"ECONOMICS OF PRODUCTION AND MARKETING OF SOYBEAN IN KOLHAPUR DISTRICT"

A thesis submitted to the

Mahatma Phule Krishi Vidyapeeth, Rahuri- 413 722

Dist. Ahmednagar, Maharashtra State, India

By

MR. KALEL KRSHNA NAMDEV

(Reg. No. 011/224)

in partial fulfillment of the requirements for the degree

of

MASTER OF SCIENCE (Agriculture)

In

AGRICULTURAL ECONOMICS

AGRICULTURAL ECONOMICS SECTION

COLLEGE OF AGRICULTURE, KOLHAPUR

MAHATMA PHULE KRISHI VIDYAPEETH

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Approved by

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RAHURI - MAHARASHTRA (INDIA)

2014

CANDIDATE'S DECLARATION

I hereby declare that this thesis or part there of has not been submitted by me or any other person to any other University or Institute for Degree or Diploma

Place : A. C. Kolhapur

Dated : **(K. N. Kalel)**

Dr. R.R. Suryawanshi,

Professor of Agricultural Economics,
College of Agriculture, Kolhapur-416004
Maharashtra State (India)

C E R T I F I C A T E

This is to certify that the thesis entitled, **"ECONOMICS OF PRODUCTION AND MARKETING OF SOYBEAN IN KOLHAPUR DISTRICT"** submitted to the Faculty of Agriculture, College of Agriculture, Kolhapur Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra State, India in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (AGRICULTURE)** in **AGRICULTURAL ECONOMICS**, embodies the results of a piece of *bona fide* research work carried out by **Mr. KALEL KRISHNA NAMDEV** under my guidance and supervision and that no part of this thesis has been submitted for any other degree or diploma in any other form.

Place : A. C. Kolhapur **(R. R. Suryawanshi)**

Date : / /2014 Chairman and Research Guide

Dr. G. G. Khot,

Associate Dean,
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C E R T I F I C A T E

This is to certify that the thesis entitled, **"ECONOMICS OF PRODUCTION AND MARKETING OF SOYBEAN IN KOLHAPUR DISTRICT"** submitted to the faculty of Agriculture, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar, Maharashtra State, India in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (AGRICULTURE)** in, **AGRICULTURAL ECONOMICS** embodies the results of a piece of *bona fide* research work carried out by **Mr. KALEL KRISHNA NAMDEV**, under the guidance and supervision of **Dr. R. R. SURYAWANSHI,** Professor of Agricultural Economics, College of Agriculture, Kolhapur and that no part of this thesis has been submitted for any other degree or diploma in any other form.

Place : A. C. Kolhapur **(G. G. Khot)**

Date : / /2014

ACKNOWLEDGEMENTS

I avail this opportunity to acknowledge all those who helped and guided me during the course of my research work.

Before giving to way my feelings, I cordially want to salute that supreme cosmic consciousness from which everything originates in the beginning and to which everything goes to end. Though formal and dead words can not carry the fragrance of emotions with them, still they are the only available way of expressing emotions in such formal acknowledgement.

With deepest sense of gratitude, I wish to express my heartfelt and profound thanks towards my research guide, Dr. R. R. Suryawanshi, Professor of Agricultural Economics, College of Agriculture, Kolhapur for his inspiring guidance, keen interest, constructive criticism, constant encouragement and immense sympathy during the preparation of this manuscript and PG life.

I am grateful to Dr. G. G. Khot, Associate Dean, College of Agriculture Kolhapur for providing all the facilities required for my research work.

I extend my heartful thanks to the members of my Advisory Committee, Prof. B. B. Gawade, Associate Professor of Agricultural Economics, Dr. Y. R. Jadhav, Associate Professor of Agronomy, Prof. M. R. Shewale , Assistant Professor of Statistics and Mathematics for their constructive criticism, valuable guidance and critical evaluation of this manuscript.

I express my heartiest thanks to Dr. H. R. Shinde, Assistant Professor of Agricultural Economics, Dr. A. N. Ratnaparkhe, Assistant Professor of Agril. Economics, Shri. Nadaph, and all the staff members in the Agricultural Economics Section, College of Agriculture, Kolhapur for their helpful comments, suggestions and co-operation in completion of the present study.

I wish to convey my heartful thanks to my department colleagues Nasroddin, Hanumant, Hemant, Vikas and miss. Smita my seniors Amol, Vijay, Manoj, Chandrakant, Miss. Rachana and all juniors Vaibhav, shoiab, Santosh, Amol, Kiran, Jaggi whose excellent company and co-operation helped me in carrying out my study with joy and happiness.

Words are not worthy to mention deep sense of gratitude, love towards my dear friends, Kiran Bhosale, Swapnil, Pravin, Ganesh, Nagesh Patil and Amol for their valuable help and excellent company cheered me by their unending encouragement in carrying out my study with joy and happiness.

No words are enough to express my heartiest gratitude to my beloved parents Bapu and Aai, brother Hanumant and sister Bhagyashree for their sacrifice, moral support, constant inspiration, encouragement and provide me valuable opportunities in building up my educational carrier without which it was quite difficult for me to achieve the goal. Thanks are also extended to all other family members and relatives for their encouragement and affection during my higher studies.

I will be failing in my duties if I do not mention thanks for the co-operation and help rendered by soybean producers and persons in marketing committee. I am deeply obliged to all the authors and research scholars past and present whose literature has been cited.

Finally, I would like to thank one and all the helped directly or indirectly during this investigation.

Place : A.C., Kolhapur
Date : / /2014 *(Krishna Namdev Kalel)*

CONTENTS

LIST OF TABLES

List of table contd…….

LIST OF FIGURES

LIST OF FIGURES

LIST OF ABBREVIATIONS

%	: Per cent
@	: At the rate of
APMC	: Agricultural Produce Market Committee
CV	: Coefficient of Variation
e.g.	: Exempli gratia (for example)
et al.	: And others
etc.	: Et cetera
Fig.	: Figure
g	: Gram (s)
GCA	: Gross Cropped Area
Ha	: Hectare (s)
Hr	: Hour (s)
K	: Potassium
Kg	: Kilogram
Km	: Kilometer (s)
LGR	: Linear Growth Rate
MT	: Metric tonnes
N	: Nitrogen
N.S	: Non Significant
P	: Phosphorus
q/ha	: Quintals Per hectare
₹	: Rupees

ABSTRACT

ECONOMICS OF PRODUCTION AND MARKETING OF SOYBEAN IN KOLHAPUR DISTRICT

BY

Mr. KRISHNA NAMDEV KALEL

A candidate for the degree

of

MASTER OF SCIENCE (AGRICULTURE)

MAHATMA PHULE KRISHI VIDYAPEETH,

RAHURI-413 722

2014

Research Guide : Dr. R. R. Suryawanshi

Department : Agricultural Economics

The present study was intended to depict the picture of soybean growing enterprise in Kolhapur district. The investigation was carried out with a view to examine the resource use structure, to estimate per hectare costs and returns and examined the trends in area, production and productivity of soybean. The study also study marketing cost of soybean in Kolhapur Market and assess problems involved in production and marketing of soybean .Two tahsils having maximum area under soybean in Kolhapur district were purposively selected. The total samples, consisted 72 soybean farmers comprising 24 each from small, medium and large size groups and data pertained to the year 2012-2013.

The secondary data on area, production and productivity of soybean of Kolhapur district for the period of 10 years (2002-03 to 2011-12) was collected.

The primary data were analyzed by simple tabular method while the functional analysis was also carried out by using Cobb-Douglas type of production for estimation of resource productivities. The compound growth rates of area, production and productivity were estimated in order to know the past performance and trends in soybean production in Kolhapur district.

The findings of the investigation showed that the resource use structure varied among the size groups of holding. The average per hectare total male labour use was 30.21 man days and female labour use was 56.04 man days ,while the use of bullock labour was 5.04 pair days, seed rate used was 66.88 kg and use of N,P,K was 44.30, 68.00 and 9.19 kg, respectively . The average per hectare cost 'A' B' and 'C' at overall level were worked out to ₹.26525, 45175 and 49343, respectively. The average productivity at overall level was estimated to the extent of 19.02 quintals. The per farm returns was ₹.63433. The benefit-cost ratio (1.29) indicated that, the soybean cultivation is profitable enterprise due to high productivity of soybean.

The average per hectare yield and gross returns were maximum on small and medium farms, respectively because the

inputs used in case of small and medium groups were used more efficiently than those were used in case of large groups farmers .

The major items of cost of cultivation of sobean were human labour (14.94%), rental value of land (21.16%), fertilizer (8.06%), seed (6.77%), bullock labour (6.13%), machine charges (5.16%) and manures (2.25%). At overall level, per quintal cost of production was ₹.2550 and average net price realized was ₹ .3290. At overall level, B.C ratio was 1.29. It was highest in small and medium size group of holding .Different marketing channels were followed by the sample farmers. However, producer-wholesaler-mill owner was the major marketing channel. At the overall level, per quintal cost of marketing was found to be ₹ .298.41.The major items of marketing cost were commission charges and transportation charges.

The results of estimated Cobb-Douglous type of production function at overall level were highly significant except application of phosphorus (X_5). The regression coefficient of application of human labour (X_1), manures (X_3) nitrogen (X_4), and potassium (X_6) were found to be significant at 1 per cent level and bullock labours (X_2) at 5 per cent level of significance respectively. At overall level, R^2 value was found to be 60 per cent. It indicated that there was wide scope for its use in order to increase the production of soybean.

The area under soybean has shown decreasing trend during overall period of 10 years. The area under soybean decreased at the rate of 3.65 per annum and which is significant at 1 per cent level of significance. The growth rate of soybean production was 1.70 per annum and non-significant which indicate constant production. The production of soybean remains constant due to increase in productivity.

The major problems faces by the soybean growers in marketing were lack of godown facility (70.83%) high rate of commission charged (66.66%), late payment (62.50%), faulty weights and measures (61.11) and low price of produce (58.33%), and the major problems in production were high non availability of loan in time and incidence of pest and disease (54.16%), high cost of seed (51.38%) and non availability of fertilizers in time (50.00%).It is inferred that, the fifty per cent of farmers face the same problems in production of soybean. The study suggests that the farmer should enhance their existing productivity of 19.02 quintals which is far below than that of potential productivity of 35 quintals by adopting recommended package of practices.

1. INTRODUCTION

In India, the per capital consumption of edible oil is about 5 kg per annum, which is very less as compared to 25 kg in the developed countries. The per capita per year requirement of edible oils is 11 kg as per recommendation of Indian Council of Medical Research. The minimum daily per capita requirement of edible oils is around 55 g, where as the availability in India works out to only 14 g. Thus, the per capita deficit edible oil is 41 g per day which is quite high. Without adequate fats and oils, it would be impossible to solve the problem of deficiency of calories in the diet of vulnerable sections of Indian population.

Oil and fats constitutes essential ingredients of human diet. Oilseeds are the main source of edible fat as they are rich in proteins and acts as raw material for several processing industries.

India is the largest producer of oilseeds in the world. India accounts for 7.4 per cent of world output of oilseeds. Even then, presently India has emerged as the largest importer of edible oil in the world and more than 40 per cent of domestic demand is met through such imports.

In order to frame proper policies for this sector, we need to look at demand and supply side. Presently, the supply of oilseeds has been lagging behind the actual requirement. As far as consumption of edible oils is concerned, the National council of Applied Economic Research (NCAER) reported that the per capita demand for edible oils was 9.81 kg/annum in

2011-12.

Crops used as oilseeds grown in the world are soybean, cottonseed, rapeseed, groundnut, palm kernel, sunflower seed and copra. Soybean alone ranks first in the production of oilseeds in world. In India, it is used to supply edible oil. The production of oilseeds crops in the world is given in the Table 1.1

Table 1.1 Production of major crops used as oilseeds in the world (2011-12)

Sr. No	Major Oilseed Crops	Production (million metric tones)	Percent (%)
1.	Soybean	251.5	55.61
2.	Rapeseed	60.80	13.44
3.	Cotton seed	46.60	10.30
4.	Sunflower	38.90	8.60
5.	Peanut	35.50	7.80
6.	Palm kernel	13.40	2.90
7.	Copra	5.80	1.20
8.	Total	452.20	100.00

(Source: Oilseeds: World markets and trade, 2011)

Soybean is cultivated all over the country especially in the states like Madhya Pradesh, Maharashtra, Uttar Pradesh, Karnataka and Gujarat. Soybean has shown increasing trend during the last decade as the cultivators are attracted towards soybean cultivation. The Government of India and State Government are making every effort to increase the production of oilseeds especially edible oil like soybean.

1.1 Importance of Soybean

Soybean *(Glycine max L.) is* known as 'Golden Bean' of the 20th century. Though, soybean is legume crop yet it is widely used as oilseed. Due to poor cooking ability and digestibility on account of inherent presence of trypsin inhibitor, it can not be utilized as pulse. It can be grown under varied agro-climatic conditions; hence it has emerged as one of the important commercial crop in many countries. Due to its worldwide popularity, the international trade of soybean is spread globally. Several countries such as Japan, China, Indonesia, Philippines and European countries are importing soybean to supplement their domestic requirement for human consumption and cattle feed.

Soybean has great potential as exceptionally nutritive and very rich protein food. It can supply much needed protein to human diet, because, it contains 40 per cent protein of superior quality and all the essential amino acids particularly glycine, hyptophan and lysine, similar to cows milk and animal proteins. Soybean also contains about 20 per cent oil with an important fatty acids, lecithin and vitamin A and D. The 4 per cent mineral salts of soybeans are fairly rich in phosphorous and calcium.

1.2 Soybean Production in the World

Although a native of China, soybean for all a practical reason is an American crop today. USA is the major producer of soybean and ranks first in production. Its share in the world production is almost 29.11 per cent. Brazil,

Argentina and China rank second, third and fourth position in terms of production, respectively. India occupies fifth place in the production of soybean.

1.3 Soybean Production in India

In India, the total area under this crop had increased from 6.11 million hectare in 2002 to 10.18 million hectares in 2011-12 and production from 4.65 million metric tonnes to 12.28 million metric tones in 2011-12. The yield of soybean in India increased from 4.65 million metric tones in 2002-03 to 12.28 million metric tones in 2011-12.

Table 1.2 All India Area, Production and Productivity of Soybean (2002-03 to 2011-12):

Year	Area (M. ha)	Production (M. Metric Tones)	Productivity (Kg/ha)
2002-03	6.11	4.65	762
2003-04	6.55	7.82	1193
2004-05	7.57	6.87	908
2005-06	7.71	8.27	1073
2006-07	8.33	8.85	1063
2007-08	8.88	10.97	1235
2008-09	9.51	9.91	1041
2009-10	9.73	9.96	1024
2010-11	9.60	12.74	1327
2011-12	10.18	12.28	1207

(Agriculture statistics of a glance 2012)

1.4 Soybean Production in Maharashtra

Soybean was introduced in Maharashtra during nineties. The area and production of soybean had shown a continuously increasing trend during the last two decade. The

average yield for soybean realized in Maharashtra was around 12.43 q/ha as against the productivity potential of about 20-25 q/ha. This indicated that though the area under soybean was increasing, there is a wide gap between the potential yield and the actual yield on farmer's field.

Table 1.3 Statewise area and production of Soybean in Kharif Season:

Sr. No	Name of State	Kharif 2012		
		Area sown (Lakh.ha)	Yield (Kg/Ha)	Production (Lakh.MT)
1.	Madhya Pradesh	51.128	1150	66.850
2.	Maharashtra	32.130	1243	39.950
3.	Rajasthan	9.870	1249	12.326
4.	Andhra Pradesh	1.950	1113	2.170
5.	Karnataka	2.00	1103	2.206
6.	Chhattisgarh	1.520	1155	1.756
7.	Gujarat	0.830	1103	0.915
8.	Rest of India	0.520	1155	0.601
9.	Total All India	106.948	1185	126.775

Maharashtra has second rank in soybean area, production and productivity in India. Area under soybean is 3.21 million hectare with production 4.00 million metric tones and productivity 1243 kg/ha in kharif season of 2012. (www.sopa.org.in)

1.5 Soybean Production in Western Maharashtra

Western Maharashtra region is major soybean growing area in Maharashtra. The area under oilseeds in

Western Maharashtra region is 4906 lack hectares with average productivity 4066 kg/ha in the year 2009-10. The major soybean growing districts in Western Maharashtra regions are Sangli, Ahmednagar, and Kolhapur. Soybean had shown increasing trend in respect of area during the last decade. Through Soybean is recently introduced in Western Maharashtra, soybean farmers are now attracted towards soybean cultivation.

1.6 Topic of the study

The cultivators are tempted towards soybean cultivation due to its suitability and profitability. Therefore, Kolhapur district is purposively selected for the study. The study has been planned to explore various aspects of soybean with respect to production and marketing. There are very few studies conducted on economics of production and marketing in Maharashtra in general and that for Kolhapur district in particular. Therefore, the main objective of the present investigation was to prone into economic analysis of production and marketing of soybean in Kolhapur district. The study would guidelines and direction for proper use of resources for maximization of profits. The study would also be useful in selecting appropriate cropping system for study area. When soybean crop had, entering into existing cropping pattern of producers in Kolhapur district by replacing some other *kharif* crops, it is certain that it is relatively profitable. However, there are other advantages like less duration of the crop and less reduction in the fertility status of the soil. In case of cotton crop, it is of longer duration, the soils

comparatively get exhausted more than that from soybean. The other advantages are the profitability. It was seen from various studies that the per hectare gross returns as well as net returns from soybean (Rs. 24,000) were higher than sorghum (Rs. 12,608) and cotton (Rs. 15,264) (Farkade, 2004). No doubt, this picture might be due to continuance of same and stable prices for soybean as compare to relative crops over the years. However, in due course of time the prices of soybean or other alternative crops undergo a change in either of direction i.e. increase or decrease. Therefore, it would have effect on change in acreages under these crops. But it was seen that there is a stability of soybean crop in recent years in Kolhapur district. Therefore, it was important to study that at present what is the picture of profitability, returns etc. The present study will be helpful for framing suitable price policies and for planning and implementing different development programmes for soybean production programme in future, if required. The findings would also be useful to the State Government for to make certain stock of oilseeds in the state. Since the present study also proposes to examine the arrivals and prices of soybean in major markets, it would help to take appropriate decision for disposal of soybean by the producers. Similarly, study would also focus on, what role the intermediaries are playing at the disposal of soybean and what improvements are needed in their functioning, so that producers can put to the advantage. Therefore, present study involving production and marketing of soybean in Kolhapur district was taken up with following specific objectives.

1.7 Objectives of the study

1. To estimate resource use productivity, costs and returns in soybean.
2. To estimate the marketing cost, market margin and price spread in market of soybean production area.
3. To estimate the growth rates in area, production and productivity of soybean in Kolhapur district.
4. To assess the problems faced by farmers in production and marketing of soybean.

