*Study No. 107*

# HULLING AND MILLING RATIO FOR PADDY IN MADHYA PRADESH

AGRO- ECONOMIC RESEARCH CENTRE FOR MADHYA PRADESH AND CHHATTISGARH
Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (M.P.)

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# PREFACE

*The present study entitled* ***"Hulling and Milling Ratio for Paddy in Madhya Pradesh"*** *has been assigned by the Directorate of Economics and Statistics Ministry of Agriculture Government of India to this centre under the close coordination of Agricultural Development and Rural Transformation, Bangalore*

*The study comprises of 40 modern rice millers and 40 traditional rice millers (hullers) of two top rice growing districts (Balaghat and Katni) of M.P. The study revealed that the paddy to rice conversion ratio was found to be higher in parboiled rice (61-67 %) as compared to non parboiled rice (51-57 %). The huller of the study area processed area non parboiled rice on the bases of custom hiring basis.*

*The present study was conducted by Dr. U.S. Thakur, Mr. A Dangi, Dr. H.O. Sharma and Dr. Deepak Rathi of this Centre. They have done field investigation, tabulation and analysis, and interpretation and drafting of the report. I wish to express my deep sense of gratitude to them and their team members namely; Mr. Shrikant Upadhye, Mr. C.K. Mishra, Mr. S.C. Meena, Mr. Dushyant Kumar and Mr. Ravi Singh Chouhan for their untiring efforts in bringing this innovative study to its perfect shape.*

*I extend my heartfelt thanks to the Coordinator of this study Prof. Pramod Kumar, Head Agricultural Development and Rural Transformation, Institute for Social and Economic Change, Banglore for provided necessary guidelines and time to time suggestions through e-mails for conducting the study.*

*On behalf of the Centre, I express my deep sense of gratitude to Dr. V.S. Tomar, Hon'ble Vice-Chancellor, Dr. S.S. Tomar, Director Research Services, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur for providing all facilities and help during various stages in successful completion of this study of high importance.*

*I express my sincere thanks to the Commissioner Land Record, and the Managing Director, Industries, Bhopal Madhya Pradesh and their field staff for providing not only secondary data but also extending help in collection of field data from the selected respondents.*

*I hope the findings and suggestions made in the study would be useful to policy makers of the states and Govt. of India*

**Date : 27.12.2012** **(N.K. Raghuwanshi)**
**Place: Jabalpur** Prof. & Head

# CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# CHAPTER I

# INTRODUCTION

Agriculture is the backbone of India's economy, providing direct employment to about 67 percent of the working people in the country. Agriculture contributes about 19 percent to GDP and one - fourth of India's exports are agricultural products. Rice is one of the important staple foods which cover 65 percent of the population in India. It is the largest consumed calorie source among the food grains with a per capita availability of 73.8 Kg, it meets 31 percent of the total calorie requirement.

India is the second largest producer of rice in the world next to China. Paddy being the major cereal crop of India. It is grown in almost all the provinces of the country but more than 86 percent of the total production accounts for the states of Andhra Pradesh, West Bengal, Tamil Nadu, Uttar Pradesh, Bihar, Orissa, Madhya Pradesh, Punjab and Assam.

Rice Production, processing and marketing constitute the biggest industry in the country. Due to low productivity of rice, growers are not receiving higher income, but there is one way to enhance the income by value added product/processed products of rice like poha, parboiled rice and non parboiled rice. So, there is role of Indian rice milling industry. which is the oldest and largest agro- based industry. Rice milling in India is carried out in small, medium and large size rice mills. Most of the small size mills are huller mills. Other various types of mills are Huller mills, Huller-cum-Sheller mills, sheller mills and Modern mills. It is estimated about 10 per cent of paddy/ rice is damaged and /or lost in processing, storage and transport with the present methods and machinery. 60 to 80 percent head yield is obtained with 10-25 broken and admixture of bran and husk whereas with modern techniques, 68-72 percent head rice with 5-7 percent broken and better utilizable by-products. The estimated loss in terms of money due to ill rice recovery and excess broken etc. with present methods would ruin into crores of rupees. Since, paddy is the staple of practically all paddy growers and also it is seasonal with two harvests per year, there should be some facility in storage which can be protected from various hazards like damage caused due to spontaneous heating, damage by birds, rodents and insects.

## 1.2 Area Production Productivity of paddy in the state

After division of Madhya Pradesh in M.P. and C.G., the production of rice reduced drastically in Madhya Pradesh. The cultivation of rice covered 1603.00 thousand ha. of cultivated land of the state and produced 1363.00 thousand t of rice with an average yield of 896.00 Kg./ha. (2009-10).

**Table 1.1: District wise Area, Production and Productivity of Paddy in Madhya Pradesh (2009-10)**

AREA:-000'HECTARE ,PRODUCTION:-000'TONNES, YIELD:-KG./HECTARE

| S. No. | Districts | Area | %age | Production | %age | Productivity | Percentage Change over MP |
|---|---|---|---|---|---|---|---|
| 1 | JABALPUR | 65.60 | 4.09 | 46.50 | 3.41 | 747.00 | -16.63 |
| 2 | KATANI | 69.60 | 4.34 | 32.30 | 2.37 | 488.00 | -45.54 |
| 3 | BALAGHAT | 247.80 | 15.46 | 338.20 | 24.81 | 1437.00 | 60.38 |
| 4 | CHHINWARA | 18.80 | 1.17 | 14.20 | 1.04 | 799.00 | -10.83 |
| 5 | SEONI | 116.80 | 7.29 | 122.40 | 8.98 | 1103.00 | 23.10 |
| 6 | MANDLA | 110.80 | 6.91 | 58.40 | 4.28 | 555.00 | -38.06 |
| 7 | NARSINGHPUR | 13.40 | 0.84 | 14.90 | 1.09 | 1179.00 | 31.58 |
| 8 | DAMOH | 55.60 | 3.47 | 37.50 | 2.75 | 710.00 | -20.76 |
| 9 | PANNA | 58.30 | 3.64 | 28.60 | 2.10 | 515.00 | -42.52 |
| 10 | TIKAMGARH | 12.70 | 0.79 | 5.20 | 0.38 | 433.00 | -51.67 |
| 11 | CHHATARPUR | 9.70 | 0.61 | 4.40 | 0.32 | 480.00 | -46.43 |
| 12 | REWA | 124.90 | 7.79 | 73.80 | 5.41 | 673.00 | -24.89 |
| 13 | SIDHI | 70.30 | 4.39 | 44.00 | 3.23 | 659.00 | -26.45 |
| 14 | SINGROLI | 46.10 | 2.88 | 29.40 | 2.16 | 670.00 | -25.22 |
| 15 | SATNA | 82.60 | 5.15 | 53.50 | 3.93 | 682.00 | -23.88 |
| 16 | SHAHDOL | 101.20 | 6.31 | 82.90 | 6.08 | 862.00 | -3.79 |
| 17 | UMARIA | 37.70 | 2.35 | 26.60 | 1.95 | 743.00 | -17.08 |
| 18 | ANUPPUR | 97.10 | 6.06 | 56.40 | 4.14 | 612.00 | -31.70 |
| 19 | DINDORI | 69.30 | 4.32 | 47.80 | 3.51 | 726.00 | -18.97 |
| 20 | JHABUA | 13.20 | 0.82 | 5.00 | 0.37 | 395.00 | -55.92 |
| 21 | BHIND | 1.60 | 0.10 | 3.50 | 0.26 | 2248.00 | 150.89 |
| 22 | GWALIOR | 21.00 | 1.31 | 54.10 | 3.97 | 2710.00 | 202.46 |
| 23 | RAISEN | 21.90 | 1.37 | 21.20 | 1.56 | 1022.00 | 14.06 |
| 24 | HOSANGABAD | 19.90 | 1.24 | 33.00 | 2.42 | 1747.00 | 94.98 |
| 25 | BETUL | 44.10 | 2.75 | 46.00 | 3.37 | 1103.00 | 23.10 |
| **Total Rice growing districts** | | 1530.00 | 95.45 | 1279.80 | 93.90 | 931.92 | 4.01 |
| **Other Districts** | | 73.00 | 4.55 | 83.20 | 6.10 | 1139.73 | 27.20 |
| **M.P.STATE** | | **1603.00** | 100.00 | **1363.00** | 100.00 | **896.00** | 0.00 |

Balaghat (15.46%) had the highest area of rice followed by Rewa (7.79%), Seoni (7.29%), Mandla (6.91%), Shahdol (6.31%), Anuppur (6.06%), Satna (5.15%), Sidhi (4.39%), Katni (4.34%), Dindori (4.32%), Jabalpur (4.04%), Panna (3.64%), Damoh (3.47%), Singroli (2.88%), Betul (2.75%), Umariya (2.35%), Gwalior (1.31%), Raisen (1.37%), Chindwara (1.17%), Hoshangabad (1.27%), Jhabua (0.82%), Narsinghpur (0.84%), Tikangarh (0.79%), Chhatarpur (0.61%) and Bhind (0.10%). These 25 districts covered 95.45 percent of rice area of the state. (Table 1.1)

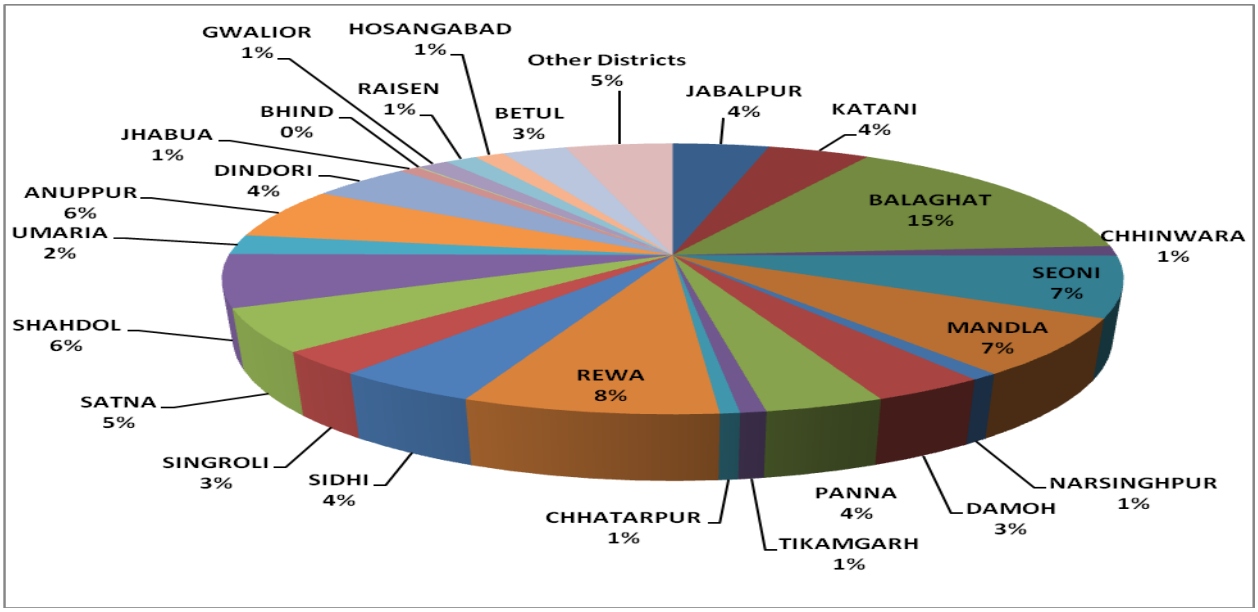


**Fig. 1.1: Contribution of area in different districts of Madhya Pradesh. (1716.8 000'ha)**

The remaining 25 other districts covered only 4.55 per cent of total rice area. As far as production of rice concerned in different districts of Madhya Pradesh, Balaghat (24.81%) had the highest production of rice in the state followed by Seoni (8.98%), Shahdol (6.08%), Rewa (5.41%), Mandla (4.28%), Anuppur (4.14%), Gwalior (3.97%), Katni (9.93%), Satna (3.93%), Dindori (3.51%), Jabalpur (3.41%), Betul (3.37%), Sidhi (3.23%), Damoh (2.75%), Hoshangabad (2.42%), Singroli (2.16%), Panna (2.10%), Umariya (1.95%), Raisen (1.56%), Narsinghpur (1.09%), Chindwara (1.04%), Tikangarh (0.38%), Jhabua (0.37%), Chhatarpur (0.32%) and Bhind (0.26%).

