Study No. 106

HULLING AND MILLING RATIO FOR PADDY IN CHHATTISGARH

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 Chhattisgarh"*** *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 (Raipur and Durg) of C.G. 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, Raipur Chhattisgarh 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 : 12.12.2012 **(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, Chhattisgarh, 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, boil rice and non parboiled rice. So, there is role of Indian rice milling industry. Indian 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. Most of the small size mills are huller mills. Other various types 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 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.

1.2 Area Production Productivity of Paddy in the State

The Chhattisgarh known as the "Rice bowl" of the India. The cultivation of rice covered 3787.73 thousand ha. of cultivated land of the state and produced 6159.02 thousand t of rice with an average yield of 1751 Kg./ha. (2009-10). The cultivation of rice covered in all the districts of the state. (Table 1.1)

Table 1.1: District wise Area, Production and Yield of Rice (2009-10) in Chhattisgarh.

District	Area (000,ha)	% age	Production (000,Tonnes)	% age	Productivity (Kg/ha)	% age
Raipur	509.95	13.46	674.4	10.95	1470	-16.05
Mahasamund	239.9	6.33	422.8	6.86	1854	5.88
Dhamtari	131.4	3.47	302	4.90	2420	38.21
Durg	446.68	11.79	785.2	12.75	1890	7.94
Rajnandgaon	271.53	7.17	425.7	6.91	1672	-4.51
Kawardha	95.74	2.53	119.4	1.94	1664	-4.97
Bilaspur	321.75	8.49	507.8	8.24	1765	0.80
Janjgir	250.2	6.61	633.42	10.28	2665	52.20
Korba	108.8	2.87	129.3	2.10	1251	-28.56
Raigarh	229.67	6.06	337.5	5.48	1472	-15.93
Jashpur	177.2	4.68	244.7	3.97	1514	-13.54
Sarguja	300.86	7.94	327.7	5.32	1131	-35.41
Koriya	67.71	1.79	70.2	1.14	1202	-31.35
Jagdalpur	240.1	6.34	424.76	6.90	1769	1.03
Narayanpur	29.92	0.79	21.24	0.34	1669	-4.68
Dantewara	137.79	3.64	254.64	4.13	1996	13.99
Beejapur	59.64	1.57	100.16	1.63	1996	13.99
Kanker	168.89	4.46	378.1	6.14	2320	32.50
CG	**3787.73**	100.00	**6159.02**	100.00	**1751**	0.00

Raipur (13.46%) had the highest area of rice followed by Durg (11.79%), Bilaspur (8.49%), Surguja (7.94%), Rajnandgoan (7.17%), Janjgir (6.61%), Jagdalpur (6.34%) Mahasamund (6.33%), Raigarh (6.06%), and Jashpur (4.68%). These 10 districts covered nearly 80 percent of rice area of the state. As far as production of rice

concerned, Durg district (12.75%) also produced the highest production rice followed by Raipur (10.95%) Janjgir (10.28%), Bilaspur (8.24%), Rajnandgoan (6.91%), Mahasamund (6.86%), Kanker (6.14%), Raigarh (5.48%), Jagdalpur (6.90%) and Sarguja (5.32%). The cultivators of Dhamtari, Janjgir, Jagdalpur, Bilaspur, Durg, Mahasamund, Dantewada, Beejapur and Kanker harvested yield of rice above the state average (1751Kg./ha.).

Table 1.2: Trends in Area, Production and Productivity of Rice in Chhattisgarh.

Year	Area (000,hac)	Production (000, tonnes)	Productivity (Kg/ha)
1998-1999	3808	3637	955
1999-2000	3681	4670	1269
2000-2001	3718	2337	629
2001-2002	3759	5004	1331
2002-2003	3737	2633	704
2003-2004	3766	5474	1453
2004-2005	3773	4494	1191
2005-2006	3774	5230	1386
2006-2007	3760	5442	1447
2007-2008	3759	5386	1433
2008-2009	3788	4506	1190
2009-2010	3788	6159	1751
CAGR (%)	**0.11**	**4.87**	**5.06**

The area of the rice in Chhattisgarh increased over the period of time with a growth rate of 0.11% per annum during the period of last 12 years (Table 1.2) from 3808 thousand ha. (1999) to 3788 thousand ha. (2010), while the production of rice increased with a growth of 4.87% per annum from 3637 thousand t (1999) to 6159 thousand t (2010). The productivity of rice in the state also increased with a rate of 5.06% per years from 955 Kg./ha. (1999) to 1751 Kg./ha. (2010). Although, 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 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 Chhattisgarh in the study area. With the consideraing of above aspects, the proposed 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 husk and barns 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 process 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.
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.

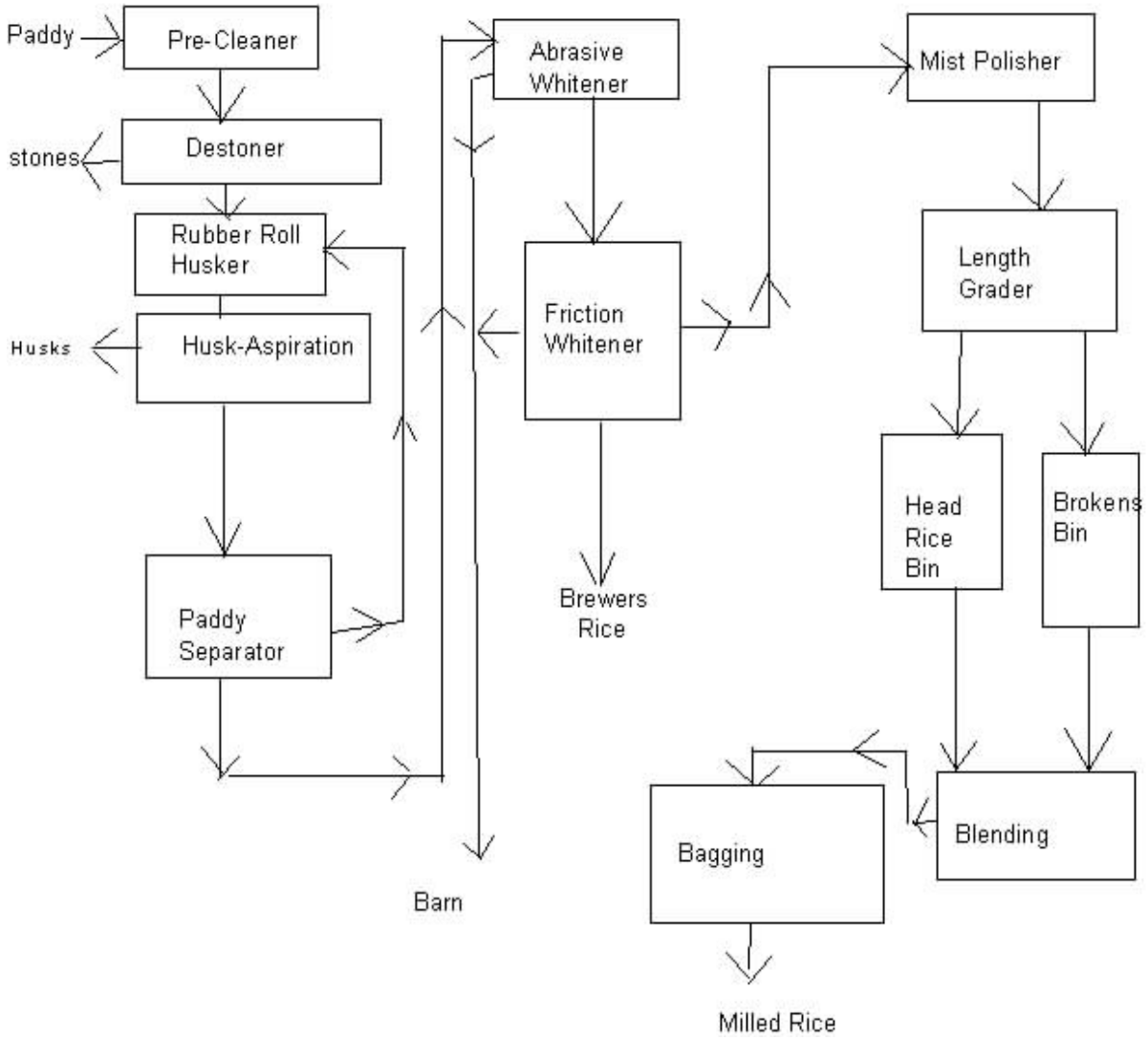

Fig. 1.1: Diagrammatic representation of rice milling operation:

1.5 Status of Rice Milling Industries in the State

In the study, two types of processing mills viz., non parboiled rice mills and parboiled rice mills were considered. The present position trends ad variations of

different processing mills and its capacity in Chhattisgarh are considered for the study.

The total numbers of processing units in Chhattisgarh is 1037 in the current year (Tn average ending 2009). The maximum number of rice mills was found in Raipur district (23%) followed by Durg (10%),

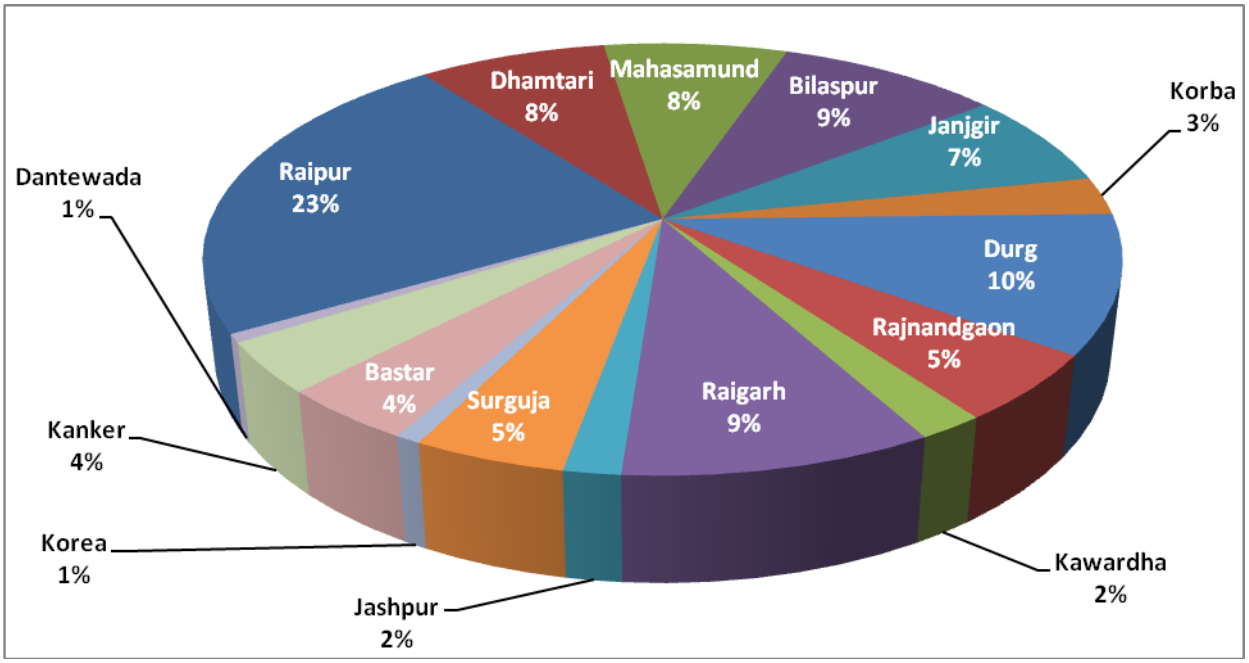

Fig. 1.2: District wise total numbers of processing units (1037) in CG.

Bilaspur (9%), Dhamtari (8%) and Janjgir (7%). Out of 1037 the maximum rice mills were processed non parboiled paddy (808) followed by parboiled (229) in Chhattisgarh.

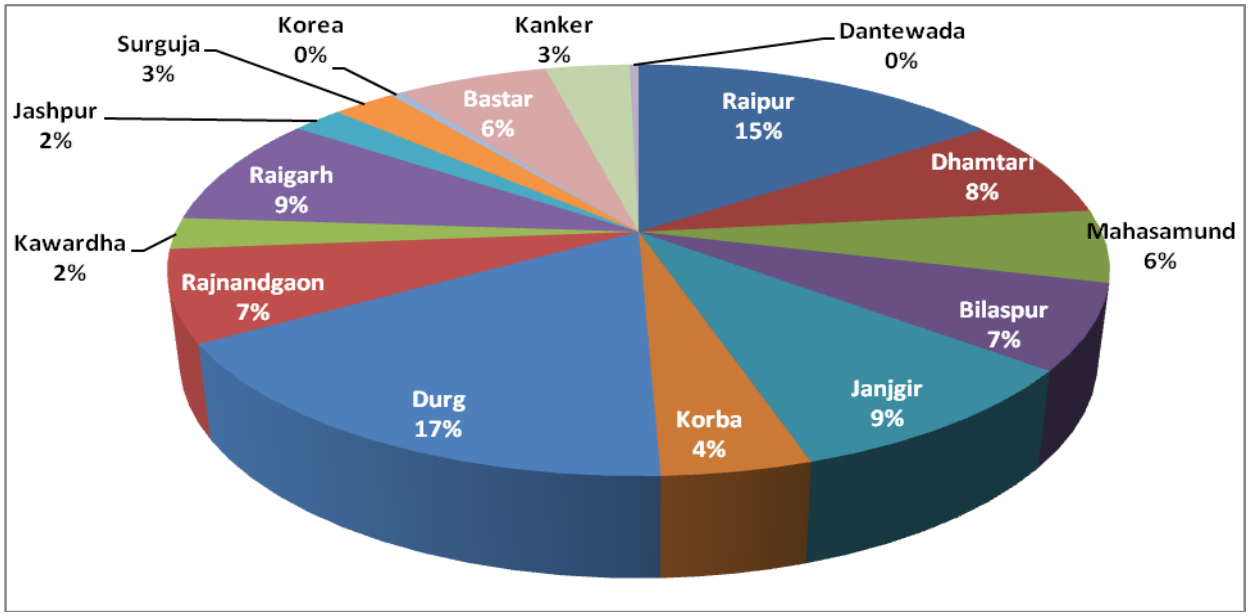

Fig. 1.3: District wise numbers of non parboiled mill (808) in CG.

The number of rice mills in different districts of Chhattisgarh has been observed and it was found that the number of processing units for **non parboiled mill** (Fig.1.3) found maximum in Durg (17%) district followed by Raipur (15%), Janjgir (9%), Dhamtari (8%) and Bilaspur districts (07%). The distribution of **parboiled rice mills** in different districts of CG. (Fig. 1.4) and found that the numbers of processing units for parboiled rice mill were highest in Durg (25%) district followed by Raipur (20%), Mahasamund (15%), Dhamtari (10%), Janjgir (7%) and Raigarh districts (7%).

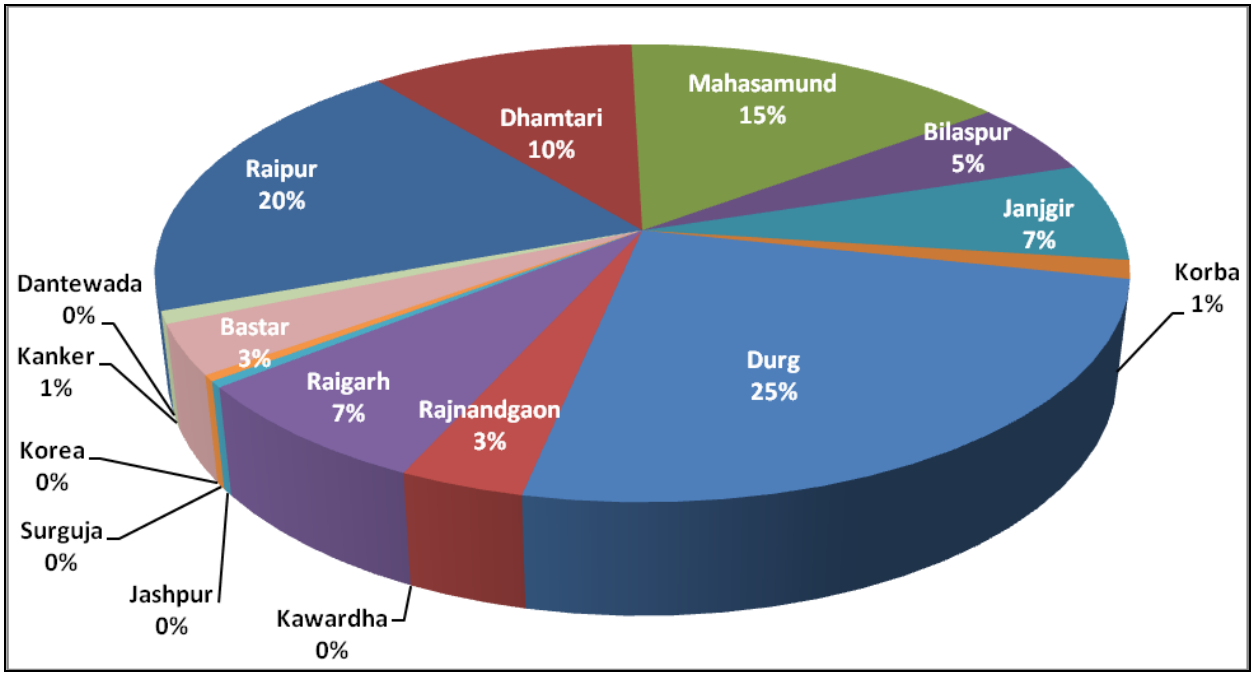

Fig. 1.4: District wise numbers of parboiled rice mills (229) in CG.