1.8 Scope and utility of the study

Scope of this investigation limits itself to study the aspects mentioned in the objectives. Now-a-days there is an increased demand for edible oils due to increased population especially in case of soybean, the tastes, preferences, family consumption and speed of life are being forced to use processed products and healthy food as it is a high protein and low calorie food. The Government is trying to encourage production and marketing activities of oilseed crops especially for soybean. Incentives and quick services have been given to producers and cultivators of soybean.

The study entitled, "Economics of production and marketing of soybean in Kolhapur district " will show the extent of profitability of the crop.

The information on production and marketing of soybean would have a way to a suitable strategy ensuring impetus and relief in the process of production and marketing of soybean in the area under study. The findings of the present study would be relevant and applicable to similar

situations existing elsewhere. The study of items of market costs at different stages in the marketing process is extremely useful. The findings would be of great help to convince the growers themselves about the tolerance of certain market sources such as packing, transportation etc. in securing relatively better price in various markets. The findings will also depict the marketing channels and intermediaries involved in marketing of soybean in different markets. This would certainly help to follow a suitable channel ensuring better returns to the farmers.

The study would definitely be useful to the farmers in planning their marketing process of this oilseed crop in the area under study and also give guidelines to the extension workers and policy makers to evolve a better marketing and production system.

The study findings would help the planners and decision makers to adopt effective strategies for development and expansion of production and marketing process in other regions with similar conditions.

The conclusion drawn from this study would provide an indicative guideline for accelerating the soybean production. The present study covers Kolhapur district of Western Maharashtra, but it is hoped the findings may be applicable to other soybean growing districts in Maharashtra, in general. The research findings would be highly useful to the cultivators, agricultural economists, planning authorities of the state.

1.9 Limitations of the study

Due to limitation of time and resources, the study was restricted to the analysis of data collected from 72 soybean cultivators from 6 villages in 2 tahsils from Kolhapur district. Findings though may not be generalized; it could become applicable in the areas where similar conditions exist.

2. REVIEW OF LITERATURE

While carrying out systematic research it is necessary to have knowledge of the previous research works carried out by other researchers. It gives an insight in respect of manner in which the problem has been tackled, the nature of result obtained and the conclusion arrived. The review of past literature, therefore, forms an integral part of any systematic research work. Therefore, the literature closely related to the present study was reviewed in this chapter. The literature is grouped in to following categories.

2.1 Production and Productivity of Soybean

2.2 Cost of cultivation of Soybean

2.3 Marketing of Soybean

2.4 Problems faced by the farmers in production and marketing of Soybean

2.1 Production and Productivity of Soybean

Sawant and Achuthan (1995) analysed the India's agricultural growth across crops and regions for the period from 1967-68 to 1992-93 and found that food grains output in the 1980's expanded at a low rate of 1.32 per cent in Andra Pradesh and remained stagnant with non- significant growth in Karnataka (positive growth rate of 1.99 per cent in 1970's was replaced by zero growth rate in 1980's). Shift in area from food grains to non-food grains was pronounced and the performance

of non-food grains production was better in 1980's which was mainly attributed by area expansion. In Karnataka, the yield per hectare of cotton increased at the rate of 9.63 per cent during 1980's while groundnut output growth was non-significant.

Vani and Vyasulu (1996) studied growth, variability and instability of three cereal crops *viz.,* rice, ragi and jowar in Karnataka for the period 1955-56 to 1989-90. They found that the average annual growth rates of rice, ragi and jowar were 3.90, 6.08 and 3.22 per cent, respectively. All the districts except Raichur showed stable growth with invariant yields implying that the technological changes did not brought in yield variability of rice while in case of ragi, the inter district variation was found to be quite high in mid 1960's compared to 1970 implying that the adoption of green revolution had taken place evenly across the districts and the magnitude of inter district variation was quite high in case of jowar crop compared to the other crops implying uneven adoption of green revolution across districts.

Mani and Jose (1997) during analysis of inter-district, intra-district and inter-temporal shifts in area, production and yield of rice, coconut and rubber between 1975-76 and 1995-96 in Kerala, it was revealed that, there was considerable reduction in area under food crops from 40.43 per cent in 1970-71 to18.74 per cent in 1990-91 and to 16.52 per cent in 1995-96. The area index of food grains declined from 102.55 to 58.38 (1994-95), whereas the index of non-food crops increased from 102.52 in 1975-79 to 159 in 1993-96. They stated that the current free trade strategy in India had necessitated significant changes in

the cropping pattern away from cereals, pulses, oilseeds and sugarcane and in favour of superior cereals, horticultural crops, vegetables and livestock products.

Shete *et al.* (1997) analysed the nature of growth of agriculture among the four regions of Maharashtra viz. Western Maharashtra, Konkan, Marathwada and Vidarbha for the period from 1956-57 to 1989-90. They estimated compound growth rates of area, production and productivity of total cereals, pulses, oilseeds, sugarcane and cotton, during Period-I (1956-57 To 1966-67), Period-II (1967-68 to 1977-78), Period-III (1978-79 to 1989-90) and for the entire period of 34 year i.e. 1956-57 to 1989-90. The study revealed that, the performance of agriculture in Maharashtra was mixed type among different regions. The increase in the production of cereals during Period-I was due to area expansion while, the productivity was declined. In oilseeds, Maharashtra continued to be a deficit state during the shales and seventies. The results showed that the aggregate output depended largely on the magnitude of cropping intensity, followed by use of fertilizers.

Kalyankar and Ghulghule (1997) examined the growth in the productivity major crops among different divisions of the Maharashtra State for the period from 1961 to 1994. They showed that the per hectare productivity of paddy crop was comparatively higher in Konkan and Kolhapur division of Western Maharashtra. The growth rates of productivity of total cereals were highest in Amravati division followed by Kolhapur division. Similarly, higher growth rates were observed for

productivity of total pulses in Nashik division While, total oilseeds productivity increased with higher rate of growth in Nagpur division. Growth rates for productivity of cotton were higher than the State growth rate in Nagpur, Amravati, Aurangabad, Kolhapur and Pune divisions.

Prajneshu and Das (2000) studied the growth models for describing statewise wheat productivity data during the period of 1973-74 to 1996-97 in respect of four major wheat growing states. To this end, attempts were made to apply a number of non-linear mechanistic growth models. Logistic and Gomertz model were found to be quite successful in descending the path of wheat productivity. Forecast values were also computed on the basis of selected models.

Kalamkar (2001) studied the growth in area, production and productivity of major crops and major inputs used Maharashtra for three periods *viz.,* pregreen revolution period (Period I: 1961-62 to 1970-71), green revolution period (Period 11:1971-72 to 1980-81) and post green revolution period (Period III: 1980-81 to 1997-98). The growth rates of area of *kharif* jowar, paddy and wheat were higher for Period II than Period I and Period III. Bajara crop had higher growth rate during Period I and for tur, gram oilseeds and cotton crop growth rates were higher in Period III. The growth in crop production of all cereals and pulses and total food grains increased substantially over entire study period in the state. Growth rate of per hectare yield of most of the crops were higher during Period II. A higher growth rates were observed for area sown more than

once and gross cropped area attribute for expansion of irrigation facilities in Maharashtra.

Jahagirdar (2001) studied district wise growth of area, production and productivity of important crops in Maharashtra. The periods where classified in four period I (1968-69 to 197778) as introduction of new technology, period II (1978-79 to 1988-89) as adoption of technology period, Period III (1988-to 1997-98) as wider adoption of technology period and Period IV (1968-69 to 1997-98) as a combined period. The study concluded that the growth rates of area, production and productivity of different crops indicated mixed behavior in cereals, consistency in pulses and increasing trend in cash crops.

Venugopalan and Shamsundaran (2001) studied non-linear statistical model and complex non-linear interrelationship among variables of interest and also studied realistic nature of models by using non-linear regression approach. Four different methods of non-linear regression were discussed and measures of goodness of fit are presented with view to develop a suitable non-linear model for describing data pertaining to the period 1960-61 to 1976-77. On an average fruit yield of coorgmandar in trees using the Gompertz model was selected. It was inferred that 94 per cent of the carrying capacity had already been achieved by the year 1977 and hence there is little scope for its survival in Coorg region.

Sharma and Prakash (2002) studied the production and productivity of major pulses in the country for the period 1950-51 to 1999-2000 and also estimated the compound growth

rates for pre-green revolution period (1950-51 to 1964-65) and post-green revolution period (1967-68 to 1999-2000). The study revealed that the area under total pulses remained the almost static during pre-green revolution period. The rate of growth in area and production of chickpea, pulses (other than chickpea and pigeon pea) and total pulses considerably declined in post-green revolution period. Growth rates in productivity increased in the case of all pulses except chickpea. They concluded that there was a slow as well as low growth in area of pulses and the production of pulses.

Ramaswamy and Selvaraj (2002) estimated the growth rate of area production and yield of pulses, oilseed and coarse cereals like jowar and bajra and concluded that the productivity increase of coarse cereal was not substantial as in case of superior cereals, coarse cereals like jowar and bajra had recorded negative growth rate in respect of area for the period from 1970-71 to 1999-2000.

Marwar et *al.* (2004) examined the performance of oilseeds in different district of Vidarbha for the period from 1980-81 to 2001-02. The study revealed that the area under *kharif* groundnut decreased over the period under study in Vidarbha, whereas summer groundnut showed mixed trends. The area under sunflower and soybean had increased significantly in all the districts of Vidarbha. In general, the area under total oilseeds had increased significantly. The production of sunflower, summer groundnut, safflower and soybean increased significantly. The productivity of kharif groundnut and

soybean had increased and productivity of sunflower was more or less stagnant over the study period. The productivity of safflower decreased at a rate of 1.80 per cent in Vidharbha, during the period under study.

Farkade (2008) studied the economic analysis of production marketing and processing of soybean in Vidarbha region of Maharashtra state. This study was conducted to examine the area, production and productivity performance of soybean along with marketing and processing. The area, production and productivity of soybean in Vidharbha region increased at the rate of 12.41, 18.95 and 3.27 per annum, respectively during the period from 1987 to 2005. In all selected districts, higher growth rates of all the three varieties viz., area, production and productivity of soybean in a given period of time were noticed except in Nagpur.

Jawane (2012) studied the economics of production and marketing of soybean in western Maharashtra. The findings of the investigation showed that the area, production and productivity of soybean in Western Maharashtra region had been increased at the rate of 28.01, 32.62 and 9.41 per cent per annum, respectively during overall period of 25 years i.e. 1985 to 2010. In both selected districts, higher growth rates of all the three varieties viz., area, production and productivity of soybean in a given period of time were noticed. The higher growth rates in production were partly due to increase in area and partly due to increased productivity of soybean in Western Maharashtra.

In the previous studies so reviewed the projections

were not indicated for the current decade and future also. Therefore, this study will focus on future trends in area, production and productivity of soybean in the Kolhapur district of Western Maharashtra.

2.2 Cost of cultivation of Soybean

Motiramani *et al.* (1979) in their study of cost of cultivation of yellow and black soybean varieties found that the per hectare cost C was ₹.1230.10 and ₹.691.29 for the respective varieties. The average yields of yellow and black soybean per hectare were 12.45 and 9.85 quintals, respectively. The yield and net income from yellow soybean were moderately higher than that of black soybean. The input - output ratios were favorable increase of black soybean for increasing the productivity of soybean; they suggested the adoption of recommended technology by the growers on large scale in Madhya Pradesh.

Manjhi (1984) studied the economics of soybean cultivation in Indore district of Madhya Pradesh, during 1979-80 and found that yellow soybean was the most profitable crop amongst the crops in terms of net returns. It gave net returns of ₹.770.60 per hectare followed by cotton (₹.604.25) and groundnut (₹.593.33). Even black soybean was profitable than jowar, urid and maize. Though yellow soybean was more profitable than black soybean, the cost-benefit ratio was relatively more in black soybean (1:1.57) than that in yellow soybean (1:1.46). The average per rupee returns was found to be ₹.1.80 from yellow soybean, ₹.1.60 from black soybean, ₹.1.50 from groundnut and ₹.1.20 from jowar. He also worked out the

additional returns from improved technology which were estimated to ₹.1510/- per hectare from black soybean and ₹ .2425/- from yellow soybean.

Singh (1988) studied the production and marketing of soybean in Uttar Pradesh and worked out the per hectare cost of cultivation of soybean in Nainital and Jalaun districts in U.P. and concluded that per hectare cost of cultivation had increased with increase in the size of holding. The average per quintal cost of production of soybean worked out to be the lowest (i.e. ₹.142) as compared to other important *kharif crops* such as paddy, udid and mung on the farm of Jalaun district. But in Nainital district, it worked out slightly higher, i.e ₹.175 per quintal through the highest i.e., ₹.223 per quintal has been accunted in case of Urd. The average net returns per hectare from soybean were noted highest. The average input output ratio in case of soybean for Nainital and Jalaun district worked out to 1:1.81 to 1:1.95 respectively.

Soni *et al.* (1990) reported that in Indore district the cost of cultivation of soybean per hectare ranged from ₹.2474/- (1986-87) to 3541/- (1988-89). Thus, the cost of cultivation per hectare showed on increasing trend over the period.

Yenprediwar and Gore (1990) found that the per hectare costs A, B and C for soybean were ₹.21.5, 2907.26 and 3703.55, respectively. They also found that the net returns per hectare from soybean at costs A, B and C were ₹.2419.36, 1647.16 and 850.81, respectively. The net returns per quintal of production were worked out ₹.253.92, 172.87 and 89.29 at costs

A, B and cost C, respectively. This indicated that the market price of soybean was remunerative to the cultivator input - output ratio at costs A, B and C were worked out 1:2.13, 1:1.57 and 1:1.23, respectively. The results indicated that the soybean production was profitable even with the low levels of adoption of package of practices.

Fadnavis (1992) studied the economics of production and marketing of soybean in umer tahsil of Nagpur District and pointed out that the cost of cultivation per hectare at cost 'A, cost 'B' and cost 'C' were ₹.3504.41, ₹.5027.11 and ₹.5309.18, respectively. Net returns per hectare at cost 'A', cost 'B' and cost 'C' were ₹.5664.13, ₹.4159.94 and ₹.3858.64, respectively.

Jibhakate (1995) studied economics and constraints analysis of soybean cultivation in Sangli district and worked out per hectare cost `A' of Rs. 3467 as against the estimated cost of ₹ .4566. The estimated cost was more and it might be due to use of recommended technology. The average per hectare cost `A' observed₹. 3094 in marginal size group of farmers and ₹.3687 in large size group of farmers in Sangli district.

Bandgar (1999) conducted a study on "Economics of soybean based cropping systems in Akola district" and revealed that the total per ha average cost of production (cost `C') was highest for soybean-wheat cropping system (₹.9487.23) and lowest in soybean-safflower cropping system (₹.7335.90). The rental value of land and hired human labour were found to be major items in all the cropping systems.

Pawar et al. (2000) studied economics of soybean

cultivation in Western Maharashtra for this study they taken an overall productivity level of soybean from 114 soybean growers from 6 villages in Satara district. The highest productivity was attained on the large sized farms (26.82 a/ha) and the lowest on the small farms (22.55 q/ha).The per hectare cost of cultivation was ₹.10958/ha at the overall level. The gross and net returns realized were worked out to be ₹.22200 and ₹.11242, respectively. Input output ratio for soybean cultivation worked out to 1:1.97, which indicates the soybean production is economically a viable proposition.

Kodag (2001) studied production and marketing of soybean in India with reference to Sangli district. It is observed that cost of cultivation of one acres of soybean is near about ₹ .2800 to 3500 as per availability of water, electricity, transportation and labour. Average production of soybean is 10 to 12 quintals per acres and farmers getting ₹.1000 to 1100 per quintal.

Tomar *et al.* (2001) conducted a field experiment during 1991/92-1993/94 on sandy loam soils in Madhya Pradesh, India under irrigated conditions select high yielding and short duration soybean varieties were used in soybean mustard double cropping. The relative productivity and profitability of the same sequence with different varieties of soybeans was also studied. Mustard was successfully grown after soybean. Soybean cultivators JS 7105 and PK 472 gave the highest total production (soybean-mustard) of 3455 and 3137 kg/ha with net returns of ₹.19425 and 17424/ha, respectively.

The lowest productivity of 2061 kg/ha with a net return of ₹ .14260/ha was obtained from fallow mustard cropping system of local farmers (control).

Kamlekar (2002) studied the economics of production and marketing of soybean in Sangli district and worked out per hectare cost `A' as ₹.6420 as against the estimated cost of ₹ .8036. The estimated cost was more and it might be due to use of recommended technology. The average per hectare cost `A' was observed ₹.6479 in small size group of farmers and ₹.7073 in large size group of farmers in Sangli district.

Kakade (2006) studied the economics of soybean seed production in Nagpur district of Maharashtra state. The result revealed that average per hectare total cost i.e., cost C was worked to ₹.16172.72. The input out-put ratio for soybean seed production at cost C was 1:1.20, which indicated that soybean seed production was profitable business.

Nale (2007) studied the economics of production and marketing of soybean in Satara district and concluded that the per hectare use of human labour was 124.91 man days which comprised of 97.51 man days of hired human labour and 27.40 man days of family human labour requirement of seed for soybean was 66.00 kg. The per hectare cost of cultivation of soybean was worked out ₹.18357.93. It increased with increase in the use of holdings. It was found that, at the overall level, the yield and gross returns obtained were 18.43 quintals and ₹ .23391.46 per hectare, respectively.

Pokharkar et al. (2011) conducted a study on

economics of production and marketing of oilssed crops in Western Maharashtra and work out the per hectare cost of cultivation of soybean estimated to ₹.20726.98 whereas, working capital and Cost 'A' constitutes 66.90 per cent (₹.13866.72) and 72.44 per cent (₹.15015.16) respectively. The ajour item of cost of cultivation were total human labour (20.91 per cent and was followed by machine labour (17.83 per cent), rental value of land (16.96 per cent). The gross return received from soybean was ₹ .21295.59. The per hectare profit at Cost 'A', Cost 'B' and cost 'C' was ₹.6280.53, ₹.2574.37 and ₹.568.61, respectively. The B:C ratio of soybean was 1.03. It clearly indicate that soybean crop was slightly profitable.

Jawane (2012) studied the economics of production and marketing of soybean in western Maharashtra and concluded that the average per hectare hired human labour was 61.86 man days and family human labour use was 36.92 man days, while bullock labour was 5.24 pair days, seed rate used was 73.36 kg and use of N, P, K was 40.95, 32.65 and 7.44 kg, respectively. The average per hectare cost 'A', 'B' and 'C' were ₹ .19177, 25650 and 30555, respectively. The average productivity was to the extent of 23.02 quintals. The input-output ratio at cost 'C' indicated that the soybean cultivation is profitable enterprise due to high productivity of soybean.

