An Economic Analysis of Rice Cultivation in Hanumangarh District of Rajasthan

राजस्थान के हनुमानगढ़ जिले में चावल की खेती का आर्थिक विश्लेषण

Thesis

Submitted to the
Sri Karan Narendra Agriculture
University, Jobner
in partial fulfillment of the requirements
for the degree of

Master of Science

in the

Faculty of Agriculture

(Agricultural Economics)

By

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2015

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ACKNOWLEDGEMENTS

I pay my obeisance to ***"The Almighty God"*** *for their gracious blessings: I could able to accomplish this Endeavour.*

I take great pleasure to express my honest and deep sense of gratitude and indebtedness to my Major Advisor ***Dr. R.C. Sharma****, Professor & Head, Department of Agricultural Economics, S.K.N. College of Agriculture, Jobner for his valuable guidance, constructive suggestion, keen and sustained interest, constant encouragement, propitious assistance, kind and gracious patronage in preparation of this manuscript and for providing necessary facilities and benevolent patronage.*

I concurrence my humble thanks to my advisory committee consisting, ***Dr R. C. Kumawat,*** *Professor, Department of Agricultural Economics,* ***Dr. K.N. Gupta,*** *Professor & Head, Department of Statistics,* ***Dr. N.K. Sharma*** *(Dean PGS Nominee), Professor, Department of Extension Education for their valuable guidance, incessant encouragement and keen interest during course of investigation.*

I am highly grateful to ***Dr. R. C. Sharma*** *Professor and Head, Department of Agricultural Economics, S.K.N. College of Agriculture, Jobner for constructive suggestions, generous assistance and rendering help as and when needed.*

I express my sincere thanks to ***Dr. G.L. Keshwa,*** *Dean, S.K.N. College of Agriculture, Jobner, for providing necessary facilities in this venture.*

I wish to express my deep sense of gratitude to ***Dr. S.S. Jheeba,*** *Associate Professor and* ***Dr. Pradeep Kumar*** *Associate professor and other staff members of Department of Agricultural Economics for their valuable help received during the execution of present investigation.*

I offer my sincere appreciation to ***Vinod kumar, Banshi Lal Verma, and Raju*** *(Ph. D. Scholar) and All Junior who boosted my moral and extended unreserved help of varied nature.*

No words are sufficient to express my almost sense of gratitude to my loving father, ***Sh. Kashi Ram,*** *mother,* ***Smt. Mahendra Devi,*** *without their unhesitating 'go ahead' blessings, it would difficult for me to undertake my study.*

I am also grateful to ***Mr. Suresh Yadav*** *of* ***Vimal Computers & Training Centre, Jobner,*** *for typing this script in computer neatly and efficiently within a very short period.*

The most cordial appreciation goes to my beloved brothers, ***Dr. S.P. Maherada, Ratan*** *for their devoted cooperation not only in the course of study but also in various moments of troubles as well as enjoyment in my life.*

Last but not the least, I feel proud to be a son of ***"Maa Sarswati".***

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Chapter-1

INTRODUCTION

Rice (*Oryza sativa* L.) has supported a greater number of people for a longer period of time than any other crop since it was domesticated between 8,000 to 10,000 years ago (Greenland, 1997). At present, rice is the staple food for more people than wheat, and 90 percent of total rice production is grown and consumed in Asia (Evans, 1998). Rice is a monocotyledonous angiosperm. The genus, to which it belongs, Oryza, contains more than 20 species, only two of which are referred to as cultivated rice: *Oryza sativa*, (Watanabe, 1997) cultivated in South-east Asian countries and Japan, and Oryza glaberrima cultivated in West Africa. Rice was originally cultivated in tropical Asia, the oldest record dating 5000 years BC, but then extended also to temperate regions (Watanabe, 1997).

Rice is a staple food for half of the world's population and most of them are living in Asia. It is largely consumed as a wholegrain. Rice is also consumed in the form of noodles, puffed rice, fermented sweet rice and snack foods made by extrusion cooking. It is used in making beer, rice wine and vinegar. Rice bran mixed in adequate quantities with other ingredients is used as a feed for domestic animals. The oil extracted from the rice bran, which is rich in vitamin E, is used for cooking purpose.

Rice is the world's single most important food crop and a primary food for more than a third of the world's population. Rice is grown worldwide over an area of 161 million hectare with an annual production of 678 million tonnes. It is cultivated in 114 of the 193 countries of the world. However, more than 90 percent of the rice is produced and

consumed in Asia, China and India account for about 50 percent of the world's rice area and 56 percent of the production. (David, 1991) .

India has the world's largest area devoted to rice cultivation, and it is the second largest producer of rice after China. Over half of its rice area is irrigated, contributing 75% of the total production. Notably, this area also consumes 50-60% of the nation's finite freshwater resources. Of the country's 1.15 billion inhabitants, 70% rely on rice for at least a third of their energy requirements (Thiyagarajan and Gujja, 2013).

The country's rice production declined to 89.13 million tonnes in 2009-10 crop years (July-June) from record 99.18 million tonnes in the previous year due to severe drought that affected almost half of the country. India could achieve a record rice production of 106.54 million tonnes in 2013-14 crop years on the back of better monsoon this year (Directorate of economics and statistics, 2013-14)

An efficient marketing system is an important means for raising the income levels of farmers. Hence there is a need to estimate marketing cost, margins and price spread in marketing of rice.

The rice cultivators are confronted with a number of problems related to marketing. The important ones are higher cost of marketing, fluctuations in their prices and lack of transportation. Most of the rural markets do not have the basic necessary facilities such as auction

platforms, godowns, warehousing etc., for orderly marketing of the crops. All these problems result in low producer's share in consumers rupee and lower income levels from the farm enterprise. .

Rajasthan, covering a land area of 3,42,239 sq km is the largest state constituting 10.41 per cent geographical area of India and is situated in the north western part of the country. The population of the State as per the Census 2011 stood at 6.86 crores. The average population density of the State is 201 persons per sq. km.

Rice is cultivated in Rajasthan on small area, and its triennium average productivity of the Rajasthan in 2013-14 is 2147 kg/ha which is much below the national average productivity. (4195 kg/ha in Hanumangarh). The low yield is probably contributed due to adoption of old traditional varieties and lack of irrigation facilities. The coverage under high yielding varieties is less than 30% and the area under irrigation is about 50% in the State (www.raj.krishi.gov.in).

Keeping all the above points in mind, the study entitled "An Economic analysis of rice cultivation in Hanumangarh district of Rajasthan" has been taken up with following specific objectives:- to estimate the growth rate in area, production and productivity of rice in the study area , to work out the costs and returns of rice cultivation, to study the marketing cost, margins and price spread in rice and to identify the problems faced by the rice cultivators.

The specific objectives of the study were:

1.1 Objectives:

1. *To estimate the growth rate in area, production and productivity of rice in the study area.*

2. *To work out the costs and returns of rice cultivation.*

3. To study the marketing cost, margins and price spread in rice.

4. To identify the problems faced by the rice cultivators.

1.2 Plan of thesis

The entire study has been presented in five chapters. The first chapter deals with introduction and objectives of the study. A comprehensive review of important relevant studies is given in chapter second. The third chapter deals with methodology adopted for analytic framework of the problem. The fourth chapter presents the production traits of rice. The fifth chapter is meant to present the results and discussions of the investigation. Summary, conclusions and suggestions of the study are presented in chapter fifth. Bibliography is given at the end of the thesis.

1.3 Limitation of the study

1. The study was of the nature of field survey. Though all attempts were made to extract correct information as far as possible, the memory and willingness of respondents, might have caused limit to some extent.

2. The study is also based on primary data obtained from various categories of farmers. Hence, the results are reliable to the extent of the data.

3. Due to the availability of limited time and funds, the study was confined to a sample of 60 farmers from two villages of the district. Therefore, the

result of study, though true to the best of researcher's ability, cannot be generalized.

Chapter-2

REVIEW OF LITERATURE

The comprehensive review of literature is an essential part of any scientific investigation. Its main function, apart from determining the work done before, is to provide an insight in to the methods and procedures adopted by other researchers to suggest changes therein. As such, an attempt has been made to present in brief and lucid details the available literature in relation to the present study. The review is presented below under the following heads:

2.1 Growth rate

Bhalla and Singh (1997) analysed and presented results of Indian state level data on area and output for 43 crops for the period 1962-65 to 1992-95. There was a marked acceleration in the growth rate of agricultural output in India during the period 1980-1983 to 1993-95 as compared with earlier periods. This period was characterized by cropping pattern changes away from coarse cereals towards both rice and wheat and oilseed agricultural growth has become regionally much more diversified. Overall there is a large scope for diversification and export promotion.

Mohandas and Thomas (1997) studied the economics of rice production for different size holders such as small, medium and large farmers in Kuttanad areas of Kerala. The analysis showed that the

percentage increase in gross income per hectare from rice cultivation was highest among marginal farmers followed by large and small farmers. The results of the study showed that cost escalation is the most important factor, which makes rice cultivation a relatively less remunerative enterprise. They suggested that mechanization should be followed wherever possible to reduce the cost of human labour.

Krishnaiah *et al.* (1998) discussed the trend in rice production of Asia, further challenges and concerns and strategies and policies for sustaining productivity growth. Modern methodology has helped in doubling rice production between 1965 and 1995. However, the growing population estimated at 57% during the next three decades forms a major challenge with very negligible scope for the expansion of rice area and of irrigation, decreasing rice prices and also of resource base. The task of producing the target rice production of 686 million tonnes by the year 2025 is a formidable one and calls for accelerated efforts through innovative research and development strategies supported by policies. Appropriate strategies include (i) Consideration of yield gains in irrigated rice ecosystem by countering factors destabilizing rice production. (ii) Increasing the genetic celing in irrigated rice by heterosis and new plant type. (iii) Raising productivity under less favourable rainfed and other marginal problems soil areas by developing location specific management practices and by combating pests and diseases. (iv) Increasing fertilizer and water use efficiency. (v) Strengthening of

research and extension activities for effective technology transfer. (vi) Price polices for rice and input.

Paroda *et al.* (1998) explained that India needs at least a 3 per cent yearly productivity growth rate to be achieved by (i) Using available technology while reducing the constraints to rice production. (ii) Increasing genetic yield and stabilizing productivity through hybrid and technology and (iii) Exploiting abundant untapped opportunities in potential rice growing environment. Food security depends on the management and conversation of the natural resources based in a manner that will ensure the continued supply of rice for future generation.

Singh and Rajan (1998) computed growth performance of principal food grains crops in north Bihar, India over the period 1970-71, 1994-95. The study revealed that production recorded positive growth rates during the post-green revolution period. There has not been a substantial increase in area under rice during the period studied. Moreover a declining trend in rice area has been observed during the early 1990. The decline in instability has been due mainly to adoption of improved technology in crop production.

Borthakur and Battacharya (1999) worked out compound growth rates of area, production and productivity for three periods viz., -pre-green revolution period (1951-52 to 1970-71), post-green revolution period and for the total period. The growth of area, production and

productivity were found to be positive and significant (1.27%, 1.86 and 0.58%, respectively). The author finally concluded that green revolution has not made much impact on production of rice in Assam.

Siju and Komjairaju (2001) analyzed the trend in rice production by fitting linear trend equation for area, production and productivity for the time period 1949 to 1998 and 1988 and 1998. The results revealed that during 1949 to 1998, value of 'b' pertaining to area was negative but not significant implying that the area under rice remained almost at the same level. The 'b' value for production and productivity were found to be positive and significant (0.08** and 0.38**, respectively). This indicates that rice production and productivity have shown an increasing trend in Tamil Nadu over the years. The compound growth rates worked out for the period 1949-98 showed positive and significant growth rate of 1.83 per cent.

Gyanendra and Chandra (2001) examined growth rates of area, yield, production, cost and profit of paddy in India by fitting different functional forms on time series data from 1975 to 1998. They observed that overall growth rate in area under paddy was small (0.47 per cent per annum). Linear trend analysis on yield revealed a growth rate of 2.58 percent per annum. The results indicated that the overall growth rate in paddy production was 3.06 per cent per annum. Growth trend in cost of production showed 8.09 percent increase per annum during the period 1975-76 to 1996-97. The study concluded that higher growth rate

of paddy yield had been the major factor to increased production.

Kumar *et al.* (2001) analyzed the area, production and productivity of all the major crops of Haryana, namely wheat, rice, gram, bajra, mustard, sugarcane and cotton (American and Desi) for the period 1966-67 to 1995-96.The data were taken from the statistical abstract of Haryana. The study reported that in case of cotton (American), the production increased mainly due to increase in area. However, in case of cotton (desi) the negative area effect exceeded the positive yield effect .The researchers felt that there was an urgent need to check the decreasing trend in the area under desi cotton. The production of cotton (American) can be further increased by increasing its productivity.

Kalamkar *et al.* (2002) conducted a study to examine the growth in area, production and yield of principal crops in India over the period of five decades (1949-50 to 1997-98) and concluded that the growth rates of area, production and yield of principal crops in India over the period were positive and significant. High growth in production accompanied by increased variability in production, increased risk associated with the production. The yield effect was the most important factor for increase in production of rice, jowar, maize, cotton and sugarcane.

Singh and Chandra (2003) tested various functional forms and

found that exponential function was the most appropriate to examine the growth trends of area, production and yield of paddy in India. They studied the growth rates in area, production and productivity and found that as a result of increase in area under cultivation and yield, the overall growth rate in paddy production had been very significant (2.96) during - the 1975/76 -1990/00 period. Yield increased by 2.42 per cent whereas acreage increased by 0.52 percent.

Verma *et al.* (2006) worked out the annual compound growth rates of area, production and productivity of principal crops in Madhya Pradesh for the period 1986-87 to 2000-01. The trend analysis indicated that there was a major break-through in the annual compound growth rates of area and productivity of oilseeds at 2.35 per cent and 1.68 percent, respectively, resulting in higher growth of production at 4.03 per cent per annum.

Saravanadurai and Kalaivani (2010) examined the growth actions of area, production and yield of selected cereal crops in the Tamil Nadu state. Using the data from 1993-94 to 2007-08, the Compound Growth Rate (CGR) of area, production and yield for the selected cereal crops in the Tamil Nadu state were estimated for each period to study the growth performance of area of cultivation, production and yield of these crops. In Tamil Nadu state, the paddy holds good performances in absolute terms, among the other cereal crops are concerned. But the compound growth rate reveals that the maize was found to be positive and records

the highest growth rate among other cereal corps in terms of area of cultivation, production and yield in Tamil Nadu over the study period. Despite the fact that maize was found to acquire highest in terms of growth actions of area of cultivation, production and yield among other cereal crops, it cannot serve the purpose of livelihood for majority of the population in Tamil Nadu state. Hence, the importance had given to the paddy cultivations. Besides, the study suggests that the farmers can also cultivate maize for the money-making purpose in the Tamil Nadu state that suits the climatic conditions of the state as well.

Kumar and Sudheesh (2013) studied rice which is the staple food of the people of Kerala. Rice is cultivated throughout the country. The important rice producing areas in the state are Kuttanad and Palakkad. Rice production has been stagnating around 10 to 11 lakh tones during the past decade. Paddy cultivators have been facing various problems as paddy did not fetch the reasonable price all over the country. The fall in the price leads to increase in the cost of cultivation, this leads the farmers to commit suicide. The number of farmers committing suicide has been increasing because of the unfavorable climate condition, low price, high cost of cultivation. Paddy cultivation of Palakkad is falling down over the period of time. This paper analysed socio economic background of the paddy cultivators in the selected villages of palakkad district and also analyzed the problem of the paddy cultivators. The major causative factors identified by the social scientist are shortage of labour and low price for paddy. This paper emphasises the group management for improving the economies of paddy cultivation through

better management based on low cost technology, improvement in productivity, selective mechanization and cost reduction. This statement has been proved in the present study.

2.2 Cost and returns

Banerjee (1985) stated that farms classified on the basis of size of holding depicted a rough picture of inverse relationship between that farm size and productivity. The marginal and small farmers were more efficient in using the variable resources and as a result productivity was more on these farms than on medium and large farms.

Santha *et al.* (1993) worked out the cost of cultivation and profitability of paddy crop in Kerala using primary data collected for three cultivation seasons. The findings showed that the cost of cultivation per hectare was minimum for Viruppa season, which was found to be ₹ 726.16 while there was not much difference between the cost of cultivation during Mundakan and Punja, which was ₹ 4641.51 and ₹ 4625.50, respectively. The input-wise split-up revealed that the major share of the total cost was on hired human labour, which accounted for 22.62 per cent for Virappa and 25.57 per cent for Mundakan and 27.22 per cent for Punja. The next important input was the imputed value of rent on land. The cost A, which forms the paid out cost accounted only for 62.54 per cent in Viruppa, 65.04 per cent in Mundakan and 67.74 per cent in Punja. The profitability analysis revealed that return per rupee

invested was the highest for Viruppa (1.4) followed by Mandaka (1.33) and Punja (1.27).