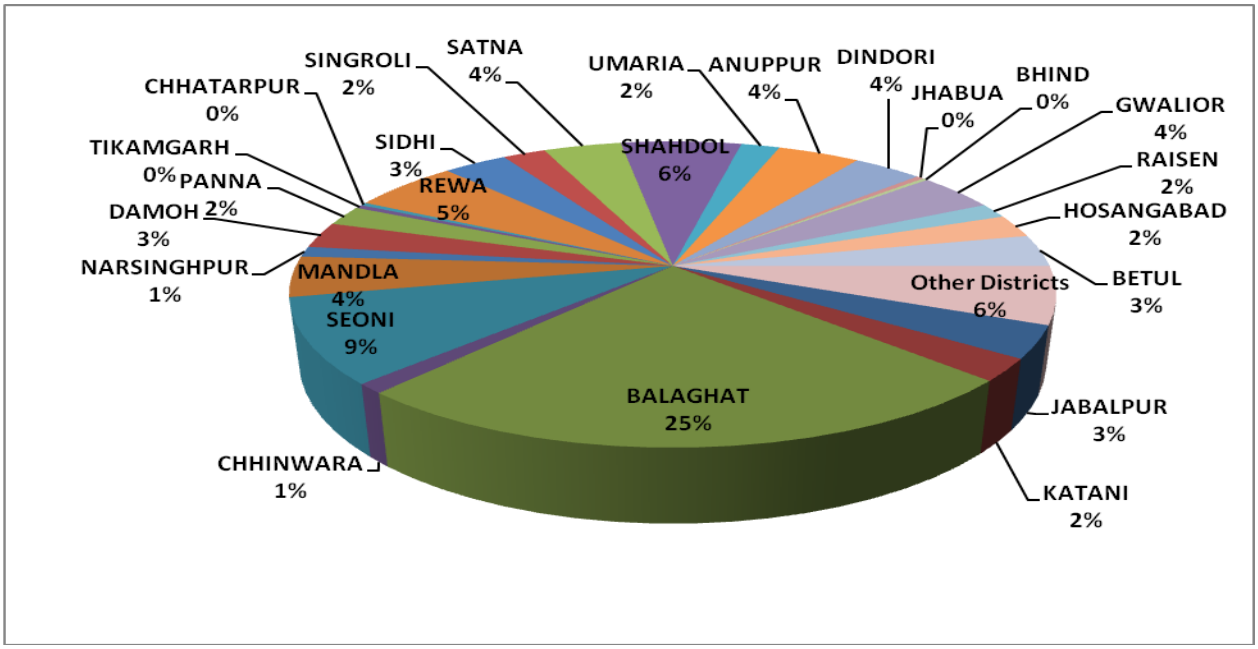


**Fig. 1.2: Contribution of production in different districts of Madhya Pradesh. (1578 000't)**

The cultivator of Gwalior harvested 202.46 % more yield as compare to other districts of Madhya Pradesh. The yield of rice also found more than the state average in Katni, Balaghat, Seoni, Narsinghpur, Bhind, Raisen, Hosangabad, and Betul.

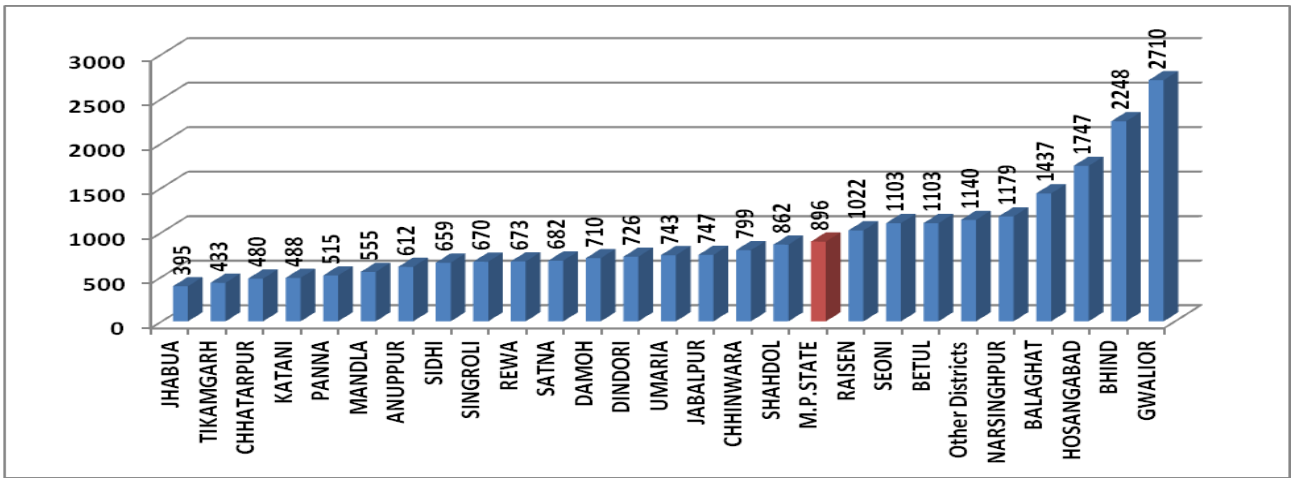


**Fig. 1.3: Productivity (Kg./ha) of rice in different districts of Madhya Pradesh.**

The area of the rice in Madhya Pradesh increased by 1.18 per cent per year in period I (1991-2000), while it was found to be decreased by -0.58 per cent per year in the period II (2001-2010).

**Table 1.2: Trends in Area, Production and Productivity of Rice in Madhya Pradesh.**

| Year | Area (Ha) | Production (Tons) | Productivity (Kg/Ha) |
|---|---|---|---|
| 1990-91 | 1556 | 1435 | 922 |
| 1991-92 | 1559 | 978 | 628 |
| 1992-93 | 1573 | 1185 | 754 |
| 1993-94 | 1566 | 1346 | 859 |
| 1994-95 | 1612 | 1459 | 905 |
| 1995-96 | 1672 | 1212 | 747 |
| 1996-97 | 1644 | 1346 | 819 |
| 1997-98 | 1656 | 1229 | 742 |
| 1998-99 | 1672 | 1424 | 892 |
| 1999-00 | 1740 | 1750 | 1059 |
| **CAGR (%)** | **1.18** | **2.71** | **2.01** |
| 2000-01 | 1708 | 982 | 605 |
| 2001-02 | 1777 | 1693 | 1005 |
| 2002-03 | 1681 | 1032 | 646 |
| 2003-04 | 1719 | 1750 | 1074 |
| 2004-05 | 1686 | 1309 | 818 |
| 2005-06 | 1711 | 1694 | 1045 |
| 2006-07 | 1684 | 1396 | 874 |
| 2007-08 | 1645 | 1332 | 853 |
| 2008-09 | 1717 | 1578 | 969 |
| 2009-10 | 1603 | 1363 | 896 |
| **CAGR (%)** | **-0.58** | **2.03** | **2.64** |

The production of rice in Madhya Pradesh showed increasing trend in period I (2.71% per annum) and in period II (2.03% per annum). This could be happened due to increase in productivity in these two periods with a growth rate of 2.01% per year (period I) and 2.64 % per year (period II). The productivity level is far below than potential exist, thus farmers loose substantial income. To augment the income from rice, one way is to sell it in processed and value added form. The proposed study seeks to answer the following question.

(1) What is the processing cost incurred in paddy among different types of processing units?

(2) Problems faced by paddy processors?

(3) What are the losses occurring during the paddy processing?

(4) Numbers, trends, percentage distribution and variation and growth of rice mills in different districts of Madhya Pradesh in the study area. With the consideration of above aspects, the present study is undertaken with the following specific objectives.

### 1.3 Objectives

1. To analyse the trends and pattern in the growth of modern rice mills.
2. To estimate conversion ratios of paddy to rice with varietal differences with or without parboiling in various paddy processing units.
3. To estimate the relative shares of different milling techniques in paddy processed with various type of processing technologies.
4. To examine the problems and prospects in paddy processing industry.

### 1.4 Procedure of Rice milling

Paddy in its raw form cannot be consumed by human beings. It needs to be suitably processed for obtaining rice. Rice milling is the process which helps in removal of hulls and bran from paddy grains to produce polished rice. Rice forms the basic primary processed product obtained from paddy and this is further processed for obtaining various secondary and tertiary products.

The basic rice milling processes consist of:

1. Pre Cleaning: Removing all impurities and unfilled grains from paddy.
2. De-stoning: Separating small stones from paddy.
3. Parboiling (Optional): Helps in improving the nutritional quality by gelatinization of starch inside the rice grain. It improves the milling recovery percent during de-shelling and polishing/ whitening operation.
4. Husking: Removing husk from paddy.
5. Husk Aspiration: Separating the husk from brown rice/Unhusked paddy.
6. Paddy Separation: Separating the unhusked paddy from brown rice.

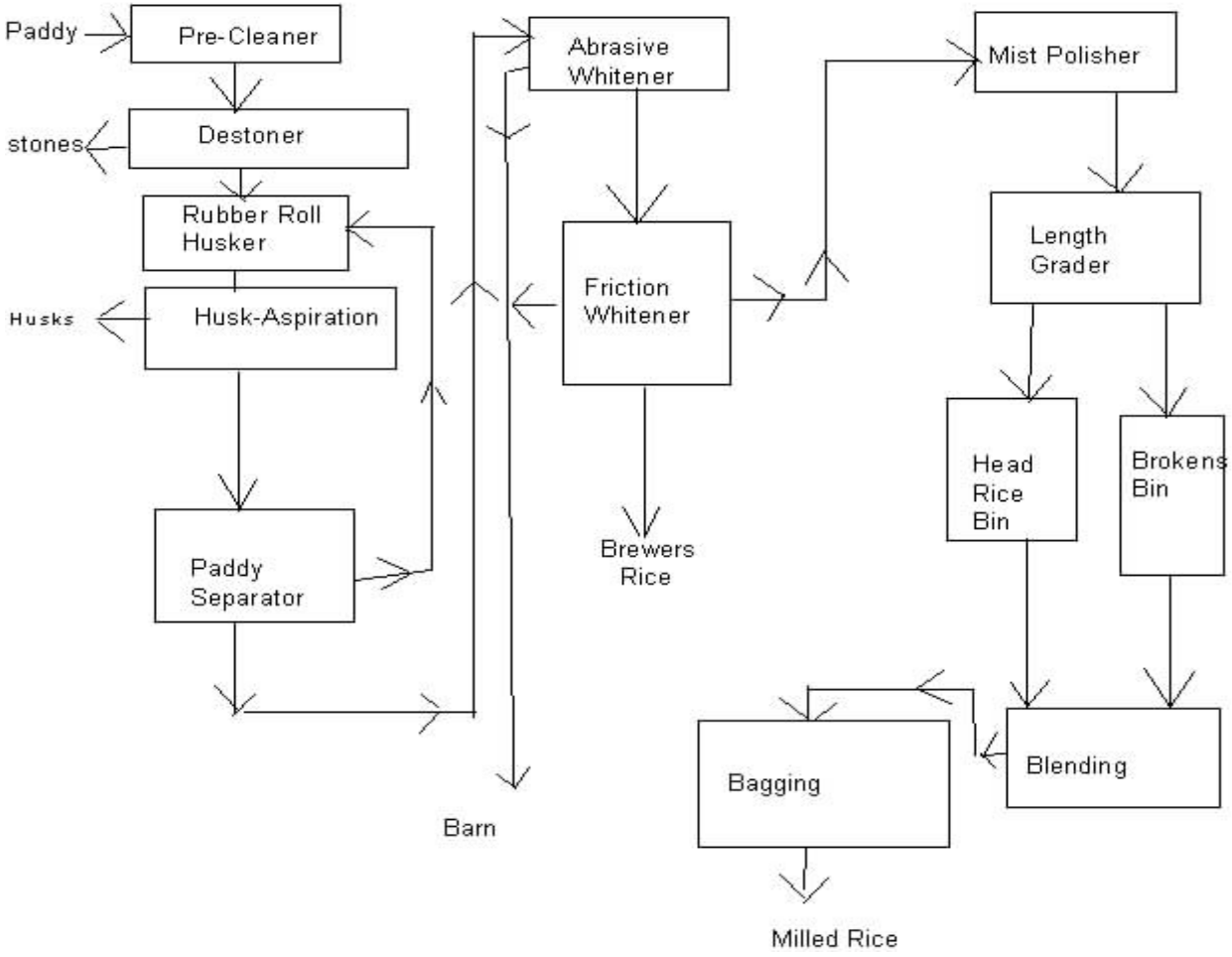


**Fig. 1.4: Diagrammatic representation of rice milling operation:**

7. Whitening: Removing all or part of the bran layer and germ from brown rice.

8. Polishing: Improving the appearance of milled rice by removing the remaining bran particles and by polishing the exterior of the milled kernel.

9. Length Grading: Separating small and large broken from head rice.

10. Blending: Mixing head rice with predetermined amount of broken, as required by the customer.

11. Weighing and bagging: Preparing the milled rice for transport to the customer.

### 1.5 Status of Rice milling industries in the state

In the study area only two types of processing mills viz., Modern rice mills and Traditional rice mills (Hullers). These both types of mills only process non-parboiled rice. The modern mills were found to be processed rice on "owner cum trader basis" while the hullers were found to be processed rice on "custom hiring basis." The time series secondary data related to millers and hullers are not available at the time of investigation. Hence, the current year data related to modern paddy processing mills has been considered and presented in table 1.3.