The capacity of these rice mills in different districts of Chhattisgarh has also been observed and it was found that the capacity of processing units for **non parboiled rice mill** (fig.1.5) has been found to be maximum in Raipur (23%) district followed by Durg (10%), Bilaspur (10%), Raigarh (9%), Mahasamund (9%) and Dhamtari (8%), districts. while capacity of processing units for **parboiled rice mill** (fig.1.6) has been found highest in Raipur (32%) district followed by Dhamtari (16%), Durg (11%), Mahasamund (12%), Raigarh (9%) and Janjgir (8%) districts.

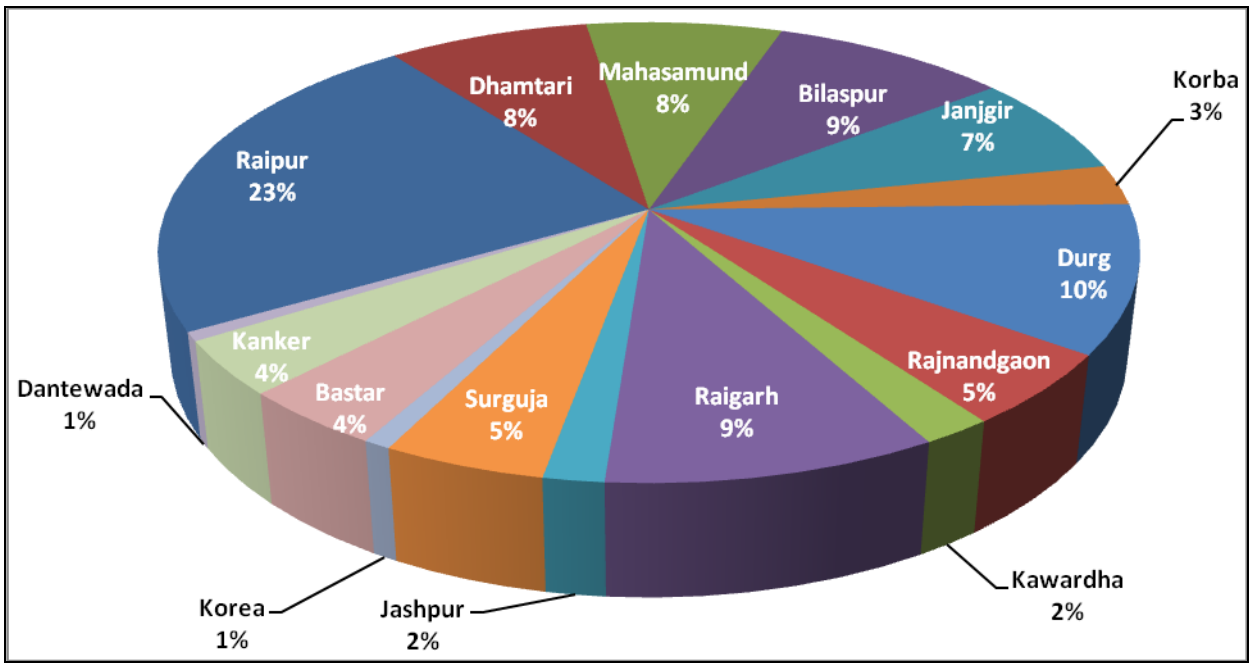

Fig. 1.5: District wise capacity of non parboiled units (912118 t) in CG.

The Capacity of processing units for **total rice mills** (Fig.1.7) was also found maximum in Raipur (26%) district followed by Dhamtari (11%), Durg (11%), Mahasamund (9%), Raigarh (8%) and Bilaspur districts (8%).

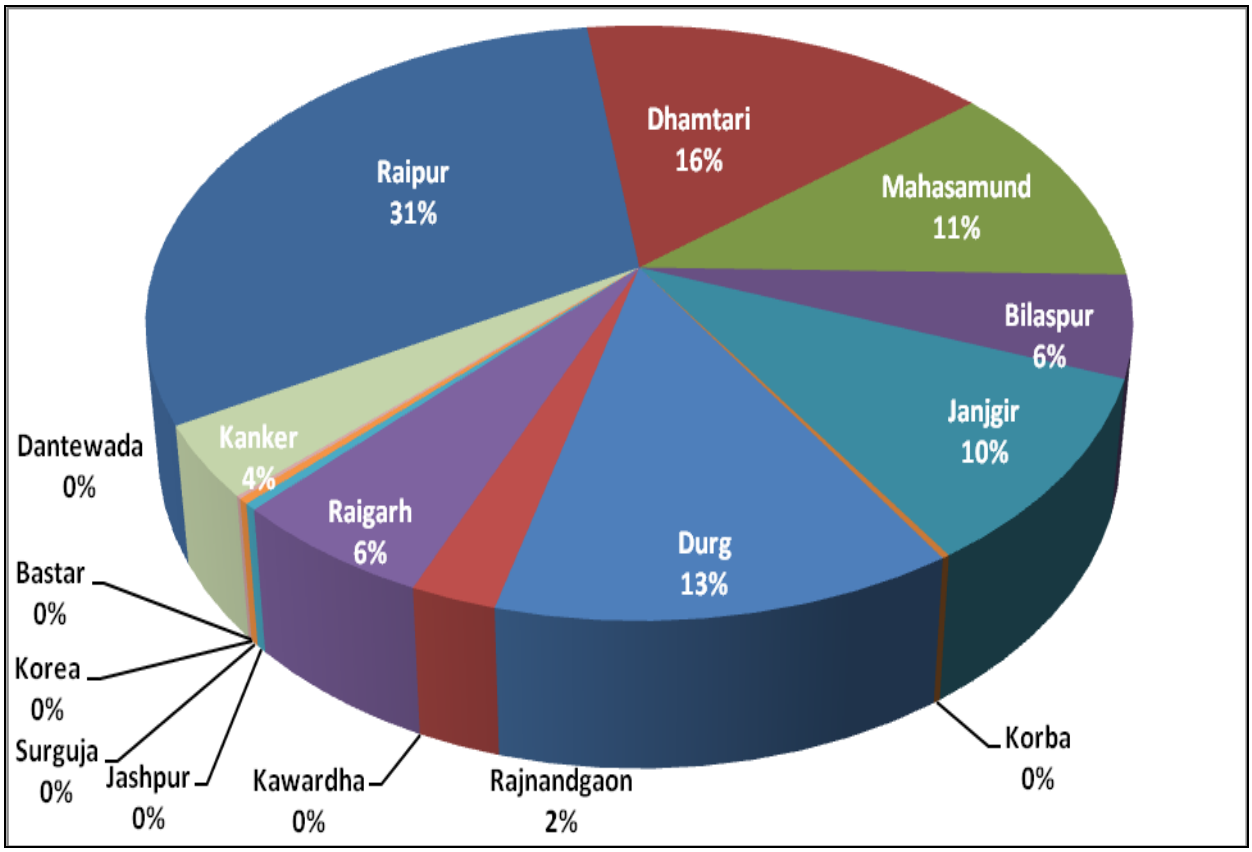

Fig. 1.6: District wise capacity of parboiled processing units (499442 t) in CG.

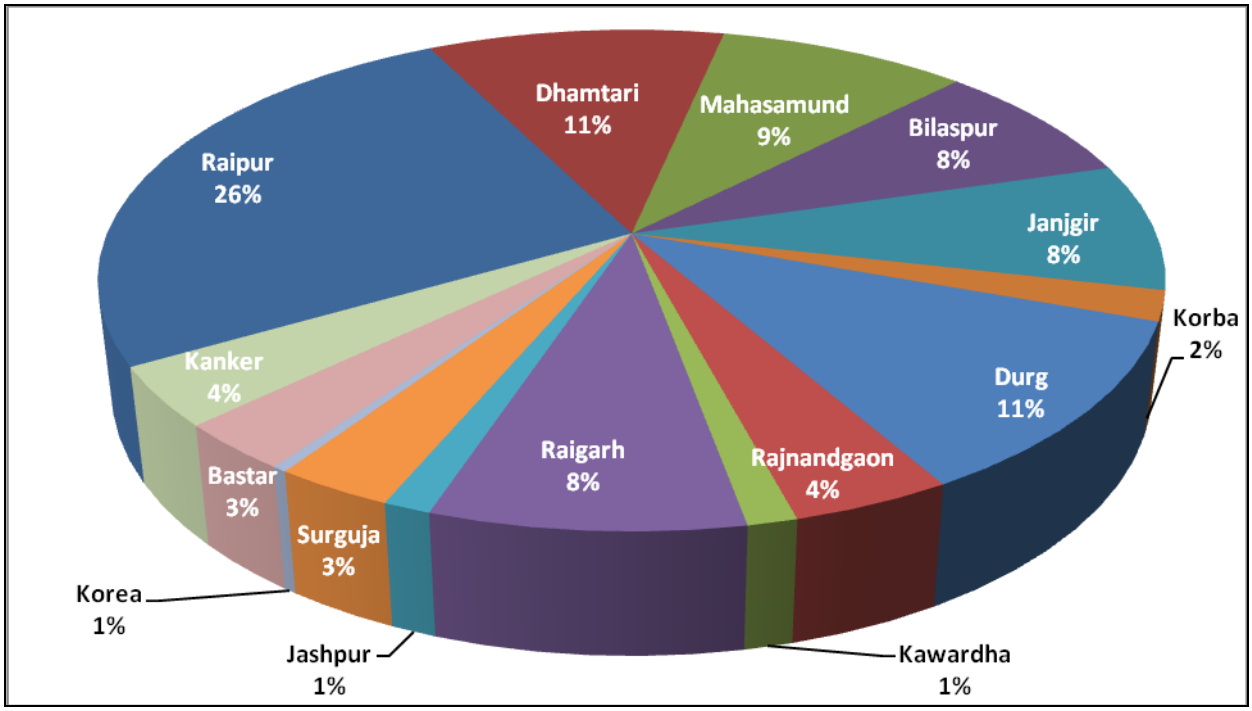

Fig. 1.7: District wise capacity of total processing units (1408057 t) in CG.

1.6 Research Methodology

The study is based on both primary and secondary data. Primary data has been collected from 2 districts (Raipur and Durg) selected purposively on the basis of the highest area under paddy in Chhattisgarh (Table 1.1).

Table 1.3 Details of selected Modern and Traditional Paddy Processing Units.

S. No.	Type of Unit	Total Sample Units (No.)				
		Owner Cum Trader		Custom Hiring		All
		Non-parboiled	Parboiled	Non-parboiled	Parboiled	
1.	Modern Milles with 3 phase	9	31	9	31	40
2.	Hullers	0	0	40	0	40
Total		**9**	**31**	**49**	**31**	**80**

A total number of 20 modern and 20 traditional rice mills have been selected from each selected districts for detail information. Thus, the total number of selected modern rice mills and hullers were 40 each selected district. Out of the total modern rice mills, all were found to be trading on owner cum trader and custom hiring basis (Table 1.3) 9 modern rice mills were found to be processed non- parboiled (raw) rice, where as 31 were found to process parboiled rice for which a separate unit was found to

be attached with the existing processing plant. As regards to hullers were concerned all the hullers (40) processed only non- parboiled rice on custom hiring.

The traditional rice mills, namely, hullers were randomly selected from the total number 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 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 were collected related to the reference year of 2007-08, 2008-09 and 2009-10 (financial year) to avoid yearly fluctuations. The secondary information was collected from the Ministry of Food Processing Industries and Chhattisgarh Government Departments on modernization of rice milling from 2000-2009 considering the current year (Tn average of 2006-07, 2007-08 and 2008-09) and the base year (Tn average of 1999-2000, 2000-01 and 2001-02) 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 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.

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 adopted Japanese/ Chinese machines. Some of them also found to be used separators to separate low quality of grains. Hence, the data reported in the study were related to only third phase of modern rice mills.

2. In traditional rice mills only hullers have been found to be present in the selected districts (Raipur and Durg) of the state. The secondary data were not available at the

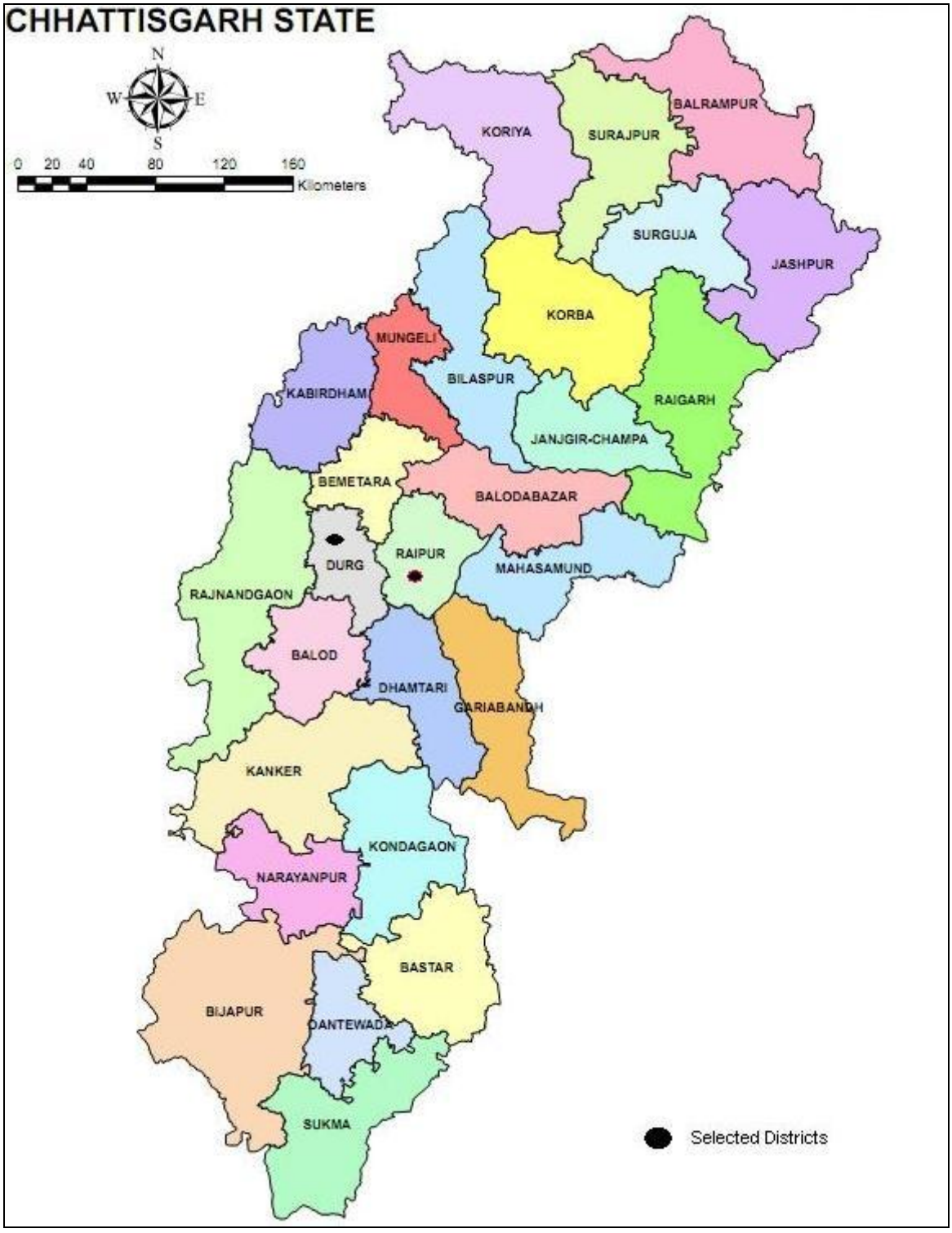

Fig. 1.8 Map of Chhattisgarh Showing selected districts

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 Durg and Raipur district of Chhattisgarh. 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 are 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 return 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 makes an attempt to answer these critical questions hampering the processing of this cereal crop. It will investigate the 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 has 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 collected 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 and infrastructural facility are the important factors of 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 use of traditional processing methods and 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 found to be 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 combines, 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 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 1 is introduction. It gives a brief introduction of the area, production and productivity, status of rice milling in different districts of Chhattisgarh along with objectives, research methodology, scope and the limitation of the study. Differences in rice milling ratio among modern and traditional rice mills is discuss out along with the growth of rice milling in the state in Chapter 2. Chapter 3 related to the economics of paddy processing by modern as well as traditional rice mill in the selected districts of Chhattisgarh. The identification of the constraints in processing of paddy and the steps required to overcome these constraints forms the subject matter of the chapter 4. Finally, the chapter 5 encompasses the conclusion drawn and policy implication emerging out from the present study.