Mohandas and Thomas (1997) studied the economics of rice production for different size holders such as small, medium and large farmers in Kuttanad areas of Kerala. The analysis showed that the percentage increase in gross income per hectare from rice cultivation was highest among marginal farmers followed by large and small farmers. The results of the study showed that cost escalation is the most important factor, which makes rice cultivation a relatively less remunerative enterprise. They suggested that mechanization should be followed wherever possible to reduce the cost of human labour.

Shaikh *et al.* (1998) worked out costs and returns of major crops grown in Andhra Pradesh. The overview of the study revealed that human factor accounted for major share in total cost of all the crops including paddy in all the zones of Andhra Pradesh, while the adoption of plant protection measures were low in almost all the crops except in cotton. The analysis of profitability in case of cereals indicated that paddy claimed a lion's share of higher profitability in high potential irrigated zone of Krishna-Godavari compared to other zones. Similar situation was observed in case of maize in Krishna-Godavari zone, which was due to wider acceptance of technology by the farmers.

Umashankara et al. (1998) worked out costs and returns in paddy farming in hilly zone of Karnataka. The cost of cultivation per acre in low land situation (transplanted) was higher (₹ 4930.96) than upland situation under drill sown (₹ 4716.04). This was due to increased usage of labour, fertilizers, pesticide and improved varieties of seeds in anticipation of higher yield. The share of variable cost was 96 per cent of total cost in both situations. Among the variable costs, the cost on human labour was the single largest item. The average yield was found to be 15.1 qt. per acre for lowland situation as compared to 13.1 qt. for upland districts. The net returns were ₹ 3498.46 per acre in lowland and ₹ 2442.38 per acre in upland area.

Chinnappa (2001) conducted a study to examine the cost and resource use structure and profitability of rice based cropping system in southern transition zone, Karnataka. He found per acre cost of cultivation ₹ 15391.35, 12689.14 and 13954.34 for rice-rice, rice-jowar, rice groundnut system, respectively. Net return on a per acre basis was highest in the rice-rice system and lowest in the rice-ground nut system.

Krishna *et al.* (2001) conducted a study to work out costs and returns of paddy cultivation in Kerala state through a sample of 100 farmers. The total cost of cultivation per hectare was ₹ 31043.75. In this, human labour share was 61.46 per cent of total cost. Total returns per hectare of cultivation were ₹ 27023.68 which was below the total cost incurred and the net income was negative with a loss of ₹

4020.08 per hectare and B-C ratio was 0.87, indicating unprofitable situation. However, rice and prawn cultivation together pushed B-C ratio to 1.27. The study concluded that there was an increased trend towards double crop of prawn. One of the major recommendations made in the study was mechanization of rice farming operations.

Satapathy and Tripathy (2001) stated that operational cost constituted more than 50 per cent of the total cost of sample rice farmers in Cuttack district. Irrespective of farm SBC and type expenditures on human labour, fertilizer and manure, seed and plant protection chemicals were the important components of operational cost. Similarly rental value of owned land, interest on fixed capital and depreciation charges were the major components of fixed cost.

Neelappa *et al.* (2002) studied the costs and returns structure in cultivation of paddy in Tungabhadra command area (TBP) of North Karnataka. The profitability aspect of paddy cultivation in TBP was analyzed by computing per hectare cost and returns. The per hectare cost of cultivation of paddy was ₹ 26192, ₹ 25938 and ₹ 23822 for Bellary, Raichur and prize winning farmers respectively. The variable costs constituted the major proportion of total cost of cultivation of paddy farming, which was about 85 percent. The expenditure on human labour was found to be major item of variable cost. The gross returns per hectare of paddy cultivation were ₹ 42851 and ₹ 40735. It was ₹ 45350 for prize-winning farmers. The net returns per rupee spent in paddy

were estimated to be ₹ 1.64 for farmers in Bellary, ₹ 1.57 for farmers in Raichur and ₹1.90 for prize winning farmers.

Sileshi *et al.* (2003) conducted a study to analyze the changes in the costs and returns of wheat, paddy and cotton crops in Punjab to ascertain the performance of agricultural sector. The study concentrated on post-green revolution period from 1971-72 to 1996-97. They observed that the total cost of paddy cultivation increased by 136.86 percent from ₹ 5952.53 in 1982-83 to ₹ 14159.37 in 1993-94 per hectare. However, at constant prices, the increase was only 0.43 per cent indicating that it was the inflationary pressure. At constant prices, there was a decrease in the variable cost due to increased level of mechanization that pushed the fixed cost and reduced the variable cost on labour.

Sreeja *et al.* (2004) studied the economics of rice, tapioca, coconut and rubber grown in Kerala by analyzing costs and returns data for the year 2002-03 collected from Kallam district. Analysis of cost of production data for rice revealed that variable cost accounted for 82.37 percent of the total cost and labour cost alone represented 69 per cent of the total cost. The cost-benefit ratio for rice was 1.09 which was the lowest compared to other crops studied indicating that all other crops ensured better income to the farmers. The findings further confirmed the trend of changes in cropping pattern. Area under cereals dropped by 34 per cent from 1982-83 to 2001-02 period mainly due to the reduction in area under paddy which was diverted to other profitable crops.

Zulfiqar (2005) determined the net returns of three main crops,

i.e. wheat, rice and maize, in the district of Malakand, Pakistan Northwest Frontier, during the year 2000. The total cropped area of the 75 respondents was 270 acres each during the kharif and rabi seasons. Wheat was grown on 87% of the cropped area during the rabi season, while rice was sown on 75% of the area and maize on 9% of the area during the *kharif* season. The total cost was 6095, 4073 and 4104 rupees per acre for rice, maize and wheat crops, respectively. The total gross returns of rice, maize and wheat were 10932, 7745 and 8613 rupees, respectively. The net returns of the aforementioned crops were 4837, 3672 and 4509 rupees per acre, respectively. The study as a whole shows that rice gives more net return than wheat and maize in the study area.

Afroz and Islam (2012) conducted the study to estimate the relative profitability of growing *aus* rice and jute and to determine the resource use efficiency in the production of these crops in three selected villages of Raipura upazila in Narsingdi. A total of 60 farmers were interviewed to collect primary data of which 30 farmers produced *aus* rice and another 30 farmers produced jute. Total costs for producing jute and *aus* rice were Taka 50254 and 44970 per hectare, respectively. The equivalent gross returns were Taka 83717 and Taka 55762, respectively. Accordingly, net return for jute was Taka 33463, which was about 3 times higher than that for *aus* rice (Taka 10792/hectare). Moreover, BCR of producing jute was about 30% higher (1.7) than that of *aus* rice (1.3). Cobb-Douglas production function was used to

estimate specific effects of individual inputs on production of jute and *aus* rice. Resource use efficiency analysis showed that neither jute nor *aus* rice farmers was efficient enough to use various inputs. Therefore, it seems that efficient and judicious use of various resources would enable both jute and *aus* rice farmers to earn more profit.

2.3 To study the marketing costs, margins and price spread

Ohajianya and Onyenweaku (2003) studied small-scale rice farmers are not equally considered with their large scale counterparts in resources inputs allocation and distribution with the presumption that their returns on investment is not as high as those of the large scale farmers. However, this presumption of lower returns on investment has no empirical backing for rice production in Nigeria. This study was designed to analyze the costs and returns of rice farming by farm size in Ebonyi state of Nigeria. Data were collected through the cost-route approach with pre-tested structured questionnaire from 40 randomly selected small scale and 40 purposively selected large-scale rice farmers, Data were analyzed by Net Farm Income analytical technique, Z - statistics and percentages. Rice production was found to be profitable enterprise but there was no significant difference in the net farm income levels of large scale and small-scale rice farmers. Labour cost is a major component of the total variable costs in rice farming and is higher in large-scale rice farms. There would be increased rice outputs and farm income if resource inputs are equally distributed among large

scale and small scale farmers by the agencies charged with farm inputs distribution.

Abassian *et al.* (2005) studied the marketing margin which is defined as the difference between the producer's price and the consumer's price and it can be affected by various factors. In this article, noting the fact that Sistan and Blouchistan province is one of the most important date producers in Iran, an attempt is made to estimate the economic function of factors affecting the date marketing margin in the province. The data required in this research has been collected through field survey and document analysis. The results of estimation of marketing margin functions obtained through utilizing a combination of models including the Price Increase Model, Relative Price and Marketing Margin. Data analysis indicates that farm-gate price and harvest margin of dates are among the highly influential factors on the entire marketing margin. The retail-margin function is influenced by retail price and retailer cost and the wholesale margin function is affected by wholesale price and wholesaler cost. Calculation of market transparency determination criteria shows that due to the fact that the total of farm-gate price and marketing costs are less than the retail sale, there is lack of transparency in studying marketing channels, which in turn resulted in the declining market efficiency.

Chauhan and Chhabra, (2005), conducted a study on the production, marketed surplus, disposal channels, margins and price-

spread for maize cultivation in the Hamirpur district of Himachal Pradesh. A multi-stage stratified sampling technique has been used to select the sample of blocks (2), villages (10) and maize growers (120) for the year 2001-02. The study on factors affecting marketed surplus, and cost & margins in the marketing of maize has revealed that farm-level marketable surplus is comprised of 53.21 per cent of the total production. The practices of storing maize for some time and selling at a later date at higher price have led to storage losses to the extent of 0.16 quintal (2.80% of marketable surplus). Much of the marketable surplus of maize (66.92%) was disposed off by a majority of farmers (74.56%) during the first quarter (October- December). Producer → Local trader → WS/ CA → Processor/ Consumer has been found as the main channel in the marketing of maize followed by about 71.93 per cent farmers, accounting for about 70 per cent of the produce. The producer's share in consumer's rupee has been estimated at 78.01 per cent in this channel.

Murthy *et al.* (2007), explicit evaluation of the post-harvest losses at different stages of marketing and their impact on farmers' net price, marketing costs, margins and efficiency have been presented. It has been found that the existing methods tend to overstate the farmers' net price and marketing margins of intermediaries. In fact, the margin of the retailers' after taking into account the physical loss during retailing has been found to be negative (loss), which otherwise, was positive (profit) in the conventional estimation. Similarly, the producers' net share and

wholesalers' margins also decrease substantially. It has been shown that marketing efficiency is inversely proportional to the marketing losses. The co-operative marketing has been found to be a more efficient system in terms of both operations and price. Marketing cost has been identified as the major constraint in the wholesale marketing channel and bringing down the costs, particularly the commission charges as demonstrated in the co-operative channel, will help in reducing the price-spread and increasing the producers' margin. The need for specialized transport vehicles for perishable commodities has been highlighted.

Muhammad-Sajjad *et al.* (2008) studied marketing channels, marketing costs and margins of rice in district Malakand (Pakistans). This study was aimed at determining the distributive marketing margins of rice and the shares of different marketing functionaries involved in the marketing margins in Batkhela Tehsil of Malakand district during the year 2004. It was observed that two marketing channels viz. Channel -I (Producer->Wholesalers (Pharia)-> retailer->consumer) and Channel-II (Producer->beopari->wholesaler (Pharia)-> retailer->consumer) were involved in trading of rice in the study area. In channel 1, the producer received 17.90% net margin and 41.04% gross margin. However, in channel 2, it was found that the producer gained less net margin (36.36%) and gross margin (14.54%). The main reason behind the reduction in net margin and gross margin was observed to be relatively low involvement of farmer in the marketing activities.

Wang and Lee (2009) tested whether changes in the marketing margin between the farm and the retail prices can result in an asymmetric relationship between the farm and the retail prices in the rice market of Taiwan. By separating the transaction cost variation into two regimes, this paper utilizes a two-regime TVECM with the error correction term serving as the threshold variable to create a non-linear threshold model. The empirical results show that when the marketing margin is lower than the threshold value, the market system operates freely and there is feedback between the farm and retail prices. However, when the marketing margin is higher than the threshold value, the government intervenes in the market and the causality between the farm and retail prices no longer exists. The conclusions are as follows. Changes in the marketing margin can cause the asymmetric price transmission between the farm and retail prices in Taiwan's rice markets; therefore, ignoring the effect of the marketing margin could lead to errors in the models. When the marketing margin is higher than the threshold value, the government intervenes in the market and the causality between the two prices is broken.

Balaji *et al.,* (2010) focused on the identification of potato marketing channels, ascertainment of margins of different inter mediaries and examination of marketing efficiency in the Punjab state, was based on the primary data collected from 80 potato growers, 10 village trader/ itinerant trader 10 wholesalers and 10 potato retailers from top two potato growing district (Jalandhar and Hoshiarpur). The marketable surplus worked out to be above 73 per cent of the production

in Punjab. The prevalent channels for marketing of potato have been identified as producer-wholesaler-retailer (Channel-II). The result showed that the producer in Jalandhar market were getting only about 70.8 and 68.6 per cent of the price paid by the consumer in channel I and II respectively. The corresponding figures for hoshiarpur market were estimated as 70.9 and 68.3 per cent for channel I and II, respectively. The result pertaining to market efficiency show that channel I was more efficient as compared to channel II in both the market. This was mainly due to the fact that an additional intermediary (village trader) was involved in channel II which inflated the price spreads, which is a clear indication for the elimination of the intermediaries. This could be achieved through group marketing cooperative marketing and / or contract farming. On the whole the present potato marketing system in Punjab is not conducive to interests of various interest groups as it is infested by many in affiances and deficiencies.

Tuong (2011) studied the rice crop which is considered to be the most important crop in Vietnam. In 2009, Vietnam exported approximately 5.6-6.0 million tonnes of milled rice. Most of the rice follows the marketing channels: (i) Producers–Assemblers – Millers – Polishers – Wholesalers – Retailers – Consumers. (ii) Producers – Assemblers/ Milling/ Polishing – Wholesalers – Retailers – Consumers. (iii) Producers – Millers/ Polishers – Wholesalers – Retailers – Consumers. Analysis of marketing and price spread of normal rice in the first and second channels indicated the producers who sold their

produce could realize 43.26 per cent of the consumer's price. The rest, 56.74 per cent, was shared by other market functionaries. In channel III, producers share of the consumer's rupee was high than that in all the other channels discussed earlier and was about 48.70 per cent of consumer's price. Total price spread in this accounted for 51.30 per cent of the consumer's price. Forecasting price of HQR in CanTho market from September, 2010 to August, 2011 indicated that the HQR price is forecasted to be VND 13,718 per kg in September, 2010, which increases to VND 15,488 per kg in December, 2010. The model was also given HQR price in January, 2011 (15,502 vnd per kg) which will be increasing to VND 16,350 per kg in August, 2011. The government should establish wholesale markets and build warehouse with bigger storage reserve capacity in each province along with procurement center to make rice cultivation more remunerative through increased share of consumer rupees to the producers. There is a need to reduce the taxes and fees for the traders and their business activities, which may lead to reduction in the price spread and thus benefit the rice producer.

Shrestha (2012) analyzed factors affecting retail-price spread of rice in Nepal using the Relative Price Spread (RPS) model with cross section data collected from four districts namely Jhapa, Morang, Chitwan, and Rupandehi in 2008. The flow of the product was traced forward and backward from the selected wholesaler respondents for selecting the farmer and the retailor respondents randomly. The marketing margin is higher in the farm to wholesale market as compared

to the wholesale to retail market. The result revealed that the marketing cost, wholesale price of rice, retail prices of rice, and market information to the farmer significantly influence the marketing margin. Reduction in the transportation cost, improving the market information system, and improving the role of farmer in price determination help reduce the marketing margin.

Ramesh and Vijayan (2012) observed that the total cultivated area of the Cuddalore district is around 2,72,159 hectares. Agricultural marketing plays a vital role in agricultural development which is a pre-requisite for development in other sectors and for the overall development of the economy. An efficient marketing is a sine qua non in the economy of all countries, in general and of agriculturally dominant countries, in particular. Marketing perhaps has its greatest and most enduring role to play in the economic changes in developing countries. An efficient internal marketing system for agricultural commodities holds the key for rural development and for meeting the challenges thrown up by explosive growth of population in developing countries. Marketing holds the key for agricultural development which could determine the quality of urban life.

Chalajour and Feizabadi (2013) studied whether changes in the marketing margin between the farm and the retail prices can result in an asymmetric relationship between the on farm and the retail prices in the rice market of Iran. By separating the transaction cost variation into two

regimes, this paper utilizes a two-type TVECM with the error correction. The empirical results show that when the marketing margin is lower than the threshold value, the market system operates freely and there is feedback between the farm and retail prices. However, when the marketing margin is higher than the threshold value, the government intervenes in the market and the causality between the farm and retail prices no longer exists. The conclusions are as follows: Changes in the marketing margin can cause the asymmetric price transmission between the farm and retail prices in Iran's rice markets; therefore, ignoring the effect of the marketing margin could lead to errors in the models. When the marketing margin is higher than the threshold value, the government intervenes in the market and the causality between the two prices is broken.