**Table 1.3: Number of Paddy Processing Units in Madhya Pradesh during (2008-09)**

| S.No. | District Name | Modern/Modernised Rice Mills |
|---|---|---|
| 1 | JABALPUR | 25 |
| 2 | KATNI | 35 |
| 3 | BALAGHAT | 76 |
| 4 | SEONI | 46 |
| 5 | MANDLA | 14 |
| 6 | NARSINGHPUR | 3 |
| 7 | DAMOH | 2 |
| 8 | PANNA | 2 |
| 9 | REWA | 9 |
| 10 | SIDHI | 3 |
| 11 | SATNA | 18 |
| 12 | SHAHDOL | 3 |
| 13 | ANUPPUR | 2 |
| 14 | DINDORI | 1 |
| 15 | BHIND | 12 |
| 16 | GWALIOR | 20 |
| 17 | SHIVPURI | 2 |
| 18 | DATIA | 2 |
| 19 | BHOPAL | 4 |
| 20 | RAISEN | 2 |
| 21 | HOSHANGABAD | 6 |
| 22 | HARDA | 1 |
| **Total** | | **288** |

The total numbers of processing mills were found to be 288 (2009). The maximum number of rice mills are found in Balaghat (76) followed by Seoni (46), Katni (35), Jabalpur (25), Gwalior (20), Satna (18), and Mandla (14).

### 1.6 Research Methodology

The study is based on both primary and secondary data. The primary data have been collected from 2 districts (Balaghat and Katni) selected purposively on the basis of highest rice mills in Madhya Pradesh. Although, the rice mills are found highest in Balaghat (75) followed by Seoni (46%) and Katni (Table 1.3). But, as Balaghat and Seoni are the adjoining districts (Fig. 1.5). Hence, Katni district has been selected for the study.

**Table 1.4 Details of selected Modern and Traditional Paddy Processing Units.**

| S. No. | Type of Unit | Total Sample Units (No.) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Owner Cum Trader | | | Custom Hiring | | |
| | | Non-parboiled | Parboiled | Total | Non-parboiled | Parboiled | Total |
| 1. | Modern Milles with 3 phase | 40 | 0 | 40 | 0 | 0 | 40 |
| 2. | Hullers | 0 | 0 | 0 | 40 | 0 | 40 |
| **Total** | | **40** | **0** | **40** | **40** | **0** | **80** |

A total number of 20 modern and 20 traditional rice mills have been selected from each selected districts for detailed information. Thus, the total number of selected modern rice mills and hullers were 40 from each selected district. Out of the total modern rice mills, all were found to be owner cum trader. (Table 1.4) As regards to hullers were concerned all the hullers (40) processed only non- parboiled rice on custom hiring basis.

The tradition rice mills, namely, huller have been randomly selected from the total number of hullers in each selected district. A primary survey has been carried out from each selected mill or unit with pre-tested interview schedule provided by the coordinator of the study i.e. Agricultural Development and Rural Transformation (ADRT), Bangalore (Karnataka), which was prepared specifically indicating the quantity of paddy processed, hulled or milled in the mills. There are certain mills which follow two steps process in which the first step involves hulling paddy to get brown rice and the second process includes polishing the brown rice to the fine white rice.

The primary data related to the reference year of 2007-08, 2008-09 and 2009-10 (financial year) to avoid yearly fluctuations. The secondary information has been collected from the Ministry of Food Processing Industries Madhya Pradesh

Government. The Secondary information has also been collected on applied aspects of rice processing and by-product utilization like drying, storage, parboiling, milling, bran stabilization, etc.

In order to analyze the trend growth of rice mills, secondary information was obtained from concerned Industrial Departments, rice millers association etc. Data have been analyzed using suitable statistical techniques such as descriptive statistics and regression analysis etc.

### 1.7 Limitation of the study

1. As all the modern mills have been found to be related with 3 phases; whether related to 3 phase of electrical connection or third phase of generation of technology. All the mill owners converted their traditional mills into new modern mills majority of them have been adopted Japanese/ Chinese machines. Some of them also found to use separators to separate low quality of grains. Hence, the data reported in the study were related to only third phase of modern rice mills.

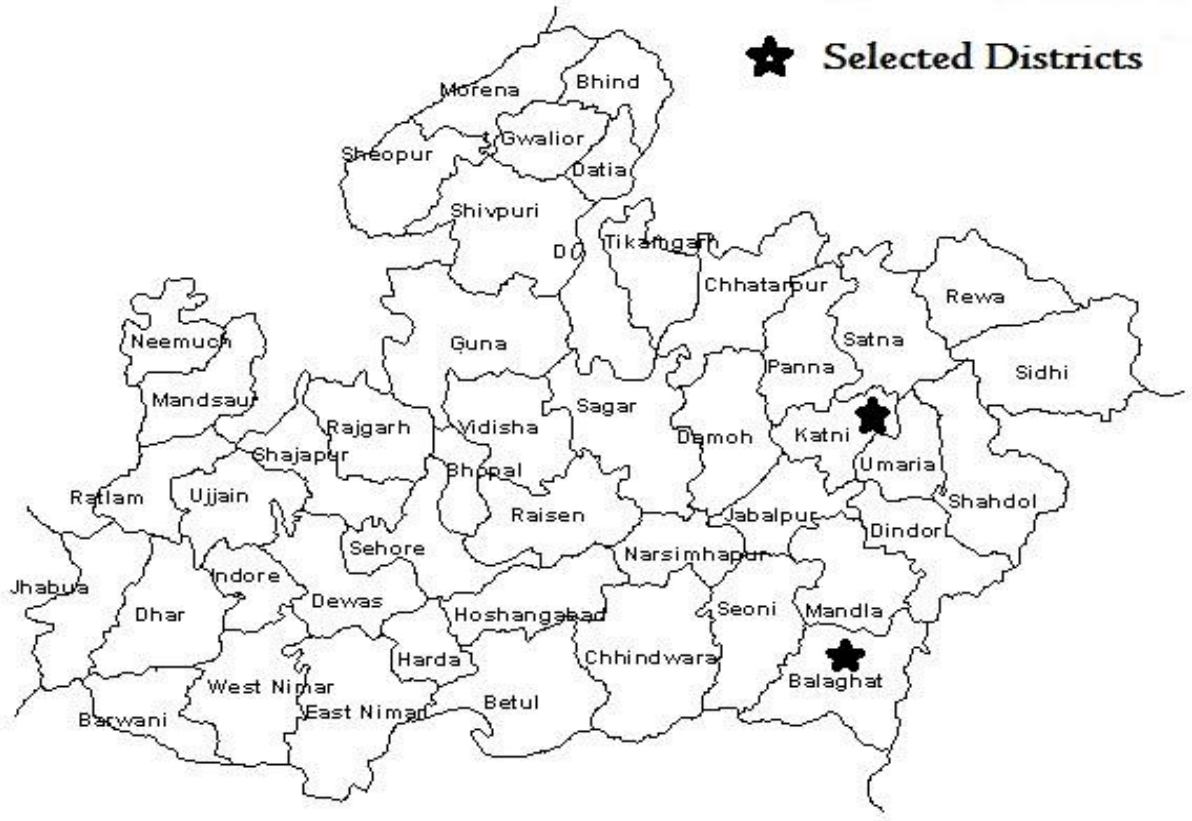


**Fig. 1.5 Map of Madhya Pradesh showing selected districts**

2. In traditional rice mills only hullers have been found to be present in the selected districts (Balaghat and Katni) of the state. There secondary data were not available at the time of investigation. Thus, the study is related to only hullers and secondary data related to these are not incorporated in the study.

3. The study confined to the economics of processing in Balaghat and Katni districts of Madhya Pradesh. Various socio- psychological factors affecting the paddy processing could not be studied due to limitation of time with the research worker. The results of study would be specifically applicable only to paddy processing plants, which were within the area under study.

4. The study is purely based on the information provided to investigator by the selected respondents at the time of investigation. The respondents not provided any written record to them.

### 1.8 Scope and Importance of the study

Among agro- industries, rice –processing industry is the biggest industry in India because India is the second largest rice producer of the world. The paddy is a major cereal crop and seeks to point out the inherent constraints socio- economic, technological and institutional operating in the district. Also with regard to growth, economics of processing and losses occurring during processing of paddy. The study within its scope made an attempt to answer these critical questions hampering the processing of this cereal crop. The investigation made on various aspects of growth, economics, losses and problems recommended in the paddy processing. Recognizing the importance of agro- industry in general and rice processing in particular in the national economy, the present study had been undertaken to examine the following issues i.e., growth, economics of processing , losses and problems involved in the paddy processing.

### 1.9 Review of literatures

The various studies which were done in the topic, the outcome of some are as follows:

There is further scope for expanding paddy processing industry without increasing productivity of paddy per unit of area. The cost benefit ratio was found to be highest for huller type of mill due to lower cost per unit of processing as compared to

modernized mills. (Gautum *et al.* 1988) 33.64% of rice mill owner were interested in modification of their rice mills, while 16.15% were satisfied with the existing systems and did not want to switch over to improved methods. (Dash *et al.* 1996) The better economic background of infrastructural facility was the important factor for growth and previous experience, conducive government policy are growth parameters for development. (Govindappa *et al.* 1996)

Processing losses were found very high mainly due to traditional processing methods and use of inefficient machinery. The rubber roll huller should be option for good milling output and quality of rice. (Rahman *et al.* 1996),

The processing costs were Rs.15.72, Rs.15.99, Rs.16.27 and Rs. 34.30 at the utilization capacity while the margins were Rs. 20.27, Rs. 20.97, Rs. 17.18 and Rs. 3.83 in 1t/h mills, 2t/h mills, 3t/h mills and integrated paddy processing complex, respectively. The processing costs were Rs. 18.06, Rs. 14.78, Rs. 16.09 and Rs. 16.41 at the installed capacity while the margins were Rs. 17.92, Rs. 22.17, Rs. 17.36 and Rs. 21.72 in 1t/h mills, 2t/h mills, 3t/h mills and integrated paddy processing complex, respectively. In modern rice mills, the margins were maximum in 2t/h mills followed by integrated paddy processing complex. The break- even point was lowest in 2t/h mills and found highest in integrated paddy processing complex. (Gupta *et al.* 2000)

There is a need for the ability to hull at higher moisture contents and a need to decrease noise levels. In rice milling machines there are also problems of high grain moisture contents. (Sugiyama 2002)

The lack of available credits, low rice price, restriction of capacity of power line, narrow surface area used for processing also contribute to the difficulties in rice processing.( Nguyen- Thi – Minh - Hien *et al.* 2003)

The milling capacity in the state was not geographically properly distributed. the net returns were worked out to be Rs. 29.58, Rs. 20.82 and Rs. 8.56 per quintal by rubber roll mills, hullers and mini rice mills (Sekhon *et al.* 2003). The study inferred that the cost of processing decreased with the increase in the size of units. (Sharma and Machara 2003)

The poor quality of raw materials due to higher moisture content especially in the early arrival of paddy and harvesting of paddy through harvest combine harvesters,

delay in announcing levy prices by the Central Government, demand for gratification while accepting rice by procurement agencies etc, public agency on the owner hand faced difficulties in getting their paddy milled at proper time were major problems faced by rice mill owners. (Sekhon *et al.* 2003)

As the nutritional qualities and health effects of rice bran (RBO) oil are also established. Therefore, in recent years, research interest has been growing in RBO processing to obtain good quality oil with low refining loss. (Ghosh 2007)

The institutional credit support for the expansion and modernization of paddy processing is required, and contract marketing arrangements are needed between paddy growers and millers to ensure regular paddy supplies. (Ali *et al.* 1998)

### 1.10 Organization of the study

The study is organised into 5 chapters. Chapter I is introduction. It gives a brief introduction of the area, production and productivity, status of rice milling in different districts of Madhya Pradesh. In Chapter I also list objectives, research methodology, scope and the limitation of the study were also covered. Differences in rice milling ratio among modern and traditional rice mills is discussed in Chapter II. Chapter III related to the economics of paddy processing by modern as well as traditional rice mill in the selected districts of Madhya Pradesh. The identification of the constraints in processing of paddy and the steps required to overcome these constraints forms the subject matter of the Chapter IV. Finally, the Chapter V encompasses the conclusion drawn and policy implication emerging out from the present study.

**0000**

# CHAPTER II

# HULLING AND MILLING RATIO FOR PADDY

This chapter deals with trends the basic characterises of the sample unit, hulling and milling ratio of modern rice mills at owner cum traders basis and traditional rice mills on custom hiring basis also discussed in this chapter.