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CHAPTER II

HULLING AND MILLING RATIO FOR PADDY

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

2.1 Trends of Rice Mills in Chhattisgarh

The trends of number of rice mills and its capacity in Chhattisgarh were observed with regards to non- parboiled, parboiled and total rice mills.

2.1.1 Trends of Rice Mills

The trend of **non- parboiled rice mills** in Chhattisgarh over 10 years i.e. from 2000-2009 was observed. It is observed that the non- parboiled rice mills shows increasing trend and the trend equation states that these were increased with a rate of 47 rice mills per year from 460 to 1001 (Fig. 2.1) during the period under study.

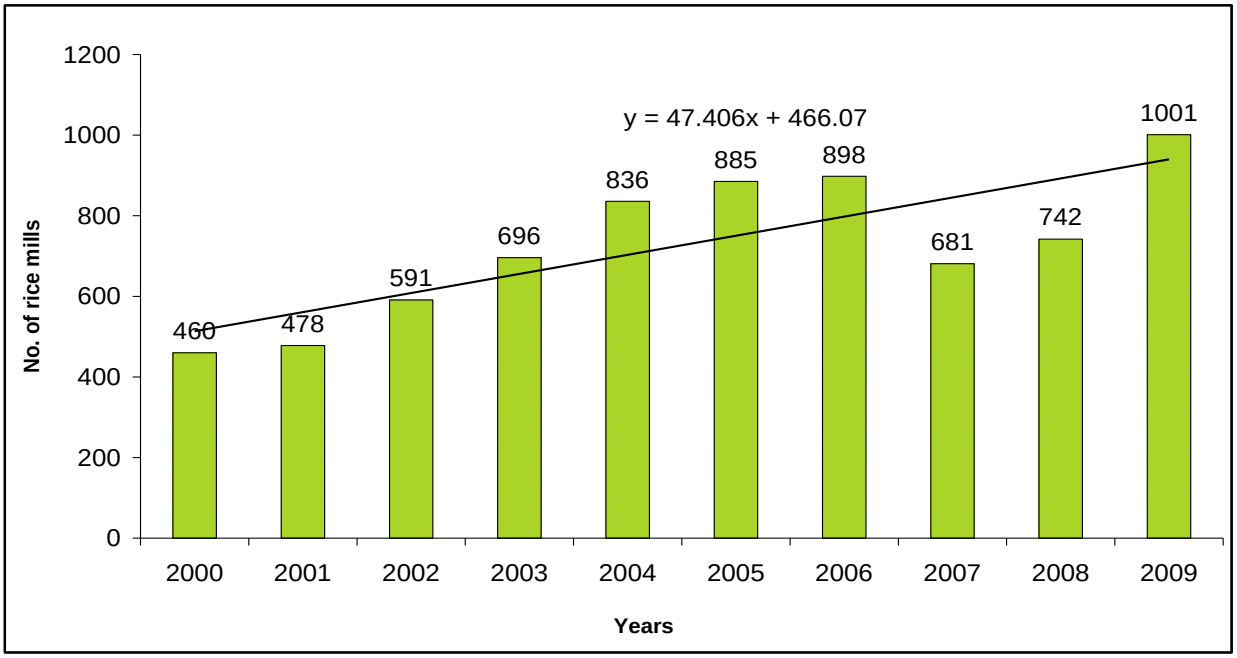

Fig. 2.1: Trend of non- parboiled rice mills in Chhattisgarh.

The trends of parboiled rice mills in Chhattisgarh over 10 years (from 2000-2009) is shown in Fig. 2.2. It is observed that the rice mills showed stagnant or constant trend. The trend equation showed that these were increased with a rate of 4 rice mills per year from 212 to 447 during the period under study.

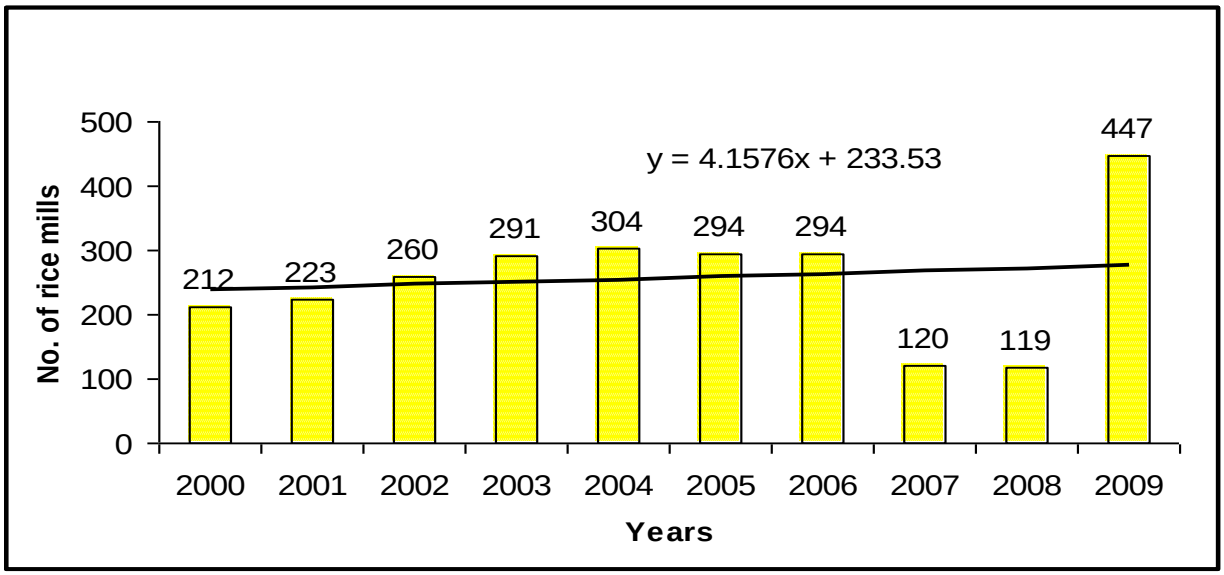

Fig. 2.2: Trend of Parboiled rice mills in Chhattisgarh.

The trend of total rice mills in Chhattisgarh over 10 years i.e. from 2000-2009 is shown in Fig. 2.3. The total rice mills showed increasing trend and the trend equation shows that these were increased with a rate of 51 rice mills per year from 672 to 1448 during the period under study.

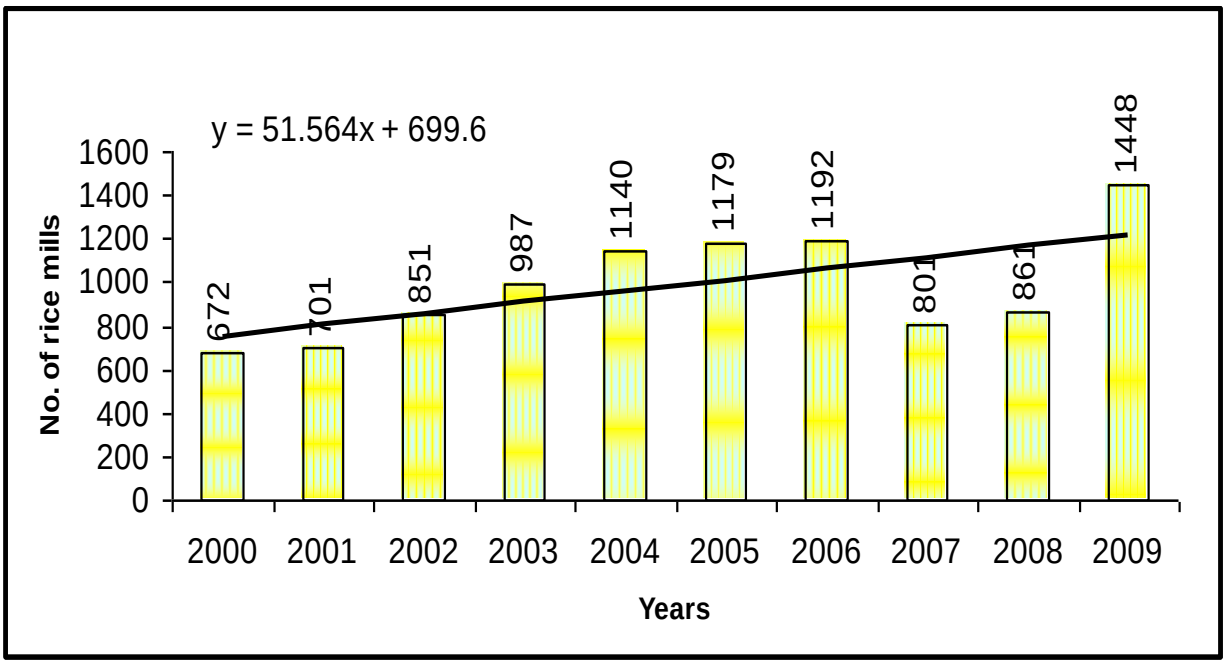

Fig. 2.3: Trend of total rice mills in Chhattisgarh.

2.1.2 Capacity of Rice Mills in Chhattisgarh:

Trend of capacity of these rice mills also observed with regard to non- parboiled, parboiled and total. The trend of capacity of non- parboiled rice mill in Chhattisgarh over 10 years i.e. from 2000-2009 is shown in Fig. 2.4. It is observed that the capacity of non-parboiled rice mills showed an increasing trend with a rate of 96112 t per year from 196180 t to 1022060 t over 10 years during the period under study.

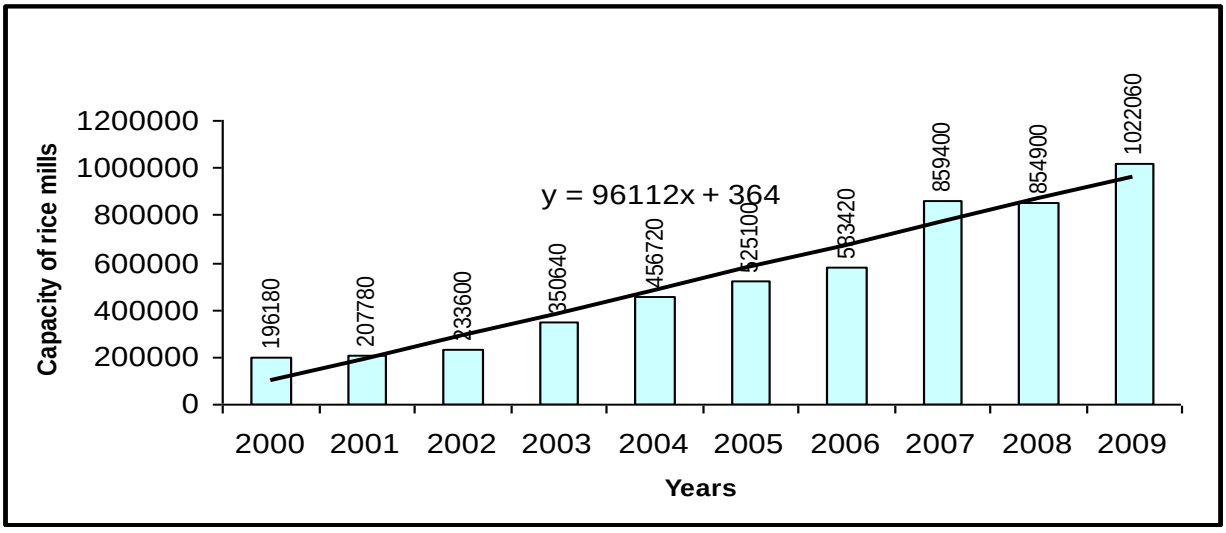

Fig. 2.4: Trend of capacity of Non- Parboiled rice mills in Chhattisgarh.

As regard to the trend of capacity of the parboiled rice mill in Chhattisgarh over 10 year. The capacity of these rice mills also showed increasing trend. The trend equations showed that there were increased with the rate of 48979 t per year during the period under study from 117400 t (2000) to 589456 t (2009) (Fig.2.5).

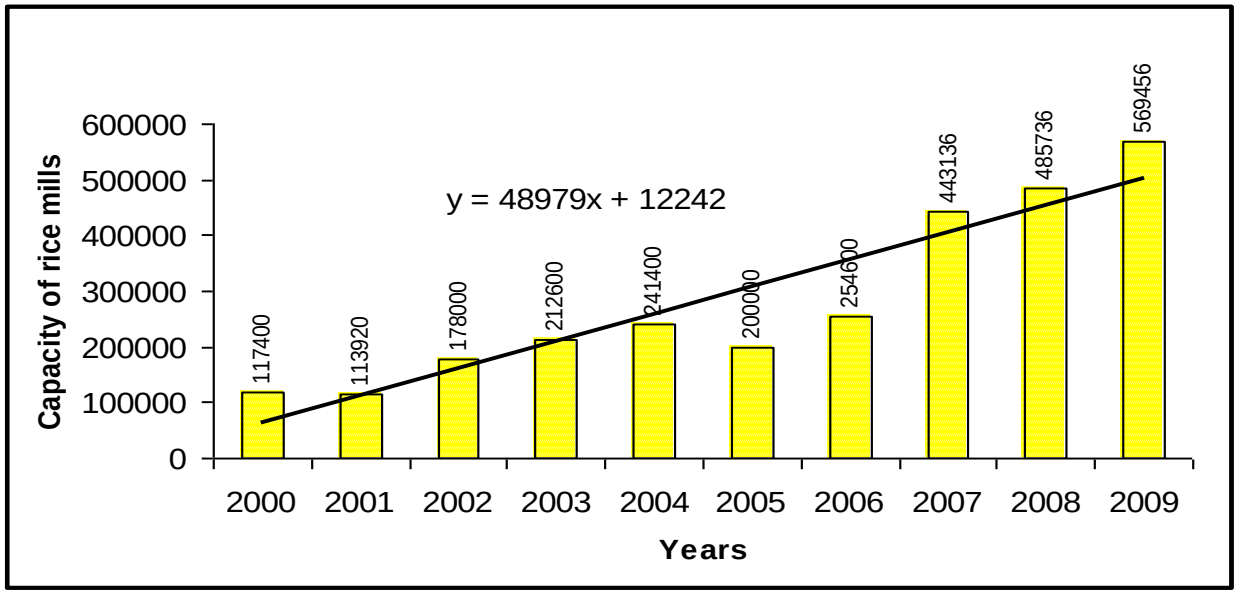

Fig. 2.5: Trend of capacity of parboiled rice mills in Chhattisgarh.