Kaur *et al*. (2013) conducted a study in Hanumangarh district of Rajasthan which has the highest production under Basmati paddy cultivation. Tibbi tehsil in Hanumangarh and two villages in Tibbi were selected on the basis of highest area under Basmati paddy. A sample of 50 farmers was surveyed for input use pattern in Basmati and its marketing. The sample included 25 small,16 medium and 9 large farms. The analysis of data revealed that the growth rates of area and productivity were significant. The CGRs of production were non-significant. On an overall basis, cost of cultivation of basmati was ₹ 31098.24. It had a tendency to increase with increase in the size of holding. The gross returns, on an average, were ₹ 101813 and the net income was ₹ 70714.77 per ha. The marketable surplus had a tendency

to increase with increase in farm size. Due to immediate cash needs there was no difference in marketed and marketable surplus. The market analysis of basmati revealed that channel II was more remunerative because farmer's share in consumer rupee was the highest (66.09 percent). The net share to commission agent was 1.37 percent. The net share of wholesaler was 10.72 percent share rupee. The net share of miller was 10.66 percent and the net share of retailer was 2.38 percent. Price spread was maximum in channel I (35.73 percent) followed by channel II (33.91percent).

2.4 Problems faced by farmers

Joshi *et al.* (2004) conducted a study on production and marketing of rice in different developed regions of Nepal and concluded that farmers were facing several production problems such as lack of technical knowledge, lack of irrigation, lack of organized credit facilities, lack of quality inputs, diseases and pests. They also reported marketing problems such as low price of produce, unorganized market and lack of appropriate transportation facilities.

Hangchaun *et al.* (2005) conducted a study to examine characteristics of the rice marketing system in Cambodia. They analyzed that poor roads and illegal fee collection by Govt. officials increased the marketing costs and created distribution barriers to deficit areas. Farmers' income remained very low because they had poor bargaining power for price due to limited chances to meet buyers and inadequate availability of information on agro-product prices. They suggested an open paddy market.

Thanh and Singh (2006) find out the constraints faced by farmers to propose Government's policies regulating to overcome the constraints of rice production promotion and export in India and Vietnam. A study had surveyed on 100 farmers in Punjab and West Bengal states of India and An Giang and Vinh Long provinces of Vietnam. It found that the agro-ecological constraints faced by farmers, ranked from more to less serious were related to dependence on monsoon; land/soil problems; environmental pollution; lack of water and small land holdings. Under technical constraints, it was found that diseases (sheath blight, blast, and stem rot); pests; lack of proper varieties; post-harvest technology constraint; storage problems were the most serious constraints perceived by large percentage of respondents. Fertilizer problems; plant protection constraints; weed problems; lack of labours and poor processing were found to be other constraints as perceived by farmers. In case of socio-economic constraints, the study found that poor infrastructures; high cost of inputs; credit problems; low rice price; inadequate inputs and lack of trainings were the most important constraints as perceived by large percentage of farmers. Other constraints as perceived by lower percentages of farmers were poor extension services; lack of information and lack of helpfulness from local authorities/governments.

Shivamurthy (2008) conducted a study on constraints of farmers cultivating rainfed paddy in eastern dry zone of Karnataka. Of the 24 taluks from 3 districts, 6 taluks (Kanakapura, Channapatna, Tumkur,

Gubbi, Kolar and Bangarpet) were selected based on the size of area under rice cultivation. One hundred rice farmers from 25 villages who cultivated rice during the kharif of 2003-04 were interviewed. Of the farmers interviewed, 89 percent expressed problems associated with high cost of inputs and rising cost of cultivation. The other constraints in rice cultivation consisted of the non-availability of loans (84%), high interest rate on loans (64%), inadequate insurance coverage (48%), susceptibility of the area to drought (90%), pest and disease epidemics (40%), lack of market facilities (71%), lack of transport facilities (52%), lack of profitable marketing channels (79%), shortage in labour resources (61.0%), high wages (51.0%) and shortage of skilled labour (41.0%).

Naing *et al.* (2008) identified yield constraints, input intensities and the general practices of rice cultivation in Myanmar, a survey was conducted during the wet seasons of 2001 and 2002. A total of 98 farmers from five townships in Upper Myanmar and 16 in Lower Myanmar representing the most important areas of rice production were questioned on their management practices, yields, and perceived yield constraints over the previous four years. There was a recent decrease in the overall average rate of fertilizer application, an increase in the prevalence of rice-legume cropping systems, and only localized insect pest or disease problems. Additionally, rice yields were found to be higher in Upper Myanmar, likely the results of more suitable weather conditions, better irrigation, and ready market access. Furthermore, a

number of critical factors affecting production are identified and possible solutions discussed.

Goufo (2008) stated that the economic factors have driven more and more people into the agricultural sector. Today food production constitutes an important component in the livelihood strategies of many farmers. Given the increasing rice consumption trend in the country, rice self sufficiency is seen as a means to achieve food security. The per capita consumption in the country in 2006 was about 23 kg rice equivalents, compared to 2 kg in 1960. The country has highly favorable resources for increasing its production; however, it will not happen automatically. For Cameroonian rice farmers to be able to fully realize sustainable production a number of obstacles need to be tackled and supportive agricultural policies adopted. This paper underlines major constraints to increase rice production in Cameroon. Proposals are also made for the sustainable development of the sector.

Aamer *et al.* (2009) conducted a study to find out production, protection and marketing problems faced by the rice growers in Tehsil Hafizabad, Dist. Hafizabad (Pakistan). They found that timely unavailability of fertilizers, high prices of inputs and expensive labour for nursery transplantation, lack of finance, high prices of pesticides, adulteration in fungicides and monopoly of middle men, lack of storage facilities and distant markets were the major problems faced by the rice growers in the study area.

Nirmala and Muthuraman (2009) studied economics and major constraints in rice cultivation in Kaithal district of Haryana. The study covered four villages of two blocks and data on constraints and cost-return aspects of rice cultivation were collected from 80 farmers. Total costs in rice production amounted to be ₹ 33778.68/ha. Average yield was 4.99 t/ha. Benefit-cost ratio worked out to be 1.27. Pests and disease incidence, lack of remunerative price and labour shortage were the major constraints in rice production.

Muthoni and Nyamongo, (2009) studied Irish potatoes are an important food crop in Kenya, with production volumes only second to maize. Potatoes are produced in the cool highlands mostly by small scale farmers under rain-fed conditions. The soils in these areas are generally acidic and of low fertility due to anthropogenic activities. The national production is far below the potential, largely due to limited use of certified seeds, low application of fertilizers and other organic amendments, and low use of fungicides and other production chemicals. Marketing problems bedeviling potato industry include lack of organized channels in which farmers have no power. The channel is controlled by cartels, which shield producers from receiving any market information. There is a lot of handling and in the process the producer's share in the final price of the commodity is minimal. Transport of potatoes to the market is expensive due to poor road infrastructure in the producing area. Seasonality in production and lack of on-farm ware potato storage lead to minimal returns to farmers.

Alarima *et al.* (2011) identified the constraints to adoption of sawah system of rice production in Nigeria. Data were collected from 124 randomly selected sawah-rice farmers. Data were analysed using correlation and regression analyses to determine the relationships between the study variables. The results showed that respondents were predominantly male (98.80%), married (98.80%) and had Quranic education (62.70%). Farm size ranged from 0.03 to 10 hectares (χ = 0.5ha), mean yield was 4.65 tonnes/ha, and mean income was $1,041.38 ($1 = N145.00). Production and on-farm constraints affecting sawah development were water management and flood. Major economic constraints faced by sawah farmers were lack of viable financial agencies to support production, poor capital base and non-availability of loan. Regression analysis showed that the yield of sawah was negatively related to land acquisition constraints (β=-0.34, $p<0.05$) and technological constraints (β = -0.43, $p < 0.01$). This study concluded that problems faced by farmers were interwoven in which existence of one relates with the other. Addressing these problems will lead to increase in the rate of adoption of sawah rice production technology and ultimately rice productivity in Nigeria.

Kaur and Saran (2011) carried out in Dera Bassi sub division to find out status and constraints of sugercane cultivation in the area. A

sample of 151 farmers was randomly selected from two blocks *i.e.* Dera Bassi and Rajpura climatic constraints for sugar cane cultivation in Punjab will continue to account for disparity in cane productivity and sugar recovery in this area farmer perception based on their experience indicates a good rating for quality of soil, but poor rating for water quality. The varities already being grown were found to be recommended ones and some non- recommended with good sugar recovery, but a gap was found to be existing between potential and realized yield. The constraints regarding the suger cane cultivation were mainly related to the payment problems absence of any sugar mill in the sub division, the long waiting period for the disposal of cane besides harassment of the farmer by the staff of sugar mills. The long distance between sugar cane growers of the sub-division and sugar mill has added to difficulties of sugar cane growers, which has led to decline in area under sugar cane.

Rao (2011) assessed the economics and sustainability of SRI (system of rice intensification) and traditional methods of paddy cultivation in North Coastal Zone of Andhra Pradesh for the period 2008-09, based on the data of costs and returns of crop. A part from budgeting techniques, benefit-cost ratio (BCR), yield gap analysis, sustainability index and response priority index have been employed in the study. It has shown that BCR is higher for SRI (1.76) than traditional (1.25) methods. Further, there is a 31 per cent yield gap between SRI

and traditional methods, in which cultural practices (20.15%) have shown a stronger effect than input use (10.85%). The most important constraint in SRI cultivation has been identified as nursery management'. The SRI method being more skill oriented, the study has observed that yields can be made sustainable if constraints are addressed on war-footing basis.

Chapter-3

METHODOLOGY

In this chapter, an attempt has been made to describe the methodology adopted for the study *viz.* selection of district, tehsil, farmers and marketing functionaries' data collection and analysis of the collected data.

3.1 Selection of Crop

Rice crop was purposively selected for the detailed study because this crop has a good place among the cereal crops and certain problems are faced by the rice cultivators in that area.

3.2 Selection of the study area

Rajasthan is low rice producing, trading and consuming state in the country. Hanumangarh was selected purposively for the study as it occupies first place in terms of area and production of rice in the state. (Table: 3.1).

3.3 Selection of tehsil

Hanumangarh district comprises 7 tehsils viz. Hanumangarh, Rawatsar, Bhadra, Tibi, Pilibanga and Nohar. Out of these one tehsil Tibi was purposively selected for the study. Because this tehsil is having highest area and production of rice crop.

Table 3.1 Area, production and productivity of rice in various district of Rajasthan states.

(2011-12)

District	Area(ha)	Production(MT)	Productivity(kg/hac)
Hanumangarh	22095 (16.45)	66827 (26.38)	3025
Banswara	28542 (21.25)	36806 (14.52)	1290
Bundi	20974 (15.61)	34217 (13.50)	1631
Dungarpur	22031 (16.40)	17128 (6.76)	777
Kota	10586 (7.89)	24665 (9.73)	2330
Ganganagar	9215 (6.85)	32318 (12.75)	2507
Baran	6129 (4.56)	13737 (5.42)	2241
Uadipur	5436 (4.05)	5676 (2.24)	1044
Jhalawar	1784 (1.32)	7298 (2.88)	4091
Karoli	1484 (1.10)	1800 (0.71)	1213
Chittorgarh	520 (0.39)	981 (0.39)	1887
Bhartpur	2241 (1.67)	5684 (2.24)	2536
Dholpur	675 (0.5)	1273 (0.50)	1886
Bhilwara	336 (0.27)	690 (0.27)	1885
Pratapgarh	1168 (0.87)	2203 (0.86)	1886
Other	1121 (0.83)	2057 (0.81)	182.39
Rajasthan	134337	253360	1886

(source: www.rajasthankrishi.gov.in)

3.4 Selection of villages

Ratakhara and sareka villages as per the statistical norms were randomly selected amongst the rice growing tehsil.

3.5 Selection of rice cultivators

In the selected villages, a complete enumeration of rice farms along with area under rice was done. These farms were pooled and arranged in ascending order of area under rice. These farmers were further classified according to size of land holding

in to five categories. i.e. marginal, small, semi-medium, medium and large size groups. The classification of farmers in different size groups is presented in Table 3.2

Table 3.2 Classification of farmers in different size holdings

S. No.	***Category of farmers***	***Size of land holding under paddy (ha)***
1.	*Marginal*	*< 1*
2	*Small*	*1-2*
2.	*semi-medium*	*2-4*
3.	*Medium*	*4-10*
4.	*Large*	*>10*

Source**: Ministry of agriculture and irrigation, all India report on Agriculture census: 1970-71.**

Table 3.3 Total numbers of farmers in different size groups and the number selected for the study:

Size of land Holding	Selected Villages				Total no. of farmers	Total no. of selected farmers
	Rathakhera		sareka			
	No. of farmers	No. of selected farmers	No. of farmers	No. of selected farmers		
marginal	16	8	18	9	34	17
Small	12	6	16	8	28	14
semi-medium	10	5	14	7	24	12
Medium	8	4	12	6	20	10
Large	6	3	8	4	14	7
Total	52	26	68	34	120	60

3.6 Selection of market functionaries

A separate list of all the village traders and licensed wholesalers operative in the study area was prepared from information collected from the sample farmers and the records of Krishi Upaj Mandi Samities Hanumangarh. In all 7 village traders and 9 wholesalers were operative in command area of Krishi Upaj Mandi Hanumangarh. Out of them a random sample of 2 village traders and 2 wholesalers were selected from Krishi Upaj Mandi Hanumangarh for obtaining the required information pertaining to the costs incurred and margins earned by them in the marketing of rice.

3.7 Collection of Data

Both primary and secondary data were collected for the study.

3.7.1 Primary data

The primary data were collected from the selected rice cultivators, using personal interview method. Information regarding various cost components in production viz. cost of inputs and prices obtained for output and marketing of rice viz. price received and cost incurred in marketing and margins received were collected from farmers, village traders, wholesalers and retailers and other functionaries through personal interview method on pre-structured data schedule for the year 2012-13.

3.7.2 Secondary data

To examine the growth rates in area, production and productivity of rice in the district as well as in the state, secondary data were collected from various Publications and Records of Agriculture Statistics Cell, Hanumangarh district, Directorates of Economics and Statistics, Directorate of Agriculture, Krishi Pant Bhawan, Govt. of Rajasthan, Jaipur and its websites (www.rajsthankrishi.gov.in) for 18 years (1994-95 to 2011-12).

3.8 Analysis of Data;

The collected data were analyzed by using various statistical tools to achieve objectives of the study.

3.8.1 Compound growth rate analysis:

Suitable statistical techniques were used to meet the objectives specified in the study. Simple analytical tools such as percentages and averages were used wherever necessary. To study growth in area, production and productivity of rice in major rice growing districts and the state as a whole, compound growth rates (CGR) were worked out by using the following formula:

$$yt= ab^t\ Ut \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(I)$$

Where,

yt is area/production/productivity of rice in time period t

t is time element which takes the value 1,2,3…….n

a and b are parameters to be estimated and

b = (1+g), where g is the rate at which y grows every year in relation to its value in preceding year.

Ut is the disturbance term.

On logarithmic transformation of equation (i) we get

$$\text{Log } yt = \log a + t \log b + \log Ut$$

This can be expressed as :

$$y^*t = a^* + b^*t + U^*t$$

Where,

y*t=log yt; a*=log a; b*=log b and U*t= log Ut

The estimate of compound growth rate can be obtained as

$$g = (\text{antilog } b^* - 1) \times 100$$

The F test was used for testing significance of the CGR

3.8.2 Cost of cultivation

To achieve second objective of the study, cost of cultivation of rice on different size of farms was studied. The cost of cultivation of rice was worked out by using various cost concepts which are defined as under:

Cost concepts

1. Value of hired human labour

2. Value of owned bullock labour

3. Value of hired bullock labour

4. Value of owned machine labour

5 .Value of hired machine labour

6. Value of owned seed

7. Value of purchased seed

8. Value of owned farm yard manure

9. Value of purchased farm yard manure

10. Value of fertilizers and insecticides

11. Irrigation charges

12. Land revenue

13. Interest on working capital

14. Depreciation

15. Miscellaneous expenses

16. Rent paid for the leased in land

17. Interest on fixed capital

18. Rental value of owned land, and

19. Value of family labour

Cost A_2: Cost A_1 + rent paid for leased in land

Cost B_1: Cost A_1 + interest on value of owned fixed capital assets

Cost B_2: Cost B_1 +rental value of owned land and rent paid for leased in land

Cost C_1: Cost B_1 + imported value of family labour

Cost C_2: Cost B_2 + imputed value of family labour

Cost C_3; Cost C_2 + cost of management i.e.10% of cost C_2

The cost of production was worked out by using following formula;

$$\text{cost of production per quintal} = \frac{\text{Total cost (cost } C_2\text{) / hac.}}{\text{Yield (kg/hac.)}}$$

Returns**;**

Gross Income (G.I.)