Though the above mentioned studies indicated the trends in the cost of cultivation of soybean but those studies were concentrated in the Madhya Pradesh and in the Vidarbh region of Maharashtra. Though few studies were carried out for

Kolhapur districts, those were of decade old. Therefore, the present investigation covering the Kolhapur District for the current period is planned.

2.3 Marketing of soybean

Gupta and Arora (1988) worked out the marketing cost incurred on various items for sale of soybean. The maximum cost was incurred by soybean producers on transportation followed by storage. They observed that the storage cost was increased with size of farm i.e. 0.58, 0.65 and 0.92 per quintal on marginal, small and large farmers, respectively. The cost of transportation varied according to distance from gate to selling place. The mode of transportation and quantity transported the transportation cost per quintal was found to be ₹.3.00, 3.14 and 2.16 per quintal on marginal, small and large farms, respectively.

Yenprediwar and Gore (1990) conducted a study on market arrivals of soybean in Agricultural Produce Market Committee, Nagpur and Umrer and found that November, December, January and February were the months of heavy arrivals of soybean constituting 77 to 85 per cent of the total arrivals. Coefficient of variation for monthly arrivals was lowest (35.19) for the year 1988-89 in Umrer while it was highest (50.40) in the year 1988-89 in Nagpur market. They observed that the average price per quintal of soybean in APMC Nagpur and Umrer was rising. Average prices of ₹.440.42 in Nagpur market during 1986-87 increased to ₹.488.33 during 1987-88

and ₹.539.50 in 1988-89. Similarly in Umrer market the price of ₹.427.75 had increased to ₹.485.08 in 1987-88 and ₹.500.83 subsequently in 1988-89.

Jayraj (1992) evaluated market integration across space by using zero order price correlation coefficients and spatial pricing differences. Monthly wholesale price data for groundnut kernels was obtained from the selected markets in Tamilnadu for the 9 year period 1975/76-1983/84. The results of the analysis indicated that the price integration or transmission is efficient between the majorities of markets considered.

Jibhakate (1995) studied the economics and constraints analysis of soybean cultivation in Sangli district of Maharashtra. The per quintal cost of marketing was ₹.26.33 in which the cost of transportation was ₹.8.04 (30.53 %) and the cost on octroi was ₹.1.40 (5.31 %). The cost on commission was the highest in total cost. It was ₹.14.89 per quintal constituting 56.56 per cent of the total cost of marketing. The cost incurred on weighing and hamali was found equal. It was ₹.1.00 per quintal (3.80 %) each.

Kothawale *et al.* (1998) conducted a study on marketing of soybean based on micro level data obtained from sample of no soybean producers selected from six villages in Walwa and Hatkhangle tahsil of Sangli district and Kolhapur district of Maharashtra. The functioning of agriculture marketing has been studied on the basis of data from primary market of Peth and Rukali and from secondary market at Aactgaon and

Islampur. The data were obtained for year 1994-95.The primary market was the important market for the small farmers in the area under study as they marketed about 70 per cent of the produce. The medium and large farmers marketed about 92 to 96 per cent of the produce in the secondary market. At the overall level, the price per quintal obtained was relatively higher in the primary and secondary market than the small and medium farmers because of delayed sale. The per quintal cost of marketing of soybean worked out to ₹.9 and ₹.21, in the primary and secondary markets, respectively of which transportation and commission charges were major items of the marketing cost. The producers share in the min-owners price was 91 per cent in channel-I (Producer-itinerant trader- commission agent- mill owner) and 85 per cent channel-II (Producer-Commission agent-Wholesaler-Mill owner) in Kolhapur district of Maharashtra.

Pawar *et al.* (1999) undertook a study on marketing of soybean in Maharashtra and identified marketing channels for soybean and computed the marketing cost and margins. The data were obtained from survey of 114 soybean growers in Satara district and 24 commission agents, 16 wholesalers and 29 retailers in Satara, Karad, Koregaon and Umbraj market. Three channels identified were producers-itinerant trader-commission agent-oil miller (channel-I), producers- commission agent-wholesaler-oil miller (Channel-II) and producers-wholesaler-oil miller (Channel-III). The commission charges were the most expensive item in the marketing cost. Gross marketing margins were highest in channel-I followed by channel-II and III.

Athavale (2002) studied marketing and processing of soybean in Indore district of Madhya Pradesh. Season wise mandi data showed that, 74.20 per cent arrivals took place during harvest season. During post harvest season arrivals reduced to 15.22 per cent. The lowest price was observed in September and October. The maximum price was reached in the months of July and August. On the selected farms soybean and gram were mainly for sale, whereas, jowar and wheat were produced for home consumption. The total quantity of soybean sold 79.92 per cent sold within the villages. No significant relationship was noticed between the proportions sold to different agencies and size of holdings. Oil federation played an important role in procuring soybean. Soybean was processed in oil mills. The products obtained were oil and de oiled cakes. Net profit on processing one quintal of soybean was processor. All effort should be made to organize marketing and processing cooperatives so that the average farmer is benefited.

Kamlekar (2002) studied the economics of production and marketing of soybean in Sangli district of Maharashtra. The overall per quintal cost incurred on marketing was ₹.31.90, 31.83 and 39.80 in small, medium and large size groups respectively. The cost on octroi was ₹.2.00 (6.27 per cent) at overall farmers. Commission was found to be the highest in the total cost. It was ₹.18.86 per quintal constituting 59.12 per cent of the total cost of marketing at overall farmer.

Banafar et al. (2003) studied the marketing of soybean

in Sehore district of Madhya Pradesh. They found three marketing channels as,

Channel I : Producer-Village merchant wholesale dealer-processor-Refiners-Wholesale dealer of oil-Retailer of oil-Consumer.

Channel II : Producer-Cooperative society-Processor-Refiners wholesale dealer of soybean oil- Retailer of oil-Consumer.

Channel III : Producer-Wholesale dealer in regulated market-processor-Refiners-Wholesale dealer of oil-Retailer of oil-Consumer.

The study also revealed that the per quintal marketing costs for channel I, II and III was ₹.202.00, 160.40 and 191.27, respectively.

Though, the above mentioned studies indicated the marketing of soybean, but no studies were carried out on these aspects for Kolhapur district. So, the present study was undertaken for Kolhapur district.

Most of the research workers had mentioned that the commission charges were most expensive item of marketing cost. Also they observed that the intermediaries involved in marketing of soybean were itinerant traders, commission agents, wholesalers and oil mill owners. Through, the present investigation, it will be ascertained that whether similar intermediaries does exist or any other agencies are present in the marketing of soybean.

2.4 Problems faced by the farmers in production and

marketing of Soybean

Singh (1988) studied production and marketing of soybean in Nainital and Jalaon district of Uttar Pradesh. He identified the problem and prospects of production marketing and processing of soybean. The study had also described the trends in production, marketable and marketed surplus of soybean, future, prospects for processing, industrial uses of soybean and adequacy of existing marketing arrangements.

Wakade and Gwalbanshi (1989) in their study on the soybean crop they observed that there were the constra[i]nts like high cost seed, fertilizers and insecticides, non availability of rhizobium culture and non availability of timely subsidies.

Jibhakate (1995) studied the economics and constraint analysis of soybean cultivation in Sangli district of Maharashtra. He studied the various problems of the farmers with respect to the cultivation and marketing of soybean in Sangli district studied the per quintal cost of marketing, high commission charger, faulty weights measures low prices to produce and lack of godawn facilities.

Lokhande (2003) found the problems regarding the soybean cultivation and marketing of soybean. Difficulty of cash for affecting payment of the labour, difficulty in getting human and bullock labour for timely farm operations, non availability of loan in time for carrying out implements, quality seeds, fertilizer were the major problems.

Farkade (2008) studied economic analysis of production

marketing and processing of soybean in Vidarbha region. The study provided guidelines and direction for proper use of resource for maximization of profits. The study was useful in selecting an appropriate cropping system for the study area. When the soybean crop had entered into existing cropping pattern of the producers in Vidarbha by replacing *kharif* sorghum at certain places while cotton at other places it is certain that it is relatively profitable.

Though, the above mentioned studies indicated about the problems faced by the farmers in production and marketing of soybean in India and Maharashtra but there was no aspect as such study for Kolhapur district particularly.

So the present study will focus on, what are the problems faced by the farmers during production and marketing of soybean.

3. METHODOLOGY

This chapter is devoted to discuss in brief the methodological procedure adopted for the study. It deals with procedure used for the selection of sample, method of data collection, types of data collected, sources of data and analytical procedures used to get the results as per the objectives of the study.

3.1 Basic approach of the study

In order to study the production and marketing aspects, the information is collected on the following various aspects of soybean in Kolhapur district.

i. General information of the sample soybean farmers.
ii. Detailed information regarding resource use, cost of cultivation and returns from soybean crop.
iii. Information of marketing practices and marketing cost.
iv. Information on different problems faced by the sample soybean farmers in production and marketing of soybean.

3.2 Selection of the region and district

Maharashtra state is divided into four major geographical divisions *viz.,* Western Maharashtra, Konkan, Vidarbha and Marathwada and nine agro climatic zones on the basis of agro-climatic conditions, soil types and socio-cultural, factors and other administrative and political considerations.

Western Maharashtra is one of the recent major

soybean producing regions in Maharashtra. The major soybean growing districts in Western Maharashtra region are Sangli, Kolhapur and Ahmadnager. Therefore, Kolhapur district is purposively selected for the present study.

After selecting the district, tahsilwise area under soybean in the selected district were obtained from the Department of Agriculture of the respective district. On the basis of maximum area under soybean, two tahsil from Kolhapur district having higher share were selected purposively. Accordingly, Hatkanangle and Gadhinglaj tahsils were selected from Kolhapur district.

3.3 Method of sampling

The village wise information on area under soybean from the selected tahsils were collected from the revenue records. Then, the villages in selected tahsils were arranged in descending order on the basis of area under soybean. Three villages from each of tahsils were selected on the basis of maximum area under soybean. Thus, in all, 6 villages were selected purposively. The list of farmers producing soybean along with their holdings were obtained from the respective revenue records of each selected village. Then, these farmers were categorized into 3 different size groups according to recognized size of operational land holdings.

Small : 0.01 to 2.00 ha
Medium : 2.01 to 4.00 ha
Large : 4.01 ha and above

The information on selected tahsils and villages along with the number of soybean farmers is presented in Table 3.1.

Table 3.1 Tahsil and village wise number of soybean farmers

Name of the tahsil and villages	Size groups of holding			Total
	Small	Medium	Large	
I Hatkanangle				
a. Narande	4	4	4	12
b. Vadgaon	4	4	4	12
c. Wathar	4	4	4	12
Sub total	12	12	12	36
II Gadhinglaj				
a. Mahagaon	4	4	4	12
b. Basarge	4	4	4	12
c. Harali	4	4	4	12
Sub total	12	12	12	36
Grand total	**24**	**24**	**24**	**72**

The list of soybean farmers along with their operational area for each village was obtained. The cultivators from each village were grouped in three predetermined size groups on the basis of operational area and 12 sample farmers were randomly selected from each of village. Thus, the total 72 soybean farmers were selected for the study.

3.3.1 Distribution of selected holdings

The information regarding the distribution of selected holding in different size groups and average size of holdings is given in the Table 3.2.

Table 3.2 Distribution of selected holdings in different size groups

Sr. No	Size group	Size limit (ha)	No. of cultivators	Average size of holdings (ha)
1.	Small	0.00-2.00 ha	24	1.56
2.	Medium	2.01-4.00 ha	24	3.03
3.	large	Above 4.01	24	4.71
	Average		72	3.10

The average size of land holding in small, medium and large groups was worked out to be 1.56, 3.03 and 4.71 hectares, respectively. The average size of land holding for three size groups together was worked out to 3.10 hectares.

3.4 Method of data collection and sources of data

The survey method was adopted for collecting the data on cost of production and cost of marketing of soybean. A detailed questionnaire covered the following aspects.

i. General information of the farmer on the aspects like farm, family information, land utilization, cropping pattern, livestock and capital asset position.
ii. Details about cost of cultivation and marketing of soybean.
iii. Detail information was collected from intermediaries about marketing of soybean from selected markets.
iv. Constraints in production and marketing of soybean.

In order to examine economics of marketing of soybean in Kolhapur, the separate questionnaire were prepared for

collecting information from commission agents, wholesalers and retailers operating in selected markets.

The data were collected by personal visits and interviewing the selected farmers, intermediaries in the marketing of soybean.

The data in respect of area, production and productivity of soybean were collected for the 10 years period (2002-03 to 2011-12) were recorded from various issues of Season and Crop Reports and Epitomes published by the Department of Agriculture, Maharashtra State and from various Government publications.

3.5 Analysis of data

The simple tabular analysis was carried out to work out the level of input utilization, per hectare cost of cultivation and cost of production of soybean. The collected data were complied, tabulated and analyzed, to accomplish the objectives of the present study. While studying the marketing of soybean, the marketing costs, market margins and producers share in consumer's rupee were also worked out.

3.5.1 Items of costs

The collected data were analyzed by using standard Cost Concepts viz., Cost 'A', Cost 'B', and Cost 'C' normally used in farm management studies.

Cost A:

Cost 'A' includes the cost on account of hired human

labour, hired plus owned bullock labour, value of manures and fertilizers, planting material, insecticides and pesticides, irrigation charges, depreciation on implements and machinery, land revenue and cesses and interest on working capital.

1. Irrigation charges

It was worked out for sweet corn crop by the maintenance of electric pump plus electricity charges paid by cultivator plus depreciation and repairs dividing it by gross irrigated area.

2. Depreciation on implements and machinery

It was worked out on the present value of the implements at the rate of 10 per cent. Depreciation of these assets for the current year was calculated by using straight line method. For this purpose, present value and the remaining useful life of asset were considered.

3. Land revenue, cesses and taxes

This item of cost includes land revenue and other relevant taxes and cesses which were actually paid by the cultivator. Like Z.P. tax, education cess and employment taxes.

4. Interest on working capital

Interest was charged at the rate of 6 per cent per annum for the period of six months on working capital viz., cash or kind expenditure (excluding items in respect of which payments are generally made after the harvest i.e. rent, land, revenue, etc.) incurred during the period of cultivation.

Cost B:

Comprises of Cost 'A' plus the imputed rental value of

owned land plus interest rate on owned fixed capital.

1. Rental value of land

Rental value of the owned land was calculated and considered as $1/6^{th}$ of the value of the gross produce minus land revenue and taxes.

2. Interest on fixed capital

Per hectare interest on fixed capital was worked out at the rate of 10 per cent, per annum.

Cost C :

This cost includes Cost 'B' plus imputed value of family labour charges. The family labour charges considered at rates prevailing in villages. The cost of marketing of sweet corn has been analyzed by adopting the normal pattern. For most of the aspects of the study, tabular method of analysis has been used.

3.6 Functional analysis

3.6.1 Estimation of resource use productivities

Various types of the Production functions could be fitted to agricultural production data, each subject to its assumptions and limitations. On account of its general acceptance of data, the Cobb Douglas type of production function (Ear O Heady and John Dillon 1969) has been fitted to the data used for the present study to estimate resource use productivities.

The general form of the function.

$Y = a. X_1^{b1}. X_2^{b2}. X_3^{b3}.....X_n^{bn}. e^u$

Where,

Y = Dependent Variable (Output)

X_i's = Independent Variable (Input)

b_i's = Regression Coefficients of the corresponding inputs

a = Constant

e^u = is the error term.

The function is log linear and its logarithmic transformation can be written as,

$\text{Log } Y = \log a + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + \ldots\ldots + b_n \log X_n + u$

The variables included in the production function are as given below,

Y = Output in Qtls.

X_1 = Human labour in Man Days.

X_2 = Bullock labour in days

X_3 = Manure in Qtls.

X_4 = Nitrogen in Kg.

X_5 = Phosphorous in Kg.

X_6 = Potassium in Kg.

b_i's = Regression Coefficients of the corresponding inputs

a = Constant

3.7 Problems faced by the farmers in production and marketing of soybean

The marketing and production problem of selected growers were listed and given numbers. Thus the number of farmers facing different problems in production and marketing in different size groups were enumerated and studied.

4. SOCIO ECONOMIC FEATURES OF STUDY AREA

4.1 General

Agriculture is the main source of livelihood for more than 60 per cent population of Maharashtra. Moreover, the share of Agriculture in the state income is less than 12 per cent. The soil type, topography and weather conditions are important factors directly influencing the crop growth, besides other inputs like soil, fertilizer, irrigation, etc.

This chapter explains the background information of Western Maharashtra and selected district under study, covering the aspects such as socio-physical features, land use and cropping pattern of the study area. The knowledge about physical features and socio-economic background of the selected district and tahsils would facilitate for better understanding of the problem under study.

In view of the above, following general information of the study area is briefly discussed in this chapter.

4.2 Introduction

Kolhapur district is the southernmost district of Maharashtra and is one of the industrially and agriculturally developed districts. Its headquarter is Kolhapur city which is an ancient city. The city is situated on the bank of river Panchaganga and is known as ‘Dakshin Kashi’. Kolhapur's Goddess Mahalaxmi is one of the shaktipeethas mentioned in Indian mythology.

The growth of the district in modern times is fascinating. Chhatrapati Shahu Maharaja is an architect and

founder of modern Kolhapur. The district is abundant in natural vegetation, animal wealth and minerals. As a result, Kolhapur is not only one of the most agriculturally advanced districts of Maharashtra but also of India. It is also a fast becoming industrialised district and already a front runner in agro-based industries. Kolhapur district is one of the leading and shining examples in the co-operative movement of India.

4.3 Geographical Location

The district of Kolhapur lies in the south west of Maharashtra between 15^0 to 17^0 latitude and 73^0 to 74^0 East longitude, and spreads across the Deccan Platue in the rain shadow region, Sahyadri Mountain ranges other southernmost tip of the state of Maharashtra. The district interior has a varied economical culture. The ranges of mountain Sayhadri have spread their wings mainly in the western region of the district and this has converted part of the district with Konkan type soil and ecology and partly with Deccan type. Although the major portion of the district is 390 to 600 meters above the mean sea level. Some of the points are as high as 900 meters above mean sea level[3]. The location of Kolhapur district is shown in map No. 3.1 of Maharashtra State map.

4.4 Boundaries

Kolhapur district is the most developed district in Maharashtra. It is surrounded by Sangli district to the North, Belgaum district of Karnataka State to the east and south, Ratnagiri and Sindhdurg district to the west and the river Warana to the north from natural boundaries.

4.5 Soil

The soil of Kolhapur district is divided in to three zones viz. (I) western zone, (II) central zone and (III) eastern zone.

I) Western Zone - This zone receives heavy rain fall, is covered with laterite soils. It is mainly found in Karveer, Ajara, Bhudargad, Gaganbawada, Radhanagari, Panhala and Shahuwadi talukas. It has the altitude of 600 to 900 meters above sea level. It is having laterite soil drained and shallow having the phospheric and acidic quality. The crops such as vari, nachani, sava, rala etc. are grown in this zone.