## 2.1 Basic Characteristics of selected Sample Units

The characteristic of studied sample units of processing rice in the Madhya Pradesh has been presented in Table 2.1. It is observed from the data that an average modern mill owner invested Rs. 54.7 lakhs to establish a non- parboiled rice mill. An average capacity of modern rice mill was found to be 2.87t/hr. (non- parboiled). An average number of employees and average number of daily wage labours were 9 and 7 in numbers respectively for an average non- parboiled rice mill existing in the area under study. (Table 2.1)

**Table 2.1: Characteristics of sample units of paddy processing in the state. (average)**

| Particulars | Avg. Investment (Rs. in lakhs) | Avg. Size of Units (Tons Per Hr.) | Avg. No. of Employees | Avg No. of Daily Wage Labourers |
|---|---|---|---|---|
| **Modern Rice Mills** | 54.7 | 2.87 | 9 | 7 |
| **Traditional Rice Mills (Hullers)** | 1.35 | 0.36 | 0 | 1 |

As for as hullers are concerned, an average huller invest only Rs. 1.35 lakhs to establish a hulling mill in the area under study. An average capacity of huller was found to be 0.36t/hr. with an average of daily wage labours of 1 only (Table 2.1).

## 2.2 Hulling and milling ratio

The paddy to rice conversion ratio was analysed both for modern rice mills and hullers.

### 2.2.1 Modern Rice Mills

On owner cum trader basis an average mill owner of the study area found to obtain 15352.03 q. (58.07%) and 11761.75q. (59.57%) rice from the processing of 26435.60 q. of grade A and 19745.53 q. of common non- parboiled rice.

**Table 2.2: Hulling and Milling Ratio in Modern Rice mills with 3 Phase.**

| Particulars/Year | | 2007-08 | 2008-09 | 2009-10 | Average |
|---|---|---|---|---|---|
| **Total Quantity of Paddy Processed in the Year (Qtl./unit)** | Grade. A | 26522.28 | 32339.33 | 20445.20 | 26435.60 |
| | Common | 12696.18 | 27555.17 | 18985.22 | 19745.53 |
| | Others | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Rice Produced (Qtl./unit)** | Grade. A | 15332.53 | 18928.21 | 11833.68 | 15352.03 |
| | Common | 7480.59 | 16500.04 | 11372.15 | 11761.75 |
| | Others | 0.00 | 0.00 | 0.00 | 0.00 |
| **Paddy to Rice Convertion Ratio (per cent)** | Grade. A | 57.81 | 58.53 | 57.88 | 58.07 |
| | Common | 58.92 | 59.88 | 59.9 | 59.57 |
| | Others | 0.00 | 0.00 | 0.00 | 0.00 |

Note: Non Parboiled means raw paddy (without boiling before processing)

### 2.2.2 Traditional rice mill (Hullers)

An average huller of study area processed 1238.03 q. and 5032.63 q. respectively of grade A and common variety of paddy at their huller mill and produced 46.80% (579.36 q.) and 47.05% (2367.69 q.) of grade A and common non- parboiled rice respectively at custom hiring basis (Table 2.3). It is observed during investigation that hullers only hulling the non-parboiled rice on custom hiring basis.

**Table 2.3: Hulling and Milling Ratio in Hullers under Custom Hiring.**

| Particulars/Year | | 2007-08 | 2008-09 | 2009-10 | Average |
|---|---|---|---|---|---|
| **Total Quantity of Paddy Processed in the Year (Qtl./unit)** | Grade. A | 978.00 | 1570.00 | 1166.10 | 1238.03 |
| | Common | 5228.00 | 4558.00 | 5311.90 | 5032.63 |
| | Others | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Rice Produced (Qtl./unit)** | Grade. A | 453.69 | 729.89 | 554.01 | 579.36 |
| | Common | 2410.63 | 2144.99 | 2548.12 | 2367.69 |
| | Others | 0.00 | 0.00 | 0.00 | 0.00 |
| **Paddy to Rice Conversion Ratio (per cent)** | Grade. A | 46.39 | 46.49 | 47.51 | 46.80 |
| | Common | 46.11 | 47.06 | 47.97 | 47.05 |
| | Others | 0.00 | 0.00 | 0.00 | 0.00 |

## 2.3 Conclusions

It is concluded from the above findings that.

An average modern mill owner invested Rs. 54.7 lakhs for established a non-parboiled rice mill. An average capacity of modern rice mill was found to be of 2.87 t/hr. (non- parboiled). An average number of employees and average number of daily wage labours were 9 and 7 in numbers respectively for an average non- parboiled rice mill existing in the area under study. An average huller invested only Rs. 1.35 lakhs to

establish a hulling mill in the area under study. An average capacity of huller was found to be 0.36 t/hr. with an average of daily wage labours of 1 only.

On owner cum trader basis an average mill owner of the study area found to be got 15352.03 q. (58.07%) and 11761.75 q. (59.57%) rice from the processing of 26435.60 q. of grade A and 19745.53 q. of common non- parboiled rice respectively.

An average huller of study area processed 1238.03 q. and 5032.63 q. of grade A and common variety of paddy respectively at their huller mill and produced 46.80% (579.36 q.) and 47.05% (2367.69 q.) respectively of grade A and common non-parboiled rice at custom hiring basis. It is observed during investigation that hullers only hulling the non-parboiled rice on custom hiring basis in Madhya Pradesh.

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# CHAPTER III

# ECONOMICS OF PADDY PROCESSING

This chapter deals with market incidentals in procuring raw materials, processing cost of modern and traditional rice mills, economics of hullers running on custom hiring basis, marketing of processed rice, standard maintained in processing and relative share in different milling techniques.

## 3.1 Market incidentals in procuring raw materials

There were several market incidentals observed during the course of investigation i.e. .(a) handling /cleaning/packing (b) packing material (c) labour and material charges, and weight loss during drying of paddy (d) weight loss, (e) transportation charges (f) storage charges of modern rice mills and presented in table 3.1.

**Table 3.1: Market incidentals incurred for the purchase of paddy (Owner cum trader).**

**(Rs./Qtl)**

| S.N. | Particulars | 2007-08 | | | 2008-09 | | | 2009-10 | | | Overall Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Paddy variety purchased** | **G.A.** | **C.** | **Av** | **G.A.** | **C.** | **Av** | **G.A.** | **C.** | **Av** | **G.A.** | **C.** | **Av** |
| 1 | Handling/ Cleaning/ Packing | 5.45 | 4.85 | 5.15 | 6.69 | 5.15 | 5.92 | 7.20 | 5.63 | 6.42 | 6.45 | 5.21 | 5.83 |
| 2 | Packing Material | 21.73 | 18.87 | 20.30 | 22.15 | 19.85 | 21.00 | 24.80 | 20.13 | 22.47 | 22.89 | 19.62 | 21.26 |
| 3 | Drying | | | | | | | | | | | | |
| | Labour/ Material Charges | 6.43 | 6.43 | 6.43 | 6.87 | 6.23 | 6.55 | 7.34 | 6.77 | 7.05 | 6.88 | 6.48 | 6.68 |
| | Weight loss (Kg. /Q.) | 2.87 | 3.10 | 2.98 | 2.93 | 3.47 | 3.20 | 3.13 | 3.87 | 3.50 | 2.98 | 3.48 | 3.23 |
| | Weight loss | 32.97 | 29.70 | 31.33 | 34.23 | 31.57 | 32.90 | 38.23 | 34.50 | 36.37 | 35.14 | 31.92 | 33.53 |
| 4 | Transporation | 9.03 | 9.03 | 9.03 | 9.97 | 9.97 | 9.97 | 10.43 | 10.43 | 10.43 | 9.81 | 9.81 | 9.81 |
| 5 | Storages Charges | 6.12 | 6.12 | 6.12 | 6.52 | 6.52 | 6.52 | 6.75 | 6.75 | 6.75 | 6.46 | 6.46 | 6.46 |
| 6 | Other Specify | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7 | Total | **89.74** | **85.00** | **87.37** | **95.42** | **89.52** | **92.47** | **105.76** | **97.22** | **101.49** | **96.97** | **90.58** | **93.78** |

G.A. = Grade A, C. = Common, A.V. = Average

It is observed from the data that market incidental charges were found to more in the processing of grade A rice (Rs. 96.97/q.) as compared to common rice (Rs.

90.58/q.). This was due to only high weight loss during processing, packing material cost for grade A rice as compared to common rice.

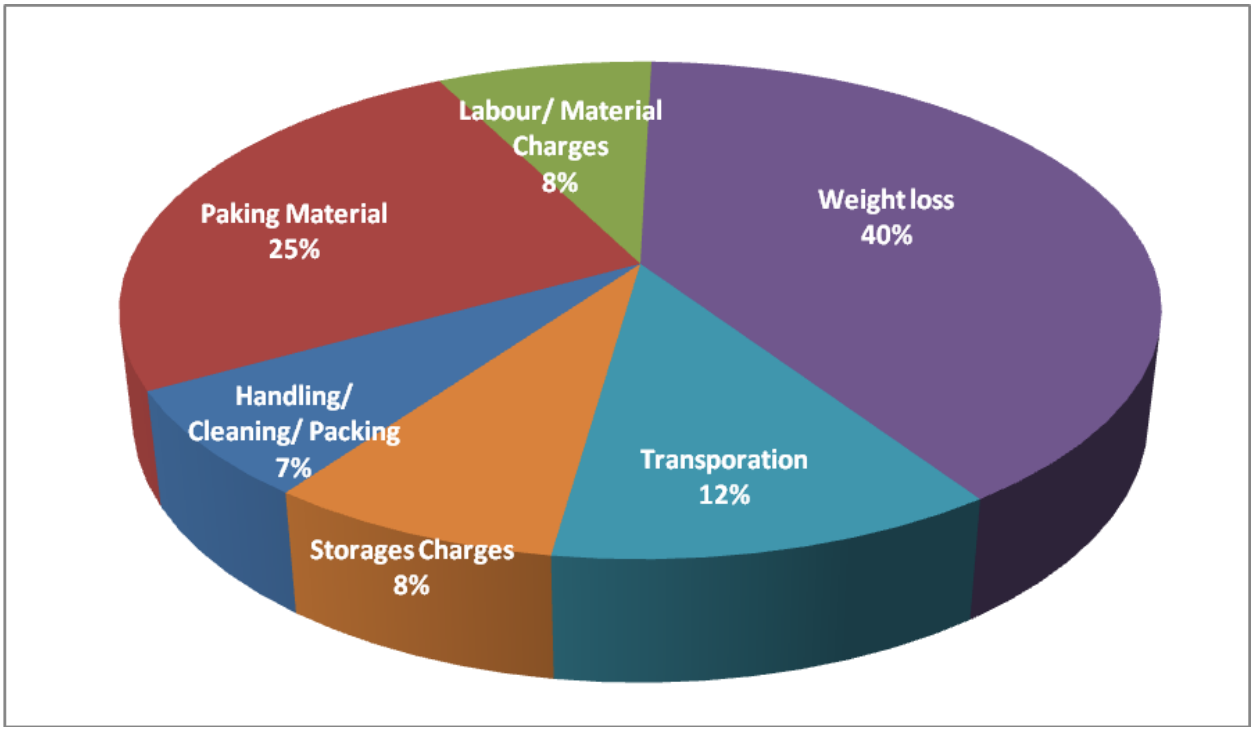


**Fig. 3.1: Average Market incidentals in procuring raw materials in modern rice mills.**

The weight loss (40%) was the main component of market incidental charges followed by packing material (25%), transportation charge (12%), labour charges (8%), storage charges (8%) and handling/cleaning/packing charges (7%) to average market incidental charges in procuring raw materials (paddy).

### 3.2 Processing cost

The cost of paddy processing includes both variable and fixed cost incurred in processing of a quintal of rice. The variable cost includes cost of labour, electricity, packing material, maintenance and storage, while fixed cost includes insurance, depreciation, administrative expenses etc. The cost of processing of modern (non – parboiled) at owner cum trader basis and traditional rice mills (Hullers) at custom hiring basis have been observed and dealt in this subhead.

#### 3.2.1 Modern rice mills

The cost of processing of non- parboiled rice has been analysed and presented in Table 3.2. It is observed from the data that the average cost of processing of non parboiled rice was found to Rs. 67.18/q. in the area under study. The share of variable cost was found to be 95.21% in total processing cost of rice.