Synonymous with value of output (both main and by product) evaluated at harvest prices.

$$G.I. = Q_m \times P_m + Q_b \times P_b$$

Where;

GI = Gross income

Q_m = quantity of main product

P_m = Price of main product

Q_b = Quantity of by-product

P_b = Price of by-product

Farm business income = Gross income – Cost A_2

Family labour income = Gross income – cost B_2

Net income = Gross return – Total cost (cost C_2)

$$\text{Rate of return} = \frac{\text{Gross income/hac.}}{\text{Total cost (cost } C_2\text{)}}$$

3.8.3 Study of marketing cost and margins in marketing of rice

The marketing cost and margins including average gross margins, per cent margins and price spread was computed as follows:

Total cost of marketing:

Total cost of marketing was computed using the formula :

$C = CF + CM_1 + CM_2 + CM_3 + \ldots\ldots\ldots\ldots\ldots + CMn$

Where

C = Total cost of marketing

CF= Cost borne by the producer- Farmers from the time the produce leaves the farm till it is sold and

CM_1, CM_2, CM_3, CM_n = cost incurred by different middlemen

Average gross margin:

The average gross margin at each successive level of marketing was worked out by dividing the difference between the sale value and purchase value by the quantity of produce handled:

$$AGM = \frac{\text{Total sale value} - \text{Total purchase value}}{\text{Quantity of produce handled}}$$

Absolute margin:-

$$AM = PRi - (PPi + CMi)$$

Where,

PRi = Total value of receipts per unit (sale prices)

PPi = Purchase value of the commodity per unit (Purchase price)

CMi = Per unit cost incurred in marketing by middlemen.

Percentage margin:-

Per cent margin was calculated by expressing the absolute margin as per cent of sellling price

$$\text{Per cent margin} = \frac{PRi - (PPi+CMi)}{PRi} \times 100$$

Where:-

PRi = Receipt per unit (sale price)

PPi = Purchase price of goods per unit (Purchase price)

CMi = Cost incurred on marketing per unit

Price spread:

Price spread refers to the differences between the price paid by the ultimate consumer and the price received by the producer for an equivalent quantity of the farm produce *i.e.*

Price spread = Price paid by the consumer – price received by the producer farmers

Symbolically

Psd = PC – PF

Psd = Price spread

PC = Price paid by the consumer

PF = Price received by tehsil farmers for equipment quantity of the produce

Producer's share in consumer's rupee:-

$$PS = \frac{PC}{PF} \times 100$$

Where

PS = Producer's share

PF = Producer's price

PC = Price paid by the consumer

3.9 Problems faced by the rice cultivators

The opinions of the rice cultivators were observed by the personal interview method and the same was suitably classified and analyzed for reaching the point to find out the constraints in the way of marketing of rice.

Chpater-4

PRODUCTION TRAITS OF RICE

This chapter acquaints with the brief history of origin and variances agronomical practices following in the production of rice cultivation *i.e.* land preparation, methods of planting, water management, harvesting and threshing etc.

R I C E (*Oryza sativa*)

Rice is the most important cereal food crop of the world. It is the staple food for more than half of the world's populations. Among the states of India, AP is the maximum rice producer with 106.35 lakh tons (enjoying 3rd rank), the first and second being WB and UP respectively. The Productivity of rice in AP was 2407 kg/ha in 1992-93 against the India's productivity of 1742 kg/ha.

4.1 ORIGIN :

Rice is one of the oldest cultivated crops in China & India for several thousands years. Cultivated species Oryza sativa is thought to have originated in South & SE tropical Asia. Other species of rice are O.glaberrima, O.perennis. In Oryza sativa, the somatic chromosomal no is 2n=24 which corresponds to that of many wild species of Oryza. Some wild species of Oryza are tetraploid, 2n = 48. Rice has been cultivated for thousands of years under widely differenst geographic and agroclimatic regions. During this long period different forms and varieties have been evolved.

1. **INDICAS :** The traditional varieties raised in tropics are called Indicas. These are traditional long duration varieties, photosensitive

(season bound), mostly awnless. They are tall, weak stemmed and susceptible to lodging and less responsive to heavy fertilizers.

2. **JAPONICAS :** These are temperate region varieties dwarf in stature with sturdy stems & thus non lodging. Leaves short,thick, narrow, dark green colour, making medium angle with main culm. They are awnless to awned varietie, grains are nearly round and fertilizer responsive vartieties.

3. **JAVANICAS :** These are intermediatory to Indicas and Japonicas, having morphological resemblance to indicas. Adopted to low atitudes. They are called “BULU” varieties, low tillering and sensitive to photoperiod (equatorial belt of Indonesia)

4.2 Temperature:

It greatly influences the growth and growth pattern of rice plant. Temperature variations are low in tropics and hence needs no significant consideration for the rice cultures in these areas. The critical temperatures for different stages of rice plant are given below.

Germination 16- 19

4.3 Rainfall :

Variability in the amount and distribution of rainfall is most important factor limiting the yields of rainfed rice, which constitutes about 80% of the rice grown in South and SE Asia. Rainfall variability is more critical for upland rice than for lowland rice. Moisture stress can damage or even kill the plants in an area that receives as much as 200 mm of rainfall in a day and then receives no rainfall for the next 20 days. Rice is grown in rainfed conditions with rainfall of 1000-1500 mm/annum, if

distributed over 3- 3 ½ months. The water requirement of rice is 1240 mm.

Rice crop is being cultivated under widely varying climatic conditions as detailed below:

Latitude : 45^{o} N – 40^{o}S Altitude : Mean Sea Level to 1524 m RH : 35 – 100%

Rainfall: 20" – 200" (500mm to 5000mm) Daylength : 9 hrs. optimum

Light : 400 cal/cm2/day is the minimum requirement

Soil:

Sandy soils to heavy soils are most preferable to rice crop cultivation. Rice is able to tolerate a wide range of soil reaction but it may have a preference for acidic soils.The crop has preference to 5.5 to 6.5 PH. Redsoils, black soils and laterite soils are also suitable.

4.4 LAND PREPERATION

Puddling is the reorientation of soil particles at high moisture content due to cultivation, which results in soil particles becoming oriented in respect of each other which causes an increase in bulk density and a large decrease in non-capillary porosity. Mechanical manipulation of the soil at high moisture regime which reduces deep percolation

losses is termed as PUDDLING.

Objectives of Puddling :

1. To obtain a soft seed bed for the seedlings to establish themselves faster.

2. To minimize leaching losses of N (nutrients) and thereby increase the availability of plant nutrients by achieving a reduced soil condition.

3. Suppression of weeds

4. To mix organic matter with the soil.

5. To create an imperveous sub soil layer for reducing deep percolation & leaching losses.

6. To facilitate easy transplantation.

Waterlogged/flooding causes changes in physical, microbiological & chemical properties of soil because of the physical reactions between the soil and water and also because of the biological and chemical processes set in motion as a result of excess water. These changes have a profound bearing on nutrition and fertilization aspects of rice cultivation.

4.5 METHODS OF PLANTING :

Direct seeding/transplanting is adapted in low land rice after puddling.

Seed rate 60 to 80 kg/ha Spacing 20 to 30 cm

TRANSPLANTING:

Transplanting of healthy seedlings may be done at 4-5 leaf stage or when they are about 20-25 cm in height @ 2-3 seedlings not deeper than 2-4 cm.

Spacing:

***Kharif*:** 15 x 15 cm or 15 x 20 cm

***Rabi*:** 15 x 10 cm

With late tillering varieties or overaged seedlings, spacing may be even up to 15 x 10 cm or 20 x 10 cm.

4.6 FERTILIZER MANAGEMENT

NITROGEN:

For Dwarf and semi dwarf varieties? Optimum 'N' rates are 80-100 kg /ha during *kharif* 100-120kg/ha during *rabi*.

PHOSPHORUS:

Results showed that application of 60 kg P_2O_5/ha for red soils and 80 kg P_2O_5/ha for black soils is adequate.

POTASSIUM:

Soil application of potash either as MOP or SOP under deficiency conditions will improve yields considerably. 30-45 kg K_2O/ha is recommended as a maintenance dose to keep available potash in the soil above critical limits for high level production. Potash is applied at the

time of last puddling along with P as surface application and incorporated.

ZINC DEFICIENCY:

Functions of zinc

1. Probable connection with production of auxins.

2. Activaton of many enzymatic reactions.

3. Close involvement in N metabolism.

Symptoms:

1. The mid ribs of younger leaves especially base become chlorotic.

2. Appearance of brown blotches and streaks on the lower leaves followed by stunted growth.

3. The size of leaf blade is reduced but not leaf sheath

4. Uneven growth and delayed maturity in the field.

BIOFERTILIZERS:

BGA : Several sps of BGA can fix N. The most important species are Anabaena and Nostoc. The amount of N fixed by BGA ranges from 15-45 kg N/ha; standing water of 2.20 cm in the field is a prerequisite for growth of BGA at a temperature of 25-450C and PH of 7-8 with high organic matter in soils. Bright sunshine increases the growth rate.

AZOLLA:

A thick mat of Azolla supplies 30-40 kg N/ha. Unlike BGA, it thrives well at low temperatures. It grows at a temperature of 20-300C and soil PH of 5.5 – 7.0. It grows better during monsoon season with frequent rains and cloudiness. Azolla is applied to the main field as a green manure crop and as a dual crop. As green manure crop, it is allowed to grow on flooded soils for 2-3 wks before transplanting. Later, water is drained and Azolla is incur porated by ploughing in situ. As a dual crop, 1000-5000 kg/ha of Azolla is applied to the soil one week after transplanting. When a thick mat forms, it is incorporated by trampling. The left over Azolla develops again which is trampled in as a 2^{nd} crop. For better growth of it, 25-50 kg of SSP/ha is applied and standing water of 5-10 cm is maintained continuously in the rice fields.

INM:

Plant nutrients can be supplied from different sources viz., organic manures, crop residues, bio-fertilizers and chemical fertilizers. For better utilization of resources and to produce crops with less expenditure, INM is the best approach. In this, all the possible sources of nutrients are applied based on economic consideration and the balance required for the crop is supplemented with chemical fertilizers. Rice crop residues add 17 kg N/ha. Application of organic matter in any form reduces loss of N fert and increases FUE.

WATER MANAGEMENT

Although a major part of irrigation water (45%) is directed to rice, yet it covers only 38% of total cultivated area under rice. In other words, 62% of rice area in the country is rainfed. 94% of the rice area is irrigated

Canals : 50.6

Tanks : 29.4

Wells & filter points : 14.4

Rainfed : 5.6

Methods of irrigation:

Surface method: Flooding, furrow, boarder strip etc., are employed.

Weed control: weeds reduce yield by 24-48% as they compete with the crop for nutrients, light water and space. Weeds also reduce the quality of crop produce.

Transplanted rice: 15-20% loss

Direct seeded rice: 30-35% loss

(Puddle soil)

Upland rice : 50%

The potential loss in production of rice in India due to weed infestation is estimated at 15 m Tons/annum.

WEEDS: Three types of weeds are found in rice fields.

i) Grasses: Monocots, two ranked leaves

Ex: Echinochloa colonum,Echinochloa crussgelli, cynodon sps panicum sps.

ii) Sedges : Similar to grasses but have 3 ranked and triangular solid stems. They frequently have modified rhizomes adopted for storage and for propagation.

Ex: Cyperus rotundus, Cyperus iria, Fimbristylis miliaceae.

iii) Broad leaved weeds: Dicots

Eg : Eclipta alba, Commelina bengalensis, Ammonia baccifera

ROUGING:

Roughing is the removal of off types from the main field. Though it is not cultural operation, it is necessary to maintain purity of seed which is taken up at the following stages of the crop.

4.7 HARVEST:

Moisture level of grain should be 20-23% for better milling quality. At the time of harvest, the bottom portion of plants and some of the grains at the base of the earhead will be green. If it is fully riped (dead ripe), the rice gets broken during milling.

4.8 THRESHING:

1. Hand threshing of sheaves:

Against some hard surface like stone, wooden plank, a bench etc.,

This is practical when the quantity is small and also for when it is for seed purpose.

2. Cattle threshing:

It is adopted when large quantity is to be handled. First, a threshing floor is prepared well by removing stubbles, compacting etc., in a circular fashion and the sheaves are spread and trampling under the feet of cattle is made to go round and round.

3. Tractor threshing:

Now days, it is widely adopted practice. The sheaves are heaped on the threshing floor in a circular fashion and the tractor goes round and round.

4.9 YIELDS:

It varies from season to season, and variety to variety besides several other factors. While the average yields vary from 4-5 tons/ha during *kharif*.

By products:

The ratio of cleaned rice to paddy is 65-70% by weight.

Chapter-5

RESULTS AND DISCUSSION

This chapter gives an overview of the results and discussion, which are presented objective wise into the following sections:

5.1 Growth in area, production and productivity of rice

5.2 Cost and returns of rice

5.3 Marketing cost, Margins and Price spread in rice.

5.4 Problems faced by the rice cultivators.

5.1 Growth in area, production and productivity of rice

Fig. I, II shows percent share of rice in area and production of total *kharif* cereals of Rajasthan over time. The Table 5.1 reveals that there were wide fluctuations in percent share of rice in area under total *kharif* cereals. It varied between 1.27 percent in 2003-04 to 3.54 percent in 1999-2000. Similarly the percent share of rice in production of total *kharif* cereals varied between 1.74 percent in 2003-04 to 9.39 percent in 1999-2000.

The analysis of year-wise area under rice in Hanumangarh district and Rajasthan (Table 5.2) reveals that the per cent share of area under

rice in Hanumangarh district varied between 10.13 per cent to 26.60 per cent. It was highest in 2002-03. The table further reveals that the per cent share of Hanumangarh district in total production of rice in Rajasthan varied between 18.25 per cent in 1997-98 to 73.84 per cent in 2006-07. The per cent share of Hanumangarh in 2011-12 was 26.38 per cent in total production of rice in Rajasthan. The productivity of rice in Hanumangarh district varied between 1535 kg per hectare (1997-98) to 4639 kg per hectare (2006-07). The productivity levels in Hanumangarh district were higher as compared to Rajasthan.

Table : 5.1 Percent share of rice in total area and production of *kharif* cereal of Rajasthan

Year	Area (ha)			Production (Mt)		
	Total *kharif* cereal crops	Rice	%Share of rice	Total *kharif* cereal crops	Rice	%Share of rice
1994-95	6764961	159091	2.35	3694878	173218	4.69
1995-96	5935461	139490	2.35	2227812	117560	5.28
1996-97	6427520	147087	2.29	3816549	174247	4.57
1997-98	6415096	163452	2.55	4199795	190264	4.53
1998-99	5849619	168078	2.87	3184000	205488	6.45
1999-00	5648997	200210	3.54	2689811	252554	9.39
2000-01	6448290	166273	2.58	3343912	1555723	4.66
2001-02	6901759	144353	2.09	5721507	180048	3.15
2002-03	4832385	83584	1.73	1725654	67932	3.94
2003-04	7835712	99756	1.27	9448584	164828	1.74
2004-05	6316949	101361	1.60	4695504	150420	3.20
2005-06	6714435	107488	1.60	3599601	153074	4.25
2006-07	6728306	107758	1.60	5100320	97689	1.92
2007-08	6895407	127807	1.85	6840569	259626	3.80
2008-09	6950061	133414	1.92	6687132	241080	3.61
2009-10	7151509	150691	2.11	3513572	228284	6.50
2010-11	7505953	131126	1.75	8926934	265545	2.97
2011-12	6776318	134337	1.98	8621619	253360	2.94

Source: www.rajasthankrishi.gov.in

Table : 5.2 Area, production and productivity of rice in Rajasthan and Hanumangarh 1994-95 to 2011-12

Year	Area (ha)			Production (Mt)			Productivity (kg/ha)	
	Raj.	HNG	%Share	Raj.	HNG	%Share	Raj.	HNG
1994-95	159091	16109	10.13	173218	32367	18.68	108.88	200.92
1995-96	139490	16340	11.71	117560	36999	31.47	84.28	226.43
1996-97	147087	17907	12.17	174247	45797	26.28	118.47	255.75
1997-98	163452	22617	13.84	190264	34720	18.25	116.40	153.51
1998-99	168078	31214	18.57	205488	59881	29.14	122.26	191.84
1999-00	200210	37006	18.48	252554	91181	36.10	126.14	246.40
2000-01	166273	33537	20.17	1555723	86026	55.24	93.66	256.51
2001-02	144353	28345	19.64	180048	86387	47.98	124.73	304.77
2002-03	83584	22232	26.60	67932	38653	56.90	81.27	173.86
2003-04	99756	20869	20.92	164828	67043	40.67	165.23	321.26
2004-05	101361	17590	17.35	150420	64671	42.99	148.40	367.66
2005-06	107488	16969	15.79	153074	65501	42.79	142.41	386.00
2006-07	107758	15550	14.43	97689	72134	73.84	90.66	463.88
2007-08	127807	18169	14.22	259626	76206	29.35	203.14	419.43
2008-09	133414	24241	18.17	241080	88500	36.71	180.70	365.08
2009-10	150691	24635	16.35	228284	84360	36.95	151.49	342.44
2010-11	131126	22311	17.01	265545	88450	33.31	202.51	396.44
2011-12	134337	22095	16.45	253360	66827	26.38	188.60	302.45

Source : www.rajasthankrishi.gov.in
Raj.- Rajasthan, HNG- Hanumangarh

Area, production and productivity in Hanumangarh district and Rajasthan state are presented graphically in Figure III, IV, V, respectively.