The trend of capacity of both non- parboiled and parboiled rice mill in Chhattisgarh over 10 years i.e. from 2000-2009 presented in Fig. 2.6. It is observed from the figure that the rice mill showed increasing trend and the trend equation shows that there were increased with a rate of 145091 t per year from 313580 t to 1591516 t during the period under study.

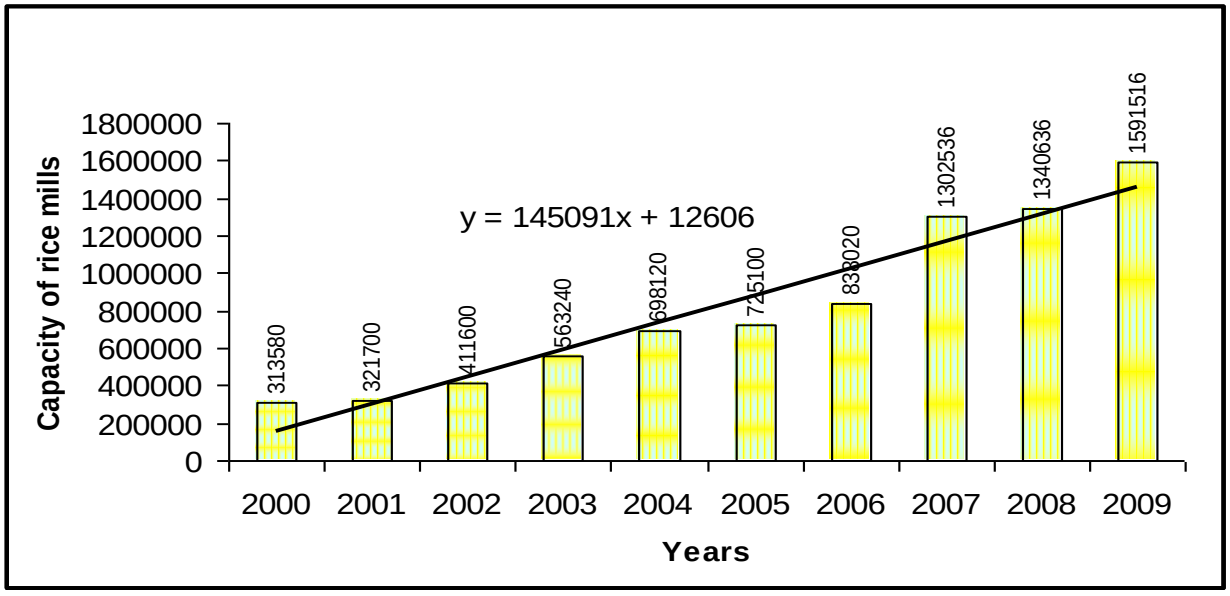

Fig. 2.6: Trend of capacity of total rice mills in Chhattisgarh

2.2 Variation and Growth of Rice Mills

The variation and growth in number and capacity of these rice mills i.e. non-parboiled, parboiled and total in different districts of Chhattisgarh has also been observed and it is found that there were 7.23% increase in number of non- parboiled rice mills in Chhattisgarh. All the districts of Chhattisgarh showed positive relative change except Bilaspur (-26.70%) and Dantewada (-30.77%).The relative change was found maximum in Raigarh district (377.27%) followed by Jaspur (354.55%), Kawardha (180.95%), Korba (130.43%), Durg (122.58%), Kanker (107.32%), Korea (100.00%), Rajnandgaon (96.63%), Jhanjgir (94.87%), Bastar (81.71%), Surguja (34.78%), Mahasamund (20.18%), Dhamtari (18.40%) and Raipur (13.37%) districts. The non- parboiled rice mills showed a positive and significant growth in all the districts of Chhattisgarh except Bilaspur (-0.73%/yr.) and Dantewada (-0.67%/yr.). The maximum positive and significant linear growth was found in Jaspur (20.34%/yr.) district followed by Raigarh (17.8%/yr.), Kawardha (13.32%/yr.), Korea (12.61%/yr.), Kanker (9.73%/yr.), Durg (9.67%/yr.), Korba (9.48%/yr.), Jhanjgir (8.90%/yr.),

Rajnandgaon (8.89%/yr.), Bastar (7.36%/yr.), Surguja (6.45%/yr.), Mahasamund (3.40%/yr.), Dhamtari(2.66%/yr.) and Raipur (2.47%/yr.) districts.

Table 2.1: Variation and growth (Number) of rice mills (Non- Parboiled) in different districts of Chhattisgarh

Districts	Base year	Non- Parboiled mill				
		Current year	Standard deviation (s.d.)	Co-efficient of variation (%)	Regression co-efficient (b)	Linear growth (%)
Raipur	110	124 (13.37)	66	59.84	3.13**	2.47
Dhamtari	54	64 (18.40)	27	50.09	1.54*	2.66
Mahasamund	38	46 (20.18)	23	61.26	1.62*	3.40
Bilaspur	74	54 (-26.70)	45	61.18	-0.58*	-0.73
Janjgir	39	76 (94.87)	38	96.29	6.12*	8.90
Korba	15	35 (130.43)	13	84.36	2.59*	9.48
Durg	62	138(122.58)	57	91.90	10.13*	9.67
Rajnandgaon	30	58 (96.63)	22	72.59	3.88*	8.89
Kawardha	7	20 (180.95)	6	89.20	1.82*	13.32
Raigarh	15	70 (377.27)	25	170.68	7.61*	17.81
Jashpur	4	17 (354.55)	5	135.32	1.83*	20.34
Surguja	15	21 (34.78)	19	123.76	1.79*	6.45
Korea	2	4 (100.00)	3	168.12	0.47*	12.61
Bastar	27	50 (81.71)	23	84.56	3.37*	7.36
Kanker	14	28 (107.32)	10	71.27	2.12**	9.73
Dantewada	4	3 (-30.77)	3	72.39	-0.04*	-0.67
Chhattisgarh	510	808 (7.23)				

Figure in the parenthesis show relative change (%) in the current year to the base year

The number of parboiled rice mills found to be decreases by -1.72% in Chhattisgarh. All the districts of Chhattisgarh showed positive relative change except Raipur (-41.63%), Dhamtari (-54.66%), Bilaspur (-29.41%), Jhanjgir (-16.07), Kawardha (-100.00) and Jaspur (-55.56%) districts. The relative change was found maximum in Durg district (341.03%) followed by Rajnandgaon (109.09%), Mahasamund (38.67%), Korba (11.11%) and Raigarh (4.17%) districts, while Surguja (0.00%), Korea (0.00%), Bastar (0.00%), Kanker (0.00%) and Dantewada (0.00%) districts showed stagnant change.

The parboiled rice mills showed a positive and significant growth in all the districts of Chhattisgarh except Raipur (-3.94%/yr.), Dhamtari (-7.04%/yr.), Bilaspur (-0.99%/yr.), Kawardha (-36.36%/yr.) and Jaspur (-7.52%/yr.) districts. The maximum positive and significant linear growth was found in Surguja (54.55%/yr.) district followed by Kanker (47.27%/yr.), Bastar (39.39%/yr.), Durg(16.42%/yr.), Rajnandgaon (11.49%/yr.), Mahasamund (6.06%/yr.), Korba (1.76%/yr.), Raigarh (1.65%/yr.), and Jhanjgir (0.25%/yr.) districts. While Korea (0.00%/yr.) and Dantewada (0.00%/yr.) districts showed stagnant growth.

Table 2.2: Variation and growth (Number) of rice mills (Parboiled) in different districts of Chhattisgarh.

Districts	Base year	Parboiled mill				
		Current year	Standard deviation (s.d.)	Co-efficient of variation (%)	Regression co-efficient (b)	Linear growth (%)
Raipur	78	45(-41.63)	41	52.44	-2.82**	-3.94
Dhamtari	54	24(-54.66)	26	48.43	-3.13*	-7.04
Mahasamund	25	35(38.67)	16	63.93	1.92*	6.06
Bilaspur	17	12(-29.41)	9	54.85	-0.16*	-0.99
Janjgir	19	16(-16.07)	11	58.57	0.04*	0.25
Korba	3	3(11.11)	2	81.00	0.05*	1.76
Durg	13	57(341.03)	21	161.44	6.11*	16.42
Rajnandgaon	4	8(109.09)	3	73.65	0.67*	11.49
Kawardha	1	0(-100.00)	3	336.35	-0.15*	-36.36
Raigarh	16	17(4.17)	11	70.86	0.38*	1.65
Jashpur	3	1(-55.56)	3	89.83	-0.19*	-7.52
Surguja	0	1(0.00)	3	0.00	0.11*	54.55
Korea	0	0(0.00)	4	0.00	0.00*	0.00
Bastar	0	8(0.00)	4	0.00	1.10*	39.39
Kanker	0	2(0.00)	3	0.00	0.24**	47.27
Dantewada	0	0(0.00)	4	0.00	0.00*	0.00
Chhatisgarh	233	229 (-1.72)				

Figure in the parenthesis show relative change (%) in the current year to the base year

Table 2.3: Variation and growth (Number) of rice mills (total) in different districts of CG.

Districts	Base year	Total					
		Current year	Standard deviation (S.D.)	Co-efficient of variation (%)	Regression co-efficient (b)	Linear growth (%)	T-test calculated value
Raipur	187	170 (-9.43)	107	57.19	0.30 **	0.15	4.75
Dhamtari	108	89 (-17.90)	53	48.63	-1.59*	-1.56	-0.06
Mahasamund	63	80 (27.51)	41	65.29	3.54*	4.46	0.16
Bilaspur	91	66 (-27.21)	56	61.33	-0.75*	-0.77	-0.02
Janjgir	58	92 (58.96)	47	81.16	6.16*	7.19	0.23
Korba	18	39 (110.91)	14	78.28	2.64*	8.69	0.59
Durg	75	195 (160.44)	79	105.97	16.24*	11.44	0.65
Rajnandgaon	33	66 (98.00)	25	74.10	4.55*	9.19	1.16
Kawardha	8	20 (145.83)	6	77.23	1.68*	11.91	0.75
Raigarh	31	87 (182.61)	36	116.34	7.98*	12.19	0.77
Jashpur	7	18 (170.00)	19	125.43	1.90*	14.28	0.35
Surguja	15	22 (39.13)	3	168.12	0.47*	6.80	0.10
Korea	2	4 (100.00)	5	78.40	1.64*	12.61	0.04
Bastar	27	58 (110.98)	10	74.35	2.36*	9.20	0.46
Kanker	14	30 (119.51)	25	90.99	4.47**	10.57	9.44
Dantewada	4	3 (-30.77)	3	72.39	-0.04*	-0.67	0.02
Chhatisgarh	741	1038 (40.08)					

Figure in the parenthesis show relative change (%) in the current year to the base year

As regards to total number of rice mills (Table 2.3) it is found that there were 40.08% increase in total number of rice mills in Chhattisgarh. All the districts of chhattisgarh showed positive relative change except Raipur (-9.43%), dhamtari (-17.90%), Bilaspur (-27.21%) and Dantewada (-30.77%) districts.The maximum relative change was found in Raigarh district (182.61%) followed by Jaspur(170.00%), Durg (160.44%), Kawardha (145.83%), Kanker (119.51%), Bastar (110.98%), Korba (110.91%), Korea(100.00%), Rajnandgaon (98.00), Jhanjgir (58.96%), Mahasamund (27.51%) and Surguja(39.13%) districts.

Table 2.4: Variation and growth (Capacity) of rice mills (Non- Parboiled) in different districts of Chhattisgarh.

Districts	Base year	Non- Parboiled Mill				
		Current year	Standard deviation (s.d.)	Co-efficient of variation (%)	Regression co-efficient (b)	Linear growth (%)
Raipur	38233	209333 (447.52)	76762	200.77	22933.90	20.64
Dhamtari	21733	72187 (232.15)	26323	121.12	6599.03	15.56
Mahasamund	32000	70533 (120.42)	26913	84.10	4946.67	10.44
Bilaspur	25467	84900 (233.38)	32301	126.83	8204.85	15.57
Janjgir	7840	65533 (735.88)	27648	352.65	8612.61	23.04
Korba	6000	26000 (333.33)	9219	153.66	2623.03	19.46
Durg	18133	94133 (419.12)	36797	202.92	10330.90	18.50
Rajnandgaon	13533	46000 (239.90)	16637	122.93	4186.67	16.10
Kawardha	5733	17933 (212.79)	7318	127.64	1751.52	14.79
Raigarh	11067	84400 (662.65)	33481	302.54	10673.90	22.77
Jashpur	1333	15433 (1057.50)	5911	443.31	2026.06	30.65
Surguja	7733	41333 (434.48)	18377	237.63	4592.73	20.52
Korea	1500	6933 (362.22)	2744	182.95	798.55	20.31
Bastar	13200	37333 (182.83)	15928	120.67	3534.55	13.22
Kanker	7147	34467 (382.28)	13463	188.38	3772.12	18.51
Dantewada	1867	5667 (203.57)	2314	123.96	524.85	13.32
Chhattisgarh	212519	912118 (329.19)				

Figure in the parenthesis show relative change (%) in the current year to the base year

The total number of rice mills showed a positive and significant growth in all the districts of Chhattisgarh except Dhamtari (-1.56%/yr.), Bilaspur (-0.77%/yr.) and Dantewada (-0.67%/yr.) districts. The maximum positive and significant linear growth was found in Jaspur (14.28%/yr.) district followed by Korea (12.61%/yr.), Raigarh (12.19%/yr.), Kawardha (11.91%/yr.), Durg (11.44%/yr.), Kanker (10.57%/yr.), Bastar (9.20%/yr.), Rajnandgaon (9.19%/yr.), Korba (8.69%/yr.), Jhanjgir (7.19%/yr.), Surguja (6.80%/yr.), Mahasamund (4.46%/yr.) and Raipur (0.15%/yr.) districts.

As regards to capacity of these rice mills it is observed that there were 329.19% increase in capacity of non- parboiled rice mills (Table 2.4) in Chhattisgarh. All the districts of Chhattisgarh showed positive relative change .The maximum

relative change was found in Jaspur district (1057.50%) followed by Jhanjgir (735.88%), Raigarh (662.65%), Raipur (447.52%), Surguja (434.48%), Durg (419.12%) and so on.

Table 2.5: Variation and growth (Capacity) of rice mills (Parboiled) in different districts of Chhattisgarh.

Districts	Base year	Current year	Parboiled mill			
			Standard deviation (s.d.)	Co-efficient of variation (%)	Regression co-efficient (b)	Linear growth (%)
Raipur	41000	154133 (275.93)	56355	119.25	7377.43	18.05
Dhamtari	24133	78689 (226.06)	28779	105.04	5009.70	16.02
Mahasamund	20000	56467 (182.33)	21007	152.89	2807.27	14.40
Bilaspur	6600	27133 (311.11)	10091	256.92	5859.15	19.94
Janjgir	7440	49667 (567.56)	19115	69.35	-7.27	26.94
Korba	1200	1067 (-11.11)	832	211.32	6905.45	-0.79
Durg	11067	62733 (466.87)	23386	188.41	1269.09	20.39
Rajnandgaon	2200	11733 (433.33)	4145	40.69	-58.18	22.58
Kawardha	400	0 (-100.00)	163	91.28	1029.70	-36.36
Raigarh	18400	28167 (53.08)	16795	46.76	-278.79	3.93
Jashpur	4000	1733 (-56.67)	1871	0.00	312.73	-9.05
Surguja	0	1467 (0.00)	1293	0.00	0.00	37.23
Korea	0	0 (0.00)	4	0.00	1048.24	0.00
Bastar	0	752 (0.00)	2846	0.00	2181.82	40.69
Kanker	0	18933 (0.00)	7778	0.00	0.00	38.41
Dantewada	0	0 (0.00)	4	0.00	0.00	0.00
Chhattisgarh	136440	499442 (266.05)				

Figure in the parenthesis show relative change (%) in the current year to the base year

The capacity of non- parboiled rice mills showed a positive and significant growth in all the districts of Chhattisgarh. The maximum positive and significant linear growth was found in Jaspur (30.65%/yr.) district followed by Jhanjgir (23.04%/yr.), Raigarh(22.77%/yr.), Raipur (20.64%/yr.), Surguja (20.52%/yr.), Korea (20.31%/yr.), Korba (19.46%/yr.), Kanker (18.51%/yr.), Durg (18.50%/yr.), Rajnandgaon (16.10%/yr.), Bilaspur (15.57%/yr.), Dhamtari (15.56%/yr.), Kawardha (14.79%/yr.), Dantewada (13.32%/yr.), Bastar (13.22%/yr.) and Mahasamund (10.44%/yr.) districts.