II) Central Zone - This zone with more or less assured rainfall is covered with fertile, well-drained, brownish medium black soils of natural reaction. It is found in Hatkanangale, Karveer, Radhanagari and some part of Bhudargad and Ajara talukas. It has attitude of 500 to 600 meters above sea level. In this zone the crops like paddy, jawar, and groundnut are cultivated during kharip season and sugarcane and vegetables are grown where the irrigation water is available.

III) Eastern Zone - The dry eastern zone with precarious rainfall is covered with medium to deep black fertile soils of varying depths. This zone consists of Gandhinglaj, Kagal, Karveer, Hatkanangale and Shirol talukas. In this zone the crops like jawar, and groundnut are cultivated on a large scale as well as the crops like paddy, sugarcane and vegetables are grown with the help of irrigation water.

4.6 Climate

The climate of the Kolhapur plain is temperate and similar to the other district of Bombay Deccan adjoining the ghats. In the western part of Kolhapur near the Sahyadris, it is always cooler than that in the eastern part which is liable to hot winds during April and May. The nights over the whole district are generally cool due to the influence of the sea breezes which set in during the afternoons and continue till late in the evening

The whole year climate of Kolhapur district may be divided into three periods as follows: - (i) hot weather period from March to May; (ii) rainy period from June to October and (iii) cold weather period from November to February.

4.7 Rainfall

The district receives rain from the South-West as well as North-East monsoons. The proportion of rainfall decreases very sharply from the west to east ranging between the maximum of 6000 mm in the west to the minimum of 600 mm in the east. Hence we can have three broad divisions as far as rainfall is concerned i) The western zone receiving heavy and assured rainfall. ii) The central zone receiving moderate rainfall and iii) The eastern zone receiving low, irregular and uncertain rainfall. The south-west mansoon commences by the first week of June and lasts till the end of September. The North-East mansoon beginning in the eastern and central part of the district which is helpful for the rabi crops and for the standing sugarcane. As the district receives rainfall from both the south-west and north-east monsoon and receives sufficient water from the various irrigation

projects throughout the year, the vegetable cultivation is done on a large scale in the district.

4.8 Land utilization pattern of Hatkanangle and Gadhinglaj tahsil

Land is a crucial input in the process of agricultural production. Its availability and proper use is an essential condition for the development of agriculture.

The spatial picture of land use pattern in the district is shown in the following table.

Table 4.1 Land utilization pattern of study area (2011-12)

Sr. No	Particulars	Kolhapur (ha)	Hatkanangle (ha)	Gadhinglaj (ha)
1.	Total geographical area	776261 (100.00)	60937 (100.00)	48115 (100.00)
2.	Area under forest	140100 (18.04)	1433 (2.35)	1818 (3.78
3.	Cultivable waste	75981 (9.79)	3588 (5.89)	898 (1.87)
4.	Land under non agril. use	35921 (4.63)	5108 (8.38)	1277 (2.65)
5.	Barren and uncultivable land	42239 (5.45)	789 (1.31)	1204 (2.50)
6.	a) Current fallow b) Other fallow	4905 (0.63) 22030 (2.84)	466 (0.76) 552 (0.91)	278 (0.58) 328 (0.68)
7.	Net area sown	455085 (58.63)	48992 (80.40)	42312 (87.94)
8.	Area sown more than once	120491 (15.52)	11013 (18.07)	5359 (11.14)
9.	Gross cropped area	575576 (74.14)	60005 (98.47)	47671 (99.07)
10.	Cropping intensity (%)	126.47	122.48	112.67

(Figures in the parentheses indicate percentages to the total geographical area)

(Source: Socio-economic review and statistical abstract of Kolhapur district, 2011-2012)

4.8.1 Kolhapur District

Table No. 4.1 shows that out of the total geographical area of 776261 hectors, 4,55,085 hectors (58.63%) is Net sown area and 575576 (74.14) is Gross Cropped area. The district has 140100 hectors (18.05%) of land under forest, 42239 hectors (5.45%) of the land is Barren / uncultivable. Additionally 75981 (9.79 %) and 26935 (3.46 %) hectors of the area is covered by cultivable waste and follow land respectively. In the expanding economy of the district on increasing quantum of the land around 35921 hectors (4.63 %) is required for socio-economic infrastructures and for absorbing the pressure of urbanization and other non-agricultural activities. Thus the total available land (net sown area + cultivable waste + Follow lands) 558001 hectors as much as (71.88 %) of the land is being used for the cultivation of rising crops. Resultantly, the scope of bringing additional area under cultivation is relatively limited. In such scenario the expansion of multiple cropped areas is the only ending way for increasing agricultural output. The district has a cropping intensity of 126.47 which is higher than the state average 114.2.

4.9 Irrigation sources

The information on area irrigated by different sources in Kolhapur district is presented in Table 4.2. In Kolhapur district the gross irrigated area as per 2011-12 statistics was 1,21,454.9 hectares which accounted for 22.32 percentage to gross cropped area. Similarly, the net irrigated area was 1,13,762.5 hectares which forms 25.08 per cent of the net sown area. Out of total net irrigated area 77,780.6

hectares was under canal irrigation which forms 68.47 per cent of net irrigated area. The area under well and lift irrigation was 17.84, 13.79 per cent of the total net irrigated area. The River Panchaganga from Kolhapur streaming through the district act as main source of irrigation.

Table 4.2 Area irrigated by different sources in Kolhapur district (2011-2012)

Sr. No	Particulars	Kolhapur Area(ha)	Percentage of net irrigated area
1.	Gross irrigated area(ha)	121454.90	106.76
2.	Net irrigated area (ha) a)canals b) Wells c) Lift	113762.50 77780.60 20291.70 15690.20	100.00 68.37 17.84 13.79
3.	Net irrigated area as percentage to net sown area	--	25.08
4.	Gross irrigated area as percentage to gross cropped area	--	22.32

(Source: Socio economic review and statistical abstract of Kolhapur district, 2011-2012)

4.10 Cropping pattern of Hatkanangle and Gadhinglaj tahsil

The nature of cropping pattern in considered as an important factor in determining the growth prospects for agriculture. The district exhibits a mixed cropping pattern. Kolhapur district holds a leading rank in respect of sugarcane cultivation and sugar industry. The laterite soil in

Gaganbavada, Panhala, Radhanagari and Shahuwadi Talukas is conducive for raising hill millets. Paddy is grown in the talukas of Chandgad, Ajara, Gadhinglaj, Shahuwadi, Hatkanangale, Karveer, Radhanagari, Panhala and some parts of Bhudargad, Kagal, Shirol and Gaganbavada talukas which have rich and fertile soils. Rice, jawar and groundnut are cultivated in Kharif season. Sugarcane and vegetable are grown where irrigation facilities are available. The eastern taluka of Hatkanangale and Shirol focus on sugarcane, groundnut and jawar together with fruits and vegetable cultivation. Shirol taluka is leading in tomato production. Broadly speaking, the cropping pattern of the district is administered by the food grain and cash crops viz. (Rice 21%), Kharif Jawar (9 %), other minor cereals and pulses and cash crops i.e. sugarcane (13 %) and groundnut (14 %). The dam of Kalammawadi (24 TMC) which is nearing completion is expected to land to an increase in the net irrigated area of the district, particularly in the talukas of Radhanagari, Kagal and Shirol and bring about a major change in the cropping pattern of the district.

4.11 Population

Accordingly to 2001 census, the total population of Kolhapur district is 35.15 lakh. It holds 9th place in Maharashtra as per census. As per the census of 2001 the population of rural area is 24.73 lakhs (70 %) and 10.30 lakhs (30 %) of the urban area. Annual population growth rate in last decade (1991-2001) is 1.76. According to 2001 census, in the district, there are 949 females for every thousand males.

Table 4.3 Cropping pattern of the study area (2011 - 2012)

(Area in hectares)

Sr. No.	Name of the crop	Kolhapur District	Hatkanangle	Gadhinglaj
1.	Rice	106325 (18.47)	1007 (1.42)	7592 (9.97)
2.	Wheat	8491 (1.47)	1073 (1.52)	720 (0.95)
3.	Jowar	21761 (3.78)	6676 (9.43)	3380 (4.44)
4.	Nachani	23784 (4.13)	59 (0.08)	385 (0.51)
5.	Maize	6477 (1.12)	642 (0.91)	1282 (1.68)
6.	Other cereals	1845 (0.82)	112 (0.16)	309 (0.41)
7.	**Total cereals**	**171531 (29.80)**	**9569 (13.52)**	**13668 (17.95)**
8.	Gram	13880 (2.41)	1760 (2.49)	1400 (1.84)
9.	Tur	2410 (0.42)	341 (0.48)	629 (0.83)
10.	Other pulses	4442 (2.62)	567 (0.80)	625 (0.82)
11.	**Total pulses**	**31390 (5.45)**	**2668 (3.77)**	**2654 (3.49)**
12.	Sugarcane	108669 (18.88)	13989 (19.77)	4984 (6.55)
13.	Spices	5334 (0.93)	390 (0.55)	1044 (1.37)
14.	Fruits and Vegetables	23198 (4.92)	2006 (2.83)	2289 (3.01)
15.	Groundnut	69265 (12.03)	8079 (11.42)	19875 (26.10)
16.	Sunflower	326 (0.06)	35 (0.05)	40 (0.05)
17.	Other oilseeds	64562 (11.22)	19149 (27.06)	11616 (15.25)

18.	**Total oilseeds**	**134153 (23.31)**	**27263 (38.52)**	**31531 (41.41)**
19.	Fiber Crops	660 (0.11)	86 (0.12)	146 (0.19)
20.	Medicinal and others	4557 (0.79)	1345 (1.90)	-
21.	Forage and fodder crops	101949 (3.64)	7478 (10.57)	13122 (17.22)
22.	Perennial crops	47361 (8.23)	4032 (5.70)	4681 (6.15)
23.	Non- Edible Crops	22652 (3.94)	1945 (2.75)	2035 (2.67)
24.	Gross cropped area	575576 (100)	70771 (100)	76154 (100)

(Figures in the parentheses indicate percentages to the respective total)

(Source: - Socio economic and statistical review of selected districts-2010-2011)

4.12 Transport facilities

In Kolhapur district the length of total roads (including the road under municipality jurisdiction) in the year 2009-2010 was 9175.27 k.m. Out of them 6281.43 k.m. hot mix and 2893.84 k.m. were made from other resources. In Kolhapur district the length of railway track is 35.57 k.m. and had 6 railway stations. Airport is available and a big nearest airport is at Belgum, 105 kms from Kolhapur.

5. RESULT AND DISCUSSTIONS

The success of any enterprise in agriculture can be judged on the basis of economic benefits enjoyed by the farmers from that enterprise. In the present age of commercialization of agriculture, the farmers are gradually feeling the impact of interplay of various economic forces. It has become necessary for him to look upon his farm production activities from the business point of view, cost of production, net profit to gain by him unless he tries to minimize the cost and maximize the returns per unit of resource used in the farms.

The proper analysis of costs and returns structure of soybean is prime importance in order to use the limited resources most efficiently. An attempt has been made in the present study to analyze the costs and returns from the cultivation of soybean, the annual growth rates in area, production and productivity of soybean and to analyze the secondary data obtained from the Divisional Joint Director of Agriculture, Kolhapur. An attempt has also been made to investigate into constraints in production and marketing of soybean for the area under study. In this chapter, the details such as, different costs, returns, price spread and constraints in production as well as in marketing of soybean are presented empirically in order to achieve the objectives of the study.

5.1 Economic characteristics of the selected soybean farmers

Detailed information about each of the selected villages in Hatkanangle and Gadhinglaj tahsils showing peculiarities regarding their location, communication facilities, cropping pattern, marketing etc. is summarized below.

5.1.1 Size and composition of farm families

The information about the size and composition of a family gives an idea about the available labour force. It also indirectly indicates consumption needs of the family. The details about the size and composition of the farm families are presented in the Table 5.1.

Table 5.1 Average size and composition of farm families

(Numbers)

Sr. No	Particulars	Size groups of holding			Overall
		Small	Medium	large	
1.	Male	1.25 (28.03)	1.37 (29.34)	1.25 (27.78)	1.29 (28.41)
2.	female	1.29 (28.92)	1.42 (30.41)	1.33 (29.55)	1.35 (29.73)
3.	Children	1.92 (43.05)	1.88 (40.25)	1.92 (42.67)	1.91 (42.07)
	Total	4.46 (100.00)	4.67 (100.00)	4.50 (100.00)	4.54 (100.00)

(Figures in the parentheses indicate the percentages to the respective total)

The Table 5.1 indicates that, the average size of family at the overall level was 4.54 persons consisting of 28.41 per cent

adult males, 42.07 per cent adult females and 42.07 per cent children. The average size of family of small size group was 4.46 persons consisting 43.05 per cent children. However, adult males and females population in this size group was about 28.03 per cent and 28.92 per cent, respectively. The family size of medium size group was 4.67 persons consisting of 29.34 per cent males and 30.41 per cent females. It was noted that the children population in medium size was 40.25 per cent. The average number of persons in a family of large size category was 4.50 persons consisting of 27.78 per cent adult males, 29.55 adult females and 42.67 per cent children. The average per farm size of family was found more in medium size group as compared to small and large size groups of holdings.

5.1.2 Educational status of farm families

The educational status of the sample farm families of the area under study will give us the knowledge about their development and tendency to adopt new farm technologies. Table 5.2 represents the information on educational status of the farm families of the area under study.

It was noticed from the table that, at the overall level, the portion of illiterate person was 11.45 per cent to the total number of family size, while the proportion of literacy was 88.55 per cent. It indicates that the educational status of the study area was above the literacy level of the Maharashtra state. Among the literate persons, the proportion up to high school education was 33.92 per cent followed by up to primary

education level 33.04 per cent and the college education, it was 21.59 per cent.

The data on the level of literacy indicated that maximum proportion up to high school education was found in large size group of holding followed by medium and small size farms.

Table 5.2 Educational status of farm families

(Number)

Sr. No	Particulars	Size groups of holdings			Overall
		Small	Medium	Large	
1.	Family size	4.46 (100.00)	4.67 (100.00)	4.50 (100.00)	4.54 (100.00)
2.	Illiterate	0.62 (13.90)	0.54 (11.56)	0.41 (9.11)	0.52 (11.45)
3.	Literate	3.84 (86.10)	4.13 (88.44)	4.09 (90.89)	4.02 (88.55)
i.	Up to Primary	1.74 (39.01)	1.47 (31.48)	1.28 (28.44)	1.50 (33.04)
ii.	Up to high school	1.36 (30.49)	1.65 (35.33)	1.62 (36.00)	1.54 (33.92)
iii	Up to college	0.74 (16.60)	1.01 (21.63)	1.19 (26.44)	0.98 (21.59)

(Figures in parentheses indicate percentage to the respective total)

5.1.3 Occupational Pattern of farm families

Farming was the main business of the selected families. However, some farmers had subsidiary occupation like business, dairy and service. The information relating to number of selected soybean farmer engaged in different occupation is given in the Table 5.3.

Table 5.3 Occupational pattern of farm families heads

(Numbers)

Sr. No	Occupation	Size groups of holdings			Overall
		Small	Medium	Large	
1.	Agriculture	21 (87.50)	19 (76.16)	17 (70.83)	57 (79.16)
2.	service	2 (8.33)	2 (8.33)	3 (12.50)	7 (9.72)
3.	Dairy	1 (4.16)	2 (8.33)	2 (8.33)	5 (6.94)
4.	Business	0 (00.00)	1 (4.16)	2 (8.33)	3 (4.16)
	Total	24 (100.00)	24 (100.00)	24 (100.00)	72 (100.00)

(Figures in the parentheses indicate the percentages to the respective total)

From the Table 5.3, it is noted that, at the overall level, 79.16 per cent of the family heads were working as agriculturist. The number of family heads engaged Service, dairy and Business enterprises were about 9.72, 6.94 and 4.16 per cent, respectively. The number of agriculturist was found to be more in small size group followed by medium and large size groups.

5.1.4 Investment in fixed farm assets.

The fixed capital assets play an important role in any business, in addition to the use of variable resources. The average value of different assets owned by the sample farms is presented in the Table 5.4.

Table 5.4 Per farm investment in capital assets

(Rupees)

Sr. No.	Particulars	Size groups of holdings			Overall N=72
		Small N=24	Medium N=24	Large N=24	
1.	Land	986860 (87.15)	1705955 (91.14)	2766874 (93.27)	1819896 (91.44)
2.	Buildings	65175 (5.75)	79939 (4.27)	100725 (3.39)	81946 (4.12)
3.	Irrigation structure	31193 (2.75)	30774 (1.64)	34819 (1.17)	32262 (1.62)
4.	Implements	3690 (0.32)	3461 (0.18)	3894 (0.13)	3682 (0.18)
5.	Machinery	19707 (1.74)	29476 (1.57)	35024 (1.18)	28069 (1.41)
6.	Livestock & poultry	25713 (2.27)	22203 (1.19)	25202 (0.85)	24373 (1.22)
	Grand total	1132338 (100.00)	1871808 (100.00)	2966538 (100.00)	1990228 (100.00)
7.	Value of assets excluding land	145478 (12.85)	165853 (8.86)	199664 (6.73)	170332 (8.56)

(Figures in parentheses indicate the percentages to the total assets)

The investment in capital asset at overall level was estimated to ₹.170332 excluding land and value of land was ₹ .1819896 comprising 91.44 per cent of total asset. The investment pattern in different size groups showed increasing trend with farm size. The value of total asset was ₹.1132338, 1871808 and 2966538 for small, medium and large size groups, respectively. The share of land in total asset ranged from 93.27 per cent (large) to 87.15 per cent (small) with an average of 91.44

per cent of overall level. After land, building was the major component of assets consist 5.75 per cent (small) to 3.39 per cent (large) of total value. Per holding investment in irrigation structure was 2.75, 1.64 and 1.17 per cent in small, medium and large size groups, respectively. Whereas the per holding investment in bullock drawn implement accounted 0.32, 0.18 and 0.13 per cent, respectively for small, medium and large size groups. The average per farm investment in bullock drawn implement at the overall level was worked to ₹.3682 (i.e. 0.18%). The per holding investment in machinery was 1.74, 1.57 and 1.18 per cent in case of small, medium and large size groups, respectively, while it was 1.41 per cent at the average level. Per holding investment in animal/poultry accounted 2.27, 1.19 and 0.85 per cent, respectively for small, medium and large size groups. The per holding investment in total assets excluding land was 12.85, 8.86 and 6.73 per cent in case of small, medium and large size groups, respectively, while it was 8.56 per cent at the average level.

5.2 Land Utilization Pattern

The information about the land utilization pattern of the sample farmers is given in the Table 5.5.