Compound growth rates in area, production and productivity of rice in Hanumangarh district and the Rajasthan state as a whole have been presented in Table 5.3. The table reveals that the rice crop registered a decline in growth of area by 1.6 percent in Rajasthan and was registered to be negatively significant at 5% level of significance. The growth rate of area for rice crop was registered to be (-0.09) Non-significant in Hanumangarh district. Rajasthan state which was Non-significant in area growth and 4.48 per cent area growth in Hanumangarh which was significant at 1 per cent level. However, the productivity of rice registered positive growth of 0.16 per cent and 4.58 per cent in Rajasthan and Hanumangarh district, respectively. The decline in area under rice has been compensated by increase in production and productivity.

Table 5.3 Compound Growth rates of Area, Production and Productivity of rice in Hanumangarh and Rajasthan (in per cent/annum)

Growth Rates	Rajasthan	Hanumangarh
Area		
CGR	-1.60** (0.94)	-0.09^{NS} (1.22)
t-value	-2.12	-0.92
Production		
CGR	-1.44^{NS} (1.48)	4.48* (1.31)
t-value	-0.69	4.32
Productivity		
CGR	0.16^{NS} (0.77)	4.58* (1.07)
t-value	0.08	5.40

* Significant at 1% level of significance
** Significant at 5% level of significance
NS Non-significant

5.2 Cost and returns of rice

Using different cost concepts, it is possible to find out different types of income measures. These include farm business income, which indicates returns over variable cost. The family labour income, which is residual of gross income over cost B_2, explains the returns to family labour and has a lot of relevance under Indian conditions. The comparative estimates of different costs incurred in rice cultivation for different size groups are explained in this section.

5.2.1 Breakup of cost of cultivation

Various costs incurred in the cultivation of rice on sample farms on different size holdings are presented in Table 4.4. On an average, the total cost per hectare of rice cultivation was ₹ 29009.95 on different sized farms. It was ₹ 30890.52 on marginal, ₹ 29468.65 on small, ₹ 28412.66 on semi-medium, ₹ 27449.11 on medium and ₹ 26779.12 on large farms. The major component of cost was rental value which contributed 24.13 per cent of total cost.

5.2.2 Cost of cultivation

The comparative estimates of different costs incurred in rice cultivation for different size groups are given in Table 5.5.

The Table 5.5 reveals that cost A_1, on an overall basis, was ₹ 16124.55. No definite trend was observed in case of cost A_1 with respect to size of holding however, A_1 cost was slightly higher on semi medium and large farms. Cost B_1 and B_2 worked out to be ₹ 17789.85 and ₹ 24789.85, respectively. The costs C_1 and C_2, on overall basis, were worked out to be ₹ 22009.95 and ₹ 29009.95, respectively. Cost C_3, which includes managerial cost, was worked out to be ₹ 31910.94 per hectare.

Table 5.4: Breakup of cost of cultivation of Rice (₹/ha)

Operational cost	Marginal	Small	Semi-medium	Medium	Large	Overall
1. Machine labour	2340 (7.58)	2168 (7.36)	3076 (10.83)	2490 (9.07)	3260 (12.17)	2579.40 (8.89)
2.Casually hired labour	4265.8 (13.81)	3810.5 (12.93)	2690 (9.47)	2960 (10.78)	1840.2 (6.87)	3343.78 (11.53)
3.Imputed value of family labour	6080 (19.68)	5495 (18.65)	2650.2 (9.33)	3145 (11.46)	1380.5 (5.16)	4220.10 (14.55)
4.Seed	715 (2.31)	612.1 (2.08)	850.5 (2.99)	652 (2.38)	780.5 (2.91)	715.23 (2.47)
5.FYM	2800 (9.06)	2600 (8.82)	1285 (4.52)	1430 (5.21)	890 (3.32)	1999.17 (6.89)
6.Fertilizers	1240 (4.01)	1446.58 (4.91)	2240.82 (7.89)	1658.60 (6.04)	2295.08 (8.57)	1681.23 (5.80)
7.Plant protection chemical	1400 (4.53)	1600 (5.43)	2300 (8.09)	1958 (7.13)	2300 (8.59)	1824.67 (6.29)
8.Irrigation charges	1550 (5.02)	1650 (5.60)	2312 (8.14)	1890 (6.89)	2415 (9.02)	1883.32 (6.49)
9.Depreciation	1360 (4.40)	1180 (4.00)	1678 (5.91)	1840 (6.70)	2035 (7.60)	1540.35 (5.31)
10.Land revenue	10 (0.03)	10 (0.03)	10 (0.04)	10 (0.04)	10 (0.04)	10 (0.03)
11.Interest on working capital	611.72 (1.97)	581.47 (1.97)	522.14 (1.84)	485.51 (1.77)	454.84 (1.70)	547.41 (1.89)
12.Interest on fixed capital	1518 (4.91)	1315 (4.46)	1798 (6.33)	1930 (7.03)	2118 (7.91)	1665.30 (5.74)
13.Rental value	7000 (22.66)	7000 (23.75)	7000 (24.64)	7000 (25.50)	7000 (26.14)	7000 (24.13)
Total	30890.52 (100)	29468.65 (100)	28412.66 (100)	27449.11 (100)	26779.12 (100)	29009.95 (100)

Figures in parenthesis represent the percentage of the column totals

Table 5.5 : Cost of cultivation per hectare of rice on different cost concepts basis on different size holdings (₹/ha)

Cost	Marginal	Small	Semi- medium	Medium	Large	Overall average
Cost A_1	16292.52	15658.65	16964.46	15374.11	16280.62	16124.55
Cost A_2	16292.52	15658.65	16964.46	15374.11	16280.62	16124.55
Cost B_1	17810.52	16973.65	18762.46	17304.11	18398.62	17789.85
Cost B_2	24810.52	23973.65	25762.46	24304.11	25398.62	24789.85
Cost C_1	23890.52	22468.65	21412.66	20449.11	19779.12	22009.95
Cost C_2	30890.52	29468.65	28412.66	27499.11	26779.12	29009.95
Cost C_3	33979.57	32415.52	31253.93	30194.88	29457.03	31910.94

5.2.3 Cost of production

The cost of production per quintal of rice on different cost concepts basis is given in Table 5.6.

It is evident from the table that the overall cost of production per quintal of rice was ₹ 715.06 on C_2 basis. The cost of production per quintal was highest on marginal farms *i.e.* ₹ 882.59 followed by small, semi-medium, medium and large farms *i.e.* ₹ 775.49, ₹ 676.49, ₹ 596.72 and ₹ 546.51, respectively.

Table 5.6: Cost of production of rice on different farm size holdings (₹/q)

Cost	Size holdings					Overall average
	Marginal	Small	Semi-medium	Medium	Large	
Cost A_1	465.50	412.07	403.92	334.22	332.26	397.45
Cost A_2	465.50	412.07	403.92	334.22	332.26	397.45
Cost B_1	508.87	446.68	446.73	376.18	375.48	438.50
Cost B_2	684.96	630.89	613.39	528.35	518.34	611.04
Cost C_1	641.96	591.28	509.83	444.55	403.66	542.52
Cost C_2	882.59	775.49	676.49	596.72	546.51	715.06
Cost C_3	970.84	853.04	744.14	656.41	601.16	786.56

5.2.4 Productivity and profitability of rice

The productivity of rice and gross returns on sample farms are given in Table 5.7.

The table reveals that on the overall basis, productivity of rice was 40.57 quintals per hectare. The yield was highest (49 quintals) on large farms, followed by medium farms (46 quintals), semi-medium farmers (46 quintals), small farmers (38 quintals) and marginal (35 quintal) which indicated that as the size of holding increased, the productivity of rice also increased. The gross returns also increased with increase in the size of holding.

Table 5.7: Gross income per hectare of rice on different farm size holdings

Size holding	Yield (q/ha)	Gross income (₹)
Marginal	35	88305
Small	38	95874
Semi medium	42	105966
Medium	46	116058
Large	49	123627
Overall average	40.57	102349.7

5.2.5 Income measures:

A comparison of various income measures from rice cultivation in Hanumangarh district are given in Table 5.8.

It is evident from the Table 5.8 that on an overall basis, gross income per hectare of rice cultivation was ₹ 102349.70 on sample farms.

It varied between ₹ 88305 to ₹ 123627 on different land size holdings. The gross income per hectare of rice cultivation was highest on large farms as compared to medium and small farms mainly because of higher productivity on large farms.

Farm business income represents returns over variable cost. On an average, the farm business income from rice cultivation was worked out to be ₹ 86225.15. Among different land size holdings, it varied between ₹ 72012.48 on marginal farms to ₹ 107346.38 on large farms. The family labour income per hectare of rice cultivation varied from ₹ 63494.48 on marginal farms to ₹ 98228.38 on large farms. On an overall basis, family labour income was worked out to be ₹ 75793.75 per hectare. The family labour income per hectare increased with the increase in size of holding as there was higher use of casually hired labour on medium and large farms.

Net income, implies profit per hectare after deducting cost C_2 from gross income. The overall net income from rice cultivation was ₹ 73339.75 per hectare. Among different size groups, it varied between ₹ 57414.48 per hectare to ₹ 96847.88 per hectare on different land size holdings. The overall rate of returns from rice cultivation were ₹ 3.56 per hectare. Among different size groups, it varied between ₹ 3.25 to ₹ 4.62.

Table 5.8: Returns from cultivation of rice on sample farms (₹/ha)

Particulars	Size holdings					Overall average
	Marginal	Small	Semi-medium	Medium	Large	
Gross income	88305	95874	105966	116058	123627	102349.70
Farm business Income	72012.48	80215.35	89001.54	100683.89	107346.38	86225.15
Family labour income	63494.48	64331.35	80203.54	91753.89	98228.38	75793.75
Net income	57414.48	66405.35	77553.34	88608.89	96847.88	73339.75
Rate of Returns	2.86	3.25	3.73	4.23	4.62	3.56

5.2.6 Net returns on different cost concepts basis

It is evident from Table 5.9 that on an overall basis, returns from the cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3 were ₹ 86255.15, ₹ 86225.15, ₹ 84559.85, ₹ 77559.85, ₹ 80339.75, ₹ 73339.75 and ₹ 70438.76 per hectare of rice cultivation, respectively. The net returns increased with increase in size of holding.

Table 5.9: Net returns per hectare of rice on different cost concepts (₹/ha)

Particulars	Size holdings					Overall Average
	Marginal	Small	Semi-medium	Medium	Large	
Cost A_1	72012.48	80215.35	89001.54	100683.89	107346.38	86225.15
Cost A_2	72012.48	80215.35	89001.54	100683.89	107346.38	86225.15
Cost B_1	70494.48	78900.35	87203.54	98753.89	105228.38	84559.85
Cost B_2	63494.48	71900.35	80203.54	91753.89	98228.38	77559.85
Cost C_1	64414.48	73405.35	84553.34	95608.89	103847.88	80339.75
Cost C_2	57414.48	66405.35	77553.34	88608.89	96847.88	73339.75
Cost C_3	54325.43	63458.49	74712.07	85863.98	94169.97	70438.76

Returns per rupee of investment from rice cultivation on the basis of different cost concepts are given in Table 5.10.

It is evident from the Table 5.10 that on an average, the returns per rupee of investment on cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3 were ₹ 6.36, ₹ 6.36, ₹ 5.75, ₹ 4.13, ₹ 4.71, ₹ 3.56 and ₹ 3.23, respectively. The returns per rupee of investment on large farms on cost C_3 basis were highest (₹ 4.20) followed by medium farms (₹ 3.84), semi-medium farms (₹ 3.39) small farms (₹ 2.96) and marginal (₹ 2.60). This indicated the scale efficiency.

Table 5.10: Returns per rupee of investment in rice cultivation (₹)

Particulars	Size holdings					Overall
	Marginal	Small	Semi-medium	Medium	Large	
Cost A_1	5.42	6.12	6.25	7.55	7.59	6.36
Cost A_2	5.42	6.12	6.25	7.55	7.59	6.36
Cost B_1	4.96	5.65	5.65	6.71	6.72	5.75
Cost B_2	3.56	4.00	4.11	4.78	4.87	4.13
Cost C_1	3.70	4.27	4.95	5.68	6.25	4.71
Cost C_2	2.86	3.25	3.73	4.23	4.62	3.56
Cost C_3	2.60	2.96	3.39	3.84	4.20	3.23

5.3 Marketing costs, margins and price spread in rice.

In this section, an attempt has been made study the marketing costs, margins and price spread in marketing of rice by the selected farmers located in the command area of Hanumangarh district of Rajasthan. The section has been divided into following these sub-sections.

A. Marketing channel,

B. Marketing costs

C. Margins and price spread

In this section, an attempt has been made to present the marketing channels, cost incurred in marketing, margins earned by the market functionaries and the producers share in the consumer's rupee for marketing of rice crop.

The studies on marketing costs and margins for a commodity help knowing the total costs incurred in the process of marketing of the commodity and the share got by the producer farmers and various intermediaries and the price paid by the consumers, the reasons for high marketing costs and finding the possible ways for reducing the extent of marketing costs. It also helps in formulations and implementation of an appropriate price and marketing policies. Thus, the knowledge of marketing costs, margins and price spread is necessary improvement in the efficiency of the marketing system.

This section has been presented under the following heads.

5.3.A Marketing channels

The producer- farmers sell rice in the study area both in the village sale as well as in the nearby regulated market. The marketing channels identified in the sale of rice at these places are presented in the Table.5.11.

Table 5.11: Distribution of producer farmers adopting different marketing channels

Marketing channel	Size of group					
	Marginal	Small	Semi-medium	Medium	Large	Total
Producer- village trader- wholesaler - miller- retailer consumer	5 (29.41)	4 (28.57)	5 (41.67)	4 (40.00)	-	18 (30.00)
Producer- wholesaler- - miller-retailer- consumer	12 (70.59)	10 (83.33)	7 (58.33)	6 (60.00)	7 (100.00)	42 (70.00)
Total	17	14	12	10	7	60

Figures in parenthesis represent the percentage of the column totals

5.3.A.1: Village sale (Producer-Village trader-Wholesaler-Miler-Retailer-Consumer).

Out of the 60 sampled farmers, 18 farmers (30.00%) sold the rice in their own village. None of the large sized farmer sold rice in the village. Five farmer (29.41%) of marginal, four farmer (28.57%) of small sized groups, five farmer (41.67%) of semi-medium farmer and four farmer (40.00%) of medium farmers sold rice in the village. The reason being the low quantity of surplus available with them.

5.3.A.2 Mandi sale (Producer-Wholesaler-Miller- Retailer-Consumer)

Hanumangarh market is one of the main markets of the Hanumangarh district for transactions of rice. Hanumangarh market stands first among the important mandies of Rajasthan for rice arrivals. Out of 60 sampled farmers, 42 (70%) brought the rice in the Hanumangarh market. Only 70.59 per cent marginal farmer brought the produce to the mandi followed by 83.33 per cent by small farmer and 58.33 per cent by semi medium farmers, 60.00 per cent medium farmer and 100 per cent large farmers brought in mandi. No definite trend in mandi sale was observed with respect to the size of holding.

5.3B Marketing cost:

5.3B.1 Marketing charges in sale of rice at village level:

The marketing costs borne by the producer farmers and the village trader in sale of rice at the village level have been as under.

(a) Transportation charges:

The village trader purchase rice from the producer farmers at village level and transport the purchase quantity of rice by tractor trollys to krishi upaj mandi samiti, Hanumangarh. The average cost of transportation for this distance has been ₹ 38.40 per quintal.

(b) Weighment charge:

The weighing charges ₹ 2.5 per bag is charged by the labour from village trader.

(c) Loading and Unloading charge:

Prevailing loading charge per bag of ₹ 5.5 and unloading charge per bag of ₹ 3.75 is borne by village traders.

5.3B.2 Marketing charges in sale of rice in mandi sale:

Marketing costs borne by the producer farmer and the different middlemen in sale of rice at Hanumangarh market has been presented in Table 5.12.

Table 5.12: Marketing Charges in Sale of rice at Hanumangarh mandi

S.No.	Particulars	Unit	Rate (₹)	Borned by
1	Vat	Per 100 rupees worth of produce	4.00	Buyer
2	Mandi fee	Per 100 rupees worth of produce	1.6	Buyer
3	Commission	Per 100 rupees worth of produce	2	Buyer
4	Labour charges for			
	(a) Loading	Per quintal	5.50	Buyer
	(b) Unloading	Per quintal	3.75	Buyer
	(c) Weighing	Per quintal	2.50	Buyer
	(d) Sutli	Per quintal	2.00	Buyer

(a) Transportation charges:

The cost of transportation producer farmers brings rice in tractor trolley in krishi upaj mandi samiti, Hanumangarh. The average cost of transportation brone by farmers was ₹ 18.30 per quintal at Hanumangarh mandi.

(b) Unloading, loading, grading, weighing and sutli to sale of producer:

Prevailing labour cost for these unloading ₹ 3.75, loading ₹ 5.5, weighing ₹ 2.5, grading ₹ 5 and sutli ₹ 2 per bag is borne by the producer sellers.

(c) Loading and unloading charges:

The unloading of the produce in the mandi is done by the labour. At the rate of ₹ 5.5 for loading and ₹ 3.75 for unloading per bag is borne by the buyers.