**Table 3.2: Cost of Paddy Processing by Modern Rice Mills (Owner cum trader).**

| S. No. | Particulars/Year | 2007-08 | 2008-09 | 2009-10 | Average |
|---|---|---|---|---|---|
| A | **Variable Cost** | | | | |
| 1 | Labour Cost | 6.65 | 7.55 | 9.32 | 7.84 |
| 2 | Electricity charges | 11.75 | 12.19 | 13.10 | 12.35 |
| 3 | Fuel Charges for Parboiling | | | | |
| | a. Petrol/Diesel | 0.00 | 0.00 | 0.00 | 0.00 |
| | b. Firewood | 0.00 | 0.00 | 0.00 | 0.00 |
| | c. Bio Mass | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | Packing Material Cost | 33.4 | 35.65 | 40.15 | 36.4 |
| 5 | Maintenance/Repair Cost | 3.52 | 3.96 | 4.35 | 3.94 |
| 6 | Storage Cost Specify | 1.72 | 2.15 | 2.22 | 2.03 |
| 7 | Other Cost Specify | 1.03 | 1.38 | 1.79 | 1.40 |
| 8 | Sub-total | 58.07 (95.47) | 62.88 (95.22) | 70.93 (94.99) | 63.96 (95.21) |
| B | **Fixed Cost** | | | | |
| 9 | Insurance | 0.44 | 0.51 | 0.68 | 0.54 |
| 10 | Depreciation | 0.29 | 0.35 | 0.44 | 0.36 |
| 11 | Administrative Expenses | 1.32 | 1.45 | 1.73 | 1.50 |
| 12 | Other Specify | 0.70 | 0.85 | 0.88 | 0.81 |
| 13 | Sub-total | 2.76 (4.53) | 3.15 (4.78) | 3.74 (5.01) | 3.22 (4.79) |
| C | Total (A+B) | 60.83 (100) | 66.04 (100) | 74.67 (100) | 67.18 (100) |

The cost of packing material (Rs.36.40/q.) was found to main component of processing of non- parboiled rice followed by electricity charges (Rs. 12.35/q.), labour cost (7.84/q.), maintenance charges (Rs. 3.94/q.) and storage cost (Rs. 2.02/q.) and other cost (Rs. 1.40/q.) in the study area.

### 3.2.2 Economics of Morden Rice Mills

Morden rice processing mills are quite profitable and provide Rs. 18.71 per quintals net return to mill owners. (Table 3.3) The total cost of processed a quintal of paddy was found to be Rs. 160.61 per quintals in which the cost of paddy (raw material) was found to be maximum (84.80%) followed by total market incidentals (8.86%), depreciation (4.44%), electricity (1.17%) and labour cost (0.74%) respectively. (Fig. 3.2) An average mill owner of the state received Rs. 1075.41 per quintal as gross return from processing of paddy in which the value of by products was Rs. 168.65 per quintals.

**Table 3.3: Component-Wise Economics of Modern Rice Mills. (40mills)**

**(In Lakh)**

| S. No. | Components (Value in Lakh) | 2007-08 | 2008-09 | 2009-10 | Average |
|---|---|---|---|---|---|
| 1 | Paddy Processed (‘000 qtl) | 1568.74 | 2395.78 | 1577.22 | 18.47 |
| 2 | Value of Paddy Processed | 12686.08 | 22001.41 | 14970.70 | 16552.73 (896.08) |
| 3 | Conversion Ratio of Fine Rice | 58.36 | 59.20 | 58.89 | 58.82 |
| 4 | Quantity of Fine Rice Produced (‘000 qtl) | 915.52 | 1418.30 | 928.82 | 1087.55 |
| 5 | Value of Fine Rice Produced | 12796.07 | 22367.75 | 15086.22 | 16750.01 (906.76) |
| 6 | Conversion Ratio Broken Rice | 8.40 | 7.47 | 8.22 | 8.03 |
| 7 | Quantity of Broken Rice Produced | 131.77 | 178.97 | 129.65 | 146.80 |
| 8 | Value of Broken Rice Produced | 1343.00 | 2027.28 | 1610.24 | 1660.17 (89.87) |
| 9 | Conversion Ratio of Bran | 4.36 | 4.21 | 4.82 | 4.46 |
| 10 | Bran Produced | 68.40 | 100.86 | 76.02 | 81.76 |
| 11 | Value of Bran Produced | 579.56 | 919.98 | 770.40 | 756.65 (40.96) |
| 12 | Conversion Ratio of Husk | 22.78 | 23.19 | 22.39 | 22.79 |
| 13 | Husk Produced | 357.36 | 555.58 | 353.14 | 422.03 |
| 14 | Value of Husk Produced | 540.83 | 924.04 | 630.60 | 698.49 (37.81) |
| 15 | Total Value of By-Product (8+11+14) | 2463.38 | 3871.30 | 3011.25 | 3115.31 (168.65) |
| 16 | Gross Returns (5+15) | 15259.45 | 26239.04 | 18097.47 | 19865.32 (1075.41) |
| 17 | Total Market Incidentals | 1370.61 | 2215.38 | 1600.72 | 1728.90 (93.59) |
| 18 | Total Electricity Cost | 184.33 | 292.05 | 206.62 | 227.66 (12.32) |
| 19 | Total Bio-fuel Cost | 0.00 | 0.00 | 0.00 | 0.00 (0.00) |
| 20 | Total Labour Cost | 104.32 | 180.88 | 147.00 | 144.07 (7.80) |
| 21 | Total Depreciation & Other Costs | 665.62 | 1109.25 | 824.10 | 866.32 (46.90) |
| 22 | Total Cost (17+18+19+20+21) | 2324.87 | 3797.55 | 2778.43 | 2966.95 (160.61) |
| 23 | Total Cost Including Paddy (22+2) | 15010.95 | 25798.96 | 17749.13 | 19519.68 (1056.69) |
| 24 | Net Returns (in Lakh) (16-22-2) | 248.51 | 440.09 | 348.34 | 345.64 (18.71) |

Figure in the parenthesis shows cost in Rs. per quintal.

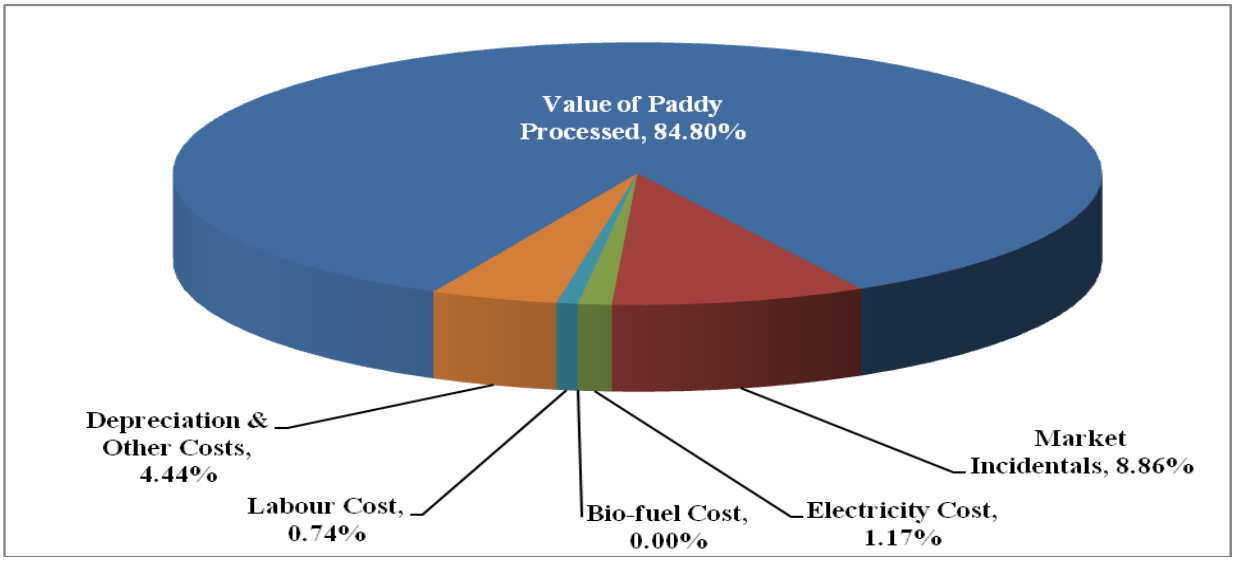


**Fig 3.2: Shair of different elements in Cost of Paddy processing.**

### 3.2.3 Traditional rice mills (Hullers)

On an average a huller expenses Rs. 16.86/q. in processing of a quintal of non parabolised rice on custom hiring basis (Table 3.3), in which the share of variable cost and fixed cost were found to be Rs. 15.25/q. (90.47%) and Rs. 1.61/q. (9.53%) respectively. The labour cost (Rs. 9.61/q.) was found to be major component of variable cost followed by electricity charges (Rs. 5.77/q.) and maintenance and repair cost (Rs. 0.91/q.), while depreciation (Rs. 1.61/q.) was found to major component of fixed cost.

**Table 3.4: Cost of Paddy Processing by an average Traditional Mills (Hullers), Non-Parboiled, Madhya Pradesh. (Rs/Qtl)**

| S. No. | Particulars/Year | 2007-08 | 2008-09 | 2009-10 | Average |
|---|---|---|---|---|---|
| A. | **Variable Cost** | | | | |
| 1 | Labour Cost | 8.74 | 9.97 | 10.12 | 9.61 |
| 2 | Electricity charges | 5.16 | 5.45 | 6.70 | 5.77 |
| 3 | Maintenance/ Repair Cost | 0.11 | 0.20 | 0.25 | 0.19 |
| 4 | Sub-total | 14.02 (90.93) | 15.62 (90.34) | 16.12 (89.36) | 15.25 (90.47) |
| B | **Fixed Cost** | | | | |
| 5 | Depreciation | 1.23 | 1.67 | 1.92 | 1.61 |
| 6 | Sub-total | 1.23 (8.07) | 1.67 (9.66) | 1.92 (10.64) | 1.61 (9.53) |
| C | Total (A+B) | 15.25 (100) | 17.29 (100) | 18.04 (100) | 16.86 (100) |

### 3.3 Economics of hullers running on custom hiring basis

An average huller received gross return of Rs. 35791.83 and Rs. 127111.99 per year through processing of grade 'A' and common rice respectively. The share of gross income through common rice was found to be more as compound to grade 'A' rice as only marginal and small farmers preferred processing from the hullers. There were two types of option prevalent in the study area for payment of charges by the farmers viz. (a) custom hiring charges Rs. 24.12/q. or (b) left their by product with the hullers of the paying charges of hulling.

These two options were considered while analysing the economics of a hullers in the study area and found that an average huller was found to be benefited when the producer left their by product with the hullers and do not pay any charge of hulling as compared to payment of custom charges. In 30 percent cases the producer left their by product with them due to the reason that they do not have hard cash to pay them at the time of processing. The total cost involved in processing of grade A (Rs. 17.24 /q.) was found to be more as compared to common rice (Rs. 17.16/q.) in hulling of paddy in the study area.

**Table 3.5: Economics of Hullers Running on Custom Hiring Basis.**

| S no | Year | 2007-08 | | 2008-09 | | 2009-10 | | Average | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Paddy Variety processed | Grade A | Common | Grade A | Common | Grade A | Common | Grade A | Common |
| 2 | Quantity of Paddy Processed (q) | 978.00 | 5228.00 | 1570.00 | 4558.00 | 1166.10 | 5311.90 | 1238.03 | 5032.63 |
| 3 | Quantity of Rice Produced (q) | 633.06 | 3419.11 | 1012.65 | 2992.33 | 760.30 | 3500.54 | 802.00 | 3303.99 |
| 4 | Conversion ratio (Rice Kgs per Quintal of Paddy) | | | | | | | | |
| | a. Good Quality | 46.39 | 46.11 | 46.49 | 47.06 | 47.51 | 47.97 | 46.80 | 47.05 |
| | b. Broken rice | 18.34 | 19.29 | 18.01 | 18.59 | 17.23 | 18.39 | 17.86 | 18.76 |
| 5 | Any by product obtained (Kgs/Qtl) | 35.27 | 34.60 | 35.50 | 34.35 | 34.80 | 34.10 | 35.19 | 34.35 |
| 6 | Customs Charges (Rs./Qtl) | 22.32 | 22.32 | 24.14 | 24.14 | 25.89 | 25.90 | 24.12 | 24.12 |
| 7 | Total Value of Customs charges (Rs) | 21828.96 | 116688.96 | 37899.80 | 110030.12 | 30190.33 | 137578.21 | 29973.03 | 121432.43 |
| 8 | By Products if they Sold (Rs./Qtl) | 151.34 | 151.34 | 166.32 | 166.32 | 178.57 | 178.57 | 165.41 | 165.41 |
| 9 | Total Value of by-product sold(Rs.) | 5337.76 | 5236.36 | 5904.36 | 5713.09 | 6214.29 | 6089.24 | 5818.80 | 5679.56 |
| 10 | Electricity cost of running the plant for the whole year (Rs) | 5046.48 | 26976.48 | 8556.50 | 24841.10 | 7812.87 | 35589.73 | 7138.62 | 29135.77 |
| 11 | Labor cost of running the plant for the whole year (Rs) | 8809.35 | 47091.30 | 15739.29 | 45694.07 | 11987.12 | 54604.55 | 12178.59 | 49129.97 |
| 12 | Depreciation and all other Costs for the whole year (Rs) | 1202.94 | 6430.44 | 2621.90 | 7611.86 | 2238.91 | 10198.85 | 2021.25 | 8080.38 |
| 13 | Gross returns in Rs | 27166.72 | 121925.32 | 43804.16 | 115743.21 | 36404.61 | 143667.45 | 35791.83 | 127111.99 |
| 14 | Total cost involved | 15058.77 | 80498.22 | 26917.69 | 78147.03 | 22038.90 | 100393.13 | 21338.45 | 86346.13 |
| | Total cost involved (Rs. Per q.) | 15.40 | 15.40 | 17.15 | 17.15 | 18.90 | 18.90 | 17.24 | 17.16 |
| 15 | Net returns with by product | 12107.95 | 41427.11 | 16886.47 | 37596.18 | 14365.72 | 43274.32 | 14453.38 | 40765.87 |
| | Net returns (Rs. Per q.) | 12.64 | 8.19 | 10.81 | 8.31 | 12.48 | 8.31 | 11.98 | 8.27 |
| 16 | Net returns with out by product | 7028.92 | 37573.81 | 11075.15 | 32153.21 | 8338.41 | 38036.82 | 8814.16 | 35921.28 |
| | Net returns with out by product (Rs. Per q.) | 7.19 | 7.19 | 7.05 | 7.05 | 7.15 | 7.16 | 7.12 | 7.14 |

### 3.4 Marketing of produced rice by modern and traditional millers

Market of rice had been considered both for modern and traditional mills **(**hullers) for non parboiled rice and discussed in this sub head considering the years 2007-08, 2008-09 and 2009-10.