As regards to capacity of parboiled rice mills (Table 2.5) it is observed that there were 266.05% increase in capacity of parboiled rice mills (Table 2.5) in Chhattisgarh. All the districts of chhattisgarh showed positive relative change except Korba (-11.11%), Jaspur (-56.67%) and Kawardha (-100.00%) districts .The maximum relative change was found in Jhanjgir district (567.56%) followed by Durg(466.87%), Rajnandgaon (433.33%), Bilaspur (311.11%), Raipur (275.93%), Dhamtari (226.06%), Mahasamund (182.33%) and Raigarh (53.08%). Whereas, Surguja (0.00%), Korea (0.00%), Bastar (0.00%), Kanker (0.00%) and Dantewada (0.00%) districts showed stagnant change.

The capacity of parboiled rice mills showed positive and significant growth in all the districts of Chhattisgarh except Korba (-0.79%/yr.), Kawardha (-36.36%/yr.) and Jaspur (-9.05%/yr.) districts. The maximum positive and significant linear growth was found in Bastar (40.69%/yr.) district followed by Kanker (38.41%/yr.), Surguja (37.23%/yr.), Jhanjgir (26.94%/yr.), Rajnandgaon (22.58%/yr.), Durg (20.39%/yr.), Bilaspur (19.94%/yr.), Raipur (18.05%/yr.), Mahasamund (14.40%/yr.), and Raigarh (3.93%/yr.) districts. While, Korea (0.00%/yr.) and Dantewada (0.00%/yr.) districts show stagnant growth.

Table 2.6: Variation and growth (Capacity) of rice mills (total) in different districts of Chhattisgarh.

Districts	Base year	Total				
		Current year	Standard deviation (s.d.)	Co-efficient of variation (%)	Regression co-efficient (b)	Linear growth (%)
Raipur	79233	363467 (358.73)	132970	167.82	38456	19.51
Dhamtari	45867	150876 (228.94)	55015	119.94	13976	15.80
Mahasamund	52000	127000 (144.23)	47689	91.71	9956.4	12.12
Bilaspur	32067	112033 (249.38)	41760	130.23	11012	16.50
Janjgir	15280	115200 (653.93)	44007	288.01	14472	24.47
Korba	7200	27067 (275.93)	9654	134.09	2615.8	18.16
Durg	29200	156867 (437.21)	59245	202.89	17236	19.22
Rajnandgaon	15733	57733 (266.95)	20702	131.58	5455.8	17.25
Kawardha	6133	17933 (192.39)	7322	119.38	1693.3	14.11
Raigarh	29467	112567 (282.01)	45082	152.99	11704	16.01
Jashpur	5333	17167 (221.88)	6603	123.80	1747.3	18.03
Surguja	7733	42800 (453.45)	19154	247.69	4905.5	21.13
Korea	1500	5200 (246.67)	1947	129.82	559	17.40
Bastar	13200	43080 (226.36)	16698	126.50	4711	17.32
Kanker	7147	53400 (647.20)	19420	271.73	5953.9	22.84
Dantewada	1867	5667 (203.57)	2314	123.96	524.85	13.32
Chhattisgarh	348960	1408057 (303.50)				

Figure in the parenthesis show relative change (%) in the current year to the base year

As regards to total capacity of rice mills (Table 2.6) it is found that there were 303.50% increase in total capacity of rice mills in Chhattisgarh. All the districts of Chhattisgarh showed positive relative change .The maximum relative change was found in Jhanjgir district (653.93%) followed by Kanker (647.20%), Surguja (453.45%), Durg (437.21%), Raipur (358.73%), Raigarh (282.01%) and so on.

The total number of rice mills showed a positive and significant growth in all the districts of Chhattisgarh .The maximum positive and significant linear growth was found in Jhanjgir (24.47%/yr.) district followed by Kanker (22.84%/yr.), Surguja (21.13%/yr.), Raipur (19.51%/yr.), Durg (19.22%/yr), Korba (18.16%/yr.) districts and

so on. Similar finding were reported by Govindappa *et al*. (1996) and Sekhon *et al*. (2003).

2.3 Basic Characteristics of Selected Sample Units

The characteristic of rice processing sample unit in the Chhattisgarh have been presented in Table 2.7. It is observed from the data that an average modern mill owner invested Rs. 76.3 and Rs. 82.84 lakhs to establish a non- parboiled and parboiled rice mill respectively. An average capacity of modern rice mill was found to be of 4.2 t/hr. (non- parboiled) and 3.74 t/hr. (parboiled) with an average number of employees of 10 each, and average number of daily wage labours were of 18 and 14 in numbers for an average non- parboiled and parboiled rice mill existing in the area under study. (Table 2.7)

Table 2.7: Characteristics of Sample Units of Paddy Processing in the state. (Average)

S. No	Particulars	Investment (Rs. in lakhs)		Size of Units (Tons Per Hr.)		No. of Employees		No. of Daily Wage Laborers	
	Type of Units	Non-parboiled	Parboiled	Non-parboiled	Parboiled	Non-parboiled	Parboiled	Non-parboiled	Parboiled
1	**Modern Rice Mills (3 Phase)**								
a	Owner Cum Trader	76.3	82.84	4.2	3.74	10	10	18	14
b	Custom Hiring								
2	**Traditional Rice Mills**								
a	Huller	1.26	0	0.04	0	0	0	1	0

As regards to hullers were, an average huller invested only Rs. 1.26 lakhs to established a hulling mill in the area under study with An average capacity of 0.04 t/hr. and only one of daily wage labours. (Table 2.7)

2.4 Hulling and Milling Ratio

The paddy to rice conversion ratio were observed both for modern rice mills and hullers.

2.4.1 Modern Rice Mills

An average mill owner of the study area got 0.22 lakh t (52%) and 0.09 lakh t (53.85%) of rice from the processing of 0.42 and 0.17 lakh t. of grade A common non-parboiled rice respectively. In case of parboiled rice an average mill owner cum trader

Table 2.8: Hulling and Milling Ratio in Modern Rice mills with 3 Phase. (Lac. t.)

Type of Service		Owner cum Trader							
Type of Rice Produced		Non-Parboiled				Parboiled			
Year		2007-08	2008-09	2009-10	Average	2007-08	2008-09	2009-10	Average
Total Quantity of Paddy Processed in the Year	Grade. A	0.4	0.49	0.36	0.42	0.11	0.1	0.12	0.11
	Common	0.17	0.18	0.17	0.17	0.48	0.49	0.52	0.5
	Others	0	0	0	0	0	0	0	0
Total Rice Produced	Grade. A	0.21	0.25	0.19	0.22	0.07	0.06	0.08	0.07
	Common	0.09	0.1	0.09	0.09	0.31	0.32	0.35	0.33
	Others	0	0	0	0	0	0	0	0
Paddy to Rice Conversion Ratio	Grade. A	52.5	51.02	52.78	52	63.64	60	64.17	62.73
	Common	52.94	55.56	52.94	53.85	64.58	65.31	67.31	65.77
	Others	0	0	0	0	0	0	0	0
Type of Service		Custom Hiring							
Type of Rice Produced		Non-Parboiled				Parboiled			
Year		2007-08	2008-09	2009-10	Average	2007-08	2008-09	2009-10	Average
Total Quantity of Paddy Processed in the Year	Grade. A	1.18	0.98	1.1	1.09	0.23	0.23	0.22	0.23
	Common	0.42	0.38	0.33	0.38	1.05	1.05	1.03	1.04
	Others	0	0	0	0	0	0	0	0
Total Rice Produced	Grade. A	0.61	0.51	0.57	0.56	0.14	0.14	0.14	0.14
	Common	0.24	0.22	0.19	0.22	0.69	0.7	0.68	0.69
	Others	0	0	0	0	0	0	0	0
Paddy to Rice Conversion Ratio	Grade. A	51.69	52.04	51.82	51.84	60.87	60.87	63.64	61.79
	Common	57.14	57.89	57.58	57.52	65.71	66.67	66.02	66.13
	Others	0	0	0	0	0	0	0	0

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

got 62.73 percent (0.07 lakh t) and 65.77% (0.33 lakh t) from the processing of 0.11 and 0.5 lakh t of Grade A and common rice respectively (Table 2.8).

Here, paddy to rice conversion ratio was found to be higher in parboiled rice 62.73% (Grade A) to 65.77% (Common) as compared to non- parboiled rice 52.00% (Grade A) to 53.85% (Common).

As regards to custom hiring on an average modern mill owner used to process 1.09 and 0.38 lakh t of Grade A and Common variety of paddy and obtained 0.56 and 0.22 lakh t of non- parboiled rice per year with paddy to rice conversion ratio of 51.84% (Grade A) and 57.52% (Common) respectively. An average mill owner of the study area was found to obtained 0.14 lakh t and 0.69 lakh t of parboiled rice from the processing of 0.23 lakh t and 1.04 lakh t of paddy with the paddy to rice conversion ratio of 61.79% (Grade A) and 66.13 (Common) respectively. Here also the conversion ratio of paddy to rice was found to be more in parboiled rice as compared to non-parboiled rice (Table 2.8).

2.4.2 Traditional Rice Mill (Hullers)

An average huller of study area processed 190.33 and 3908.33 quintals of grade A and common variety of paddy respectively in a huller mill and obtained 51.67% (98.33 q.) and 54.79% (2140.31 q.) and common non- parboiled rice respectively of grade A on custom hiring basis (Table 2.9). It is observed during the investigation that hullers only hulling the non-parboiled rice (Table 2.9) on custom hiring basis.

Table 2.9: Hulling and Milling Ratio in Hullers under custom hiring.

Type of Service		**Custom Hiring**			
Type of Rice Produced		**Non-Parboiled**			
Year		2007-08	2008-09	2009-10	Average
Total Quantity of Paddy Processed in the Year (Qtl.)	Grade. A	185.00	226.00	160.00	190.33
	Common	4436.00	3896.00	3393.00	3908.33
	Others	0.00	0.00	0.00	0.00
Total Rice Produced (Qtl.)	Grade. A	97.00	116.00	82.00	98.33
	Common	2390.00	2182.00	1849.00	2140.33
	Others	0.00	0.00	0.00	0.00
Paddy to Rice Conversion Ratio	Grade. A	52.43	51.33	51.25	51.67
	Common	53.88	56.01	54.49	54.79
	Others	0.00	0.00	0.00	0.00

2.5 Conclusions

In Chhattisgarh the total no. of rice mills were increased with a rate of 51 rice mills per year from 672 (2001) to 1448 (2009). The non parboiled rice mills also showed increasing trend with a rate of 47 rice mills per year from 460 (2001) to 1001 (2009),while, the parboiled rice mills increased with a rate of 4 rice mills per year from 212 (2001) to 447 (2009) during the period under study.

The capacity of non- parboiled rice mills also showed an increasing trend with a rate of 96112 t per year from 196180 t (2001) to 1022060 t (2009),while the capacity of

parboiled rice were also found to be increased with a rate of 48979 t per year during the period under study.

The result shows that the total number of rice mills found to be increased by 40.08% in Chhattisgarh were during the current year (Tn average 2009) as compared to the base year (Tn average 2002). All the districts of Chhattisgarh showed positive relative change except Raipur (-9.43%), Dhamtari (-17.90%), Bilaspur (-27.21%) and Dantewada (-30.77%) districts. The total number of rice mills showed a positive and significant growth in all the districts of Chhattisgarh except Dhamtari (-1.56%/yr.), Bilaspur (-0.77%/yr.) and Dantewada (-0.67%/yr.) districts.

The total capacity of rice mills was found to be increased by 303.50% in the current year as compared to the base year in Chhattisgarh. The maximum positive and significant linear growth in capacity of rice mills was found to be maximum in Janjgir (24.47%/yr.) district followed by Kanker (22.84%/yr.), Surguja (21.13%/yr.), Raipur (19.51%/yr.), Durg (19.22%/yr), Korba (18.16%/yr.) districts.

An average modern mill owner invested Rs. 76.3 lakh to establish a non-parboiled rice mill and Rs. 82.84 lakh for a parboiled rice mill. An average capacity of processing in modern rice mill was found to be of 4.2 t/hr. (non- parboiled) and 3.74 t/hr. (parboiled) with an average number of employees of 10 each, and average number of daily wage labours of 18 and 14 in numbers for an average non- parboiled and parboiled rice mill respectively existing in the area under study. An average capacity of huller was found to be 0.4 t/hr. with an average of daily wage labours of 1 only.

An average mill owner of the study area got 0.22 lakh t (52%) and 0.09 lakh t (53.85%) of rice from the processing of 0.42 lakh t of grade A and 0.17 lakh t. of common non- parboiled rice respectively. An average mill owner come traders got 62.73 percent (0.07 lakh t) and 65.77% (0.33 lakh t) was obtained from the processing of 0.11 and 0.5 lakh t of grade A and common parboiled rice respectively per year as owner cum trader basis.

The percentage of conversion of paddy to rice ratio was found to be higher in parboiled rice and varies from 62.73% (Grade A) to 65.77% (Common) as compared to non- parboiled rice from 52.00 (Grade A) to 53.85% (Common). An average mill owner also processed 1.09 and 0.38 lakh t of Grade A and Common variety of paddy and produced 0.56 and 0.22 lakh t of non- parboiled rice per year with paddy to rice

conversion ratio of 51.84% (Grade A) and 57.52% (Common) respectively. An average mill owner of the study area was also reported 0.14 lakh t and 0.68 lakh t of parboiled rice from the processing of 0.23 lakh t and 1.04 lakh t of paddy with the paddy to rice conversion ratio of 61.79% (Grade A) and 66.13 (Common). Here, also the conversion ratio of paddy to rice was found to be more in parboiled rice as compared to non-parboiled rice.

An average huller of study area processed 193.33 and 3908.33 quintals respectively of grade A and common variety of paddy at their huller mill and produced 51.67% (98.33 q.) and 54.79% (2140.31 q.) of grade A and common non- parboiled rice at custom hiring basis.

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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	2.10	2.14	2.12	2.19	2.17	2.18	2.25	2.21	2.23	2.18	2.17	2.18
2	Paking Material	12.16	12.08	12.12	12.27	12.21	12.24	12.32	12.26	12.29	12.25	12.18	12.22
3	Drying												
	a.Labour/ Material Charges	5.49	5.57	5.53	5.53	5.59	5.56	5.81	5.63	5.72	5.61	5.60	5.60
	b. Weight loss	2.45	2.44	2.45	2.51	2.53	2.52	2.54	2.53	2.54	2.50	2.50	2.50
	c. Weight loss	33.32	28.34	30.83	30.86	29.31	30.08	30.67	26.30	28.49	31.62	27.98	29.80
4	Transporation*	11.45	11.40	11.43	12.80	12.60	12.70	13.20	13.85	13.53	12.48	12.62	12.55
5	Storages Charges	4.20	4.05	4.13	4.46	4.26	4.36	4.82	4.38	4.60	4.49	4.23	4.36
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	71.17	66.02	68.59	70.62	68.67	69.64	71.61	67.16	69.39	71.13	67.28	69.21

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

It is observed from the data that market incidental charges were found to be more in the processing of grade A rice (Rs. 71.13/q.) as compared to common rice (Rs. 67.28 /q.). This was due to only high weight loss during processing, packing material cost for grade A rice as compared to common rice.

