 10.Harvesting 11. Others(Specify) III. Any other cost:						
Total cost						

V. A) Returns :

1. Main product :
2. By-product :

V. B) Cost of cultivation (₹ /Acre) : **Name of the vegetable :**

Particulars	Unit	Quantity			Cost/unit	Total value
		Owned	Purchased	Total		
I. Material cost 1. Seeds 2. Seed treatment 3. Manures 4. Fertilizers 5. P.P. Chemicals 6. Irrigation						

II. Labour Cost: 1.Ploughing 2.Harrowing 3.Manuring 4.Sowing 5.Fertilizer appln. 6.Hand weeding 7.Intercultivation 8.Irrigation 9.P.P.chemical appln. 10.Harvesting 11. Others(Specify) III. Any other cost:						
Total cost						

V. B) Returns :

1. Main product :

2. By-product :

VI. Any institutional support in vegetable production and marketing. If yes, give details:

1.Production

a) Supply of seeds
b) Supply of fertilizers
c) Supply of P P chemicals
d) Financial support
e) Technical support
f) Any others (Specify)

2. Marketing

a) Price and Arrival information
b) Financial support
c)Supply of bags boxes
d) Demand and Supply situation
f) Storage facilities
g) Any other facilities

VII. Expenses incurred in post-harvest operations

1. Do you under take any special operations to improve quality after harvest
2. If yes, indicate the operations undertaken and give details of cost incurred

a) Cleaning
b) Drying
c) Sorting
d) Packing
e) Any other

VIII.

1. Do you collect information on prices. If yes, whether daily, more than once in a week Weekly, or fortnightly
2. Sources of price information : Personal visit/ Neighbourers / Newspaper/ Radio /Teliphone / Any other source
3. Do you compare the price with that in other markets while selling the produce ? if yes, with how many markets?

X. Reasons for selling your produce to a particular agency : VT/ WS/CA/CS/Others (Specify)

SL NO.	Reason	Village trader	Wholesaler	Commission agent	Co-op. society	Others (Specify)
1.	Previous agreement with intermediaries					
2.	Better reasonable price					
3.	Immediate cash payment					
4.	Small quantity of produce for sale					
5.	Lack of information about market situation					
6.	Low market cost					
7.	Social ties with intermediaries					
8.	Getting information on the market situation					
9.	Advance loan for vegetable prodn.					
10.	Getting storage facilities					
11.	Getting transport facilities					
12.	Payments are made in advance					
13.	Any other reasons (Specify)					

X. At present what are the problems (inconvenies) you are facing in marketing of vegetables?

a) Transportation facilities (Specify)

b) Storage facilities (Specify)

c) Facilities at market(mandi) :

1. Online trading : present / absent
2. E-tendering : present / absent
3. Display board : present / absent
4. Space for keeping the produce is enough/ not enough.
5. System of weighing is correct/ incorrect.
6. Deductions while selling : legal/ illegal

7. Temporary storage facility at mandi : present / absent
8. Payment of sale proceeds : delayed / not delayed
9. Method of bidding : satisfactory / unsatisfactory
10. Grading facilities :available / unavailable
11. Physical facilities in mandi : adequate /inadequate
12. Commission charges are reasonable / non reasonable
13. Transactions : immediate / prolonged
14. Any mal-practices prevailing? If yes (Specify)
    a.
    b.
    c.
15. Any other problems faced :

XI. Do you feel that regulation of vegetable marketing by Govt. agency will help to set up fair price and solve your marketing problems ? yes / no and reasons

1.

2.

3.

XII. Particulars of vegetables sold :

Vegetables	Time of sale	To through whom sold VT/CA/WS	Place of sale	Method of sale	No. of bidders	Quantity sold	Price per unit	Total value(₹.)

XIII. Marketing costs

A) Mode of package and its costs

Vegetables	Mode of package	Number of units	Quantity packed per unit	Cost per unit (₹)	Total cost (₹)

B) Mode of transportations and its costs

Vegetables	Mode of trans.	Distance covered (Km)	Time taken (Hrs)	Cost per unit (₹)				Qty transported	TC of trans.
				Trading unloading	Hire charges	Other costs	TC		

C) Storage of vegetables :

1.Do you store vegetables for sale later in the marketing season : yes / no

2. If not why you dispose immediately after harvest?

3. If yes, give details.

Vegetables	Qty stored(Qty)	Where stored	Storage charges per qtl.	Pre-storage per qtl.	Duration of storage	Total cost incurred

D) Marketing charges borne by producer-sellers (₹)

Vegetables	Market fee	Commission	Cleaning grading	Reduction in weight	Weighment charges	Other charges	Total cost charged

E) Any other cost incurred during selling

Items of cost	Amount (₹)	Basis	Remarks

XIV. Constraints

A. Production constraints faced by vegetable growers

Sl. No.	Constraints	Rank
1	Lack of technical knowledge for production	
2	Severity of damping off in nursary	
3	Poor germination due to sale of spurious quality of hybrid seeds	
4	Poor withstanding capacity to adverse climatic conditions	
5	High cost of chemical fertilizers	
6	Sale of spurious plant protection chemicals at high cost	
7	Severe incidence of fruit borer, leaf minor and whitefly pests	
8	Problems of leaf curl, blight and wilt diseases	
9	Delay in release of institutional credit	
10	Lack of awareness on animal health care	
11	Scarcity of labours with high wage rates	