#### 3.4.1 Marketing of Rice

Market of rice by owner cum trader has been analysed for non parboiled rice considering the years 2007-08, 2008-09 and 2009-10 and presented in Table 3.5. It is observed from the data that an average mill owner of the study area sold their 80.53% of non parboiled rice to the wholesaler and remaining to the retailer or direct to consumer (19.47%). In this particular situation there were no provision was found to levy to Govt. and other sources.

**Table 3.6: Marketing of Rice by owner cum trader, Non-Parboiled Madhya Pradesh**

| Year | Unit | Wholesaler | Retailer/ Directly to Consumer | Levy to Government | Others | Total |
|---|---|---|---|---|---|---|
| 2007-08 | Qty (q) | 18784.32 | 4028.80 | 0.00 | 0.00 | 22813.12 |
| | Per cent of total | 82.34 | 17.66 | 0.00 | 0.00 | 100.00 |
| 2008-09 | Qty (q) | 27598.60 | 7829.64 | 0.00 | 0.00 | 35428.25 |
| | Per cent of total | 77.90 | 22.10 | 0.00 | 0.00 | 100.00 |
| 2009-10 | Qty (q) | 18875.62 | 4330.21 | 0.00 | 0.00 | 23205.83 |
| | Per cent of total | 81.34 | 18.66 | 0.00 | 0.00 | 100.00 |
| Average | Qty (q) | 21752.85 | 5396.22 | 0.00 | 0.00 | 27149.06 |
| | Per cent of total | 80.53 | 19.47 | 0.00 | 0.00 | 100.00 |

#### 3.4.2 Quantity of paddy processed and it's by products

The mill owner of study area not only sold the fine and broken rice but they were also found to sell by product of the processing of paddy i.e. paddy husk, rice barn and other stables for cattle feed.

The earning from these by products compensate (or minimized) the cost of processing of non parboiled rice. The data related to all these parameters considering to the years 2007-08. 2008-09 and 2009-10 and their overall average of modern rice mills are presented in Table 3.6.

**Table 3.7: Quantity of Paddy Processed and its By-Products by an average Modern Rice Mills, Non-Parboiled, Madhya Pradesh (Quantity in q. and Value in 000' Rs.)**

| S. N | Type | 2007-08 | | 2007-08 | | 2009-10 | | Average | |
|---|---|---|---|---|---|---|---|---|---|
| | | Qty | Value | Qty | Value | Qty | Value | Qty | Value |
| 1 | **Paddy** | 39218.46 | 31715.19 | 59894.50 | 55003.52 | 39430.42 | 37426.76 | 46181.13 | 46181.15 |
| 2 | **Fine Rice** | 22887.89 | 31990.17 | 35457.54 | 55919.37 | 23220.58 | 37715.56 | 27188.67 | 41875.03 |
| 3 | **Broken Rice** | 3294.35 | 3357.49 | 4474.12 | 5068.19 | 3241.18 | 4025.61 | 3669.88 | 4150.43 |
| 4 | **Paddy Husk** | 8933.96 | 1352.07 | 13889.53 | 2310.11 | 8828.47 | 1576.50 | 10550.66 | 1746.22 |
| 5 | **Rice Bran** | 1709.92 | 1448.90 | 2521.56 | 2299.94 | 1900.55 | 1926.01 | 2044.01 | 1891.62 |
| 6 | **Other Cattle Feed** | 2392.33 | 6.20 | 3551.74 | 10.37 | 2239.65 | 7.68 | 2727.91 | 8.08 |

It is observed from the data that an average rice mill owner of the study area got Rs. 41875.03/ year from the non parboiled fine rice.

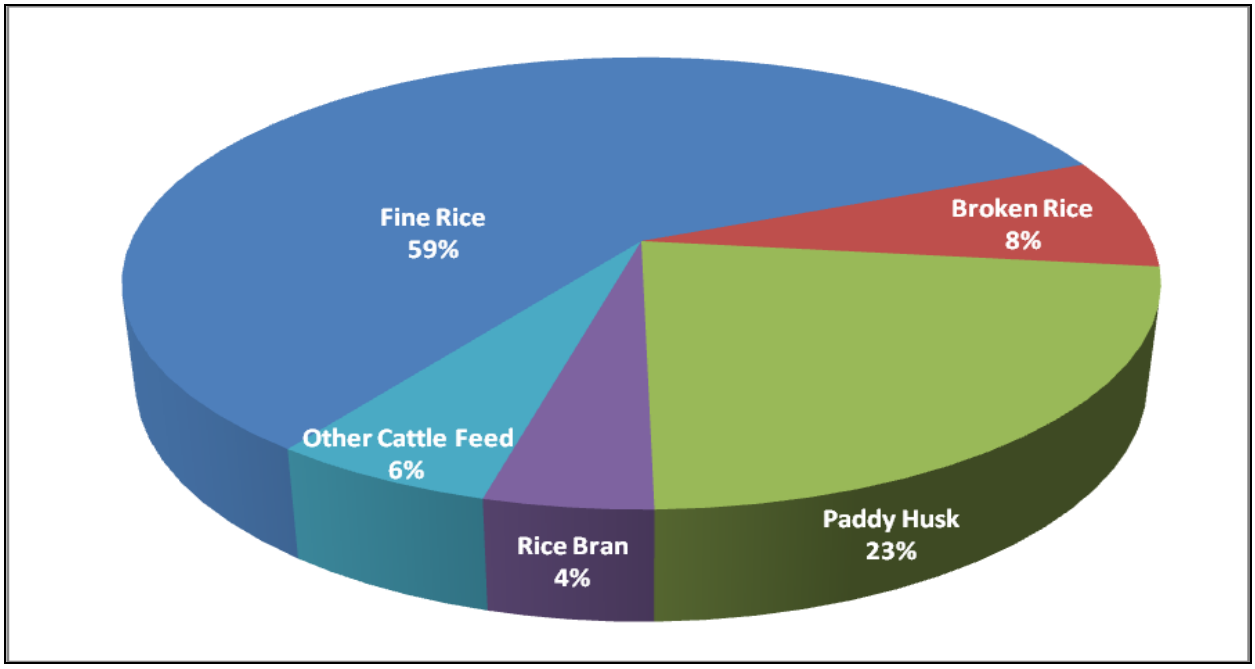


**Fig. 3.3: Contribution of different by-products of non-parboiled paddy in modern rice mills.**

An average mill owner also received Rs. 4150.43 thousand, Rs. 1746.22 thousand, Rs. 1891.62 thousand and Rs. 8.08 thousand per year from selling of non parboiled broken rice, paddy husk, rice barn and other cattle feed respectively. The share of fine rice, broken rice, paddy husk, rice barn and other cattle feed was found to be of 59%, 8%, 23%, 4% and 6%, respectively in processing of non parboiled rice.

**Table 3.8: Average quantity of paddy processed and its by-products by traditional rice mills (Hullers), non-parboiled, Madhya Pradesh**

**(Quantity in q. and Value in 000' Rs.)**

| S. N | Type | 2007-08 | | 2007-08 | | 2009-10 | | Average | |
|---|---|---|---|---|---|---|---|---|---|
| | | Qty | Value | Qty | Value | Qty | Value | Qty | Value |
| 1 | Paddy | 6206.00 | 4986.89 | 6128.00 | 5472.30 | 6478.00 | 5912.15 | 6270.67 | 5457.11 |
| 2 | Fine Rice | 2913.92 | 4821.37 | 2876.81 | 5088.22 | 3103.00 | 6139.07 | 2964.58 | 5349.56 |
| 3 | Broken Rice | 1138.25 | 1123.58 | 1128.16 | 1179.49 | 1157.84 | 1326.07 | 1141.42 | 1209.71 |
| 4 | Paddy Husk, Rice Bran,Other Cattle Feed | 2153.83 | 325.96 | 2123.02 | 335.18 | 2217.16 | 372.22 | 2164.67 | 344.45 |

The earning from these by product compensate (or minimized) the cost of processing of non parboiled rice. The data related to all these parameters considering to the years 2007-08. 2008-09 and 2009-10 and their overall average of traditional rice mills (hullers) are presented in Table 3.7.

It is observed from the data that an average traditional rice mill owner (hullers) of the study area got Rs. 5349.56 thousand per year from the non parboiled fine rice. He also received Rs. 1209.71 thousand and Rs. 344.45 thousand per year respectively from selling of non parboiled broken rice, and paddy husk, rice barn and other cattle feed. The share of fine rice, broken rice, and paddy husk, rice barn and other cattle feed were found to 47%, 18% and 35% respectively.

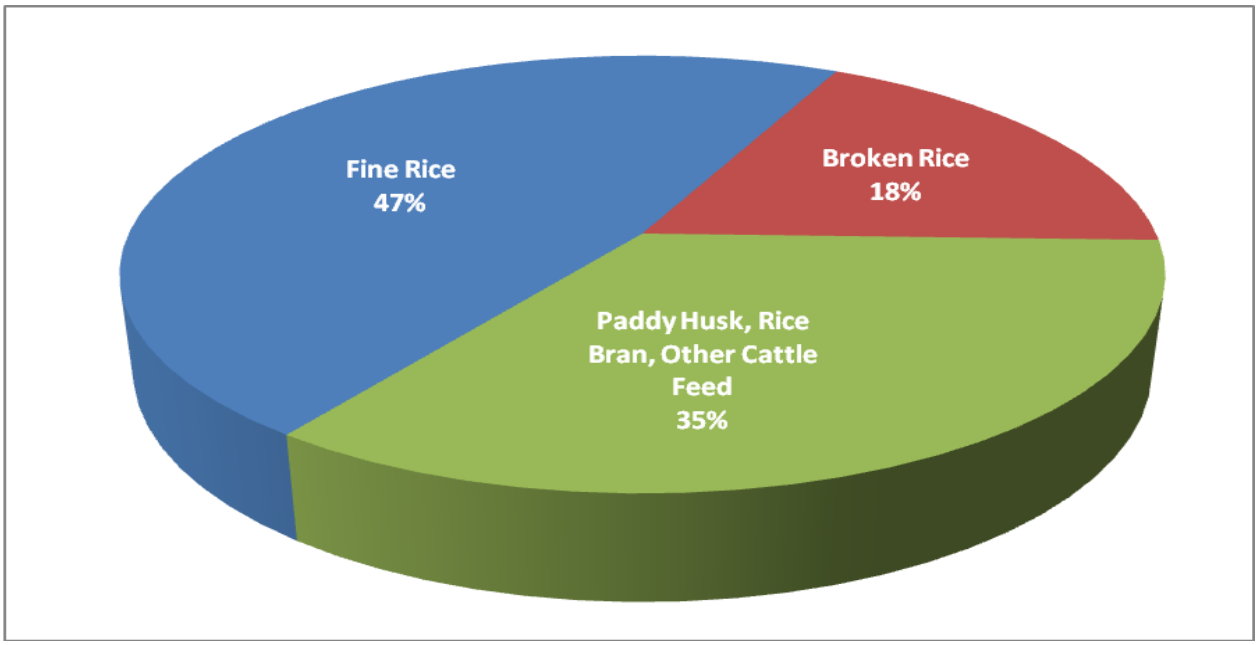


**Fig. 3.4: Contribution of different by-products of non parboiled paddy in traditional rice mills (hullers).**

### 3.5 Standard maintained in processing and the quality of end product obtained

The standard maintained for processing of non parboiled rice by rice mill owners presented in Table 3.8. An average mill owner considered an average moisture contain of 1.5% and 2.00% for processing of grade 'A' and common rice paddy. Average moisture contain for final processing was considered 1.10% (grade 'A') and 1.60% (common). and The foreign material refraction removed from non parboiled rice were 1.6 % and 1.8 % respectively. (Table 3.8)