The average size of land holding in respect of small, medium and large size groups was 1.56, 3.03 and 4.71 ha, respectively. At the overall level, the average size of the land holding was 3.10 hectares. The proportion of irrigated area to gross cropped area at the overall level was 79.03 per cent. It was

83.33, 79.21 and 77.49 per cent for small, medium and large size groups, respectively. However, the proportion of irrigated area to net sown area at the overall level was 84.48 per cent. It was 87.84, 83.92 and 83.72 per cent for small, medium and large size groups, respectively.

Table 5.5 Land utilization pattern of selected soybean farmers

(Area in ha)

Sr. No.	Particulars	Size groups of holding			Overall N=72
		Small N=24	Medium N=24	Large N=24	
1.	Total land holding	1.56 (100.00)	3.03 (100.00)	4.71 (100.00)	3.1 (100.00)
2.	Permanent fallow	0.06 (3.85)	0.12 (3.96)	0.22 (4.67)	0.13 (4.19)
3.	Operational holding	1.50 (96.15)	2.91 (96.04)	4.49 (95.33)	2.97 (95.81)
4.	Current fallow	0.02 (1.28)	0.05 (1.65)	0.13 (2.76)	0.06 (1.94)
5.	Net cultivated land	1.48 (94.87)	2.86 (94.39)	4.36 (92.57)	2.90 (93.55)
6.	Irrigated land	1.30 (83.33)	2.40 (79.21)	3.65 (77.49)	2.45 (79.03)
7.	Un irrigated land	0.18 (11.54)	0.46 (15.18)	0.71 (15.07)	0.45 (14.52)
8.	Area sown more than once	1.02 (65.38)	1.60 (52.80)	2.27 (48.20)	1.63 (52.58)
9.	Gross cropped area	2.50 (160.26)	4.46 (147.19)	6.63 (140.76)	4.53 (146.13)
10.	Cropping Intensity	168.91	155.94	152.06	158.97

(Figures in the parentheses indicate the percentage to the total land holding)

Table 5.5 reveals that, the average size of land holdings included both cultivable land and follow or uncultivable land. The net cultivable area of small, medium and large size groups was 1.48 ha (94.87%), 2.86 ha (94.39%), 4.36 ha (92.57%), respectively, while at overall level net sown area was observed to be 2.90 ha (93.55%). Permanent fallow land was observed to be 0.06 ha (3.85%) in the small size groups, 0.12 (3.96%) in the medium size group and 0.22 (4.67%) in the large size group. The overall average irrigated land was found to be 2.45 ha (79.03%) which was 1.30 ha (83.33%) in small size group, 2.40 ha (79.21%) in the medium size group, 3.65 ha (77.49%) in the large size group. The overall level, un-irrigated land was found to be 0.45 ha (14.52%) with the large size group having highest 0.71 ha (15.07%) followed by medium size group 0.46 (15.18%) arid small group with 0.18 ha (11.54%).The intensity of cropping at overall level was 158.97 per cent. It was 168.91, 155.94 and 152.06 per cent, respectively for small, medium and large size groups. This implies that, land possessed by sample cultivators intensively used as area sown more than once showed 1.63 at the overall level.

5.3 Cropping Pattern:

The cropping pattern followed by selected cultivators in different size groups for the year 2012-13 is presented in Table 5.6.

Table 5.6 Cropping pattern followed by soybean farmers

(Area in ha)

Sr. No	Seasons/Crops	Size groups of holding			Overall N=72
		Small N=24	Medium N=24	Large N=24	
A. Kharif crops					
1.	Soybean	0.57 (22.80)	0.93 (20.85)	1.47 (22.17)	0.99 (21.85)
2.	Groundnut	0.12 (4.80)	0.33 (7.40)	0.35 (5.28)	0.27 (5.96)
3.	Rice	0.10 (4.00)	0.13 (2.91)	0.12 (1.81)	0.12 (2.65)
4.	Maize	0.03 (1.20)	0.12 (2.69)	0.07 (1.05)	0.07 (1.54)
5.	Sweet corn	0.06 (2.40)	0.18 (4.04)	0.17 (2.56)	0.14 (3.09)
	Total	**0.88 (35.20)**	**1.69 (37.89)**	**2.18 (32.88)**	**1.59 (35.09)**
B. Rabi crops					
1.	Wheat	0.38 (15.20)	0.55 (12.33)	0.77 (11.61)	0.57 (12.58)
2.	Jowar	0.10 (4.00)	0.26 (5.83)	0.28 (4.22)	0.21 (4.63)
3.	Gram	0.12 (4.80)	0.20 (4.48)	0.29 (4.37)	0.20 (4.41)
4.	Other	0.10 (4.00)	0.17 (3.81)	0.40 (6.03)	0.22 (4.86)
	Total	**0.70 (28.00)**	**1.18 (26.46)**	**1.74 (26.24)**	**1.21 (26.71)**
C. Summer crops					
1.	Tomato	0.09 (3.60)	0.17 (3.81)	0.20 (3.02)	0.15 (3.31)
2.	Brinjal	0.10 (4.00)	0.10 (2.24)	0.18 (2.71)	0.13 (2.87)
3.	Other	0.14 (5.60)	0.20 (4.48)	0.23 (3.47)	0.19 (4.19)

	Total	**0.33 (13.20)**	**0.47 (10.54)**	**0.61 (9.20)**	**0.47 (10.37)**
D. Annual					
	Sugarcane	0.59 (23.60)	1.12 (25.11)	2.10 (31.67)	1.27 (28.03)
	Gross cropped area	**2.50 (100.00)**	**4.46 (100.00)**	**6.63 (100.00)**	**4.53 (100.00)**
	Cropping intensity (%)	**168.91**	**155.94**	**152.08**	**158.98**

(Figures in parentheses indicate the percentages to the gross cropped area)

It is revealed from the Table 5.6 that, soybean is the major crop of the selected area during the kharif season. The percentage of area under soybean to gross cropped area was the highest in all the size groups of holding. At the overall level, the percentage of the area under soybean crop to gross cropped area was 21.85 percent. In study area, JS-335 variety of soybean is commonly used.

The next important crop was wheat grown during rabi season. At the overall level, the percentage of the area under wheat crop to gross cropped area was 12.58 percent. The third major crop grown was jowar in rabi season. The overall percentage of jowar to gross cropped area was 4.63 percent at the overall level the percentage the kharif groundnut and rice to gross cropped area was 5.96 and 2.65 percent, respectively. The percentage the gram to gross cropped area at overall level was 4.4 percent. The percentage the summer tomato to gross cropped area at overall level was 3.31 percent. The intensity of cropping in small size category was quit high followed by medium and large size categories, respectively and was at the order of 155.94

and 152.06 percent, respectively. The cropping intensity at the overall level was 158.98 percent.

5.4 Resource use structure in soybean production

The quantities of various inputs directly affects the cost of cultivation and therefore, the use of different inputs like human labour, bullock labour, manures, fertilizers etc. in quantitative and monetary terms have been studied in detail.

The information on input utilization pattern for soybean by the selected farmers is presented in the Table 5.3 on per hectare basis.

It is seen from the Table 5.7 that, per hectare total human labour utilization, male was highest in medium size group followed by large and small size groups of soybean growers and in case female labour it was highest in large size groups followed by medium and small size groups of soybean growers. Its magnitude was 88.73, 89.38 and 80.65 man days per hectare in case large size group followed by medium and small size groups of soybean growers, respectively. While at overall level, the total human utilization level was 86.25 man days per hectare. It is concluded from above fact that, the number of total labours increases with increase in farm size. However, large number of human labour on large farms implies intensive cultivation of soybean and their farms in comparison with other category of farmers. The bullock labour utilization in case of small, medium and large size groups of soybean growers were

5.71, 4.80 and 4.62 pair days, respectively whereas, at overall level, it was 5.04 pair days.

Table 5.7 Per hectare input utilization pattern of soybean farmers

Sr. No	Particulars	Size groups of holding			Overall
		Small	Medium	Large	
1.	Total human labour(man days)	80.65	89.38	88.73	86.25
	a) Male	28.61	32.33	29.70	30.21
	b) female	52.04	57.05	59.03	56.04
2.	Bullock power (pair days)	5.71	4.80	4.62	5.04
3.	Machine power in hrs	6.07	5.53	5.39	5.65
4.	Seed (kg)	65.62	66.51	68.51	66.88
5.	Manures (q)	10.20	11.10	12.07	11.12
6.	Fertilizer (kg)				
	N	43.75	44.94	44.20	44.30
	P	68.25	66.34	69.39	68.00
	K	9.40	9.21	8.95	9.19
7.	Plant protection charges (₹)	425.48	460.34	472.50	452.77

The productivity of soybean depends upon the level of utilization of critical inputs like manures, fertilizers, plant protection, irrigation etc. The overall average quantity of manures applied by selected holdings has been worked out to be 11.12 quintals. The per hectare manure utilization by small, medium and large size group of soybean growers were 10.20, 11.10 and 12.07 quintals, respectively.

At overall level, per hectare average application of fertilizers in terms of N, P and K in case of small, medium and large size groups of soybean growers were 44.30, 68.00 and 9.19 kg, respectively. This shows that the farmers were using nitrogen and phosphorous less than the recommended dose i.e. 50 kg: 75 kg per hectare, respectively.

5.5 Per hectare cost of cultivation of Soybean

Per hectare cost of cultivation of soybean has been estimated and the same is represented in the Table 5.8.

It is seen from the Table 5.8 that, at the overall level, per hectare cost of cultivation of soybean (i.e. cost 'C') was worked out to ₹.49343.30. Among the different items of costs, rental value of land was the highest (21.16%). The other important items of cost was hired female labour (9.70%). followed by cost of hired male labour (5.24%), fertilizers (8.06%), seed (6.77%), bullock labour cost (6.13%), Machine power (5.16%), Irrigation charge (2.97%) interest on working capital (2.96%), manure(2.25%) incidental charges (1.14%), depreciation cost (1.12%), and repairing cost (0.93%).The cost incurred in respect of plant protection and land revenue was negligible in the cost of cultivation. Similar trend was observed among the different size groups of soybean cultivators.

In the total cost of cultivation, the cost 'A' was Rs. 26524.73 (53.75 per cent) and cost 'B' was ₹ .45175.05 (91.55 per cent) at the overall level. The increasing

trend in cost was observed with increase in the farm size among different size groups of holding.

Among the items of costs, the main items were rental value of land (range between 20.68 to 22.02 %), hired female labour (range between 9.42 to 10.32%), family male labour (range between 3.9. to 4.04%), bullock labour (range between 5.42 to 7.16%) male labour (range between 4.90 to 5.76%), family female labour (range between 4.19 to 4.73%), seed (ranges between 6.70 to 6.86%), fertilizers (ranges between 7.91 to 8.37%), depreciation (ranges between 1.06 to 1.16 %), manure (ranges between 2.13 to 2.36%), interest on working capital (range between 2.87 to 2.99%), irrigation charges (2.96 to 2.99) and plant protection charges (range between 0.89 to 0.94%).

Table 5.8 Per hectare cost of cultivation of soybean on sample farms

Sr. No	Particulars	Size groups of holdings			Overall
		Small	Medium	Large	
I.1	Hired human Labour (man days)				
	Male	2418.32 (5.06)	2831.76 (5.76)	2504.96 (4.90)	2584.00 (5.24)
	Female	4502.50 (9.42)	5068.75 (10.32)	4945.00 (9.68)	4816.25 (9.70)
2.	Bullock Power (pair days)	3426.00 (7.16)	2880.00 (5.86)	2772.00 (5.42)	3024.00 (6.13)
3.	Machine charges (₹)	2731.50 (5.71)	2488.50 (5.07)	2425.50 (4.75)	2548.50 (5.16)
4.	Seeds (kg)	3281.00 (6.86)	3325.50 (6.77)	3425.50 (6.70)	3344.00 (6.77)
5.	Manure (Quintals)	1020.00 (2.13)	1110.00 (2.20)	1207.00 (2.36)	1112.00 (2.25)
6.	Fertilizer (₹)	4002.25 (8.37)	3888.91 (7.92)	4044.30 (7.91)	3978.49 (8.06)
	N	43.75	44.94	44.20	44.30
	P	68.25	66.34	69.39	68.00
	K	9.40	9.21	8.95	9.19
7.	Irrigation charges (₹)	1430.24 (2.99)	1457.42 (2.97)	1513.81 (2.96)	1467.15 (2.97)
8.	Plant protection charges (₹)	425.48 (0.89)	440.34 (0.90)	482.50 (0.94)	449.44 (0.91)
9.	Incidental charges (₹)	520.35 (1.08)	560.74 (1.14)	610.20 (1.19)	563.76 (1.14)
10.	Repairs (₹)	430.18 (0.90)	450.27 (0.92)	492.02 (0.96)	457.49 (0.93)
	Working capital (₹)	24187.82 (50.58)	24502.19 (49.89)	24422.80 (47.79)	24370.93 (49.39)

Sr. No	Particulars	Size groups of holdings			Overall
		Small	Medium	Large	
11.	Interest on working capital @ 6% (₹)	1451.26 (2.96)	1470.13 (2.99)	1465.36 (2.87)	1462.25 (2.96)
12.	Depreciation on farm implements (₹)	553.52 (1.16)	519.20 (1.06)	584.17 (1.14)	552.30 (1.12)
13.	Land revenue and taxes (₹)	115.25 (0.24)	130.42 (0.26)	172.07 (0.34)	139.24 (0.28)
	Cost A	**26307.85 (55.00)**	**26621.94 (54.21)**	**26644.40 (52.14)**	**26524.73 (53.75)**
14.	Rental value of land (₹)	10532.77 (22.02)	10227.68 (20.82)	10565.72 (20.68)	10442.05 (21.16)
15.	Interest on fixed capital @10% (₹)	7043.10 (14.73)	8117.31 (16.53)	9464.40 (18.52)	8208.27 (16.63)
	Cost B	**43883.72 (91.77)**	**44966.93 (91.56)**	**46674.52 (91.34)**	**45175.05 (91.55)**
16.	Family labour (man days)				
	Male	1931.92 (4.04)	2082.40 (4.24)	2007.92 (3.93)	2007.92 (4.07)
	Female	2003.75 (4.19)	2062.50 (4.20)	2416.25 (4.73)	2161.25 (4.38)
	Cost C	**47819.39 (100.00)**	**49111.83 (100.00)**	**51098.69 (100.000)**	**49343.30 (100.00)**
II.	Output (₹)	64228.40	63351.67	62720.05	63433.37
	A) Main produce	63247.90	62501.37	61969.60	62572.75
	B) By-produce	980.50	850.30	750.45	860.41
III.	Cost 'C' net of bye produce	46838.89	48261.53	50348.24	48482.88
IV.	Per quintal cost	2451.01	2530.75	2668.16	2549.97

(Figures in the parentheses indicate to the percentage to the respective total and grand total)

Table 5.9 Average productivity of soybean in Kolhapur district (q/ha)

Sr. No	Size groups of holding			Overall
	Small	Medium	Large	
1.	19.11	19.07	18.87	19.02

Thus, from above forgoing discussion, it was noticed that the cost of cultivation varied among the size groups of holdings. The average per hectare productivity of soybean was 19.02 quintals at the overall level. It was highest in small size group (19.11 q/ha.) followed by medium (19.07 q/ha) and large size group (18.87 q/ha) of soybean growers respectively. As a result, the cost required for the production of one quintal of soybean was lowest in small size group (₹. 2425.01) followed by medium and large size group of soybean growers. This is because of appropriate production management practices adopted by small size group of soybean growers. The per hectare gross returns increased with increased in size group of holdings.

5.6 Per hectare costs, returns, gross income and B:C ratio for soybean cultivation

An attempt has been made to compare the per hectare gross income, different costs and the profit at different costs with net returns and the benefit cost ratio in soybean cultivation. The details are given in the Table 5.10.

Table 5.10 Per hectare profitability of soybean

(Values in Rupees)

Sr. No	Particulars	Size groups of holding				Overall
		Unit	Small	Medium	Large	
1.	Cost					
	I) Cost 'A'	₹	26308	26622	26644	26525
	II)Cost 'B'	₹	43884	44967	46675	45175
	III)Cost 'C'	₹	47819	49112	51099	49343
2.	Income at					
	I)Cost 'A'	₹	37921	36730	36076	36909
	II)Cost 'B'	₹	20345	18385	16046	18258
	III)Cost 'C'	₹	16409	14240	11621	14090
3.	Production	Qts	19.11	19.07	18.87	19.02
4.	Gross income	₹	64228	63352	62720	63433
5.	B:C ratio					
	I)Cost 'A'	₹	2.44	2.38	2.35	2.39
	II)Cost 'B'	₹	1.46	1.41	1.34	1.40
	III)Cost 'C'	₹	1.34	1.29	1.23	1.29

It is seen from the Table 5.10 that, the per hectare gross income received from soybean was ₹.64228, 63352 and ₹ .62720 in small, medium and large size groups, respectively while, it was worked out to ₹ .63433 at overall level. It is indicated that small size group has obtained more gross income followed by medium and large size groups, respectively. Per hectare Cost 'A' was ₹ .26308, 26622 and 26644 in small, medium and large size groups, respectively. Per hectare income at Cost 'A' was ₹.37921, 36730 and 36076 in small, medium and large size groups, respectively. Whereas, the income at Cost B

was ₹.20345, 18385 and 16046 in small, medium and large size groups, respectively.

From the above foregoing discussion, it is clear that the cultivation of soybean is profitable in all farm size. B:C ratio was highest in small (1.34) followed by medium (1.29) and large (1.23) sized groups at Cost 'C' because, cost 'A' at overall level is 53.75 per cent total Cost and Cost 'B' is 91.55 per cent of total cost which clearly shows that there is 37.80 per cent increase in the cost this is because of higher rental value of land around 21.16 per cent of total cost and hence on adding family labour cost to the Cost 'B' results in higher Cost 'C' about ₹.49343. So that the profit at Cost 'C' is very less as compared to Costs 'A' and B' which results in less B:C ratio. It is seen that, small size group of soybean cultivators received more profit compared to those by medium and large size group of soybean cultivators. This is because of higher production of soybean in the small size compare to medium and large size.

5.7 Resource use productivities in soybean production

5.7.1 Production function analysis

The agricultural production is considered as a function of different input factors such as land, labour, capital and others.

The static analysis pertaining to the use of various inputs in soybean cultivation by the sample farmers were already presented in Table 5.7 and 5.8 However, the contribution of

individual inputs in output of the crop can only be studied by the application of functional analysis. Therefore, the proposed production function analysis was carried out.

5.7.2 Dependent variable

Y = Output in quintals per hectare.

Resource productivities of soybean were then estimated by using results of Cobb-Douglous type of production function. The results of the estimated Cobb-Douglous type of production function along with details of various factors are presented in Table 5.11.