B. Marketing constraints faced by vegetable growers

Sl. No.	Constraints	Rank
1	Day to day frequent price fluctuations	
2	High price fluctuation for the same product on same day within the market	
3	Cheating in production	
4	High commission charges	
5	Illegal deduction during payments of sale proceeds	
6	Low and unremunerative product price	
7	Open auction method of sale is unsatisfactory	
8	High cost on packing and transportation	
9	Time consuming process	
10	Lack of government support in marketing of produce	

(Market functionaries)

(Village merchant/Commission agent/Commission agent-cum-wholesaler/Retailer)

No_____ Date_____

I. GENERAL INFORMATION

1. Name of the respondent : 2. Educational level :

3. Location : 4. Age :

5. Type of ownership : individual/partnership/any other.

6. Year of establishment (from how long you are in this business ?) :

II. A. Vegetables handled :

Vegetables	Quantity	Price per qtl	Total value (Rs.)
Onion Potato Brinjal Chilli			

B. Are you dealing in commodities other than vegetables ? YES/NO.

C. Do you make outright purchases in the field and transport it on your own ? Yes/No.

III. What facilities do you provide to the producer who brings produce for sale ?

Loan/Storage/Accommodation/Transportation/Advance payment/seed/ Fertilizers / pesticides etc.

IV. Do you give any credit facilities to the farmers who bring produce to your shop ? Yes/No., If yes,

a. To how many farmers

b. Maximum duration for which amount is advanced

c. Amount advanced per farmer

d. Total amount advanced

e. Conditions for advancing loan (security etc.)

f. Mode of recovery followed

g. Interest rate charged.

V. Investment made in the business :

A. 1. Owned (Rs.) :_____ 2. Borrowed :_____

3. Interest rate charged :_____

B. Investment on

i. Godowns (No.of godowns) : _____ Amount (Rs._____)

ii. Shops (No. of shops) : _____ Amount (Rs._____)

iii. Equipments: (Rs.) :_____ iv. If any :

VI. 1. Do you have the knowledge of different qualities/grades/standards of different varieties of vegetables : Little/Average/Perfect.

2. Do you grade the vegetables ? Yes/No. If yes, on what basis (for each vegetable)?

3. How do you grade the vegetables ?

4. Do you make payment according to the grades ? Yes/No.

5. Methods used in fixing the prices for different grades :

6. Do you make any deductions for more moisture content/any other foreign matter? Yes/No.

VII. 1. Are you aware of the market prices, costs, nature of commodity, arrivals in

i. Local market : Yes/No ii. Other markets : Yes/No.

2. If yes, source of information about market situation :

Personal visit/Neighbourers/Newspaper/Radio/Telephone/Any other source

VIII. Do you have shop owned/rented ?

1. If rented, what is the rent per year:_ _____: 2. License fee :_____

3. Tax paid :_____ (Basis of taxes : _____)

4. Maintenance cost :_____ 5. Insurance :_____

6.Any other costs (specify) : _____

IX. 1. Distance of your shop from the market place :_____

2. Place of arrivals of vegetables :_____

3. Distance of the village :_____

X. Do you sell the vegetables to the wholesaler/retailer?

If yes, to how many wholesalers/retailers ?_____

XI. At present what problems (or inconveniences) you are facing in vegetable marketing

1._____ 2._____

3._____ 4._____

XII. What is your opinion regarding regulation in vegetable trading :

Necessary/Unnecessary ? (State reasons).

XIII. Labour employed in marketing of vegetables :

Labourers	Number	Nature of work	Wage rate	Total cost (Rs.)
1. Permanent				
2. Casual				
3. Family				
4. Others				

XIV. Transportaion cost :

Vegetables	Mode of transport	Distance travelled	Quantity transported	Transport charge		Cost of		Any other cost
				Per unit	Total cost	Loading	Unloading	
Onion Potato Brinjal Chilli								

XV. Vegetables transactions :

A. Purchase activity

Vegetables	From whom purchased	From where	When purchased	No .of sellers buyers present	Method of purchase	Quantity purchased	Price		Market fee
							Per unit	Total value	
Onion									
Potato									
Brinjal									
Chilli									

B .Selling activity

Vegetables	To whom sold	Method of sale	Qty. sold	Sale price		Commission		Qty. sold	Value (Rs.)	Wastage	
				Per unit	Total value	Rate	Total			Qty	Value
Onion											
Potato											
Brinjal											
Chilli											

XVI. Trade directions :

A. Quantity purchased from different places

Vegetables	Place	Qty Purchased	Price per qtl.	Distance kms	Transportation cost	Handling charges	Other charges

					Per km	Total value		
Onion								
Potato								
Brinjal								
Chilli								

B. Quantity sold to different places :

Vegetables	Place	Qty sold	Price per qtl.	Distance kms	Transportation cost		Handling charges	Other charges
					Per km	Total value		
Onion								
Potato								
Brinjal								
Chilli								

XVII. Retail transactions :

1. Quantity purchased : _____

2. Average purchase price : _____

3. Quantity sold : _____

4. Average sale price : _____

6. Wastage value : _____

7. Cost incurred : _____

8. License fee : _____

a. Transportation cost _____

b. Bagging cost _____

c. Labour cost _____

d. Any other cost _____

9. Capital invested : _____