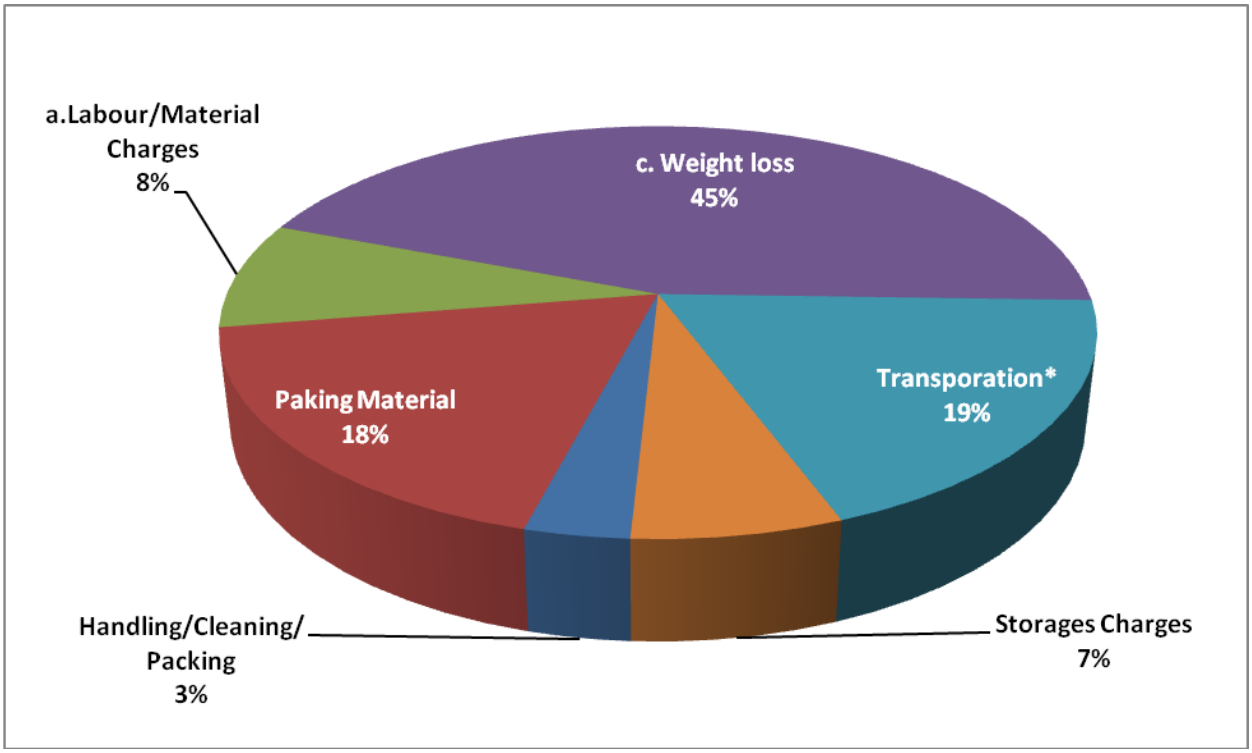

Fig. 3.1: Average Market incidentals in procuring raw materials in modern rice mills.

The weight loss (45%) was the main component of market incidental charges followed by transportation charge (19%), packing material (18%), labour charges (8%), storage charges (7%) and handling/cleaning/packing charges (3%) 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 and parboiled) as well as traditional rice mills (Hullers) has been observed and dealt in this subhead.

3.2.1 Modern Rice Mills

The cost of processing of non- parboiled and parboiled has been analysed and presented in Table 3.2. It is observed from the data that the average cost of processing of parboiled rice (Rs. 49.50/q.), was found to more as compared to non- parboiled (Rs. 41.95/q.) rice in the area under study. The share of variable cost was found to be about 99% in total processing cost of rice in both the situation.

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

S. No.	Type of Rice Produced	Non-Parboiled				Parboiled			
	Year	2007-08	2008-09	2009-10	Average	2007-08	2008-09	2009-10	Average
A.	**Variable Cost**								
1	Labor Cost	5.12	5.40	5.82	5.45	7.11	7.32	7.64	7.36
2	Electricity charges	5.14	5.37	5.74	5.42	7.28	7.56	7.91	7.58
3	Fuel Charges for Parboiling								
	a. Petrol/Disel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	b. Firewood	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	c. Bio Mass	0.00	0.00	0.00	0.00	3.11	3.41	3.86	3.46
4	Packing Material Cost	24.17	24.42	24.92	24.50	21.14	21.34	21.62	21.37
5	Maintenance Cost	3.21	3.42	4.12	3.58	5.34	5.48	5.83	5.55
6	Storage Cost	2.05	2.16	2.21	2.14	3.12	3.38	3.42	3.31
7	Other Cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Sub-total	39.69	40.77	42.81	41.09	47.10	48.49	50.28	48.62
B	**Fixed Cost**								
9	Insurance	0.12	0.14	0.16	0.14	0.14	0.17	0.24	0.18
10	Depreciation	0.04	0.04	0.05	0.04	0.05	0.05	0.06	0.05
11	Administrative Expenses	0.63	0.69	0.72	0.68	0.54	0.67	0.71	0.64
12	Other Specify	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	Sub-total	0.79	0.87	0.93	0.86	0.73	0.89	1.01	0.88
C	**Total**	**40.48**	**41.64**	**43.74**	**41.95**	**47.83**	**49.38**	**51.29**	**49.50**

The cost of packing material (Rs.24.00/q.) was found to main component of processing of non- parboiled rice followed by labour cost (3.45/q.), electricity charges (Rs. 5.42/q.), maintenance charges (Rs. 3.50/q.) and storage cost (Rs. 2.14/q.). The same was also observed for the processing of parboiled rice with minor variation at the higher sides.

3.2.2 Economics of Morden Rice Mills

Morden rice processing mills are quite profitable and provide Rs. 18.29 per quintals net return to mill owners. (Table 3.3) the total cost to process a quintal of paddy was found to be Rs. 1.12 per quintals in which the cost of paddy was found to be maximum (85%) followed by total market incidentals (9%), depreciation (4%), electricity (1%) and labour cost (1%) respectively. An average mill owner of the state received Rs. 11.32 per quintal as gross return from processing of paddy in which the value of by products was Rs. 2217.64 per quintals.

Table 3.3: Economics of Modern Rice Mills (component-wise).

S. No.	Components (Value in Lakh)	2007-08	2008-09	2009-10	Average
1	Paddy Processed (‘000 qtl)	1149.00	1304.00	1109.50	1187.50
2	Value of Paddy Processed	10711.40	13164.67	11806.92	11894.33 (10.02)
3	Conversion Ratio of Fine Rice	58.52	58.32	60.01	58.94
4	Quantity of Fine Rice Produced (‘000 qtl)	636.00	713.50	627.50	659.00
5	Value of Fine Rice Produced	10102.59	12328.89	11225.88	11219.12 (9.45)
6	Conversion Ratio Broken Rice	12.14	12.14	11.92	12.09
7	Quantity of Broken Rice Produced	162891.50	190605.00	149779.50	167758.67
8	Value of Broken Rice Produced	1254.78	1580.36	1264.03	1366.39 (1.15)
9	Conversion Ratio of Bran	3.70	3.44	2.96	3.36
10	Bran Produced	42847.00	43339.00	35154.50	40446.83
11	Value of Bran Produced	428.47	433.39	351.55	404.47 (0.34)
12	Conversion Ratio of Husk	22.74	23.41	22.12	22.77
13	Husk Produced	270415.00	314510.50	256649.00	280524.83
14	Value of Husk Produced	379.69	510.67	449.97	446.78 (0.38)
15	Total Value of By-Product (8+11+14)	2062.94	2524.42	2065.55	2217.64 (1.87)
16	*Gross Returns* (5+15)	12165.53	14853.31	13291.43	13436.76 (11.32)
17	Total Market Incidentals	788.10	897.20	763.31	816.20 (0.69)
18	Total Electricity Cost	64.74	73.45	65.01	67.73 (0.06)
19	Total Bio-fuel Cost	8.26	9.05	9.96	9.09 (0.01)
20	Total Labour Cost	64.11	72.61	64.06	66.93 (0.06)
21	Total Depreciation & Other Costs	347.52	403.13	356.17	368.94 (0.31)
22	*Total Cost* (17+18+19+20+21)	1272.73	1455.44	1258.52	1328.90 (1.12)
23	Total Cost Including Paddy (22+2)	11984.12	14620.11	13065.43	13223.22 (11.14)
24	Net Returns (in Lakh) (16-22-2)	181.40	233.20	226.00	213.54 (0.18)
25	*Net Return* (24/1) (Rs/Qtl)	16.17	18.30	20.50	18.29

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

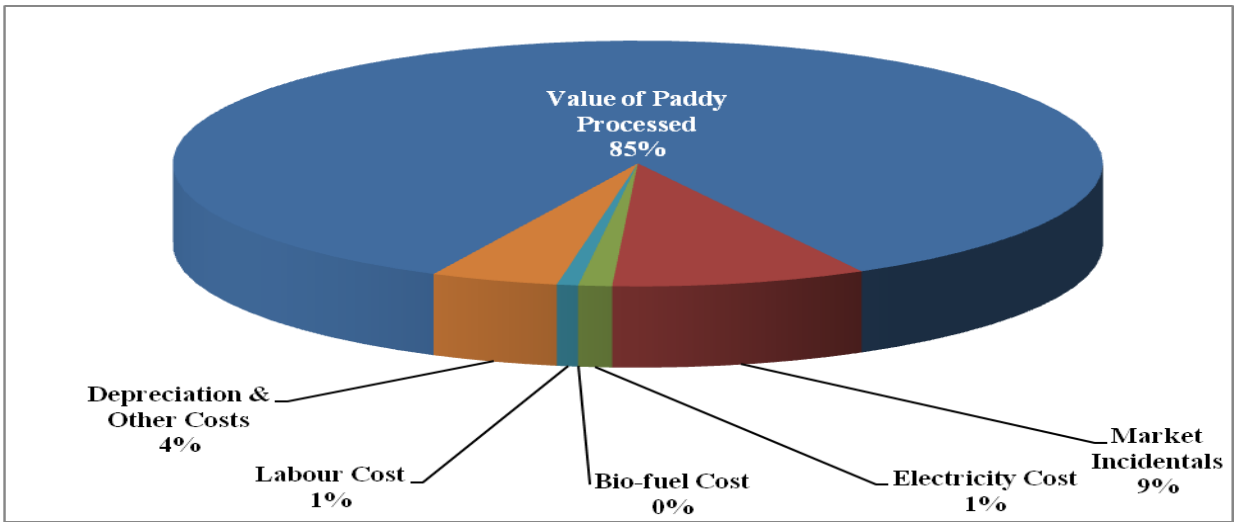

Fig 3.2: Shave of different elements in Cost of Paddy processing.

3.2.3 Traditional Rice Mills (Hullers)

As already been discussed that the hullers were only found to process non parboiled rice. On an average a huller expenses Rs. 18.58/q. in processing of a quintal of non parabolised rice (Table 3.3), in which the share of variable cost and fixed cost were found to be Rs. 16.24/q. and Rs. 2.34/q. The electricity charges (Rs. 11.13/q.) was found to be major component of variable cost followed by labour cost (Rs. 2.79/q.) and maintenance and repair cost (Rs. 2.33/q.), while insurance (Rs. 1.27/q.) was found to major component of fixed cost followed by depreciation (Rs. 0.99/q.) and other cost (Rs. 0.08/q.).

Table 3.4: Cost of Paddy Processing by Hullers on Owner cum Trader basis. (Rs/Qtl)

S.No.	Type of Rice Produced	Non-Parboiled			
	Year	2007-08	2008-09	2009-10	Average
A.	**Variable Cost**				
1	Labor Cost	2.59	2.76	3.01	2.79
2	Electricity charges	10.19	11.23	11.96	11.13
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	0.00	0.00	0.00	0.00
5	Maintenance/Repair Cost	2.20	2.27	2.51	2.33
6	Storage Cost Specify	0.00	0.00	0.00	0.00
7	Other Cost Specify	0.00	0.00	0.00	0.00
8	Sub-total	14.98	16.26	17.48	16.24
B	**Fixed Cost**				
9	Insurance	1.22	1.27	1.31	1.27
10	Depreciation	0.80	0.95	1.21	0.99
11	Administrative Expenses	0.00	0.00	0.00	0.00
12	Other Specify	0.08	0.08	0.09	0.08
13	Sub-total	2.10	2.30	2.61	2.34
C	**Total (A+B)**	**17.08**	**18.56**	**20.09**	**18.58**

3.3 Economics of Hullers Running on Custom Hiring Basis

An average huller received gross return of Rs. 12003.5 and Rs. 242725.73 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. The two types of option were prevailing in the study area to pay the charges by the farmers viz. (a) pay custom charges approximately Rs. 25/q. or (b) left their by product with the hullers and owned to pay any charge of hulling.

These two options were considered while analysing the economics of a huller in the study area and found that an average huller was found to be benefited and got approximately 4 times more net return when producers left their by product with them as compared when he paid custom charges. In 70 percent cases the producers left their by product with them due to shortage of cash. The total cost involved in processing of grade A (Rs. 2825.85) was found to be more as compared to common rice (Rs. 57781.95) in hulling of paddy in the study area. (Table 3.5)

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

S. No	Year / Paddy Variety processed	2007-08			2008-09			2009-10			Average		
		Grade A	Common	Other	Grade A	Common	Others	Grade A	Common	Others	Grade A	Common	Others
1	Quantity of Paddy Processed (Qtls)	185.00	4436.00	0.00	226.00	3896.00	0.00	160.00	3393.00	0.00	190.33	3908.33	0.00
2	Quantity of Rice Produced (Qtls)	97.00	2390.00	0.00	116.00	2182.00	0.00	82.00	1849.00	0.00	98.33	2140.33	0.00
3	Conversion ratio (Rice Kgs per Qtls of Paddy)												
	a. Good Quality	52.43	53.88	0.00	52.23	54.01	0.00	51.25	54.49	0.00	51.66	54.76	0.00
	b. Broken rice	12.90	11.41	0.00	13.01	11.41	0.00	13.01	11.41	0.00	12.97	11.41	0.00
4	Any by product obtained (Kgs/Qtl)												
	a. Husk	30.78	30.79	0.00	30.79	30.66	0.00	31.79	30.26	0.00	31.12	30.57	0.00
	b. Rice bran	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Customs Charges (Rs./Qtl)	24.80	24.86	0.00	25.12	25.12	0.00	26.66	26.66	0.00	25.53	25.55	0.00
6	Total Value of Customs charges (Rs)	4588.00	110278.96	0.00	5677.12	97867.52	0.00	4265.60	90457.38	0.00	4843.57	99534.62	0.00
7	By Products if they Sold (Rs./kg)												
	a. Husk	2.03	2.03	0.00	2.03	2.03	0.00	2.03	2.03	0.00	2.03	2.03	0.00
	b. Rice bran	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Total Value of by-product sold(Rs./q)	62.48	62.50	0.00	62.50	62.24	0.00	64.53	61.43	0.00	63.17	62.06	0.00
	Total Value of by-product sold(Rs.)	11559.43	277266.41	0.00	14125.84	242486.26	0.00	10325.39	208424.53	0.00	12003.55	242725.73	0.00
9	Electricity cost of running the plant for the whole year (Rs)	1885.15	45202.84	0.00	2537.98	43752.08	0.00	1913.60	40580.28	0.00	2112.24	43178.40	0.00
10	Labour cost of running the plant for the whole year (Rs)	479.15	11489.24	0.00	623.76	10752.96	0.00	481.60	10212.93	0.00	528.17	10818.38	0.00
11	Depreciation and all other Costs for the whole year (Rs)	148.00	3548.80	0.00	214.70	3701.20	0.00	193.60	4105.53	0.00	185.43	3785.18	0.00
12	Gross returns in Rs. (Total Value of customer charges	4588.00	110278.96	0.00	5677.12	97867.52	0.00	4265.60	90457.38	0.00	4853.57	99534.62	0.00
12a	Gross returns in Rs.(Value of by-products if they sold)	11559.43	277266.41	0.00	14125.84	242486.26	0.00	10325.39	208424.53	0.00	12003.55	242725.73	0.00
13	Total cost involved	2512.30	60240.88	0.00	3376.44	58206.24	0.00	2588.80	54898.74	0.00	2825.85	57781.95	0.00
14	**Net Returns without by product**	2075.70	50038.08	0.00	2300.68	39661.28	0.00	1676.80	35558.64	0.00	2017.73	41752.67	0.00
	Net Return per q	11.27	11.28	0.00	10.18	10.18	0.00	10.48	10.48	0.00	10.63	10.65	0.00
15	**Net Returns with by product**	9047.13	217025.53	0.00	10749.40	184280.02	0.00	7736.54	153525.79	0.00	9177.71	184943.78	0.00
	Net Return per q	48.90	48.92	0.00	47.56	47.30	0.00	48.35	45.25	0.00	28.27	47.16	0.00

3.4 Marketing of Produced Rice by Modern and Traditional Millers

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

3.4.1 Marketing of Rice

Marketing of rice by owner cum trader has been analysed both for non parboiled and parboiled rice considering the years 2007-08, 2008-09 and 2009-10 and presented in Table 3.6. It is observed from the data that an average mill owner of the study area sold their 87.68% and 71.67% of non parboiled and parboiled rice to the wholesaler and remaining to the retailer or direct to consumer. 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.