(d) VAT:

VAT is charged from the buyers at the rate of 4% of value of rice by the retailer and is ultimately deposited in the government account.

(e) Mandi fee:

It is a charge collected by the krishi upaj mandi samiti for rendering various services @ ₹ 1.6 per 100 rupee worth of rice and borne by buyer.

(f) Commission:

Commission is realized by the commission agent at the rate of 2% of value of rice from the buyers.

(g) Weighing charges:

The cost is realized from the buyers @ ₹ 2.5 per quintal of rice.

(h) Sutli charges:

This cost is borne by the buyers as well as seller @ ₹ 2 per quintal of rice.

5.3B.3 Cost in marketing of rice at village sale:

The magnitude of cost incurred and margin earned in marketing of a commodity is an indicator of the marketing efficiency. Generally, higher the magnitude of costs and margin, the lower the efficiency of marketing system .Thus knowledge of marketing costs and margin is necessary for bringing improvement in the efficiency of marketing system. Therefore, an attempt has been made to analyze the costs incurred; margins earned and relative share of intermediaries in consumer rupee. The results are presented in Table 5.13.

5.3B.4 Marketing costs in Different Marketing Channels:

Marketing cost in Channel I (Producer→ Village trader→ Wholesaler→ Miller →Retailer→ Consumer).

The marketing costs in channel-I (Table 5.13) indicates that the cost incurred by producer was ₹ 54.75 per quintal of rice which was 6.71 per cent of consumer rupee. Cost incurred by commission agent was ₹ 82.15 per quintal of rice which was 10.07 per cent of consumer rupee. Cost incurred by wholesaler was ₹ 393.25 per quintal of rice which was 48.14 per cent of consumer rupee. Cost incurred by retailer was ₹ 20.88 per quintal of rice which was 2.56 per cent of consumer rupee. Cost incurred by miller was ₹ 263.25 per quintal of rice which was 32.26 per cent of consumer rupee. The farmers share in the consumer rupee was 62.50 per cent in channel-I. Total cost in marketing of rice at village level is ₹ 816.08 per quintal

Table: 5.13: Marketing cost incurred in village sale (₹)

S.No.	Particulars of cost	Producer	Village trader	Wholesaler	Miller	Retailer	Consumer	Total charges
1	Transportation	8 (14.61)	38.40 (46.74)	18.30 (4.63)	22 (8.36)	11.63 (55.70)	-	98.33 (12.05)
2	Gunny bags	30 (54.79)	30 (36.52)	30 (7.59)	-	-	-	120 (14.70)
3	Mandi fee	-	-	68 (17.21)	-	-	-	68 (8.33)
4	VAT	-	-	170 (43.03)	-	-	-	170 (20.83)
5	Commission	-	-	85 (21.52)	-	-	-	85 (10.42)
6	Weighing	3.5 (6.39)	2.5 (3.04)	2.5 (0.63)	-	-	-	8.5 (1.04)
7	Charge of grading	-	-	5 (1.27)	-	-	-	5 (0.61)
8	Loading	6.5 (11.87	5.5 (6.70)	5.5 (1.3 9)	5.5 (2.09)	5.5 (26.34)	-	28.50 (3.49)
9	Unloading	4.75 (8.68)	3.75 (4.56)	3.75 (0.95)	3.75 (1.42)	3.75 (17.96)	-	19.75 (2.42)
10	Sutli	2 (3.65)	2 (2.43)	2 (0.51)	2 (0.76)		-	8 (0.98)
11	Cleaning	-	-	5 (1.27)	-	-	-	5 (0.61)
12	processing	-	-	-	200 (75.97)	-	-	200 (24.51)
	Total	**54.75 (6.71)**	**82.15 (10.07)**	**395.05 (48.14)**	**263.25 (32.26)**	**20.88 (2.56)**	**-**	**816.08 (100.00)**

5.3B.5 Cost in marketing of rice at mandi sale:

Cost incurred by different middleman of rice in Hanumangarh mandi has been presented in Table 5.14.

The marketing costs in channel II (Table 5.14) indicates that the cost incurred by producer was ₹ 70.07 per quintal at rice which was 9.35 per cent of consumer rupee. Cost incurred by wholesaler was ₹ 395.05 per quintal of rice which was 52.73 per cent of consumer rupee. Cost incurred by miller was 263.25 per quintal of rice which was 35.14 per cent of consumer rupee. Finally the cost incurred by retailer was ₹ 20.88per quintal of rice which was 2.79 per cent of consumer rupee. VAT, commission, gunny bags, processing, mandi fee and transportation cost were the main item of marketing costs accounting for ₹ 690.25 of the total marketing costs.

The break-up of the total marketing costs between producer - farmer, wholesaler, miller and retailer comes to ₹ 9.35, 52.73, 35.14 and 2.79 per cent of the total costs, respectively.

5.3C Marketing margins and price spread:

5.3C.1 Price spread in marketing of rice by the farmers trade at village level(Producer→ Village trader→ Wholesaler→Miller →Retailer→ Consumer):

The price spread calculated on per quintal of rice in channel-I (Producer→ Village trader→ Wholesaler→Miller →Retailer→ Consumer) is presented in Table 5.15.

Table 5.14 : Marketing cost incurred in mandi sale (₹)

S. No.	Particular of cost	Producer	Wholesaler	Miller	Retailer	Consumer	Total charges
1	Transportation	25.32 (36.14)	18.30 (4.63)	22 (34.78)	11.63 (55.70)	-	77.25 (10.31)
2	Gunny bags	30 (42.81)	30 (7.59)	30 (11.40)	-	-	90.00 (12.01)
3	Mandi fee	-	68 (17.21)	-	-	-	68.00 (9.08)
4	VAT	-	170 (43.03)	-	-	-	170.00 (22.69)
5	Commission	-	85 (21.52)	-	-	-	85.00 (11.34)
6	Weighing	2.50 (3.57)	2.5 (0.63)	-	-	-	5.00 (0.67)
7	Charge of grading	-	5 (1.27)	-	-	-	5.00 (0.67)
8	Loading	5.50 (7.85)	5.5 (1.39)	5.5 (2.09)	5.5 (26.34)	-	22.00 (2.94)
9	Unloading	4.75 (6.79)	3.75 (0.95)	3.75 (1.42)	3.75 (17.96)	-	16.00 (2.14)
10	Sutli	2.0 (2.78)	2 (0.51)	2 (0.76)	-	-	6.00 (0.80)
11	Cleaning	-	5 (1.27)	-	-	-	5.00 (0.67)
12	Processing	-	-	200 (75.97)	-	-	200 (26.69)
	Total	**70.07 (9.35)**	**395.05 (52.73)**	**263.25 (35.14)**	**20.88 (2.79)**	**-**	**486.00 (100.00)**

Table 5.15 Price spread in marketing of rice in channel-I (Producer-village trader – wholesaler-miller- retailer- consumer)

S.No.	Particulars	₹/ quintal	Share in consumer's rupee (in percentage)
1	Producer's share	4000	62.50
2	Cost incurred by	-	-
(a)	Producer	54.75	0.85
(b)	Village trader	82.15	1.28
(c)	Wholesaler	395.05	6.17
(d)	Miller	263.25	4.11
(e)	Retailer	20.88	0.33
	Total costs	816.08	12.74
3.	Margin earned by		
(a)	Village trader	184.96	2.89
(b)	Wholesaler	521.80	8.15
(c)	Miller	559.92	8.74
(d)	Retailer	318.90	4.98
	Total margin	1585.58	24.76
4.	Consumer's price	6400	100

Producer got ₹ 4000 per quintal of rice out of a price ₹ 6400 per quintal paid by consumers. As such the producers share in the consumer's rupee in this channel was 62.50. The marketing cost incurred by the producer, village trader, wholesaler, miller and retailer were 0.85, 1.28, 6.17, 4.11 and 0.33 per cent of the price paid by consumers.

These marketing costs together accounted to 12.74 per cent of the consumer price. Retailer being the only middleman got 0.33 per cent of the consumer rupee.

Thus, it can be inferred that the margin earned by the wholesaler is conspicuously towards the higher side.

The marketing margins of village trader, wholesaler, miller and retailer in absolute terms were ₹ 184.96, 521.80, 559.92 and 318.90 respectively. Agency -wise break-up of gross margins revealed that village trader, wholesaler and retailer got 2.89, 8.15, 8.74 and 4.98 per cent of the consumer's price respectively. Share of middleman in the total margins has been higher for wholesaler and retailer.

5.3C.2 Price spread in marketing of rice by the farmers trade at mandi level (Producer→ Wholesaler→Miller→ Retailer→ Consumer)

The break-up of consumer's price per quintal of rice in sale in mandi has been presented in Table 5.16.

The average price paid by the consumer for rice in this channel was ₹ 6400 per quintal. The total marketing costs incurred by the various intermediaries constituted 11.71 per cent of the consumer's rupee. The break-up of this indicates that producers, wholesaler, miller and retailer shared as 1.10, 6.17, 4.11 and 0.33 per cent of consumer's rupee.

The marketing margins of wholesaler, miller and retailer in absolute terms were ₹ 521.80, 559.92 and 318.90 per quintal respectively. The producer got net share 66.41 per cent of the consumer's rupee.

Table 5.16: Price spread in marketing of rice in channel-II (Producer-wholesaler-miller- retailer- consumer)

S.No.	Particulars	₹/ quintal	Share in consumer's rupee (in percentage)
1	Producer's share	4250	66.41
2	Cost incurred by	-	-
(a)	Producer	70.07	1.10
(b)	Wholesaler	395.05	6.17
(c)	Miller	263.25	4.11
(d)	Retailer	20.88	0.33
Total	Total costs	749.25	11.71
3.	Margin earned by	-	-
(a)	Wholesaler	521.80	8.15
(b)	Miller	559.92	8.74
(c)	Retailer	318.90	4.98
	Total margin	1400.62	21.87
4.	Consumer's price	6400	100

5.4 PROBLEMS FACED BY THE RICE CULTIVATORS.

(A) Problems faced by the farmers in marketing of rice at village sale:

The study of marketing problem (Table 5.17A) revealed that mainly 80 percent farmers reported the lack of co-operative marketing system in the village. 53 per cent farmers reported low prices and 55 per cent farmers problems were faced No ready market. 33 per cent farmers reported the problem of mal practices. Only 10 per cent farmers reported the problem of dominance of trader in the village.

Table 5.17A : Problems faced by the farmers in marketing of rice at village level

S.No.	Particulars	Number of farmers	(in %)
(i)	Low prices	32	53
(ii)	No ready market	33	55
(iii)	Mal practices	20	33
(iv)	Lack of co-operative marketing system in the village	48	80
(v)	Dominance of trader in the village	06	10

(B) Problems faced by the farmers in marketing of rice at mandi sale:

Table 5.17B shows problems in marketing of rice at mandi level. This table revealed that the major problems faced by the farmers in marketing of rice was lack of storage at mandi level. On an overall basis 71 per cent farmers reported this as a major problem. 63 per cent of the farmers faced the problems in getting payment for the produce sold. The problem of high cost of transportation was reported by 57 per cent farmers. 50 per cent farmers faced the problem of staying. On an average 36 per cent farmers faced the problem in the sale of produce in mandi. The problem of high fluctuation in prices was reported by 33 per cent farmers. 28 per cent farmers faced the problem in transportation of produce to mandi.

Table 5.17B: Problems faced by the farmers in marketing of rice at mandi level

S.No.	Particulars	Number of farmers	(in %)
(i)	In transportation of produce to mandi	17	28
(ii)	In sale of produce in mandi	22	36
(iii)	In getting price information	15	25
(iv)	Problem of staying	30	50
(v)	Problem in getting payment for the produce sold	38	63
(vi)	Problem in weighing of produce	8	15
(vii)	Lack of storage	43	71
(viii)	High cost of transportation	35	57
(ix)	High fluctuation in price	20	33

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SUMMARY AND CONCLUSIONS

6.1 INTRODUCTION

Rice (*Oryza sativa* L.) has supported a greater number of people for a longer period of time than any other crop since it was domesticated between 8,000 to 10,000 years ago (Greenland, 1997). At present, rice is the staple food for more people than wheat, and 90 percent of total rice production is grown and consumed in Asia (Evans, 1998).

The genus, to which it belongs, Oryza, contains more than 20 species, only two of which are referred to as cultivated rice: *Oryza sativa*, (Watanabe, 1997) cultivated in South-east Asian countries and Japan, and *Oryza glaberrima* cultivated in West Africa. Rice was originally cultivated in tropical Asia, the oldest record dating 5000 years BC, but then extended also to temperate regions (Watanabe, 1997).

Rice is a staple food for half of the world's population and most of them are living in Asia. It is largely consumed as a wholegrain. Rice is also consumed in the form of noodles, puffed rice, fermented sweet rice and snack foods made by extrusion cooking. It is used in making beer, rice wine and vinegar. Rice bran mixed in adequate quantities with other ingredients is used as a feed for domestic animals. The oil extracted from the rice bran, which is rich in vitamin E, is used for cooking purpose.

Rice is the world's single most important food crop and a primary food for more than a third of the world's population. Rice is grown worldwide over an area of 161 million hectare with an annual production of 678 million tonnes. It is cultivated in 114 of the 193 countries of the world. However, more than 90 percent of the rice is produced and consumed in Asia, China and India account for about 50 percent of the world's rice area and 56 percent of the production (David 1991). India has the world's largest area devoted to rice cultivation, and it is the second largest producer of rice after China.

Rice is cultivated in Rajasthan on small area. About 78% of total area under rice in the State is concentrated in low and very low productivity groups. Triennium average productivity of the State is 2416 kg/ha, which is much below the national triennium average

productivity of Rajasthan in 2013-14 is 2147 kg/ha, (4195 kg/ha in Hanumangarh). The low yield is probably contributed due to adoption of old traditional varieties and lack of irrigation facilities. The coverage under high yielding varieties is less than 30% and irrigated area is about 50% in the State (Directorate of Economics and Statistics).

The present study has been under taken as a modest attempt in this direction to fulfill the research gap with the following specific objective.

6.2 OBJECTIVES

1. *To estimate the growth rate in area, production and productivity of rice in the study area;*
2. *To work out the costs and returns of rice cultivation;*
3. To study the marketing cost, margins and price spread in rice; and
4. To identify the problems faced by the rice cultivators.

6.3 METHODOLOGY:

The study area is confined to the Hanumangarh district of Rajasthan as this district occupies second place in area (22095 hac.) and first place in production (66827 MT.) of the rice crop in the state in year 2011-12.Tibbi tehsil of Hanumangarh district have been selected for the study because this tehsil has highest production and area of rice crop in the district. From this tehsil, based on the information of maximum production and sale of rice, two villages namely Ratakhera and sareka under the command area of Krishi Upaj Mandi Samiti, Hanumangarh were selected. The list of the rice growing farmers in these two villages was prepared along with their size of operational holding during the year 2012-13. A sample of 60 rice growing farmers was randomly selected in proportion to their total number in each size group.

Primary as well as secondary data were used for the study. Primary data in respect of area under rice crop, production of rice, costs incurred by the selected

farmers in the sale of rice, sale price of the produce were obtained from the selected famers. Costs incurred by the wholesalers and retailers of Hanumangarh market were collected through personal interview method with the help of a set schedules developed specially for the purpose. The data collected pertains to the agricultural years 2012-13.

6.4 Result:

The summarized results of the study are presented under the following sub-heads:-

Growth rate in area, production and productivity of rice:

There were wide fluctuations in percent share of rice in area under total *kharif* cereals. It varied between 1.27 percent in 2003-04 to 3.54 percent in 1999-2000. Similarly the percent share of rice in production of total *kharif* cereals varied between 1.74 percent in 2003-04 to 9.39 percent in 1999-2000.

The analysis of year-wise area under rice in Hanumangarh district and Rajasthan reveals that the per cent share of area under rice in Hanumangarh district varied between 10.13 per cent to 26.60 per cent and in highest in 2002-03. The total production of rice in Rajasthan varied between 18.25 per cent in 1997-98 to 73.84 per cent in 2006-07. The per cent share of Hanumangarh in 2011-12 was 26.38 per cent in total production of rice in Rajasthan. The productivity of rice in Hanumangarh district varied between 1535 kg per hectare (1997-98) to 4639 kg per hectare (2006-07). The productivity levels in Hanumangarh district were higher as compared to Rajasthan.

The rice crop registered a decline in growth of area by 1.6 percent in Rajasthan and was negative and significant at 5% level of significance. In case of Hanumangarh district the rate of growth in area for rice crop was negative and (-0.09) Non-significant. The growth rate of production was 4.48 per cent in Hanumangarh which was significant at 1 per cent level of significance and was Non-significant in Rajasthan state. However, the productivity of rice registered positive growth of 0.16 per cent and 4.58 per cent in Rajasthan and Hanumangarh

district, respectively. The decline in area under rice has been compensated by increase in production and productivity.