**Table 3.9: Standards maintained percent in processing of paddy.**

| S. No. | Type of Rice Produced | Non-parboiled | | |
|---|---|---|---|---|
| | Variety | Grade A | Common | Average |
| 1 | Avg. Moisture Content of Raw Paddy | 1.50 | 2.00 | 1.75 |
| 2 | Avg. Moisture Content for Final Processing | 1.10 | 1.60 | 1.35 |
| 3 | Foreign Material refraction removed | 1.60 | 1.80 | 1.70 |

### 3.6 Relative shares of different milling technique

The relative share of 40 millers and 40 hullers in processing of non parboiled rice was found to be 85.89% and 14.11% in the total rice processing in the area under study. (Table 3.9)

**Table 3.10: Relative shares of different milling techniques in total paddy processed (qtls) in the sample units during 2009-10.**

| Type of Unit | Non-parboiled | Percent |
|---|---|---|
| Modern Rice Mills with 3 Phase | 39430.42 | 85.89 |
| Traditional Rice Mills (Hullers) | 6478 | 14.11 |
| All | 45908.42 | 100.00 |

### 3.7 Conclusions

Market incidental charges were found to more in the processing of grade A rice (Rs. 96.97/q.) as compared to common rice (Rs. 90.58/q.). This was due to only high weight loss during processing, packing material cost for grade A rice as compared to common rice. The weight loss (40%) was the main component of market incidental charges followed by packing material (25%), transportation charge (12%), labour

charges (8%), storage charges (8%) and handling/cleaning/packing charges (7%) to average market incidental charges in procuring raw materials (paddy).

The cost of packing material (Rs.36.40/q.) was found to main component of processing of non- parboiled rice followed by electricity charges (Rs. 12.35/q.), labour cost (7.84/q.), maintenance charges (Rs. 3.94/q.) and storage cost (Rs. 2.02/q.) and other cost (Rs. 1.40/q.) in the study area.

Morden rice processing mills are quite profitable and provide Rs. 18.71 per quintals net return to mill owners. (Table 3.3) The total cost of processed a quintal of paddy was found to be Rs. 160.61 per quintals in which the cost of paddy (raw material) was found to be maximum (89.95%) followed by total market incidentals (6.17%), depreciation (2.79%), electricity and labour cost (.51%) respectively. An average mill owner of the state received Rs. 1075.41 per quintal as gross return from processing of paddy in which the value of by products was Rs. 168.65 per quintals.

An average a huller expenses Rs. 16.86/q. in processing of a quintal of non parabolised rice on custom hiring basis (Table 3.3), in which the share of variable cost and fixed cost were found to be Rs. 15.25/q. (90.47%) and Rs. 1.61/q. (9.53%) respectively. The labour cost (Rs. 9.61/q.) was found to be major component of variable cost followed by electricity charges (Rs. 5.77/q.) and maintenance and repair cost (Rs. 0.91/q.), while depreciation (Rs. 1.61/q.) was found to major component of fixed cost.

An average huller received gross return of Rs. 35791.83 and Rs. 127111.99 per year through processing of grade ‘A’ and common rice respectively. The share of gross income through common rice was found to be more as compound to grade ‘A’ rice as only marginal and small farmers preferred processing from the hullers. There were two types of option prevalent in the study area for payment of charges by the farmers viz. (a) custom hiring charges Rs. 24.12/q. or (b) left their by product with the hullers of the paying charges of hulling. In 30 percent cases the producer left their by product with them due to the reason that they do not have hard cash to pay them at the time of processing. The total cost involved in processing of grade A (Rs. 17.24 /q.) was found to be more as compared to common rice (Rs. 17.16/q.) in hulling of paddy in the study area.

An average mill owner of the study area sold their 80.53% of non parboiled rice to the wholesaler and remaining to the retailer or direct to consumer (19.47%). In this particular situation there were no provision was found to levy to Govt. and other sources. An average rice mill owner of the study area got Rs. 52585.76/ year from the non parboiled fine rice. The share of fine rice, broken rice, paddy husk, rice barn and other cattle feed were 59%, 8%, 23%, 4% and 6% respectively.

An average traditional rice mill owner (hullers) of the study area received Rs. 5349.56/ year from the non parboiled fine rice. He also received Rs. 1209.71 thousand and Rs. 344.45 thousand per year respectively from selling of non parboiled broken rice, and paddy husk, rice barn and other cattle feed. The share of fine rice, broken rice, and paddy husk, rice barn and other cattle feed were found to 47%, 18% and 35% respectively.

The relative share of 40 millers and 40 hullers in processing of non parboiled was found to be 85.89% and 14.11% in the total rice processing in the area under study.

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# CHAPTER IV

# CONSTRAINTS IN RICE MILLING INDUSTRIES

The capacity utilization and reasons for under utilization, constraints and steps to overcome these constraints in the processing of rice from modern and traditional rice mills are discussed in this chapter.

## 4.1 Capacity utilization and reasons for under utilization

The capacity utilization both for modern and traditional rice mills have been analysed considered the years 2007-08, 2008-09, and 2009-10.

### 4.1.1 Modern rice mills

An average modern mill owner utilized only 24.52% (4618.11t) of the actual capacity (18834.00t) rice processing in the area under study. On an average the mill remained unutilized for 117 days in a year (Table 4.1).

**Table 4.1: Capacity Utilization of Modern Rice Mills.**

| S. No. | Particulars | 2007-08 | 2008-09 | 2009-10 | Average |
|---|---|---|---|---|---|
| 1 | Actual Capacity (Tones) | 18834 | 18834 | 18834 | 18834.00 |
| 2 | Capacity used (Tones) | 3921.85 | 5989.45 | 3943.04 | 4618.11 |
| 3 | Percentage capacity utilization | 20.82 | 31.80 | 20.94 | 24.52 |
| 4 | Time period for which plant remained closed in the off-season (in Days) | 113.78 | 122.8 | 115.45 | 117.34 |

The main reasons of under utilization of these rice mills were found to be adverse climate condition (high moisture content in atmosphere due to rainy season),

**Table 4.2: Reasons for under utilization of capacity (Modern Rice Mills).**

| S. No | Reasons | No. of Respondents | Per cent |
|---|---|---|---|
| 1 | Adverse climate condition (High moisture content in the atmosphere due to rainy season) | 40 | 100 |
| 2 | Sharp increase in number of rice miles | 28 | 70 |
| 3 | Lake of storage facilities | 27 | 68 |
| 4 | Lake of all weather roads | 21 | 53 |

sharp increase in number of rice mills, lack of storage facilities and lack of all weather roads as reported by 100%, 70%, 68% and 53% selected rice millers respectively of the study area (Table 4.2).

### 4.1.2 Traditional rice mills (Hullers)

The hullers of the study area were also reported that they were not in position to utilize the actual capacity of rice huller. An average huller utilized 47.72% (627.07t) of actual capacity (1314.00t) in a year.

**Table 4.3: Capacity Utilization of Hullers Rice Mills.**

| S. No. | Particulars | 2007-08 | 2008-09 | 2009-10 | Average |
|---|---|---|---|---|---|
| 1 | Actual Capacity (Tones) | 1314 | 1314 | 1314 | 1314.00 |
| 2 | Capacity used (Tones) | 620.6 | 612.8 | 647.8 | 627.07 |
| 3 | Percentage capacity utilization | 47.23 | 46.64 | 49.30 | 47.72 |
| 4 | Time period for which plant remained closed in the off-season (in Days) | 124.33 | 129.5 | 132.76 | 128.86 |

The rainy season, lack of storage facilities, Sharp increase in number of modern rice miles and Bad Quality electricity, irregular cuts, voltage fluctuation were the main constraints reported by 95%, 90%, 70% and 100% of the respondents respectively.

**Table 4.4: Reasons for under utilization of capacity (Traditional Rice Mills).**

| S. No | Reasons | No. of Respondents | Per cent |
|---|---|---|---|
| 1 | Rainy Season | 38 | 95 |
| 2 | lack of Storage Facilities | 36 | 90 |
| 3 | Sharp increase in number of modern rice miles | 28 | 70 |
| 4. | Bad Quality electricity, irregular cuts, voltage fluctuation | 40 | 100 |

## 4.2 Constraints in the Processing of Paddy

The various constraints in the proper processing of rice had also been identified during the course of investigation and presented in the Table 4.5. It is observed from the data that irregular supply of electricity, irregular cut off and voltage fluctuation was the

most important constraint in the proper processing of rice milling as reported by the cent percent respondents of the study area.

**Table 4.5: Constraints in the Processing of Paddy.**

| S. No. | Particulars | Number of Respondents | Percent of Respondents |
|---|---|---|---|
| 1 | Lack of availability of raw material nearby areas | 5 | 13 |
| 2 | Lack of good quality roads for transportation | 27 | 68 |
| 3 | Bad Quality electricity, irregular cuts, voltage fluctuation | 40 | 100 |
| 4 | Lack of international standard machinery and technical know- how | 8 | 20 |
| 5 | Lack of adequate finances | 9 | 23 |
| 6 | Mandi fee, toll tax and delays in clearance of loaded trucks with the raw materials at the state boundaries | 11 | 28 |
| 7 | Lack of government long term planning for promoting food processing industry | 8 | 20 |
| 8 | Lack of skilled labour | 21 | 53 |
| 9 | High wages of skilled labour due to NREGA | 31 | 78 |

Lack of good quality of all weather roads, high wages of skilled labour due to NAREGA, lack of skilled labour were the other major constraints in the processing of rice as reported by 68%, 78% and 53% of respondents respectively in the study area.

### 4.3 Suggestions to improve the paddy processing industry

The selected rice processor respondents also expressed their suggestions to improve the paddy processing in the area under study. The suggestions expressed by them are presented in the Table 4.6.

It is observed from the data that reliable and regular supply of electricity (100%), preparation of long term policies for processing of the rice in the state (93%), reduction in the existing market fee and taxes (83%), simplicity in existing laws and government policies (73%), credit available at cheaper rate (95%), relaxation in the limit of rate of interest of loan from Rs. 10000 to Rs. 20000 per year (93%) and increasing the storage facilities of FCI godown (73%) were found to be the major suggestions received from the respondents in the area under study.

**Table 4.6: Suggestions to improve the paddy processing industry as expressed by respondents**

| S. No. | Suggestions | No. of Respondents | Per cent of total |
|---|---|---|---|
| 1 | Long term policies for processing of rice | 37 | 93 |
| 2 | Supply of reliable and regular electricity | 40 | 100 |
| 3 | Reduction in market fees and taxes | 33 | 83 |
| 4 | Lake of storage facility in FCI go downs | 29 | 73 |
| 5 | Increase custom milling rate from Rs. 25/q. to Rs. 40/q. | 37 | 93 |
| 6 | Simplicity in laws and government processing policies | 29 | 73 |
| 7 | Credit arability at cheaper rate | 38 | 95 |
| 8. | Relaxation in the limit of rate of interest of lone from 10,000 to 20,000 | 37 | 93 |

### 4.4 Conclusions

An average modern mill owner utilized only 24.52% (4618.11t) of the actual capacity (18834.00t) rice processing in the area under study. An average mill remained unutilized for 117 days in a year. The main reason of under utilization of these rice mills were found to be adverse climate condition (high moisture content in the atmosphere due to rainy season), sharp increase in number of rice mills, lack of storage facilities and lack of all weather roads as reported by 100%, 70%, 68% and 53% selected rice millers of the study area

Irregular supply of electricity, irregular cut off and voltage fluctuation was the most important constraints in the proper processing of rice milling as reported by the cent percent respondents of the study area. Lack of good quality of all weather roads, high wages of skilled labour due to NAREGA, lack of skilled labour were the other major constraints in the processing of rice as reported by 68%, 78% and 53% of respondents respectively.

Reliable and regular supply of electricity (100%), preparation of long term policies for processing of the rice in the state (93%), reduction in the existing market fee and taxes (83%), simplicity in existing laws and government policies (73%), credit available at cheaper rate (95%), relaxation in the limit of rate of interest of loan from Rs. 10000 to Rs. 20000 per year (93%) and increase the storage facilities of FCI go-down (73%) were found to be the major suggestions received from the respondents in the area under study.