Types of services	Type of Rice Produced	Year	Unit	Wholesaler	Retailer/ Directly to Consumer	Levy to Government	Others	Total
Modern Rice Mills	Non-Parboiled	2007-08	Qty (Qtls)	26858.00	3142.00	0.00	0.00	30000.00
			Per cent of total	89.53	10.47	0.00	0.00	100.00
		2008-09	Qty (Qtls)	30220.00	4780.00	0.00	0.00	35000.00
			Per cent of total	86.34	13.66	0.00	0.00	100.00
		2009-10	Qty (Qtls)	24460.00	3540.00	0.00	0.00	28000.00
			Per cent of total	87.36	12.64	0.00	0.00	100.00
		Average	Qty (Qtls)	27179.33	3820.67	0.00	0.00	31000.00
			Per cent of total	87.68	12.32	0.00	0.00	100.00
	Parboiled	2007-08	Qty (Qtls)	34590.00	34110.00	0.00	0.00	68700.00
			Per cent of total	50.35	49.65	0.00	0.00	100.00
		2008-09	Qty (Qtls)	34279.00	3721.00	0.00	0.00	38000.00
			Per cent of total	90.21	9.79	0.00	0.00	100.00
		2009-10	Qty (Qtls)	38416.00	4584.00	0.00	0.00	43000.00
			Per cent of total	89.34	10.66	0.00	0.00	100.00
		Average	Qty (Qtls)	35761.67	14138.33	0.00	0.00	49900.00
			Per cent of total	71.67	28.33	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 the 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 fulfilled (or

minimized) the cost of processing of non parboiled and parboiled rice. The data related to all these parameters considering to the years 2007-08. 2008-09 and 2009-10 and their overall average all presented in Table 3.7.

Table 3.7 Average quantity of paddy processed and its by-products by modern rice mills.

Non-Parboiled									
Sl. No.	Type of Rice Produced	2007-08		2007-08		2009-10		Average	
		Qty (Qtls)	Value	Qty (Qtls)	Value	Qty (Qtls)	Value	Qty (Qtls)	Value
1	Paddy	57000	56259000	67000	70819000	53000	60473000	59000	62517000
2	Fine Rice	30000	51840000	35000	65100000	28000	56196000	31000	57712000
3	Broken Rice	9079	7181489	10932	9259404	8058	7034634	9356	7825176
4	Paddy Husk	13802	2194518	16484	2818764	12841	2401267	14376	2471516
5	Rice Bran	2141	2141000	2171	2171000	1798	1798000	2037	2036667
6	Other Cattle Feed	1978	197800	2413	241300	2303	230200	2231	223100
Parboiled									
Sl. No.	Type of Rice Produced	2007-08		2008-09		2009-10		Average	
		Qty (Qtls)	Value	Qty (Qtls)	Value	Qty (Qtls)	Value	Qty (Qtls)	Value
1	Paddy	59000	44250000	59000	48616000	64000	54080000	60667	48982000
2	Fine Rice	38000	45942000	38000	49742000	43000	55900000	39667	50528000
3	Broken Rice	4926	3147714	4702	3225572	5529	3859242	5052	3410843
4	Paddy Husk	12552	878640	13113	1639125	12803	1728405	12823	1415390
5	Rice Bran	2147	2147000	2153	2153000	1619	1619000	1973	1973000
6	Other Cattle Feed	1375	137500	1032	103200	1049	104900	1152	115200

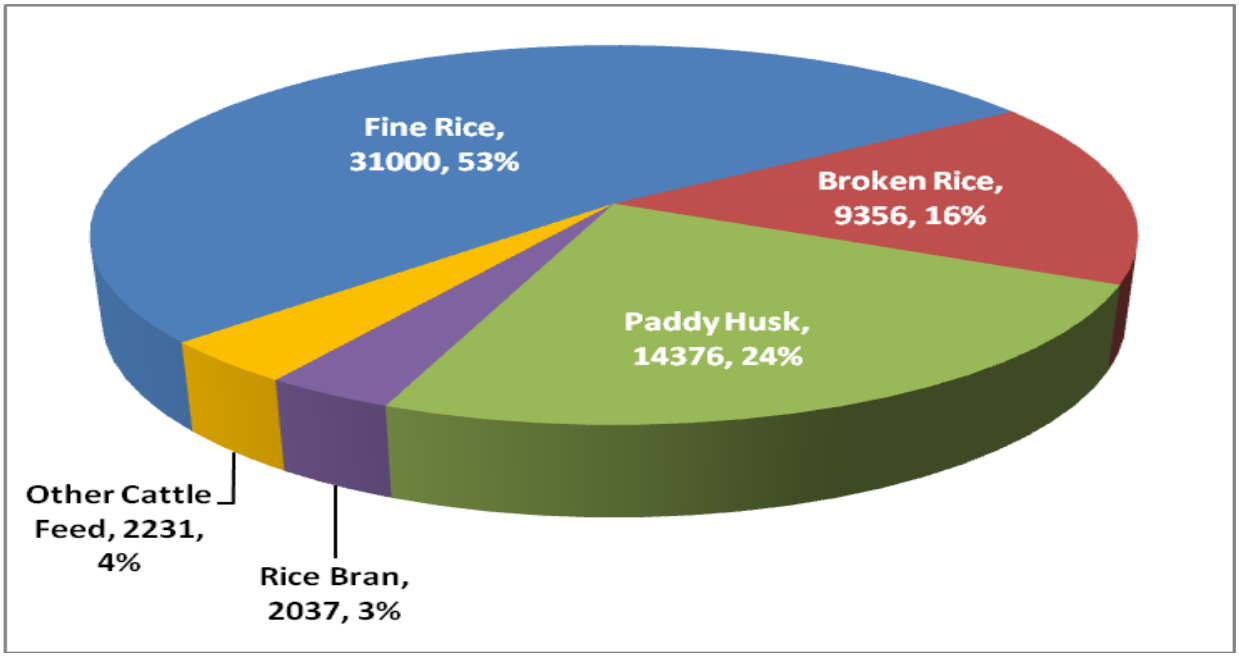

Fig. 3.3: Contribution of different by-products of non-parboiled paddy in modern rice mills.

It is observed from the data that an average rice mill owner of the study area got Rs. 50528000 and Rs. 57712000/ year from the parboiled and non parboiled fine rice. He also got Rs. 7825176, Rs. 2471516, Rs. 2036667 and Rs. 223100 per year respectively from selling of non parboiled broken rice, paddy husk, rice barn and other cattle feed, and Rs. 3410843, Rs. 1415390, Rs. 1973000 and Rs. 115200 per year from selling of parboiled broken rice, paddy husk rice barn and other cattle feed in the area under study on an overall average basis. The share of fine rice, broken rice, paddy husk, rice barn and other cattle feed was found to be 53%, 16%, 24%, 3% and 4%, for non parboiled respectively and 66% (fine rice), 8% (Broken rice), 2% (paddy husk), 3% (rice bran) and 2% (other cattle feed) for parboiled rice. Hence, the share of fine rice was found to be more in parboiled rice as compared to non parboiled rice.

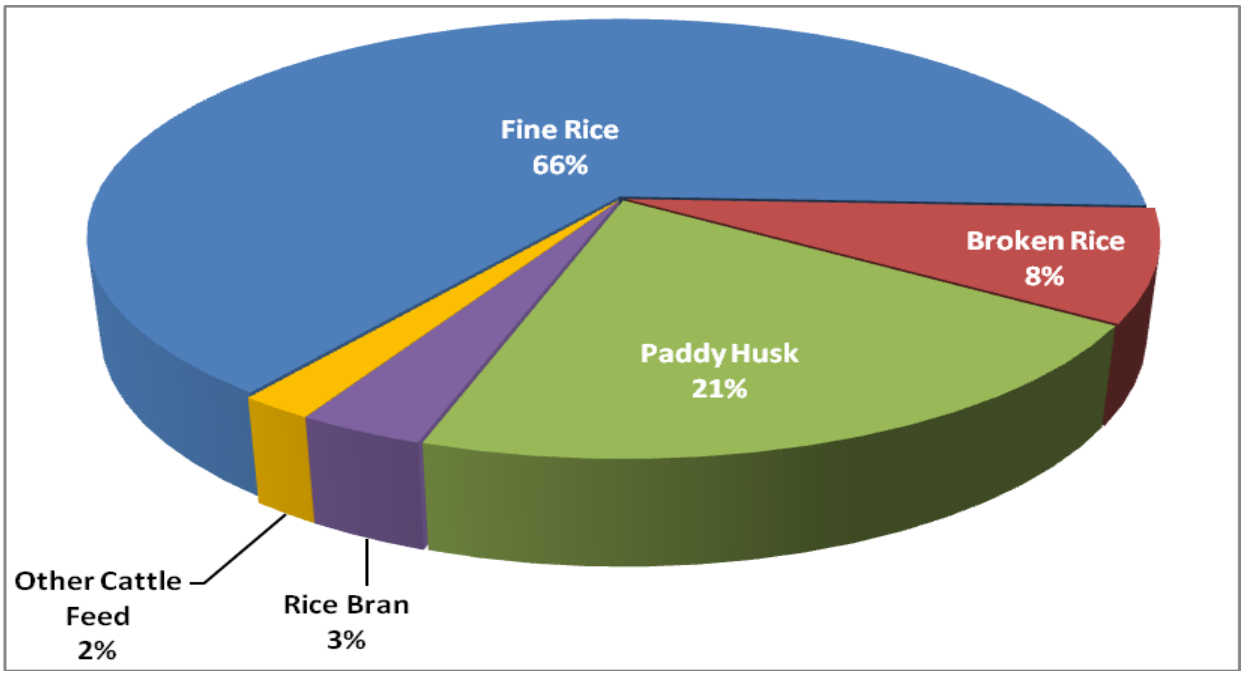

Fig. 3.4: Contribution of different by-products of parboiled paddy in modern rice mills.

3.5 Standard Maintained in Processing and the Quality of End Product Obtained

The standards maintained for processing of non parboiled and parboiled rice by rice mill owners were found to be similar and presented in Table 3.8. An average mill owner considered an average moisture contain of paddy 1.50% and 2.00% for processing of grade 'A' and common rice respectively in case of non parboiled and parboiled rice. it has also been considered to 1.60% (grade 'A') and 1.80% (common) foreign material from non parboiled and parboiled rice. (Table 3.7)

Table 3.8: Standards maintained percent in processing of paddy.

S. No.	Type of Rice Produced	Non-parboiled			Parboiled		
	Variety	Grade A	Common	Average	Grade A	Common	Average
1	Avg. Moisture Content of Raw Paddy	1.50	2.00	1.75	1.50	2.00	1.75
2	Avg. Moisture Content for Final Processing	1.10	1.60	1.35	1.10	1.60	1.35
3	Foreign Material refraction removed	1.60	1.80	1.70	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 and parboiled rice was found to be 99.42% and 0.58% in the total rice processing. The share of non parabolised and parboiled rice were found to be 51.19%, 48.81%. (Table 3.9)

Table 3.9: Relative shares of different milling techniques in total paddy processed (qtls) in the sample units during 2009-10.

S.No	Type of Unit	Non-parboiled	Parboiled	Total	Percent
A	Modern Rice Mills				
1.	Modern Rice Mills with 3 Phase	7840000.00	7560000.00	15400000.00	99.42
B	Traditional Rice Mills				
1.	Huller	89520.00	0.00	89520.00	0.58
C	Others (Specify)	0.00	0.00	0.00	0.00
	All (A+B+C)	7929520.00 (51.19)	7560000.00 (48.81)	15489520.00 (100)	100.00

3.7 Conclusions

The market incidental charges were found to be more in the processing of grade A rice (Rs. 71.13/q.) as compared to common rice (Rs. 67.28 /q.). This was due to the high weight loss during processing, packing material cost for grade A rice as compared to common rice. The weight loss (45%) was the main component of market incidental charges followed by transportation (19%), packing material (18%), storage (7%) and handling/cleaning/packing (3%) charges to average market incidental charges in procuring raw materials.

The cost of processing of parboiled rice (Rs. 49.50/q.) was found to more as compared to non- parboiled (Rs. 41.95/q.) rice in the area under study. The share of variable cost was found to be about 99% in total processing cost of rice in both the

situation. The cost of packing material (Rs.24.00/q.) was found to main component of processing of non- parboiled rice followed by labour cost (5.45/q.), electricity charges (Rs. 5.42/q.), maintenance charges (Rs. 3.50/q.) and storage cost (Rs. 2.14/q.).

Morden rice processing mills are quite profitable and provide Rs. 18.29 per quintals net return to mill owners. (Table 3.3) the total cost to process a quintal of paddy was found to be Rs. 1.12 per quintals in which the cost of paddy was found to be maximum (85%) followed by total market incidentals (9%), depreciation (4%), electricity (1%) and labour cost (1%) respectively. An average mill owner of the state received Rs. 11.32 per quintal as gross return from processing of paddy in which the value of by products was Rs. 2217.64 per quintals.

An average huller expenses Rs. 18.58/q. in processing of a quintal of non parabolised rice, in which the share of variable cost and fixed cost were found to be Rs. 16.24/q. and Rs. 2.34/q. The electricity charges (Rs. 11.13/q.) was found to be major component of variable cost followed by labour cost (Rs. 2.79/q.) and maintenance and repair cost (Rs. 2.33/q.), while insurance (Rs. 1.27/q.) was found to major component of fixed cost followed by depreciation (Rs. 0.99/q.) and other cost (Rs. 0.08/q.).

The 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 and got approximately 4 times more net return when producers left their by product with them as compared when he paid custom charges. In 70 percent cases the producer left their by product with them due to shortage of cash The total cost involved in processing of common rice (Rs. 57781.95) was found to more as compared to grade A (Rs. 2825.85) in hulling of paddy in the study area.

An average mill owner of the study area sold their 87.68% and 71.67% of non parboiled and parboiled rice to the wholesaler and remaining to the retailer or direct to consumer. 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. 50521333 and Rs. 54726667/ year from the parboiled and non parboiled fine rice.

The share of fine rice, broken rice, paddy husk, rice barn and other cattle feed was found to be 53%, 16%, 24%, 3% and 4%, respectively other for non parboiled and 66% (fine rice), 8% (Broken rice), 21% (paddy husk), 3% (rice bran) and 2% (other

cattle feed) for parboiled rice. Hence, the share of fine rice was found to be more in parboiled rice as compared to non parboiled rice.

An average mill owner considered an average moisture contain of 1.50% and 2.00% for processing of paddy for grade 'A' and common rice respectively to non parboiled and parboiled rice. He also considered 1.60% (grade 'A') and 1.80% (common) for foreign material fraction removed both for non parboiled and parboiled rice.

The relative share of 40 millers and 40 hullers in processing of non parboiled and parboiled rice was found to be 99.42% and 0.58% in the total rice processing. The share of non parabolised and parabolised rice were found to 51.19%, 48.81%.