All the selected independent variables except phosphorous (X_5) at small size group were significant at 10 per cent level of significance and potassium (X_6), negatively significant at 5 per cent level of significance. Similarly at medium size group human labour (X_1), manure(X_3) and nitrogen (X_4) were significant at 10 per cent level. Whereas bullock labour (X_2), phosphorous (X_5) and potassium (X_6) were non-significant.

In case of large size group bullock labours (X_2) was significant at 10 per cent, manures (X_3), significant at 1 per cent, nitrogen (X_4) and potassium (X_6) were significant at 5 per cent level whereas human labour(X_1) and phosphorous(X_5) were non-significant.

Table 5.11. Result of Cobb-Douglous production function for estimation of resource productivities in soybean

Sr. No	Name of the variables	Small N=24			Medium N=24			Large N=24		
		'b' values	S.E. +	't' values	'b' values	S.E. +	't' values	'b' values	S.E.+	't' values
	Constant	1.15			1.08			3.26		
1.	Human labour(X_1) in man days	0.23*	0.11	2.05	0.39*	0.21	1.77	-0.02^{NS}	0.10	-0.22
2.	Bullock labour(X_2) in days	0.06*	0.03	2.00	0.10^{NS}	0.09	1.18	0.06*	0.03	1.81
3.	Manure (X_3) in quintals	0.42*	0.23	1.86	-0.56*	0.30	-1.84	1.08***	0.22	4.77
4.	Nitrogen (X_4) in kg	0.40*	0.22	1.76	1.97*	0.96	2.06	0.34**	0.14	2.35
5.	Phosphorous (X_5) in kg	-0.28^{NS}	0.41	-0.69	0.03^{NS}	0.14	0.27	0.27^{NS}	0.22	1.26
6.	Potassium (X_6) in kg	-0.98**	0.42	-2.33	-3.44^{NS}	4.44	-0.77	-4.47**	1.71	-2.61
7.	R^2	0.84			0.67			0.77		

Table 5.11 conted....

Sr. No	Name of the variable(Overall)	'b' values	S.E.+	't' values
	Constant	0.93		
1.	Human labour(X_1) in man days	0.18***	0.05	3.23
2.	Bullock labour(X_2) in days	0.06**	0.02	2.62
3.	Manure (X_3) in quintals	0.29***	0.10	2.92
4.	Nitrogen (X_4) in kg	0.26***	0.09	2.92
5.	Phosphorous (X_5) in kg	-0.08^{NS}	0.09	-0.95
6.	Potassium (X_6) in kg	-0.67***	0.24	-2.73
7.	R^2	0.60		

Standard error of Y Estimated = 0.0223

*** : Significant at 1% significance level

** : Significant at 5% significance level

* : Significant at 10% significance level

N.S. : Non significance

All the selected independent variables at overall level were highly significant except application of phosphorus (X_5). The regression coefficient of application of human labour (X_1), manures (X_3) nitrogen (X_4), and potassium (X_6) were found to be significant at 1 per cent level and bullock labours (X_2) at 5 per cent level of significance respectively. It indicated that there was wide scope for its use in order to increase the production of soybean. It also noted that the above selected six variables together explain about 60 per cent of the variation in the output of soybean crop enterprise.

5.8 Production and disposal pattern of soybean on sample farm

5.8.1 Production

The average production of soybean produced on the sample farms selected for the study is presented in the Table 5.12.

Table 5.12 Average production of soybean on sample farmers

Sr. No	Size Groups	No. of holdings	Average area under soybean(ha)	Production of soybean per farm(q)	Production of soybean per ha (q)
1.	Small	24	0.57	10.89	19.11
2.	Medium	24	0.93	17.74	19.07
3.	Large	24	1.47	27.74	18.87
4.	Overall	72	0.99	18.83	19.02

It is seen from the Table 5.12 that, average area under soybean increased with an increase in the size of holdings from 0.57 to 1.47 hectares. The per farm production of soybean was 10.89, 17.74 and 27.74 quintals in case of small, medium and large size groups, respectively. At the overall level, it was 18.83 quintals. Per hectare overall area under the soybean per farm was 0.99 hectares. The average production of soybean was highest in small size group of holdings (19.11 q.) followed by medium (19.07 q.) and medium (18.87 q.) size group. There was no significance difference in the productivity of medium and large group of farms as indicated by statistical test. At the overall level, the productivity of soybean decreased with increase in size group of holdings.

5.8.2 Disposal pattern

The information regarding the disposal pattern of soybean among different size groups is presented in Table 5.13.

It is seen from the Table 5.13 that at overall level, 0.31 q of the produce was retained for home consumption, 0.19 q of produce was kept for cattle feed, 0.21 q of produce was used as a seed and 0.40q was wastages. It was observed that the majority of the produce (93.93 %) was available as marketable surplus for selling in market. The farm reductions are mainly required for home consumption and it depends upon family size. And rest is marketable surplus. Farm family consumption of soybean is less and hence rest is marketable surplus (93.93 %).

Table 5.13 Disposal pattern of soybean on sample farms

(quintal)

Sr. No	Particulars	Size groups of holding			Overall
		Small	Medium	Large	
1.	Per farm production (q/ha)	10.89 (100.00)	17.73 (100.00)	27.74 (100.00)	18.79 (100.00)
2.	Quantity disposed on farm				
a.	Home consumption	0.24	0.31	0.39	0.31
b.	Cattle feed	0.13	0.19	0.24	0.19
c.	Seed purpose	0.12	0.21	0.31	0.21
d.	Wastage	0.25	0.41	0.53	0.40
	Sub total	0.74	1.12	1.54	1.13
3.	Marketable surplus	10.15 (93.20)	16.61 (93.68)	26.20 (94.45)	17.65 (93.93)

(Figures in parentheses indicate the percentage to the total farm production)

It was observed that, home consumption was increased from small to large size groups. This is because of family composition of sample farm was also increased from small

to large size groups. It was highest (0.39q) in large followed by medium (0.31q) and small (0.24q).

5.9 Marketing practices of green soybean

Agricultural marketing plays an important role not only in stimulating production and consumption, but in accelerating the pace of economic development. For this reason, it has been described as the most important multiplier of agricultural development.

Marketing is one of the important activities in the production process which facilitates the movement of goods from site of production to the consumer; Soybean is taken to threshing yard, where it is threshed and cleaned. Most of the farmers preferred gunny bags for packaging of soybean. Farmers normally used bullock carts for transportation of soybean from field to villages, where farmers can store their produce if they want to store it and take it directly to market if they want to sale it.

5.9.1 Marketing functions carried by soybean farmers

The important marketing functions observed in sale of soybean in the study area are packaging and transport. The different operations in marketing of soybean are also shown in Plate 3.

5.9.1.1 Packaging

Packaging is another important function in case of soybean. An ideal package results into reduction of losses in transport, less decaying in storage, maintain the quality of produce and ultimately leads to better return. More than 90 per cent farmers used gunny bags for packaging of soybean because it is easily available, cheap as compared to other material, easy to carry and also reusable.

5.9.1.2 Transportation

Quick and efficient transportation of produce to the desired place has direct influence on the operational efficiency in the marketing. Transportation is essential for creation of place utility, which helps in timely supply of a particular commodity to the different markets. Transport efficiency depends upon the timely availability of vehicles, condition of roads, etc. The mode of transport varies with the nature of commodity and distance to be covered. Majority of the farmers preferred the bullock cart and large farmers could also use tractor as transportation means to transport soybean from field to village.

5.9.1.3 Method of sale

Farmers follow different methods for selling of soybean. APMC is one of the place where farmers can sale their produce through licensed intermediaries. Also they can sale their soybean through village traders, who purchase the produce from field or

village itself. Some large farmers use to sale their soybean to processing plant directly.

5.10 Marketing channels

5.10.1 Different channels in soybean marketing

The information on total quantity of the produce sold by the soybean farmers through the different marketing channels is presented in Table 5.14.

It was revealed from the Table 5.14 that there exist two marketing channels in soybean marketing. These Channels are; Channel-I producer-commission agent-wholesaler-mill owner Channel-II producer-wholesaler-mill owner.

The sample soybean farmers sold their produce through the channel I and II. In which channel II is prominently used by the soybean farmers.

5.10.2 Marketing cost

Various marketing charges for sale of soybean for different size group of holdings in the popular marketing channel in Kolhapur market was studied and results are presented in Table 5.14.

From the Table 5.14, it is revealed that, highest cost per quintal sale of soybean was incurred by producer (47.42 per cent) followed by wholesaler (28.28 per cent) and commission agent (22.95 per cent) at the overall level as far as the intermediaries in the market is concerned.

Table 5.14 Channelwise per quintal marketing cost of soybean

(₹/q)

Sr. No	Particulars	Channel-I N=12	Channel-II N=12	Overall N=24
	A. Cost incurred by producer			
1.	Packing	30.00 (8.42)	31.50 (18.29)	30.75 (10.30)
2.	Transportation	32.40 (9.10)	40.25 (23.37)	36.32 (12.17)
3.	Hamali/Labour	8.15 (2.29)	8.25 (4.79)	8.20 (2.75)
4.	Tolai	4.00 (1.12)	4.00 (2.32)	4.00 (1.34)
5.	Commission charges	132.48 (37.20)	-	132.48 (44.39)
	Total	207.03 (58.13)	84.00 (40.78)	145.51 (47.42)
	B. Cost incurred by Commission agent			
1.	Transportation	12.00 (3.37)	-	12.00 (4.02)
2.	Loading and unloading charges	7.00 (1.96)	-	7.00 (2.34)
3.	Market fees	20.00 (5.61)	-	20.00 (6.70)
4.	Storage Charges	21.50 (6.04)	-	21.50 (7.20)
5.	Other(postage, phone etc)	8.00 (2.25)	-	8.00 (2.68)
	Total	68.50 (19.23)	-	68.50 (22.95)
	C. Cost incurred by wholesaler			
1.	Transportation	20.00 (5.61)	22.50 (13.06)	21.25 (7.12)
2.	Loading and unloading charges	7.10 (1.99)	7.20 (4.18)	7.15 (2.40)

Sr. No	Particulars	Channel-I N=12	Channel-II N=12	Overall N=24
3.	Market fees	22.50 (6.32)	24.00 (13.94)	23.25 (7.79)
4.	Storage Charges	21.00 (5.90)	22.00 (12.75)	21.50 (7.20)
5.	Other(postage, phone etc)	10.00 (2.81)	12.50 (7.26)	11.25 (3.77)
	Total	80.60 (22.63)	88.20 (51.21)	84.40 (28.28)
	Total cost of marketing	356.13 (100.00)	172.20 (100.00)	298.41 (100.00)

(Figures in the parentheses are indicate to the percentage to the respective total and grand total)

On an average, at overall level, farmer incurred total marketing cost per control sale of soybean ₹.145.51 which is 47.42 per cent of total marketing cost, farmers incurred large proportion of expenditure on commission charges (44.39 per cent) and transportation (12.17 per cent). Among the intermediaries, commission agent and wholesaler incurred 7.20 per cent expenditure on storage charges. Marketing fees incurred by commission agent and wholesaler were 6.70 and 7.79 per cent, respectively. Whereas, proportional expenditure on transportation was 4.02 and 7.12 per cent by commission agent and wholesaler, respectively.

From the Table 5.14 it is prominently observed that, the commission charges, storage charges, marketing fees and transportation cost were the important items of marketing of soybean.

5.10.3 Market margin and price spread in soybean marketing

Price spread refers to the difference between the price paid by the consumer and price received by the producer for a unit quantity of farm produce. Price spread consists of marketing costs and margins of the intermediaries which ultimately determine the overall efficiency of marketing system. Since bulk of the produce was sold through different channels, all selected channels were considered for analysis of price spread.

Table 5.15 Price spread in marketing of soybean

(Rupees)

Sr. No	Particulars	Channel-I N=12	Channel-II N=12	Overall N=24
1.	Gross price received by the producers	3312.00 (90.97)	3350.00 (94.73)	3331.00 (92.82)
2.	Market expenses incurred by the producers	207.13 (5.69)	84.00 (2.37)	145.56 (4.06)
3.	Net price received by the producers	3104.87 (85.28)	3266.00 (92.35)	3185.54 (88.77)
4.	Price paid by commission agent	3312.00 (90.97)	-	3312.00 (92.29)
5.	Market expenses incurred by commission agent	68.50 (1.88)	-	68.50 (1.91)
6.	Net margin of commission agent	85.00 (2.33)	-	85.00 (2.37)
7.	Price paid by wholesaler	3465.50 (95.19)	3350.00 (92.35)	3407.75 (94.96)
8.	Market expenses incurred by the wholesaler	80.60 (2.21)	88.20 (2.49)	84.40 (2.35)
9.	Net margin of the wholesaler	94.20 (2.59)	98.20 (2.77)	96.35 (2.63)
10.	Price paid by mill owner(processor)	3640.60 (100.00)	3536.40 (100.00)	3588.50 (100.00)

(Figures in the parentheses are indicate to the percentage to the price paid by mill owner in respective group)

The channel wise price spread and market margin for the sale of soybean is presented in Table 5.15 Highest cost of marketing was incurred wholesaler (2.21%) by followed by and commission agent (1.88%) in channel I.

In Channel-II where the producers sold their produce directly to wholesalers instead commission agent and village traders. It is observed from the Table 5.11 that, the producer's share in consumer rupee for the channel (II) was 94.73, which was maximum than in channel I, under study in soybean marketing.

The producer's share in consumer rupee was maximum in channel II than the other channels mainly because of less number of market intermediaries. Channel-I, where the producer sold his produce to commission agent, commission agent to wholesaler, wholesaler to mill owner. The net price received by the producer was ₹.3104.87, whereas the price paid by the mill owner was ₹.3640.60. It means producer share in consumer rupee in channel-I was 90.97. Among the different intermediaries in the channel, wholesaler received the maximum net profit of (2.59%).

5.11 Growth rates of area, production and productivity

It is believed that, the process of agricultural development has pronounced effects on productivity of agriculture resulting thereby a higher level of agricultural production per unit of available resources.

The changes in area under a crop, its production and productivity are dynamic phenomenon. The shift in area under soybean takes place due to changing demand supply position and prices. The productivity can be increased with proper adoption of modern technology, whereas the production is the combined result of area and productivity. Increasing productivity is the prime object of present day research. The measurement of these changes gives an idea of the direction and magnitude of changes taking place. In this context, the annual compound growth rates were computed for area, production and productivity of soybean crop for the period of 10 years from 2002 to 2012 in the Kolhapur district and are presented in Table 5.16.

5.11.1 Growth rates in area under soybean

The annual compound growth rate of area under soybean for the period of 2002-2012 in the Kolhapur region was 3.65 per cent per annum and it is negative and significant at 1% level of significance, which indicated the continuous decrease in area of soybean in the district.

5.11.2 Growth rates in production of soybean

The annual compound growth rate of soybean production for the period of 2002-2012 in the Kolhapur was 1.70 and it was positive and non-significant which indicates significantly constant production.

The significant increase in production in the selected district is attributed mainly to decrease in the area and partly

due to increase in the productivity. It is concluded that, the production growth pattern in Kolhapur district as a whole had been dominated mainly by production expansion factor.

Table 5.16 Annual compound growth rates in area, production and productivity of soybean in Kolhapur District (2002-2012)

Sr. No	District	Area	Production	Productivity
1.	Kolhapur	-3.65***	1.70^{NS}	5.39^{NS}

Note : CGR= Compound Growth rates
*** : Significant at 1% significance level
** : Significant at 5% significance level
* : Significant at 10% significance level
N.S. : Non significance

5.11.3 Growth rates in productivity of soybean

Productivity is the most important criteria in measuring the growth of any crop output. The success or failure of any improvement in the art of agriculture is measured by the resultant increase or decrease in the productivity.

During the period 2002-2012, the annual compound growth rate of soybean productivity for Kolhapur district was recorded to be 5.39 per cent per annum and it was non-significant.

5.12.1 Constraints in production of soybean

To know the problems faced by the cultivators in production of soybean, the cultivator interviewed and the problems faced by them are depicted in Table 5.17.

From the below Table 5.17, it is seen that the problem of incidence of pests and diseases was 54.16 per cent. About 54.16 per cent of farmers reported about non availability of loan in time, while 51.38 per cent of the farmer reported about high cost of seed. Non availability of fertilizers in time was another major problem reported by 50.00 per cent of sample farmers, 45.83 per cent of farmers faced problems of high wage rate of hired human labour and 44.44 per cent of farmer faced problem of high cost of fertilizers.

Table 5.17 Constraints in production of soybean

(Numbers)

Sr. No	Particulars	Size groups of holding			Overall N=72
		Small N=24	Medium N=24	Large N=24	
1.	High cost of seed	14 (58.33)	12 (50.00)	11 (45.83)	37 (51.38)
2.	High wages for labour	13 (54.16)	11 (45.83)	09 (37.50)	33 (45.83)
3.	Non availability of fertilizer in time	12 (50.00)	11 (45.83)	13 (54.16)	36 (50.00)
4.	High cost of manure and fertilizer	13 (54.16)	10 (41.66)	09 (37.50)	32 (44.44)
5.	Non availability of loan in time	14 (58.33)	13 (54.16)	12 (50.00)	39 (54.16)
6.	Incidence of pests and diseases	12 (50.00)	13 (54.16)	14 (58.33)	39 (54.16)

(Figures in the parentheses are the percentages to their respective total)

5.12.2 Constraints in marketing of soybean

The problems faced by the soybean growers in its marketing were studied and are presented in Table 5.18.

From the below Table 5.18, it was observed that, the lack of gowdown facility was major bottle neck in efficient marketing of soybean about 70.83 per cent farmers complained about lack of gowdown facility. High commission rate is another problems faced by 66.66 per cent of farmers. About 62.50 per cent of the farmers were facing problem about the late payments.

Table 5.18 Constraints in marketing of soybean

(Numbers)

Sr. No	Particulars	Size groups of holding			Overall N=72
		Small N=24	Medium N=24	Large N=24	
1.	High rate of commission charged	17 (70.83)	16 (66.66)	15 (62.50)	48 (66.66)
2.	Faulty weights and measures	15 (62.50)	14 (58.33)	15 (62.50)	44 (61.11)
3.	Late payments	16 (66.66)	15 (62.50)	14 (58.33)	45 (62.50)
4.	Low price of produce	15 (62.50)	13 (54.16)	14 (58.33)	42 (58.33)
5.	Lack of market intelligence	16 (66.66)	13 (54.16)	12 (50.00)	41 (56.94)
6.	Lack of godown facility	18 (75.00)	17 (70.83)	16 (66.66)	51 (70.83)

(Figures in the parentheses indicate the percentages of their respective total)

6. SUMMARY AND CONCLUSIONS

Kolhapur district is the major soybean growing region in Maharashtra, where it is recently introduced. The area under oilseeds in Kolhapur is 48.5 thousands hectares with average productivity of 2544 kg/ha in the year 2011-12. Soybean had shown increasing trend in respect of area during the last decade. The cultivators are attracted in big way towards soybean cultivation and are cultivating the crop on large scale in *kharif* season. Therefore, the present study entitled, "Economics of production and marketing of soybean in Kolhapur district" was conducted to examine the area, production and productivity performance of soybean along with detailed study of production and marketing.