Cost and return in cultivation of rice

On an average the total cost of cultivation (cost C_2) of rice crop was ₹ 29009.95 per hectare. This cost varied from ₹ 26779.12 per hectare on large sized farms to ₹ 30890.52 per hectare on marginal sized farms. The cost of machine labour accounted for major share (7.58 to 12.17 per cent) in total operational cost on different sized farms. The other important operational costs were human labour, plant protection, chemicals, seed, irrigation charges, FYM, and fertilizer. The cost A_1, cost A_2, cost B_1, cost B_2, cost C_1 and cost C_2 in cultivation of rice crop were ₹ 16124.55, 16124.55, 17789.55, 24789.85, 22009.95 and 29009.95 per hectare, respectively. The use of FYM on per hectare of land decreased with the increase in the holding size both due to high cost and non availability in the area.

On an average the cost of production of rice seed was ₹ 715.06 per quintal. This cost varied from ₹ 546.51 per quintal on large sized farms to ₹ 882.59 per quintal on marginal farms. The cost of production per quintal has been inversely related with the size of holding i.e. decrease in cost of production with the increase in the size of holding due to scale economics. Rice cultivation has been found to be a highly profitable enterprise in the study area. Net income in cultivation of rice crop ranged from ₹ 57414.48 to ₹ 96847.88 per hectare on different size farms. Highest returns were obtained by the farmers of large size farms. Return per rupee from rice cultivation was very high (₹ 4.62 on large sized farms and decreased with the decrease in size holding. It decreased to ₹ 2.86 on small sized farms and was ₹ 3.56 on overall farm.

Marketing cost, margins and price spread in rice:

The studies on marketing costs and margins for a commodity help in knowing the total costs incurred in the process of marketing of the commodity and the share got by the producer farmers and various intermediaries and the price paid by the consumers, the reasons for high marketing costs and finding the possible ways for reducing the extent of the possible ways for reducing the extent of marketing costs. It also helps in formulations and implementation of an appropriate price and marketing policies. Thus, the knowledge of marketing costs, margins and price spread is necessary for bringing improvement in the efficiency of the marketing system.

The total marketing cost incurred by the middlemen in sale of rice at village has been ₹ 816.08 per quintal or 12.75 per cent of the consumer's price. The total marketing cost in sale of rice at regulated market was ₹ 749.25 per quintal or 11.71 per cent of the consumer's price. As such total marketing costs were higher at a village level as compared to the sale in the regulated market (Hanumangarh) due to the involvement of more number of middlemen in the sale process.

Producer got a share of 62.50 per cent in the price paid by consumers in the sale of rice at village and 66.41 per cent in the sale directly in the Hanumangarh market. Thus, the net price received by the producer farmer is higher by 4.09 per cent in sale of rice in the mandi than at village.

Problems faced by the rice cultivators

Results of opinion survey undertaken to know the problems faced by the farmers in marketing of rice revealed that lack of co-operative marketing system in the village (80 per cent), lack of storage (71 per cent), problem in getting payment for the produce sold (63 per cent), high cost of transportation (57 per cent) and no ready market (55 per cent), etc. were the main problems faced by the rice growers in the study area.

6.5 Conclusions

The important conclusions of the study are:

(i) In Rajasthan the crop rice was found to have negative growth rate in area and production through it recorded positive growth in productivity. Where as in Hanumangarh district the growth rate was positive in production and productivity but in area the growth rate was negative.

(ii) Rice cultivation was a profitable entity in the study area. Net income per hectare of rice cultivation ranged from ₹ 57414.48 to ₹ 96847.88 on different sized farms. Highest return was obtained by the large sized farms. Return per rupee from rice cultivation was also very high (₹ 4.62) on large sized farms, this increased with the increase in size of farms and the average being ₹ 3.56 per rupee of investment. Per hectare cost of cultivation (cost C_3) was ₹ 29457.03 on large sized farms and highest (₹ 33979.57) on marginal sized farms with an overall average of ₹ 31910.94. The average A_1, A_2, B_1, B_2, C_1 and C_2 were ₹ 16124.55, 16124.55, 17789.85, 24789.85, 22009.95 and 29009.95 per hectare, respectively. Per hectare cost of production (cost C_3) was ₹ 970.84 on marginal sized farms and highest (₹ 970.84) on marginal sized farms with an overall average of ₹ 786.56. The average cost of production of rice was A_1, A_2, B_1, B_2, C_1, and C_2 ₹ 397.45, 397.45, 438.50, 611.04, 542.52, and 715.06, respectively.

(iii) The selected farmers sold rice at village as well as at Mandi. 70 per cent farmers sold the rice in the Hanumangarh market and 30 per cent farmers in the village markets to the village traders. The adoption of village sale by the farmers decreased with the increase in farm size and sale in the regulated market increased with the increase in farm size. All large sized farmers sold the rice in the Mandi.

(iv) The marketing costs were higher by ₹ 66.83 per quintal in sale of rice at village compared to the sale in the regulated market of Hanumangarh. This has been so due to the involvement of more number of middlemen at the village sale.

(v) There existed significant difference in the margin earned by the intermediaries in sale of rice at village and Mandi. The village traders received 2.89 per cent share of the consumer's rupee in purchase of rice in the village. The share got by the wholesaler, miller and retailer has been 8.15, 8.74 and 4.98 per cent,

respectively. Among all the functionaries, miller got higher margin due to the sale of rice at high prices by them to the consumers in small quantity.

(vi) The producer's share in consumer's rupee in the sale of rice directly in regulated market of Hanumangarh was 66.41 per cent as compared to 62.50 per cent in sale at village level. The share and net price received by the producer-farmers in sale of rice at village level has been lower than that of sale in Hanumangarh regulated market.

(vii) Farmers reported to have the most important problems of lack of co-operative marketing system in the village, lack of storage, low prices, problem in getting payment for the produce sold, high cost of transportation, no ready market, mal practices and high fluctuation in price.

6.6 Policy implication

On the basis of the results and conclusion obtained in the study following policy recommendation could the framed.

1. Producer got a share of 62.50 per cent in the price paid by consumers in the sale of rice at village and 66.41 per cent in the sale directly in the Hanumangarh market. Thus, the net price received by the producer farmer is higher by 4.09 per cent in sale of rice in the mandi than at village.

2. The producer's net share in consumers rupee was 4.09 per cent higher in channel-II as compared to channel-I, therefore, it is suggested that the producer farmers should sell their produce in the regulated markets. Small farmers having low marketable surplus may pool up their produce in order to reduce the per unit transportation cost and to increase the profit.

3. Wide gap existed in price of rice seed in village and regulated market. Prices were much lower in village markets for the same quality of rice seed compared to the regulated market. There in a need for development of village markets as sub- yards or as kisan mandi for providing reasonable prices to all farmers in general and more specifically to the small sized farmers, having small produce for disposal.

4. Lack of co-operative marketing system in the village, lack of storage, problem in getting payment for the produce sold, high cost of transportation were the major constraints faced by the farmer. To safeguard the interests of the farmers and to enhance farming efficiency, necessary arrangement need to be made facilitate timely and adequate availability of credit, inputs and market information.

5. Higher margin of miller among all the functionaries is an important cause of concern for the government to check it for the benefit of the producer farmers.

Bibliography

Aamer, I., Ashraf, I., Muhammad, S. and Choudhary, K.M., 2009, “Identification and prioritization of production, protection and marketing problems faced by the rice growers”. *Pakistan-Journal-of-Agricultural-Sciences,* **46**(4): 290-293.

Abassian, M., Karim M.H., Esmaeili, M. and Ebrahimzadeh, H., 2005, "The Economic Analysis of Marketing Margin of Mazafati Date: A Case Study of Sistan and Blouchestan-Iran". *Agricultural Economics Research Review,* **18**: 39-49

Afroz, S. and Islam, M.S., 2012, "Economics of *Aus* Rice (*Oryza sativa*) and Jute (*Corchorus olitorius*) Cultivation in Some Selected Areas of Narsingdi District of Bangladesh". *The Agriculturists,* **10**(2): 90-97.

Alarima, C. I., Adamu,C.O., Masunaga,T. and Wakatsuki, T., 2011, “Constraints to Sawah Rice Production System in Nigeria”. *J Hum Ecol*, **36**(2): 121-130.

Anomymous, 2011-12, Rice production in India. http://en.wikipedia. org/wiki/Rice_productin_in_india..

Banerjee, B.N., 1985, “Concepts of farm size resources use and productivity in agriculture”. *Journal of Economic Affairs*, **30** : 17-21.

Bhalla, G.S. and Singh, G., 1997, “Recent development in Indian agriculture : a station level analysis”. *Economic and Political Weekly*, **32**(13) : 12-18.

Borthakur, S. and Battacharya, B.K., 1999, “Trend analysis of area, production and productivity of rice in Assam”. *Agricultural, Situation in India*, **56**(4) : 203-206.

Chalajour, M. and Feizabadi, Y., 2013, "Marketing price transmission analysis in the Iranian rice market". *African Journal of Agricultural Marketing*, **1**(2): 041-046.

Chauhan, S.K. and Chhabra, A., 2005, “Marketable Surplus and Price-Spread for Maize in Hamirpur District Himachal Pradesh”. *Agricultural Economics Research Review* . **18**, 39-49.

Chinnappa, B., 2001, “An economic appraisal of paddy based cropping system in southern Transition Zone (Zone-7) Karnataka”. *Mysore Journal of Agricultural Science,* **35**(3): 258-260.

David, C.C., 1991, The world rice economy; Challenges ahead. In rice biotechnology, Ed. G.S. Khud and G.Toennissen,1-18 Cambridge.

Evans, L.T., 1998, Feeding the ten billion: plants and population growth. Cambridge University Press, Cambridge.

Goufo, P., 2008, "Evaluating the Constraints and Opportunities for Sustainable Rice Production in Cameroon*". Research Journal of Agriculture and Biological Sciences*, **4**(6): 734-744.

Greenland, DJ., 1997, "The sustainability of rice farming". CAB International, Wallingford, UK. p. 273. IRRI (International Rice Research Institute).2006.Bringing hope, improving lives: Strategic Plan 2007-2015, Banos, Phillippines.p.61.

Gyanendra, S. and Chandra, H, 2001, "The Paradox of declining of agricultural output growth co-existing with declining prices of agricultural commodities". *Agricultural*.

Hang Chuon, C. and Suzuki, N., 2005, “Characteristics of the rice marketing system in Cambodia”. *Journal of the Faculty of Agriculture Kyushu University*. **50**(2): 693-714.

http://www.agsri.com/images/documents/sri/SRI_Book_final_version.pdf.

Joshi, N.P., 2004, “Production and Marketing of Rice in different Development Regions of Nepal”. Institute of Agriculture and Animal Science (IAAS), p 138.

Kalamkar, S.S., Atkare, V.G. and Shende, N.V., 2002, “An Analysis of Growth Trends of Principal Crops in India”. *Agricultural Science Digest*., **22**(3): 1.

Kaur, A. and Saran, S.K., 2011, “Status and constraints of sugarcane cultivation in Punjab". *Indian Journal Agriculture Marketing,* **25**(1) : 78-87.

Kaur, P.J., Singh, I.P. and Sharma S., 2013, "Production and marketing of basmati paddy in Hanumangarh district of Rajasthan". *Indian Journal of Agricultural Marketing*, **27**(1) : 59-66.

Krishna, V.V., 2001, "Sustainability and economic efficiency of rice farming in the agroecological problem area zone of Kerala". *M.Sc. Thesis*, Department of Agricultural Economics.

Krishnaiah, K., Dhaliwal, G.S., Arora, R., Randhawa, N.S. and Dhawan, A.K., 1998, “Technology and policy perspective for sustainable rice development”. Ecological agriculture and sustainable development: Proceedings of International Conference on Ecological Agriculture. Towards Sustainable Development : Chandigarh, India, **2** : 571-588.

Kumar, A. and Mor, B.S., 2001, “Analysis of Growth rates in Area, Production and Productivity of major Crops in Haryana”. *Research on Crops,* **2**(3): 327-331.

Kumar, R.R. and Sudheesh, B., 2013, "Economies of paddy cultivation in Palakkad district of Kerala". *International Journal of Economic and Business Review*, **1** (1): 26-31.

Mohandas, K. and Thomas, E.K., 1997, “Economic analysis of rice production in Kuttanad areas of Kerala”. *Agricultural Situation India*, **43**(3): 555-561.

Muhammad, S., Khan, M., Sardar, U. l., Mulk, D.K and Nazir, M., 2008, “An investigation into marketing channels and margins of rice in district Malakand”. *Sarhad Journal of Agriculture,* **24**(3): 479-484.

Murthy, D.S., Gajanana, T.M., Sudha, M. and Dakshinamoorthy, V., 2007, “Marketing Losses and Their Impact on Marketing Margins: A Case Study of Banana in Karnataka*”. Agricultural Economics Research Review*, **20**(1): 47-60.

Muthoni, J. and Nyamongo, D.O., 2009, “A review of constraints to ware Irish potatoes production in Kenya”. *Journal of Horticulture and Forestry*, **1**(7): 98-102.

Naing, T. A. A., Kingsbury, A. J., Buerkert A. and Finckh, M. R., 2008, “A Survey of Myanmar Rice Production and Constraints”. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, **109**(2): 151-168.

Neelappa, S., 2002, “Technical and allocative efficiency of paddy production in TBP area – An Economic analysis”. *M.Sc .Ag. Thesis*, Department of Agricultural Economics, UAS, Dharwad.

Nirmala, B. and Muthuraman, P., 2009, "Economic and constraint analysis of rice cultivation in Kaithal district of Haryana". *Indian Res. J. Ext. Edu.,* **9**(1): 47-49.

Ohajianya, D.O. and Onyenweaku. C.E., 2003, "Analysis of costs and returns in rice farming by farm size in Ebonyi State*". Journal of Agriculture and Social Research,* **3**(1): 29-39.

Paroda, R.S., Dowling, N.G., Greenfield, S.M. and Fischer, K.S., 1998, “Priorities and opportunities of rice production and consumption in India for self sufficiency”. *Sustainability of Rice in Global Food System*, 357-390.

Ramesh, C. and Vijayan, S., 2012, "Marketing Cost of Paddy in Cuddalore District of Tamil Nadu, India". *Strength for Today and Bright Hope for Tomorrow*, **12**(2): 553-564.

Rao, I.V.Y.R., 2011, "Estimation of Efficiency, Sustainability and Constraints in SRI (System of Rice Intensification) v*is-a-vis* Traditional Methods of Paddy Cultivation in North Coastal Zone of Andhra Pradesh*". Agricultural Economics Research Review,* **24**: 325-331.

Santha, A.M., 1993, “A Comparative analysis on cost and returns of paddy cultivation for different seasons in Trichur Kerala”. *Madras Agricultural Journal,* **80**(2) :41-44.

Saravanadurai, A. and Kalaivani, M., 2010, "Growth actions of selected cereal crops in Tamilnadu state". *International Journal of Applied Biology and Pharmaceutical Technology,* **1**(3): 778-785.

Satapathy, S.K. and Tripathy, S., 2001, “An Economics analysis of borrower and non-borrower rice farmer in Cuttack district of Orissa”. *Indian Journal of Agricultural Economics*, **56**(1) : 89-99.

Shaik, H., Ramorao, C.A., Katyal, J.C. and Reddy, Y.V.R., 1998 “Costs and returns analysis of different crops under different agro-climatic zones in Andhra Pradesh” A Comprehensive study”. *Agricultural Situation in India*, **50**(2) : 77-84.

Shivamurthy, M., Rao, L.R., Hittalamani, S. and Lakshminarayan, M.T., 2008, “Constraints of farmers cultivating rainfed paddy in eastern dry zone of Karnataka”. *Mysore Journal of Agricultural Sciences,* **42**(1): 163-165.

Shrestha, R.S., 2012, “Factors Affecting Price Spread Of Rice in Nepal”. *Journal of Agriculture and Environment,* **13:** 47-52.

Siju, T. and Kmbairaju, S., 2001, "Rice production in Tamil Nadu : A trend and decomposition analysis agriculture situation in India". **58**(4) : 143-146.

Sileshi, D., Bant, S. and Jasdev, S., 2003, “Changes in costs and returns of major crops in Punjab”. *Agricultural Situation in India,* **60**(1) :11-17.

Singh, G. and Chandra, H., 2003, “Production and economic factors growth in Indian Agriculture”. *Central Institute of Agricultural Engineering, Bhopal*.

Singh, R.K.P. and Rajan, K.P., 1998, “Growth and instability in production of principle food grain crops : A case of backward economy”. *Bangladesh Journal of Agricultural Economics*, **21**(1-2): 1-20.

Sreeja, M., 2004, “Land use dynamics in Kerala- An economic analysis*”* *M.Sc Thesis*, Department of Agricultural Economics, University of Agricultural Sciences, Dharwad.

Thanh, N.C. and Singh, B., 2006, “Constraints faced by the farmers in rice production and export”. *Omonrice*, **14**: 97-110.

Thiyagarajan, T.M. and Biksham Gujja, 2013, National Consortium on Sri (NCS) Transforming Rice Production with SRI (System of Rice Intensification) Knowledge and Practice.

Tuong, D.M., 2011, "Analysis marketing and forecasting rice price in the mekong delta of vietnam". *Omonrice,* **18**: 182-188.