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

4.1.1 Modern Rice Mills

An average modern mill owner utilized only 27% (157200t) of the actual capacity (5796200 t) of rice processing in the area under study. This mill has been remained unutilized for 120 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)	5796200	5796200	5796200	5796200
2	Capacity used (Tones)	1616000	1560000	1540000	1572000
3	Percentage capacity utilization	27.88	26.91	26.57	27
4	Time period for which plant remained closed in the off-season (in Days)	119	121	120	120

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),

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	26	65
3	Lake of storage facilities	32	80
4	Lake of all weather roads	12	30

sharp increase in number of rice mills, lack of storage facilities and lack of all weather roads as reported by 100%, 65%, 80% and 30% selected rice millers respectively (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 only 23% (16393t) of actual capacity (70080t) 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)	70080	70080	70080	70080
2	Capacity used (Tones)	18480	16488	14212	16393
3	Percentage capacity utilization	26.37	23.53	20.28	23
4	Time period for which plant remained closed in the off-season (in Days)	121	132	146	133

They reported that rainy season, lack of storage facilities and government policy of distribution of Rs. 2/kg. of rice to BPL family were the main reasons for under utilization of huller in a year. Due to the Govt. Policy of distribution of Rs. 2 per kg. of rice to BPL family, all the marginal and small farmer sold their produce in the market and purchased rice Rs. 2/kg. from the cooperative societies for their lively hood.

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	lake of Storage Facilities	36	90
3	Government Policies Rs. 2/kg of Rice for BPL families hence, all the farmers sold their produce in the market and purchase rice from the society at the rate Rs. 2/kg	32	80

4.2 Constraints in the Processing of Paddy

The various constraints in the proper processing of rice has also been identified during the course of constitution 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 constraints 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	3	7.5
2	Lack of good quality roads for transportation	26	65
3	Bad Quality electricity, irregular cuts, voltage fluctuation	40	100
4	Lack of international standard machinery and technical know- how	4	10
5	Lack of adequate finances	3	7.5
6	Mandi fee, toll tax and delays in clearance of loaded trucks with the raw materials at the state boundaries	4	10
7	Lack of government long term planning for promoting food processing industry	0	0
8	lake of skilled labour	26	65
9	High vages of skilled labour due to NREGA	32	80

Lack of good quality of all weather roads, high wages of skilled labour due to NAREGA, lack of skilled labour were the other constraints in the processing of rice as reported by 68%, 80%, 65% 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.

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	38	95
2	Supply of reliable and regular electricity	40	100
3	Reduction in market fees and taxes	36	90
4	Lack of storage facility in FCI go downs	26	65
5	Increase custom milling rate from Rs. 25/q. to Rs. 40/q.	31	77.5
6	Simplicity in lows and government processing policies	36	90
7	CREDIT arability at cheaper rate	31	77.5
	Total	40	100

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 (95%) reduction in the existing market fee and taxes (90%) simplicity in existing laws and government policies (90%) increased of custom milling rate from Rs. 25/q. to Rs. 40.0/q. (77.5%) credit available at cheaper rate (77.5%), relaxation the limit of rate of interest of loan from Rs. 10000 to Rs. 20000 per year (77.5%) and increase the storage facilities of FCI godown (65%) were found to be the major suggestions received from the respondents in the area under study.

4.4 Conclusions

An average modern mill owner utilized only 27% (157200t) of the actual capacity (5796200t) rice processing in the area under study. This mill has been remain unutilized for 120 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%, 65%, 80% and 30% selected rice millers of the study area.

An average huller utilized only 23% (16393t) of actual capacity (70080t) in a year. They were reported that rainy season, lack of storage facilities and government policy of distribution of Rs. 2/kg. of rice to BPL family were the main reasons for under utilization of huller in a year. Due to the Govt. Policy of distribution of Rs. 2 per kg. of rice to BPL family, all the marginal and small farmer sold their produce in the market and purchased rice Rs. 2/kg. from the cooperative societies for their lively hood.

The 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 respondents. Lack of good quality of all weather roads, high wages of skilled labour due to NAREGA, lack of skilled labour were the other constraints in the processing of rice as reported by 68%, 80%, 65% of respondents respectively.

Reliable and regular supply of electricity (100%) preparation of long term policies for processing of the rice in the state (95%) reduction in the existing market fee and taxes (90%) simplicity in existing laws and government policies (90%) increased of custom milling rate from Rs. 25/q. to Rs. 40.0/q. (77.5%) credit available at cheaper

rate (77.5%), relaxation the limit of rate of interest of loan from Rs. 10000 to Rs. 20000 per year (77.5%) and increase the storage facilities of FCI godown (65%) were found to be the major suggestions received from the respondents in the area under study.

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CHAPTER V

CONCLUSIONS AND POLICY RECOMMENDATIONS

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, boil rice and non parboiled rice. So, there is role of Indian rice milling industry. Indian 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. Most of the small size mills are huller mills. Other various types 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 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 Chhattisgarh known as the "Rice bowl" of the India. The cultivation of rice covered 3787.73 thousand ha. of cultivated land of the state and produced 6159.02 thousand t of rice with an average yield of 1751 Kg./ha. (2009-10). The cultivation of rice covered in all the districts of the state. Raipur (13.46%) had the highest area of rice followed by Durg (11.79%), Bilaspur (8.49%), Surguja (7.94%), Rajnandgoan (7.17%), Janjgir (6.61%), Jagdalpur (6.34%) Mahasamund (6.33%), Raigarh (6.06%), and Jashpur (4.68%). These 10 districts covered nearly 80 percent of rice area of the state. As far as production of rice concerned, Durg district (12.75%) also produced the highest production rice followed by Raipur (10.95%) Janjgir (10.28%), Bilaspur (8.24%), Rajnandgoan (6.91%), Mahasamund (6.86%), Kanker (6.14%), Raigarh (5.48%), Jagdalpur (6.90%) and Sarguja (5.32%). The cultivators of Dhamtari, Janjgir, Jagdalpur, Bilaspur, Durg, Mahasamund, Dantewada, Beejapur and Kanker harvested yield of rice above the state

average (1751Kg./ha.). The area of the rice in Chhattisgarh increased over the period of time with a growth rate of 0.11% per annum during the period of last 12 years (Table 1.2) from 3808 thousand ha. (1999) to 3788 thousand ha. (2010), while the production of rice increased with a growth of 4.87% per annum from 3637 thousand t (1999) to 6159 thousand t (2010).

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 Chhattisgarh 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 Chhattisgarh state.

With the consideration of above aspects, the proposed 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 Chhattisgarh.
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 total numbers of processing units in Chhattisgarh is 1037 in the current year (Tn average ending 2009). The maximum number of rice mills was found in Raipur district (23%) followed by Durg (10%), Bilaspur (9%), Dhamtari (8%) and Janjgir

(7%). Out of 1037 the maximum rice mills were processed non parboiled paddy (808) followed by parboiled (229) in Chhattisgarh. The Capacity of processing units for **total rice mills** (Fig.1.7) has also been found maximum in Raipur (25%) district followed by Dhamtari (12%), Durg (12%), Mahasamund (10%), Raigarh (9%) and Bilaspur districts (8%).

Hence, the study has been based on 2 districts (Raipur and Durg) which were selected on basis of the highest area under paddy and the highest number of rice mills in Chhattisgarh. The total number of selection modern rice mills and hullers were 40 each selected district. Out of the total modern rice mills, all were found to be trading on owner cum trader and custom hiring basis a modern rice mills were found to be processed non- parboiled (raw) rice, where as 31 were found to processed parboiled rice for which a separate unit was found to attached with the existing processing plant. As regards to hullers were concerned all the hullers (40) processed only non- parboiled rice on custom hiring.

A total number of 20 modern and 20 traditional rice mills have been selected from each selected districts, for detailed information. The tradition rice mills, namely, huller has been randomly selected from the total numbers of hullers in each selected districts. both primary and secondary data has been collected from each selected mill or unit, primary survey has been carried out with pre-tested interview schedule provided by the coordinator of the study i.e. ADRT, Banglore (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 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.

Both primary and secondary data has been collected for the study. 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 Chhattisgarh Government Departments on modernization of rice milling in their respective states. Secondary information has been collected on number of rice mills and their capacity in different climate of Chhattisgarh from the year 2001- 2009.

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 descriptive statistics and regression analysis etc.

The major findings of the study as follows:-

In Chhattisgarh the total no. of rice mills were increased with a rate of 51 rice mills per year from 672 (2001) to 1448 (2009). The non parboiled rice mills also showed increasing trend with a rate of 47 rice mills per year from 460 (2001) to 1001 (2009),while, the parboiled rice mills increased with a rate of 4 rice mills per year from 212 (2001) to 447 (2009) during the period under study.

The capacity of non- parboiled rice mills also showed an increasing trend with a rate of 96112 t per year from 196180 t (2001) to 1022060 t (2009),while the capacity of parboiled rice were also found to be increased with a rate of 48979 t per year during the period under study.

The result shows that the total number of rice mills found to be increased by 40.08% in Chhattisgarh were during the current year (Tn average 2009) as compared to the base year (Tn average 2002). All the districts of Chhattisgarh showed positive relative change except Raipur (-9.43%), Dhamtari (-17.90%), Bilaspur (-27.21%) and Dantewada (-30.77%) districts. The total number of rice mills showed a positive and significant growth in all the districts of Chhattisgarh except Dhamtari (-1.56%/yr.), Bilaspur (-0.77%/yr.) and Dantewada (-0.67%/yr.) districts.

The total capacity of rice mills was found to be increased by 303.50% in the current year as compared to the base year in Chhattisgarh. The maximum positive and significant linear growth in capacity of rice mills was found to be maximum in Janjgir (24.47%/yr.) district followed by Kanker (22.84%/yr.), Surguja (21.13%/yr.), Raipur (19.51%/yr.), Durg (19.22%/yr), Korba (18.16%/yr.) districts.

An average modern mill owner invested Rs. 76.3 lakh to establish a non-parboiled rice mill and Rs. 82.84 lakh for a parboiled rice mill. An average capacity of processing in modern rice mill was found to be of 4.2 t/hr. (non- parboiled) and 3.74 t/hr. (parboiled) with an average number of employees of 10 each, and average number of daily wage labours of 18 and 14 in numbers for an average non- parboiled and

parboiled rice mill respectively existing in the area under study. An average capacity of huller was found to be 0.4 t/hr. with an average of daily wage labours of 1 only.

An average mill owner of the study area got 0.22 lakh t (52%) and 0.09 lakh t (53.85%) of rice from the processing of 0.42 lakh t of grade A and 0.17 lakh t. of common non- parboiled rice respectively. An average mill owner come traders got 62.73 percent (0.07 lakh t) and 65.77% (0.33 lakh t) was obtained from the processing of 0.11 and 0.5 lakh t of grade A and common parboiled rice respectively per year as owner cum trader basis.

The percentage of conversion of paddy to rice ratio was found to be higher in parboiled rice and varies from 62.73% (Grade A) to 65.77% (Common) as compared to non- parboiled rice from 52.00 (Grade A) to 53.85% (Common). An average mill owner also processed 1.09 and 0.38 lakh t of Grade A and Common variety of paddy and produced 0.56 and 0.22 lakh t of non- parboiled rice per year with paddy to rice conversion ratio of 51.84% (Grade A) and 57.52% (Common) respectively. An average mill owner of the study area was also reported 0.14 lakh t and 0.68 lakh t of parboiled rice from the processing of 0.23 lakh t and 1.04 lakh t of paddy with the paddy to rice conversion ratio of 61.79% (Grade A) and 66.13 (Common). Here, also the conversion ratio of paddy to rice was found to be more in parboiled rice as compared to non-parboiled rice.

An average huller of study area processed 193.33 and 3908.33 quintals respectively of grade A and common variety of paddy at their huller mill and produced 51.67% (98.33 q.) and 54.79% (2140.31 q.) of grade A and common non- parboiled rice at custom hiring basis.

The market incidental charges were found to be more in the processing of grade A rice (Rs. 71.13/q.) as compared to common rice (Rs. 67.28 /q.). This was due to the high weight loss during processing, packing material cost for grade A rice as compared to common rice. The weight loss (45%) was the main component of market incidental charges followed by transportation (19%), packing material (18%), storage (7%) and handling/cleaning/packing (3%) charges to average market incidental charges in procuring raw materials.

The cost of processing of parboiled rice (Rs. 49.50/q.) was found to more as compared to non- parboiled (Rs. 41.95/q.) rice in the area under study. The share of variable cost was found to be about 99% in total processing cost of rice in both the situation. The cost of packing material (Rs.24.00/q.) was found to main component of processing of non- parboiled rice followed by labour cost (5.45/q.), electricity charges (Rs. 5.42/q.), maintenance charges (Rs. 3.50/q.) and storage cost (Rs. 2.14/q.).

Morden rice processing mills are quite profitable and provide Rs. 18.29 per quintals net return to mill owners. (Table 3.3) the total cost to process a quintal of paddy was found to be Rs. 1.12 per quintals in which the cost of paddy was found to be maximum (85%) followed by total market incidentals (9%), depreciation (4%), electricity (1%) and labour cost (1%) respectively. An average mill owner of the state received Rs. 11.32 per quintal as gross return from processing of paddy in which the value of by products was Rs. 2217.64 per quintals.

An average huller expenses Rs. 18.58/q. in processing of a quintal of non parabolised rice, in which the share of variable cost and fixed cost were found to be Rs. 16.24/q. and Rs. 2.34/q. The electricity charges (Rs. 11.13/q.) was found to be major component of variable cost followed by labour cost (Rs. 2.79/q.) and maintenance and repair cost (Rs. 2.33/q.), while insurance (Rs. 1.27/q.) was found to major component of fixed cost followed by depreciation (Rs. 0.99/q.) and other cost (Rs. 0.08/q.).

The 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 and got approximately 4 times more net return when producers left their by product with them as compared when he paid custom charges. In 70 percent cases the producer left their by product with them due to shortage of cash The total cost involved in processing of common rice (Rs. 57781.95) was found to more as compared to grade A (Rs. 2825.85) in hulling of paddy in the study area.

An average mill owner of the study area sold their 87.68% and 71.67% of non parboiled and parboiled rice to the wholesaler and remaining to the retailer or direct to consumer. 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. 50521333 and Rs. 54726667/ year from the parboiled and non parboiled fine rice.

The share of fine rice, broken rice, paddy husk, rice barn and other cattle feed was found to be 53%, 16%, 24%, 3% and 4%, respectively other for non parboiled and 66% (fine rice), 8% (Broken rice), 21% (paddy husk), 3% (rice bran) and 2% (other cattle feed) for parboiled rice. Hence, the share of fine rice was found to be more in parboiled rice as compared to non parboiled rice.

An average mill owner considered an average moisture contain of 1.50% and 2.00% for processing of paddy for grade 'A' and common rice respectively to non parboiled and parboiled rice. He also considered 1.60% (grade 'A') and 1.80% (common) for foreign material fraction removed both for non parboiled and parboiled rice.

The relative share of 40 millers and 40 hullers in processing of non parboiled and parboiled rice was found to be 99.42% and 0.58% in the total rice processing. The share of non parabolised and parabolised rice were found to 51.19%, 48.81%.

An average modern mill owner utilized only 27% (157200t) of the actual capacity (5796200t) rice processing in the area under study. This mill has been remain unutilized for 120 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%, 65%, 80% and 30% selected rice millers of the study area.

An average huller utilized only 23% (16393t) of actual capacity (70080t) in a year. They were reported that rainy season, lack of storage facilities and government policy of distribution of Rs. 2/kg. of rice to BPL family were the main reasons for under utilization of huller in a year. Due to the Govt. Policy of distribution of Rs. 2 per kg. of rice to BPL family, all the marginal and small farmer sold their produce in the market and purchased rice Rs. 2/kg. from the cooperative societies for their lively hood.

The 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 respondents. Lack of good quality of all weather roads, high wages of skilled labour due to NAREGA, lack of skilled labour were the other constraints in the processing of rice as reported by 68%, 80%, 65% of respondents respectively.

Reliable and regular supply of electricity (100%) preparation of long term policies for processing of the rice in the state (95%) reduction in the existing market fee and taxes (90%) simplicity in existing laws and government policies (90%) increased of custom milling rate from Rs. 25/q. to Rs. 40.0/q. (77.5%) credit available at cheaper rate (77.5%), relaxation the limit of rate of interest of loan from Rs. 10000 to Rs. 20000 per year (77.5%) and increase the storage facilities of FCI godown (65%) 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

The poor quality of raw materials due to higher moisture content especially in the early arrival of paddy and harvesting of paddy through harvest combines, 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 RBO 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. Hence, 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.

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 percent age 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 of finance at per with the international rates to the tune of 3-4% and also some of the non exporting units have desired to become exporters

but non exporting units demand 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 personal at various levels i.e. for technical, managerial and at top level as per the needs of changed environment.

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

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