The study would definitely be useful to the farmers in planning their marketing process of this oilseed crop in the area under study and also give guidelines to the extension workers and policy makers to evolve a better marketing and production system. Since the present study proposes to examine the arrivals and prices of soybean in major markets, it would help to take appropriate decision for disposal of soybean by the producers. Similarly, study would also focus on, what role the intermediaries are playing at present in the disposal of soybean and what improvements are needed in their functioning, so that producers can put to the advantage. The present study would be useful to the government in framing the suitable price policies and for planning and implementing different developmental programmes for

soybean production in future. The findings would also be useful to the state government to make certain stock of oilseeds in the state.

6.1 Methodology

Soybean production is mainly concentrated in western Maharashtra region next to Vidarbha. The leading soybean producing districts in this region viz., Ahmednagar, Sangli and Kolhapur as these districts contributed more than 65 per cent to the total area under soybean. Therefore, Kolhapur, one of the districts of western Maharashtra was purposively selected for the present study. On the basis of area under soybean, two tahsils of Kolhapur district having maximum acreages under soybean were selected purposively. Three villages from each of the tahsils were selected on the basis of maximum acreages under the soybean. Thus, in all 6 villages were selected and from these villages, twelve sample farmers (four each from small, medium and large groups) from each village were selected randomly. In all 72 farmers cultivating the soybean were selected randomly. Also five wholesalers, five commission agents and five retailers of soybean were selected from the selected markets. Primary data were collected with the help of specially designed questionnaires separately for production and marketing of soybean. The secondary data were collected from various issues of season, crop reports and epitomes published by the Government agencies.

The primary data thus collected were compiled and analyzed to workout the cost and returns of production and marketing of soybean whereas the secondary data were

analyzed, district wise to obtain estimates of growth rates in area, production and productivity of soybean. The statistical and econometric tools like simple regressions, exponential functions, various cost concepts, etc were used.

6.2 Summary of findings

1. The background information of sample cultivators according to size of land holding revealed that the average land holding of small, medium and large farms was 1.56, 3.03 and 4.71 hectares, respectively, whereas, at overall level it was 3.10 hectares. The literacy level was more or less same in small and medium size groups of in farmers, whereas large farmers showed maximum literacy. This indicated that there was direct relationship between farmers and size of land holding.
2. The cropping pattern showed that in cereals Rice, maize, rabi jowar, wheat were grown and in pulse gram is major crop, in oilseeds soybean and groundnut are major crops grown by the farmers. At overall level, the percentage of area under soybean to gross cropped area was 21.85 and 22.80, 20.85, 22.17 per cent in small medium and large groups respectively. The percentage of wheat, rabi jowar and gram to the GCA was12.58, 4.63 and 4.41 per cent, respectively. The cropping intensity was 158.98 per cent.
3. The resource use structure for soybean revealed that, at overall level, per hectare human labour utilization was 86.25 man days. Bullock labour utilization was 5.04 pair days and, the machine labour utilization was 5.65 hrs. Per hectare seed utilization was 66.88 kg. Use of N, P and K

per hectare was 44.30, 68.00 and 9.19 kg. Manures applied were 11.12 quintals and the average per hectare yield obtained was 19.02 quintals.

4. The per hectare cost of cultivation i.e. Cost 'C' for soybean at overall level was to ₹.49343, whereas Cost 'A' was ₹.26525 which accounted for 53.75 per cent of the total cost and Cost B was ₹.45175; sharing 91.55 per cent of the total cost. The major items of working expenditure on soybean farms were Rental value of land (21.16%), hired human labour (14.94%), seed (6.77%) and bullock labour (6.13%)
5. Per hectare gross income received by soybean, revealed that at overall level it was ₹.63433. Small size group has obtained more gross income followed by medium and large. The average overall value of cost 'A' ₹ 26525, cost 'B' 45175, cost 'C' ₹.49343. Income at costs 'A', 'B' and 'C' was ₹ 36909, 18258 and 14090 respectively. B:C ratios at three costs are 2.39, 1.40, 1.29 respectively. It indicate the profit at cost 'A' is maximum followed by profits at cost 'B' and cost 'C'.
6. The production function analysis revealed that, the selected independent variables were highly significant except application of phosphorus (X_5). The regression coefficient of human labour (X_1), manures (X_3), nitrogen application (X_4), potassium (X_6), were found to be significant at 1 per cent level of significance and bullock labour at 5 per cent level of significance. The value of coefficient of multiple determinations was 0.77.
7. The disposal pattern of soybean growers showed that the

average per farm total retention was 1.13 quintal by sample farmers. Marketable surplus was 17.65 quintal (93.93%) per farm.

8. In the study area, following marketing channels were observed.

   Channel I : Producer-Commission agent-Wholesaler-Mill owner.

   Channel II : Producer-Wholesaler-Mill owner.

9. Per quintal marketing cost given through channel I was ₹.356.13 and from Channel II was ₹.172.20. Cost incurred on commission charges was highest in channel I and II followed by Transportation cost.

10. Gross price received by farmer was Rs 3312 from channel I and ₹.3350 per quintal from channel II. Wholesalers (2.63%) take more margin than commission agents (2.37%) at overall level. Price paid by mill owner was high in case of channel I than channel II.

11. The area of soybean in Kolhapur district had been decreased at the rate of 3.65 per cent per annum, but production and productivity increased at the rate of 1.70 and 5.39 per annum respectively during the period of 10 years i.e. from 2002 to 2012. In selected district, smaller growth rates of all the three varieties *viz.,* area, production and productivity of soybean in a given period of time were noticed. The smaller growth rates in production were partly due to decreased area and partly due to increased productivity of soybean in Kolhapur.

12. Considering the problems in production, incident of pest and diseases and Non availability of timely loan such

problems were faced by 54.16 per cent of farmers. High cost of seed problem was faced by 51.38 per cent of farmers. It shows that the fifty per cent of farmers were facing same type of problems.

13. Considering the constraints in marketing, 70.83 per cent of farmers faced the problem of lack of gowdown facility to store the soybean during the period of rainy season in the market. High commission rate 66.66 per cent of farmers faced a problem in the market. 62.50 per cent producers faced the problem of late payments.

6.3. Conclusions

1. The cropping pattern of sample farmers in Kolhapur district were dominated by sugarcane and soybean crops and it contributed about 28.03 and 21.85 per cent respectively share in GCA, which was greater than other crops.
2. There is variation in the use of resources in soybean cultivation on different size group of farms. Productivity of soybean per hectare was highest on small size of group followed by large and medium size of group.
3. From the production function analysis, it is concluded that, productivity of nitrogenous fertilizers, human labour and manures have contributed greatly to the yield of soybean enterprise. The regression coefficients of all the selected variables except phosphorous was positive indicating there is a scope to increase the use of these variables for getting an advantage of increasing return to scale.

4. The resource use pattern needs to be adjusted to rationalize the soybean production function in the study area.
5. Out of two marketing channels identified channel-II: Producer-Wholesaler-Mill owner (processor) was found profitable from producer's point of view as producers share in consumers rupee was recorded as 92.35. Highest marketing costs were incurred by wholesalers followed by commission agents.
6. In Kolhapur district, negatively growth rates of area and positively growth rates of production and productivity were obtained. At the overall, the growth rate of area was negatively significance while production and productivity of soybean were non-significant. The smaller growth rates in production were partly due to decreased area and partly due to increased productivity.
7. The various problems faced by the soybean growers in the production aspects need to be addressed, so as to increase yield. Present investigation indicated that the soybean production is a profitable enterprise which needs to be encouraged by the Government agencies.

6.4 Policy implications

1. By now, the prices of soybean offered were compatible with other crops; and therefore resulted into most rewarding crop. The policy makers, however, will have to ensure that the stable and rewarding price policy of soybean is maintained for a longer period. This will ensure the stable area under soybean for adequately longer period.

2. The sale of soybean has not been affected through co-operative marketing societies by any of the producer sellers. Therefore, it is recommended that the producers be educated for sale of soybean through co-operative marketing society. Efforts are needed to establish co-operative processing units in the study areas, which will help farmers to reap benefits for their produce. Also storage facilities need to be increased.
3. Though there were satisfactory growth rates in productivity of soybean during last decade, there is still scope to improve the productivity. This can be done by varietal improvement and by educating the farmers to adopt the improved method of technology. It was observed that there was a less use of bullock, human and machine labour by the soybean cultivators. The productivity can be increased by increasing the use of these resources up to their optimal points in of soybean cultivation.
4. The dissemination of knowledge of various production practices such as harvesting time, packaging, storage etc, should be done to cultivators, as it was pointed out by the farmers themselves. This can be done by agricultural extension agencies of the Department of Agriculture or through the newly established farmers-scientist forum of the State Agricultural Universities.

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8. APPENDIX

QUESTIONNAIRE (2012 -13)

"Economic of Production and Marketing of soybean in Kolhapur district"

DATA COLLECTION SCHEDULE

A. Questionnaire for sample grower
General information about the cultivator

Name : .....

Age : .....

Education : .....

Village : ..... Tahsil :.....

District : .....

Occupation : .....

Main : .....

Subsidiary : .....

I. Details of the family members

Sr. No	Family members	NO.	Occupation	
			Main (Farming / dairy / business / service / any other)	Subsidiary
1. 2. 3.	Male Female Children			

II. Cropping pattern

Season	No.	Crop	Variety	Area (ha)		Total area (ha)	Production (q/ ha)		Total production (q/ha)	Total gross income
				Dry	Irrigated		Dry	Irrigated		
Kharif	1. 2. 3. 4.									
Rabi	1. 2. 3. 4.									
Summer or Perennial	1. 2. 3. 4.									

III. Information about the buildings

Sr. NO.	Type of buildings	No.	Type of construction	Year of construction	Remaining life	Present value (Rs.)	Repair during to current year (Rs.)
1.	Residential House						
2.	Part of residential building used for storage						
3.	Godown						
4.	Cattle shed						
5.	Engine shed Wells						
6.	Life with pipeline						
7.	Threshing yard						

IV. Implement and machinery

Sr. NO.	Type	Number	Year of Purchase or construction	Value (Rs.)	Present value	Repairs during current year (Rs.)
A	**Implements**					
1	Iron plough					
2	Seed drill					
3	Harrow					
4	Hoe					
5	Bullock cart					
6	Spade					
7	Weeding Hook					
8	Sickle					
9	Axe					
10	Spade					
11	Kudal					
12	Wire rope					
13	Other					
B	**Machinery**					
1	Oil engine					
2	Elect.Motor					
3	Tractor					
4	Sprear					
5	Duster					
6	Motor cycle					
7	By Cycle					

V. Livestock inventory

Sr. No.	Type	Number	Homebred/ Purchased	If purchased		Present value(Rs)
				Year	Value (Rs)	
1	Bullocks a.Working b.Non-working					
2	Bulls					
3	He buffaloes					
4	Milch animals a. Cows b. Buffaloes					
5	Dry animals a. Cows b. Buffaloes					
6	Calves Heifers					
7	Others					
8	a. Goat b. Sheep c. Poultry					

VI. Land Inventory:

Sr. No.	Survey No.	Soil Type	Total land (ha)	Fallow land (ha)	Cultivated land		Value of land (Rs)	Land Revenue (Rs.)
					Irrigated (ha)	Dry (ha)		
1								
2								
3								
4								
5								

VII. Cost of Cultivation of (Irrigation / Dry) --------- Season---------Area (ha) --------- Variety --------

Sr. No	Particulars	No. Of Operations	Required inputs			Required labour								Hiring charges			
						Owned											
			Name	Qty	Value	M.	F.	B.	ML.	M.	F.	B.	ML.	M.	F.	B	ML.
1	Ploughing																
2	Picking of stubbles																
3	Harrowing																
4	Sowing & layout																
5	Weeding																
6	Hoeing																
7	FYM transportation & use																
8	Use of insecticides a) Liquid b)Dry																
9	Use of Herbicides a) Pre emergence b) Post-emergence																
10	Irrigation																
11	Harvesting																
12	Transport to Threshing yar																
13	Threshing																
14	Transportation																
15	Packaging																
16	Storage																

Yield Main : qtl.
By produce: qtl.

Disposal of soybean (q.)

1. Soybean Sold
2. Soybean given to balutedars
3. Soybean given to labours
4. Soybean given free of charge
5. Soybean kept for home consumption
6. Soybean kept for speed purpose
7. Soybean kept for cattle shed
8. Wastage

VIII. Cost of marketing of soybean in various markets.

Month	Place of sale (Mkt)	Market Distance From farm (km)	No. of Bags Sent to market	Total Quantity (q.)	Mode of transport	Transportation Cost per q. (Rs.)	Agency to whom sold		Labour Charges (Rs.)		Octroi	Weighing Charges	Commission charges	Any others charges	Total amount received
							Com. agent	processors	Loading	Un. loading					

IX. a) Opinions regarding price realized

1. Did you get reasonable price to your produce Yes/No
   If no what is the reason
   Method of sale of soybean
   Open auction/privy negotiations/hatta system

b) Particular about cultivation of soybean

2. Did you used home seed/purchased
3. Did you get good seed Yes/No
   If yes, whether is time?
4. Do you use sufficient quantity of manures/fertilizer Yes/No
   If no, why? I) it is costly II) Not available III) Not availability in time
5. Whether the pesticide is available?
   a) In time Y/N b) Sufficient quantity Y/N
6. Do you need credit? Y/N
7. Is family labour sufficient for frame work? Y/N
8. What are the difficulties in cultivation of soybean?
   If yes. 1)…… 2)……. 3)……
9. Do you think present marketing system is sufficient? Yes/No
   If no, what are the defects?
   1…… 2…….. 3……..
10. What are difficulties in marketing?
    1……. 2…….. 3……
11. What are the improvement would you suggest in respect following to make soybean growing more profitable.
    1. Variety 2. Control of P/D 3. Seed 4. Fertilizer
    5. Transport 6. Credit facilities 7. Marketing 8. Price
    9. Any other

Questionnaire for Wholesaler

1. Name - .....
2. Age - .....
3. Education - .....
4. Name of the market .....
5. How many years you are in this business?
6. What are the commodities you deal with?

Month	Purchase		Sale	
	Qty (q/s)	Value (Rs.)	Qty (q/s)	Value (Rs.)
November December January				

Annual Total Turnover Rs.

Approximate losses per quintal

8. Other information
   i) Number of servants _ _ _ _ _ _ _ _ _ _ _ _ pay per month
   ii) Size of the shop _ _ _ _ _ _ _ _ _ _ _ Rent paid / month
   iii) Other expenses (Electricity and telephone) _ _ _ _ __ _ _ _
   Total of all expenses
9. Other Stock

General Questions (Marketing) for commission Agent / wholesaler / retailer

1. How do you arrange the purchase of soybean from farmers at different places ?
   a.
   b.
2. Do you have your own adat shops in the market yard?
3. Do you have adequate man power to run all the functions include in market yard
   a.
4. Do you have your own storage facility? It is adequate or inadequate?
5. For how many days / month soybean can be stored in a good condition?
   a.
6. How do you arrange the sale of soybean and how the prices of soybean are determined in market and by which method? open / Hatta / other ?
7. Do you follow the job of grading before the soybean is purchase?
   a.
   b.
8. Whether you have to bear loss in weight of soybean purchased from farmers?
   a.
   b.
9. Is there a problem of capital? If yes, in what respect and to what extent?
   a.
   b.

10. Is there a problem of labour in market?
    If yes, state the problem.
    a.
    b.
11. In which month the price of soybean are higher / lower in the market? State the reason.
    a.
    b.
12. Are you giving advance to the farmer before purchasing or dealing? If yes, how much?
    a.
13. Licensing authority? DO you have the license of both the activities? What the criterion for getting the license? How much is the license renewal fees paid to revenue department?
    a.
14. Is there any transportation difficulties? If yes then what.
15. To whom you are selling the soybean? Wholesales/ any other
    a.
    b.
16. Where you are selling the soybean?
    a. State level market
    b. Out of state
17. Who are arranging the transportation?
    a. Yourself
    b. Buyer
18. Did you have any contacts / contracts whit the buyer if yes, with whom?

19. Are they from Maharashtra or from other state?
20. To which of the following aspects do you give importance while making contract?
    a. Soybean production
    b. Quality
    c. Payment pattern
    d. Transportation
    e. Grading and packaging
21. What are the conditions of contract about payment?
    a. In advance
    b. In time
    c. At the time of selling
    d. After delivery
22. What amount are they paying as advance to you? In production to the quality of produce.
23. How they are paying by direct / Cheque / DD
24. How many purchaser you have contacted during this season?
25. What are the constraints you are facing during marketing?

Questionnaire for Retailers

1. Name ……
   Village ……
   Tahsil ……
   District……
2. Name of the market ……
3. For how many years have you been working as a retailer?
4. Details about your business
   a. Do you have your own stall?
   b. If hired, what is the hiring charge? Rs……
   c. Have you kept some deposit for hiring it ?
      If yes, Amount Rs. ……
5. From whom, do you purchase the soybean
   a. Wholesaler dealers
   b. Commission agent
   c. Farmers'
6. When do you purchase the soybean (Methods of purchase)
   a. Daily
   b. Other
   c. On alternate day
   d. Once a week
7. What is the payment pattern in soybean
   a. Cash
   b. Payment after selling the produce
   c. On the weekend
   d. Other

8. What quantity do you purchase at once?
9. Do you pay any extra charge on purchasing?
   If yes on which aspects?
10. How many products of Soybean you are selling?
    Types 1.
    2.
    3.
    4.
11. How much is the demand for soybean
12. Items of cost incurred by the retailers value addition

Sr. No.	Name of the Products	Purchase price	Selling Price	Time lay between sale and purchase	Taxes

16. Approximate losses during handling
17. How much quantity is handled during this year?
18. Which are the constraints you are facing at time of marketing?