Umashankara, C., 1998, “Production efficiency and marketing constraints of rice in hilly zone of Karnataka” *M.Sc. Ag. Thesis,* Department of Agricultural Marketing and Cooperation, University of Agricultural Sciences, Bangalore.

Verma, A.R., 2006, “Growth in production and productivity of principal crops and constraints in food security in M.P”. *Ind. J. of Agril. Econ*., **63**(3): 442-444.

Wang, K.M. and Lee, Y.M., 2009, "A measure of marketing price transmission in the rice market of Taiwan". *Zb. rad. Ekon. fak. Rij*, **27**(2): 311-326.

Watanabe, Y., 1997, Genomic constitution of Genus Oryza. (Tokyo: Food and Agriculture Policy Research Center).

AN ECONOMIC ANALYSIS OF RICE CULTIVATION IN HANUMANGARH DISTRICT OF RAJASTHAN

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ABSTRACT

The present study was conducted in Hanumangarh district of Rajasthan state which has highest production under rice cultivation. The present study was conducted with the following specific objectives: To estimate the growth rate in area, production and productivity of rice in the study area; to work out the costs and returns of rice cultivation; to study the marketing cost, margins and price spread in rice and to identify the problems faced by the rice cultivators. Tibbi Tehsil in Hanumangarh and two villages from Tibbi Tehsil were selected on the basis of highest area under rice. A sample of 60 farmers was drawn by probability proportional to area under rice. The farmers were divided into marginal, small, semi-medium, medium and large categories. The sample included 17 marginal, 14 small, 12 semi- medium, 10 medium and 7 large farms. The primary data were collected for the agriculture year 2012-13.

Rajasthan was found to have negative growth rate in area and production due to positive growth in productivity. In Hanumangarh district the growth rate was positive in production and productivity but in area the growth rate was negative. The CGRs of production were non-significant.

On an overall basis, cost of cultivation of rice on Cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3 basis were ₹ 16124.55, ₹ 16124.55, ₹ 17789.85, ₹ 24789.85, ₹ 22009.95, ₹ 29009.95 and ₹ 31910.94, respectively. Cost of production per quintal for rice varied between ₹ 882.59 per quintal on marginal farms to 546.51 on large farms with an overall average of ₹ 715.06 per quintal. On an average, the farm business income, family labour income and net income were ₹ 86225.15, ₹ 75793.75 and ₹ 73339.75 respectively. On an overall basis, returns on cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3 basis, were ₹ 86225.15, ₹ 86225.15, ₹ 84559.85, ₹ 77559.85, ₹ 80339.75, ₹ 73339.75 and ₹ 70438.76, respectively. On an average, the returns per rupee of investment on cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3 basis were ₹ 6.36, ₹ 6.36, ₹ 5.75, ₹ 4.13, ₹ 4.71, ₹ 3.56 and ₹ 3.23, respectively.

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Total costs in sale of rice have been ₹ 816.08 per quintal at village and ₹ 749.25 per quintal at mandi. Marketing margins accounted to 24.76 and 21.87 per cent of consumer's price in village and mandi sale channel. Miller got higher margins in sale of rice in both village and mandi sale compared to the wholesaler. Producer share in consumer's rupee was 62.50 per cent in sale of rice at village and 66.41 per cent at regulated market of Hanumangarh. Farmers selling their rice in the regulated market got 3.91 per cent higher share.

The major constraints in marketing of rice were lack of co-operative marketing system in the village, lack of storage, problem in getting payment for the produce sold, No ready market, low prices and problem of staying and sale of produce in mandi.

राजस्थान के हनुमानगढ़ जिले में चावल की खेती का आर्थिक विश्लेशण

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सारांश

वर्तमान अध्ययन राजस्थान राज्य के हनुमानगढ़ जिले में किया गया जो कि चावल की खेती में अग्रणी है। वर्तमान अध्ययन निम्नलिखित विशिष्ट उद्देश्य को ध्यान में रखकर किया गया। अध्ययन के क्षेत्र में क्षेत्र उत्पादन और उत्पादकता में वृद्वि दर का अनुमान लगाने के लिए, चावल की खेती में वितरण एवं लागत का अध्ययन करने के लिए, चावल की खेती करने वाले किसानों द्वारा महसूस की गई बाधाओं को पहचानने के लिए। हनुमानगढ़ जिले की टिब्बी तहसील और टिब्बी तहसील में से दो गांवों का अधिकतम चावल उत्पादन क्षेत्रफल के आधार पर चयन किया गया। चावल के क्षेत्र की आवृति के आनुपातिक आधार पर 60 किसानों का एक प्रतिदर लिया गया। योजना, आयोग की मानक श्रेणीयों की मदद से सीमान्त, लघु, अर्द्व,–मध्यम, मध्यम और दीर्घ खेत में विभक्त किया गया। नमूने में सीमान्त 17, 14 लघु, 12 अर्द्व–मध्यम, 10 मध्यम और 7 दीर्घ खेत सम्मिलित किये गए। इस अध्ययन हेतु प्राथमिक आकड़ें कृषि वर्ष 2012–13 हेतु इकट्टे किए गए।

राजस्थान में क्षेत्र और उत्पादन में नकारात्मक वृद्वि दर की वजह से उत्पादकता में सकारात्मक वृद्वि पायी गई। हनुमानगढ़ जिले की उत्पादन एवं उत्पादकता की वृद्वि दर सकारात्मक पायी गई लेकिन क्षेत्र में वृद्वि दर नकारात्मक रही।

चावल की खेती पर प्रति हैक्टर औसत लागत $ए_1$, $ए_2$, $बी_1$, $बी_2$, $सी_1$, $सी_2$ और $सी_3$, क्रमशः ₹ 16124.55, ₹ 16124.55, ₹ 17789.85, ₹ 24789.85, ₹ 22009.95, ₹ 29009.95 और ₹ 31910.941 आंकी गई। चावल की उत्पादन लागत का पूर्ण औसत ₹ 715.06 प्रति क्विटंल था। जिसका फैलाव ₹ 882.59 प्रति क्विंटल सीमान्त आकार के खेतों में ₹ 546.06 प्रति क्विटंल दीर्घ आकार के खेतों पर था। औसततन

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क्षेत्र व्यावसायिक आय, पारिवारिय श्रमिक आय तथा शुद्व आय क्रमशः ₹ 86225.15, ₹ 75773.75 और ₹ 73339.75 प्रति हैक्टर थी। चावल की खेती पर प्रति हैक्टर कुल विपणन की पूर्ण औसतन लागत ए$_1$, ए$_2$, बी$_1$, बी$_2$, सी$_1$, सी$_2$ और सी$_3$ क्रमशः ₹ 86225.15, ₹ 86225.15, ₹ 84559.85, ₹ 77559.85, ₹ 80339.75, ₹ 73339.75 और ₹ 70438.76 आंकी गई। पूर्ण औसतन प्रति रूपये खर्च पर लागत ए$_1$, ए$_2$, बी$_1$, बी$_2$, सी$_1$, सी$_2$ और सी$_3$ क्रमशः ₹ 6.36, ₹ 6.36, ₹ 5.75, ₹ 4. 13, ₹ 4.71, ₹ 3.56 और ₹ 3.23।

चावल के विक्रय में कुल विक्रय लागत, ग्रामीण क्षेत्र में विक्रय करने पर ₹ 816.08 रू. एवं मण्डी में विक्रय करने पर ₹ 749.25 रूपये प्रति क्विंटल पायी गई। ग्रामीण क्षेत्र में विक्रय करने पर एवं मण्डी में विक्रय करने पर मण्डी में विक्रय में उत्पादकों को उपभोक्ता कीमतों में से प्राप्त लाभांश क्रमशः ₹ 62.50 एवं ₹ 66.41 प्रतिशत पाया गया। खुदरा व्यापारी को थोक व्यापारी की अपेक्षा ग्रामीण विक्रय एवं मण्डी विक्रय करने की दोनों विधियों में अधिक विपणन लाभ प्राप्त होता है। उत्पादन कृषकों का उपभोक्ता कीमतों में अंश, गांवों में विक्रय करने पर ₹ 24.76 प्रतिशत एवं हनुमानगढ़ नियंत्रित मण्डी में विक्रय करने पर ₹ 21.87 प्रतिशत पाया गया। उत्पादक कृषकों को नियंत्रित मण्डी में ले जाकर अपने चावल के उत्पाद को विक्रय करने पर 3.91 प्रतिशत अधिक लाभांश प्राप्त होता है।

गांव में सहकारी विपणन प्रणाली की कमी, भण्डारण की असुविधा, बेचे गए उत्पाद का भुगतान प्राप्त करने में समस्या, कोई तैयार बाजार नही, कम कीमत रहने और मण्डी में उपज की ब्रिकी की समस्या चावल का विपणन करने में प्रमुख बाधांए रही।

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S.K.N. College of Agriculture, Jobner

Title: An Economic Analysis of Rice Cultivation in Hanumangarh district of Rajasthan.

Name of scholar : Rajesh Kumar [M.Sc. (Ag. Economics)

Research Scholar]

Reference year : 2012-13

Date of interview :

Appendix-I

Schedule for farmer

1. General information

Name of the farmers **: .....**

S/o Sh.	
Caste	
Village	
Tehsil	
District	

2. Family composition

S.No.	Name	Relationship with head of the household	Sex M/F	Age	Marital status	Education status	Occupation main/ subsidiary
(i)							
(ii)							
(iii)							
(iv)							

3. a) Details of land holding (in bigha / hectare)

S.No.	Particulars	Irrigated	unirrigated	Total
(i)	Owned			
(ii)	Rented in			
(iii)	Rented out			
	Total area			

3 b) Land rent / revenue

1) Land revenue paid on owned land cash ₹. _____
2) Land revenue paid on leased out land cash ₹. _____
3) Rent paid on leased in land cash ₹. _____

4. Irrigation

S.No.	Particulars	Share	Capacity per day (bigha/ha)	Cost of electricity / diesel per irrigation
(i)				
(ii)				

5. Labour use

S.No.	Particulars	No.	Month during which available	Payment
(A)	**Family labour**			
	(i) Male			
	(ii) Female			
	(iii) Children			
(B)	**Permanent hired labour**			
	(i) Male			
	(ii) Female			
	(iii) Children			
(C)	**Casual labour**			
	(i) Male			
	(ii) Female			
	(iii) Children			

6. Farm machinery and building

S.No.	Particulars	No.	Expected age	Purchase value (₹)	Present value (₹)
(i)	M.B. plough				
(ii)	Desi plough				
(iii)	Pata				
(iv)	Spades				
(v)	Sickles and khurpi				
(vi)	Chaff cutter				
(vii)	Bullock cart				
(viii)	Sprayers				
(ix)	Tube wells				
(x)	Thresher				
(xi)	Tractor				
(xii)	Diesel engine				

(xiii)	Buildings				
(xiv)	Irrigation structure				
(xv)	Other				

7. Livestock

S.No.	Kind of livestock	Number	Present value
I.	**Milch animal**		
	a) Cow		
	(i) Desi		
	(ii) Cross-breed		
	b) Buffalo		
	(i) Desi		
	(ii) Improved		
II.	**Drought animals**		
	(i) Bullock		
	(ii) Buffaloes		
	(iii) Camel		
III.	**Calves**		
IV.	**Heifers**		
V.	**Goat**		
VI.	**Sheep**		

8. Existing cropping pattern

S.No.	Crop	Area (bigha/ha)	Irrigated	unirrigated	Total
	***Rabi* season**				
1.					
2.					
	***Kharif* season**				
1.					
2.					
	***Zaid* season**				
1.					
2.					

9. Production on farms (2011-12):

S.No.	Crops	Area in ha/bigha	Total Pro. in quintals	Yield /ha	Price /qt.
1	***Kharif* season**				
	(i)				
	(ii)				
	(iii)				
	(iv)				
2.	***Rabi* season**				
	(i)				
	(ii)				
	(iii)				
	(iv)				
3.	***Zaid* season**				
	(i)				
	(ii)				
	(iii)				
4.	**Fruits/Vegetables**				
	(i)				
	(ii)				
	(iii)				

Length of Zarib……..

10. FYM _____ cart load / tractor trolly

11. Milk production _____ liters / days_____

12. Custom hire of bullock ₹ _____

13. Renting out of irrigation water ₹ _____

14. Non-farm income ₹_____

15. Others _____ ₹.

16. Farm expenditure (in ₹)

S.No.	Particulars	*Kharif*		*Rabi*		*Summer*		Total
		No.	Amount	No.	Amount	No.	Amount	
1.	Wage to							
	a) Permanent hire labour							
	b) Casual labour							
2.	Rent paid on machinery (hired)							
3.	Electricity charges (specify time)							
4.	Repair of							
	a) Pump set							
	b) Farm machinery							

	c) other							
5.	Feed							
6.	Dairy fodder							
7.	Green fodder							
8.	Medicine for livestock							
9.	Fertilizers							
	a) urea							
	b) DAP							
10.	Seeds							
11.	Chemical							
12.	FYM							
13.	Land revenue							

17. Marketing channels adopted in marketing of rice by the farmers

S.No.	**Channel**	**Quantity sold**	**Percentage of quantity**
(i)	Sale to consumers		
(ii)	Sale to village traders		
(iii)	Sale to wholesaler at village		
(iv)	Sale to retailer at village		
(v)	Sale to commission agent at market		
(vi)	Sale to wholesaler at market		
(vii)	Sale to retailers at market		
(viii)	Any other		

18. Marketing cost incurred in sole of rice in village market

S.No.	Components of costs	Quantity (qts)	Rate (₹/qts)	Amount (₹)
(i)	Cost of gunny bags			
(ii)	Labour charges for filling and stitching of begs			
(iii)	Labour charges for loading			
(iv)	Transportation charges			
(v)	Unloading charges in villages			
(vi)	Weighing charges			

(vii)	Commissions			

19. A problem faced by the farmers during the process of marketing in villages

(i)	Low price	
(ii)	No ready market	
(iii)	Mal practices	
(iv)	Lack of cooperative marketing system in the village	
(v)	Dominance of traders in the village	

B. Problem faced by the farmers during the process of marketing in regulated market (mandi)

(i)	In transportation of produce to the mandi	
(ii)	In sale of produce in mandi	
(iii)	In getting price information	
(iv)	Problem of staying	
(v)	Problem in weighing of produce	
(vi)	Problem in getting payment for the produce sold	
(vii)	Lack of storage	
(viii)	High cost of transportation	
(ix)	High fluctuation in prices	
(x)	Any other problems	

Appendix-II

Schedule for village trader

1. Name of village trader _____

2. S/o Sh. _____

3. Purchase of rice by the village trader

S.N.	Date	Place of purchase	Farmer from whom which purchased	Quantity purchased	Price paid (₹/q)
(i)					
(ii)					
(iii)					

4. Cost incurred by the village trader in purchase of rice

S.N.	Particulars	Quantity (qt)	Rate (₹/qt)	Amount (₹)
(i)	Transportation charges from produce			

	farmer to the mandi			
(ii)	Labour charges for loading and unloading			
(iii)	Storage charges			
(iv)	Other costs			
	Total costs			

5. Sale of rice

S.N.	Date of sale	To whom sold	Quantity (qt)	Rate (₹/qt)	Amounts (₹)
(i)					
(ii)					
(iii)					
	Total				

6. Net price received by the village trader _____

Appendix-III
Schedule for wholesaler

1. Name of wholesaler _____ S/o Sh. _____

2. Purchase of rice by the wholesaler

S.N.	Date	Number of gunny bags purchased	Weight (qt)	From whom purchased	Purchase price (₹/qt)
(i)					
(ii)					
(iii)					

3. Cost incurred by the wholesaler in purchase of rice

S.N.	Particulars of costs	Quantity (qt)	Rate (₹)	Amount (₹)
(i)	Sale tax			
(ii)	Mandi fee			
(iii)	Commission			
(iv)	Loading charges			
(v)	Unloading charges			

(vi)	Weighing charges			
(vii)	Cost of gunny bags used			
(viii)	Quantity losses during the period of purchase and sale			
(ix)	Other costs			
	Total cost			

4. Disposal of rice by the wholesaler

S.N.	Date of sale	Qtys sold (qt)	Rate (₹)	Amount (₹)	Place of Sale
(i)					
(ii)					

5. Average net price received by the wholesaler _____

Appendix-IV

Schedule for retailer

Date of interview _____

1. Name of retailer _____ S/o Sh. _____

2. Purchase of rice by the retailer

S.N.	Date	Place of purchase	Agency from which purchased	Quantity purchased	Price (₹/qt)
(i)					
(ii)					
(iii)					
(iv)					

3. Cost incurred by the retailer in purchase of rice

S.N.	Particulars	Quantity (qt)	Rate (₹)	Amount (₹)
(i)	Transportation charges from mandi to the shop			
(ii)	Labour charges for loading and unloading			
(iii)	Storage charges			
(iv)	Other costs			
	Total costs			

4. Sale of rice

S.N.	Date of sale	To whom sold	Quantity (qt)	Rate (₹)	Amounts (₹)
(i)					
(ii)					
(iii)					
(iv)					

5. Net price received by the retailer _____