# CHAPTER V
# CONCLUSIONS AND POLICY RECOMMENDATIONS

Rice Production, processing and Marketing constitute the biggest industry in the state. Due to low productivity of rice, state has not receiving higher income, but there is one way to enhance the income by value added product/processed products of rice like poha, boil rice and non parboiled rice. So, there is role of rice milling industry. Rice milling industry is the oldest and largest agro- based industry. Rice milling in India is carried out in small, medium and large size rice mills. The most of the small size mills are huller mills. It is estimated about 10 per cent of paddy/ rice is damaged and /or lost in processing, storage and transport with the present methods and machinery. Sixty to eighty percent head yield is obtained with 10-25 broken and admixture of bran and husk whereas with modern techniques, 68-72 percent head rice with 5-7 percent broken and better utilizable by-products. The estimated loss in terms of money due to ill rice recovery and excess broken etc. with present methods would run into crores of rupees. Since, paddy is the staple of practically all paddy growers and also it is seasonal with two harvests per year, there should be some facility in storage which can be protected from various hazards like damage caused due to spontaneous heating, damage by birds, rodents and insects.

The cultivation of rice covered 1603.00 thousand ha. of cultivated land of the state and produced 1363.00 thousand t of rice with an average yield of 896.00 Kg./ha. (2009-10). Balaghat (15.46%) had the highest area of rice followed by Rewa (7.79%), Seoni (7.29%), Mandla (6.91%), Shahdol (6.31%), Anuppur (6.06%), Satna (5.15%), Sidhi (4.39%), Katni (4.34%), Dindori (4.32%), Jabalpur (4.04%), Panna (3.64%), Damoh (3.47%), Singroli (2.88%), Betul (2.75%), Umariya (2.35%), Gwalior (1.31%), Raisen (1.37%), Chindwara (1.17%), Hoshangabad (1.27%), Jhabua (0.82%), Narsinghpur (0.84%), Tikangarh (0.79%), Chhatarpur (0.61%) and Bhind (0.10%). These 25 districts covered 95.45 percent of rice area of the state. The remaining 25 other districts covered only 4.55 per cent of total rice area. As far as production of rice concerned in different districts of Madhya Pradesh, Balaghat (24.81%) had the highest production of rice in the state followed by Seoni (8.98%), Shahdol (6.08%), Rewa (5.41%), Mandla (4.28%), Anuppur (4.14%), Gwalior (3.97%), Katni (9.93%), Satna

(3.93%), Dindori (3.51%), Jabalpur (3.41%), Betul (3.37%), Sidhi (3.23%), Damoh (2.75%), Hoshangabad (2.42%), Singroli (2.16%), Panna (2.10%), Umariya (1.95%), Raisen (1.56%), Narsinghpur (1.09%), Chindwara (1.04%), Tikangarh (0.38%), Jhabua (0.37%), Chhatarpur (0.32%) and Bhind (0.26%). The cultivator of Gwalior harvested 202.46 % more yield as compare to other districts of Madhya Pradesh. The yield of rice also found more than the state average in Katni, Balaghat, Seoni, Narsinghpur, Bhind, Raisen, Hosangabad, and Betul.

To augment the income from rice, one way is to sell it in processed and value added form. The present study seeks to answer the following question.

- ✓ What are numbers, trends, percentage distribution and variation and growth of rice mills in different districts of the state in the study area?
- ✓ What is the processing cost incurred in paddy among different types processing units?
- ✓ What problems faced by paddy processors?
- ✓ What are the losses occurring during the paddy processing and what steps which are to be taken up to promote these industries in future?
- ✓ What is the hulling milling ratio of rice mills in the state?

With the consideration of above aspects, the present study is undertaken with the following specific objectives.

**Objectives**

1. To analyse the trends and pattern in the growth of modern rice mills in different districts of Madhya Pradesh.
2. To estimate conversion ratios of paddy to rice with varietal differences with or without parboiling in various paddy processing units.
3. To estimate the relative shares of different milling techniques in paddy processed with various type of processing technologies.
4. To examine the problems and prospects in paddy processing industry.

**Research Methodology**

The study has been based on both primary and secondary data. Primary data has been collected from 2 districts (Balaghat and Katni) selected purposively for the study in Madhya Pradesh. A total number of 20 modern and 20 traditional rice mills have been selected from each selected districts for detailed information. Thus, the total number of selection modern rice mills and hullers were 40 from each selected district. Out of the total modern rice mills, all were found to be trading on owner cum trader. As regards to hullers were concerned all the hullers (40) processed only non- parboiled rice on custom hiring basis.

The tradition rice mills, namely, huller have been randomly selected from the total numbers of hullers in each selected districts. A primary survey has been carried out with pre-tested interview schedule from each selected mill or unit provided by the coordinator of the study i.e. ADRT, Bangalore (Karnataka), which was prepared specifically indicating the quantity of paddy processed, hulled or milled in the mills. There are certain mills which follow two step processes in which the first step involves hulling paddy to get brown rice and the second process includes polishing the brown rice to the fine white rice.

The primary data related to the reference year of 2007-08, 2008-09 and 2009-10 (financial year) to avoid yearly fluctuations. The secondary information has been collected from the Ministry of Food Processing Industries and Madhya Pradesh Government Departments on modernization of rice milling from 2000-2009. The Secondary information has also be collected on applied aspects of rice processing and by-product utilization like drying, storage, parboiling, milling, bran stabilization, etc.

In order to analyze the trend growth of rice mills, secondary information will be obtained from concerned Industrial Departments, rice millers association etc. Data has been analyzed using suitable statistical techniques such as descriptive statistics and regression analysis etc.

The major findings of the study as follows:-

An average modern mill owner invested Rs. 54.7 lakhs for established a non-parboiled rice mill. An average capacity of modern rice mill was found to be of 2.87 t/hr. (non- parboiled). An average number of employees and average number of daily

wage labours were 9 and 7 in numbers respectively for an average non- parboiled rice mill existing in the area under study. An average huller invested only Rs. 1.35 lakhs to establish a hulling mill in the area under study. An average capacity of huller was found to be 0.36 t/hr. with an average of daily wage labours of 1 only.

On owner cum trader basis an average mill owner of the study area found to be got 15352.03 q. (58.07%) and 11761.75 q. (59.57%) from the processing of 26435.60 q. of grade A and 19745.53 q. of common non- parboiled rice respectively.

An average huller of study area processed 1238.03 q. and 5032.63 q. of grade A and common variety of paddy respectively at their huller mill and produced 46.80% (579.36 q.) and 47.05% (2367.69 q.) respectively of grade A and common non-parboiled rice at custom hiring basis. It is observed during investigation that hullers only hulling the non-parboiled rice on custom hiring basis.

Market incidental charges were found to more in the processing of grade A rice (Rs. 96.97/q.) as compared to common rice (Rs. 90.58/q.). This was due to only high weight loss during processing, packing material cost for grade A rice as compared to common rice. The weight loss (40%) was the main component of market incidental charges followed by packing material (25%), transportation charge (12%), labour charges (8%), storage charges (8%) and handling/cleaning/packing charges (7%) to average market incidental charges in procuring raw materials (paddy).

The cost of packing material (Rs.36.40/q.) was found to main component of processing of non- parboiled rice followed by electricity charges (Rs. 12.35/q.), labour cost (7.84/q.), maintenance charges (Rs. 3.94/q.) and storage cost (Rs. 2.02/q.) and other cost (Rs. 1.40/q.) in the study area.

Morden rice processing mills are quite profitable and provide Rs. 18.71 per quintals net return to mill owners. The total cost of processed a quintal of paddy was found to be Rs. 160.61 per quintals in which the cost of paddy (raw material) was found to be maximum (84.80%) followed by total market incidentals (8.86%), depreciation (4.44%), electricity (1.17%) and labour cost (0.74%) respectively. An average mill owner of the state received Rs. 1075.41 per quintal as gross return from processing of paddy in which the value of by products was Rs. 168.65 per quintals.

An average a huller expenses Rs. 16.86/q. in processing of a quintal of non parabolised rice on custom hiring basis, in which the share of variable cost and fixed cost were found to be Rs. 15.25/q. (90.47%) and Rs. 1.61/q. (9.53%) respectively. The labour cost (Rs. 9.61/q.) was found to be major component of variable cost followed by electricity charges (Rs. 5.77/q.) and maintenance and repair cost (Rs. 0.91/q.), while depreciation (Rs. 1.61/q.) was found to major component of fixed cost.

An average huller received gross return of Rs. 35791.83 and Rs. 127111.99 per year through processing of grade 'A' and common rice respectively. The share of gross income through common rice was found to be more as compound to grade 'A' rice as only marginal and small farmers preferred processing from the hullers. There were two types of option prevalent in the study area for payment of charges by the farmers viz. (a) custom hiring charges Rs. 24.12/q. or (b) left their by product with the hullers of the paying charges of hulling. In 30 percent cases the producer left their by product with them due to the reason that they do not have hard cash to pay them at the time of processing. The total cost involved in processing of grade A (Rs. 17.24 /q.) was found to be more as compared to common rice (Rs. 17.16/q.) in hulling of paddy in the study area.

An average mill owner of the study area sold their 80.53% of non parboiled rice to the wholesaler and remaining to the retailer or direct to consumer (19.47%). In this particular situation there were no provision was found to levy to Govt. and other sources. An average rice mill owner of the study area got Rs. 52585.76/ year from the non parboiled fine rice. The share of fine rice, broken rice, paddy husk, rice barn and other cattle feed were 59%, 8%, 23%, 4% and 6% respectively.

An average traditional rice mill owner (hullers) of the study area received Rs. 5349.56/ year from the non parboiled fine rice. He also received Rs. 1209.71 thousand and Rs. 344.45 thousand per year respectively from selling of non parboiled broken rice, and paddy husk, rice barn and other cattle feed. The share of fine rice, broken rice, and paddy husk, rice barn and other cattle feed were found to 47%, 18% and 35% respectively.

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An average modern mill owner utilized only 24.52% (4618.11t) of the actual capacity (18834.00t) rice processing in the area under study. An average mill remained unutilized for 117 days in a year. The main reason of under utilization of these rice mills were found to be adverse climate condition (high moisture content in the atmosphere due to rainy season), sharp increase in number of rice mills, lack of storage facilities and lack of all weather roads as reported by 100%, 70%, 68% and 53% selected rice millers of the study area

Irregular supply of electricity, irregular cut off and voltage fluctuation was the most important constraints in the proper processing of rice milling as reported by the cent percent respondents of the study area. Lack of good quality of all weather roads, high wages of skilled labour due to NAREGA, lack of skilled labour were the other major constraints in the processing of rice as reported by 68%, 78% and 53% of respondents respectively.

Reliable and regular supply of electricity (100%), preparation of long term policies for processing of the rice in the state (93%), reduction in the existing market fee and taxes (83%), simplicity in existing laws and government policies (73%), credit available at cheaper rate (95%), relaxation in the limit of rate of interest of loan from Rs. 10000 to Rs. 20000 per year (93%) and increase the storage facilities of FCI godown (73%) were found to be the major suggestions received from the respondents in the area under study.

Hence, it is suggested that

As it was found that the milling capacity in the state was not geographically properly distributed. Hence, efforts are made to established new and modern rice mills in remote areas for their development.

The poor quality of raw materials due to higher moisture content especially in the early arrival of paddy and harvesting of paddy through combine harvester , delay in announcing levy prices by the Central Government, demand for gratification while accepting rice by procurement agencies etc. Public agency on the owner hand faced difficulties in getting their paddy milled at proper time. These the major problems faced by rice mill owners.

As the nutritional qualities and health effects of rice bran oil are also established. Therefore, in recent years, research interest has been growing in Rice Bran Oil processing to obtain good quality oil with low refining loss. (Ghosh 2007)

As the capacity of rice mills and hullers are found to be underutilized, this creates need for the ability to hull at higher moisture contents at low noise levels.

There is a scope of improvement in various processes like parboiling, storage paddy drying polishing and grading etc. The methods adopted by most of the units are traditional and unscientific/non professional. They give rise to the broken percentage and affect product quality and productivity.

About 60 per cent of modern and 48 per cent of traditional rice millers desired to reduce the existing rate of interest to 3 – 4 % which is with the international rates. Some of the non exporting units have desired to become exporters and but non exporting units demand for concession at par with exporter to effectively compete in the market. The relaxation in the limit interest of loan should be increased from Rs. 10,000 to Rs.20,000 per year

In order to manage the industry in a professional manner to get optimum outputs there is an utter need to upgrade the competency of mill owners at various levels i.e. for technical, managerial and at top level as per the needs of changed environment.

The modern and traditional rice millers opined that uninterrupted power supply, avail duty free diesel for generators as per EXIM policy and concessional power supply will also help in boosting paddy processing industry in the state.

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