9. VITA

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A candidate for the degree
of
MASTER OF SCIENCE (AGRICULTURE)
in
AGRICULTURAL ECONOMICS
2013

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Personal	
	Born at Gormale, Tal. Barshi, Dist. Solapur on 8th July, 1988. Son of Mr. Kalel Namdev Dnyandev and Mrs. Kalel Rupashri Namdev.
Educational	
	Attended Primary School at Zilla Parishad Primary School, Gormale, Tal. Barshi, Dist. Solapur. Passed S.S.C. examination from Maharashtra Vidhyalaya,

	Barshi during 2005 in First class. Passed H.S.C. examination from S. B. Z. C. Barshi during 2007 in First class. Completed Bachelor of Science (Agriculture) degree from College of Agriculture, Dapoli in Second Class with CGPA 7.45.
Extra-curricular activities	Completed NCC 'B' certificate. Participated in NSS camp of 240 hrs.
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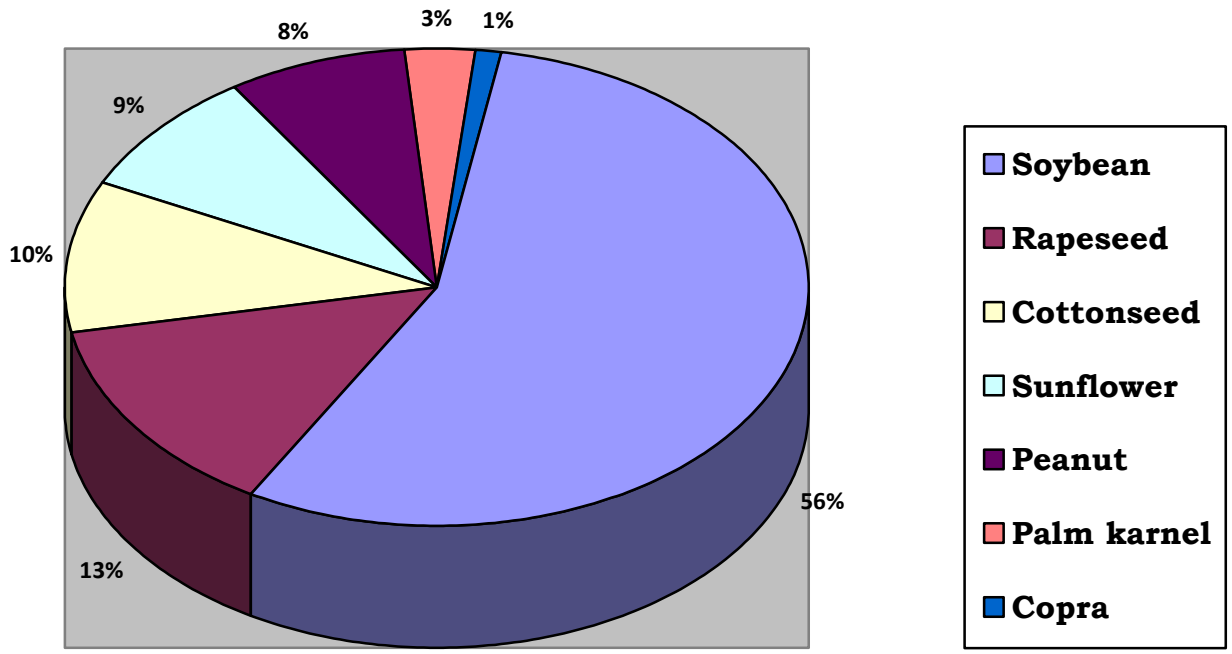


Fig 1.1 Production of major Oil seeds in the World (2011-12)

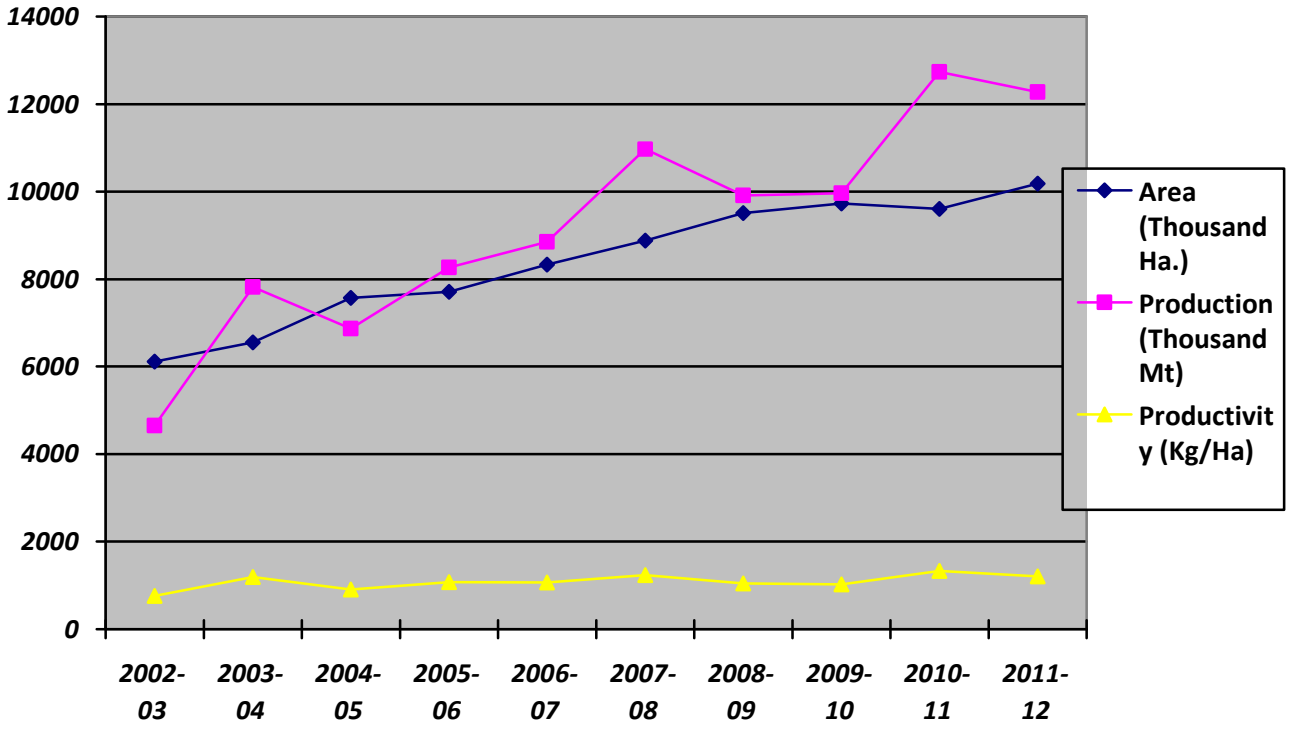


Fig. 1.2 All India Area, Production and Productivity of Soybean (2002-03 to 2011-12)

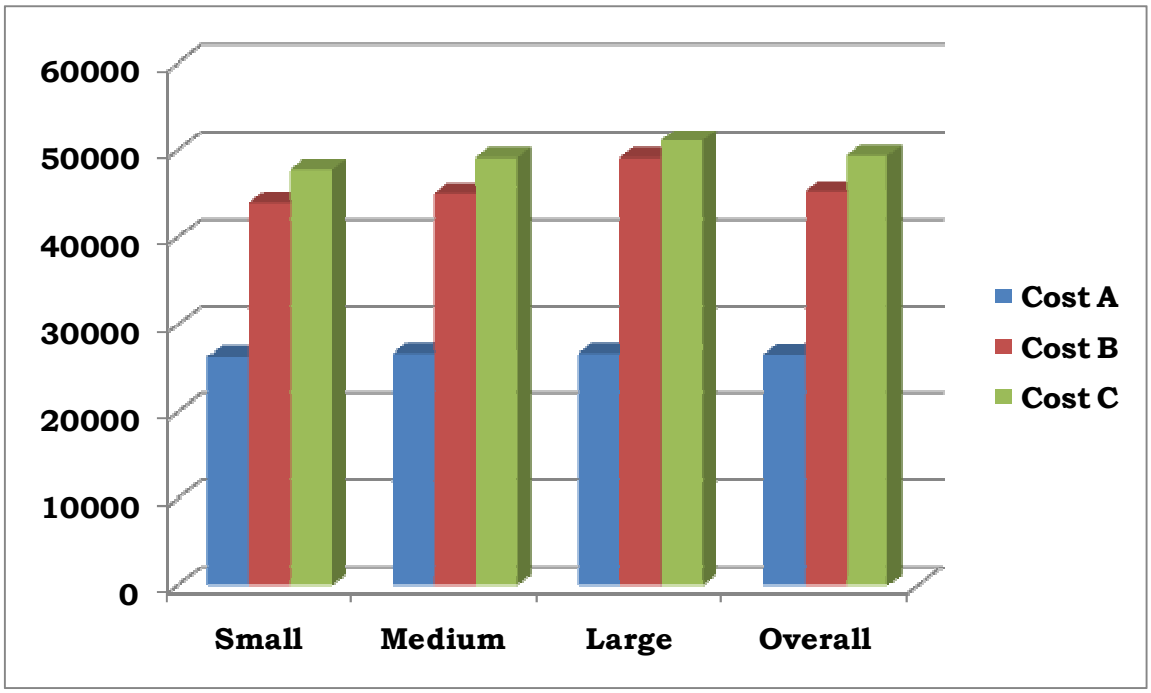


Fig. 5.1 Per hectare cost of cultivation of Soybean in Kolhapur district

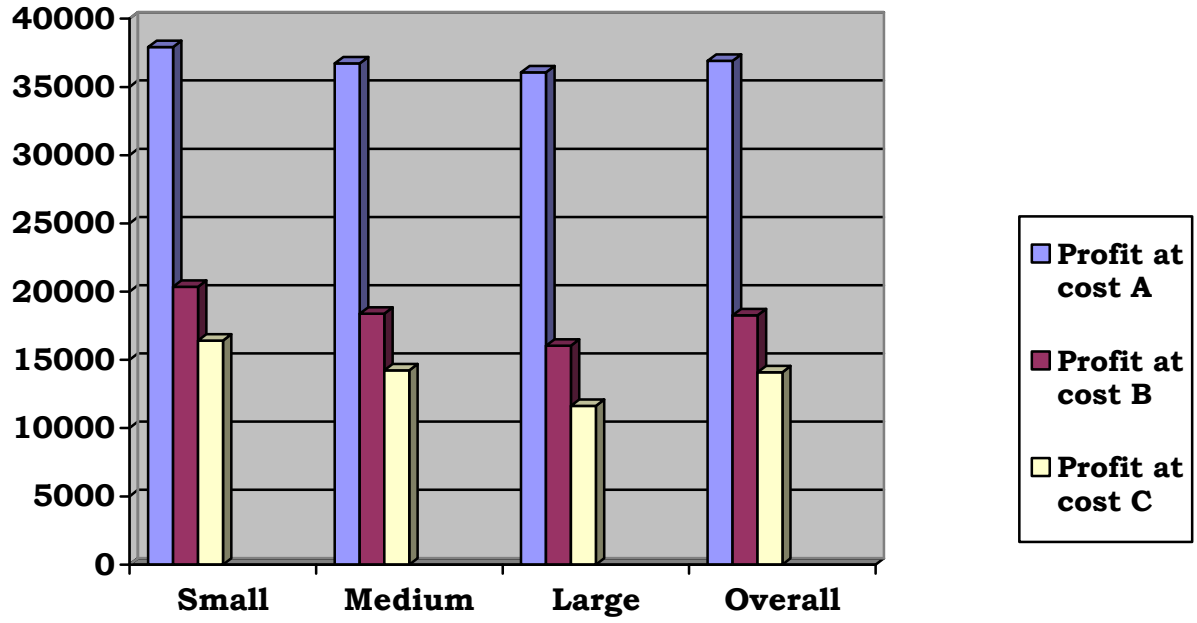
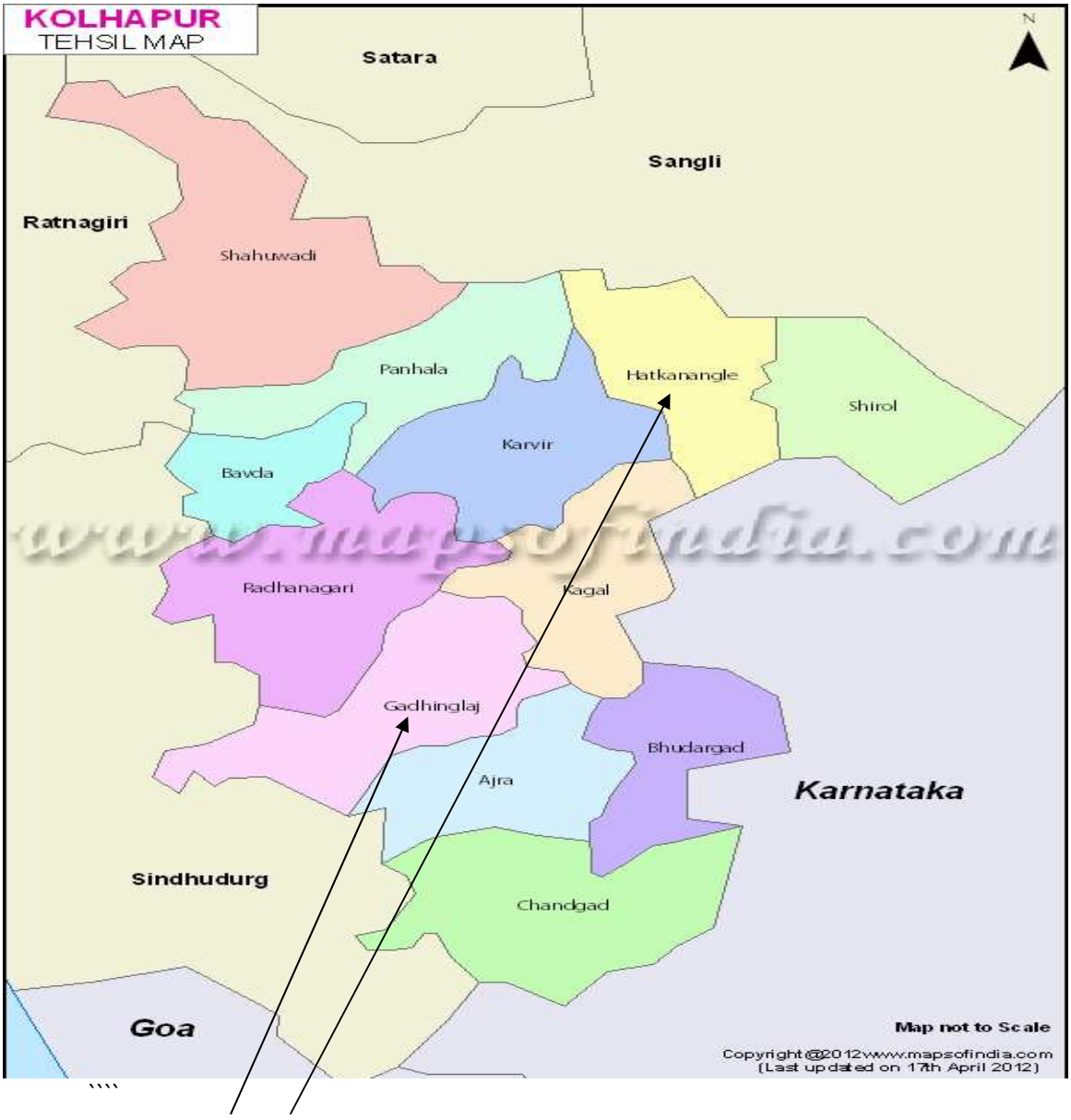


Fig.5.2 Per hectare net profit of Soybean on selected farmers.

Plate No. 1 Standing Soybean in the field

Plate No. 2 Variety of Soybean (JS-335)

Plate No. 3 Different marketing practices of soybean



Selected tahasils

Fig.4.2 Kolhapur District Map

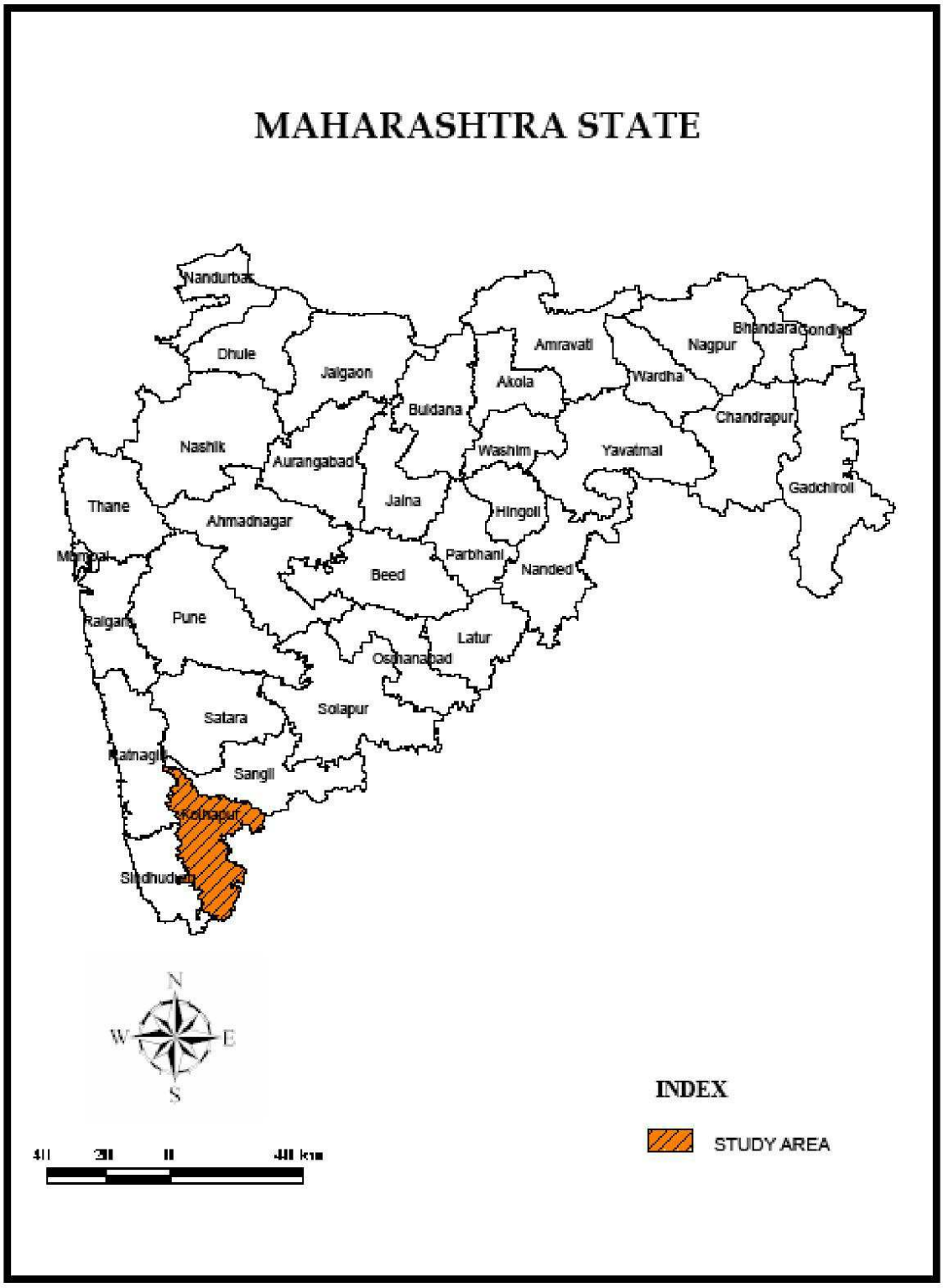


Fig. 4.1 Map of Maharashtra state