"A DETAILED ANALYSIS ON VALUE CHAIN OF PADDY IN KUNDRA BLOCK"

WITH REFERENCE TO M.S.SWAMINATHAN RESEARCH FOUNDATION

A project report submitted to *Orissa University of Agriculture & Technology*

(*OUAT*), Bhubaneswar, in completion for the award of the degree of

MASTERS OF AGRI-BUSINESSMANAGEMENT

By

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Roll No- 06/ABM/12

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DISSERTATION SUBMITTED TO

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(Agri-Business Management)

By

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GUIDE'S CERTIFICATE

This is to certify that this project work entitled "**VALUE CHAIN ANALYSIS OF PADDY IN KUNDRA BLOCK**". with reference to **M.S.Swaminathan Research Foundation(MSSRF)** is a bonafide work carried out by Ms. Ananya Sahu towards the fulfilment of the requirements for the award of "MASTERS OF AGRI BUSINESS MANAGEMENT" under my guidance and supervision. The results of the investigation reported in this report have not so far been presented for any Degree or Diploma. The assistance and help received as well as source of information availed during the course of investigation have been duly acknowledged.

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ACKNOWLEDGEMENT

Availing this opportunity, I wish to express our abysmal sense of reverence gratitude which I owe to **M.S.Swaminathan Research Foundation** for providing the opportunity. In success of this academic accomplishment with intense learning during my project, a number of people have contributed either directly or indirectly. I deem it a proud and privilege to express my deep sense of regard and gratitude to all of them.

I would like to extend my deep sense of gratitude to **M.S. Swaminathan Research Foundation (MSSRF)** and **Mr. Tushar Ranjan Nayak** who gave me an opportunity to work with their organisation for this assignment, which has been a pleasant and immensely valuable learning experience for me.

Heartily thanks to **Dr. K.U.K Nampoothiri (Director MSSRF)** and other officials for their valuable guidance, which helped a lot in my project.

Thanks also to all farmers, rice processors, input dealers, village heads, and volunteers at various level, who actively participated and helped me in this study. These stakeholders positively co-operated in giving information which was required for this report.

I owe my sincere thanks to my project guide **Dr. B. Parasar**, Professor and Head, Department of Agriculture and Extension, College of Agriculture, OUAT, for his co-operation and support to complete my project work.

I am very happy about the way this project went on and proud that it has been completed successfully.

Ananya Sahu

Odisha University of Agriculture and Technology, Bhubaneswar.

DECLARATION

I hear by declare that the project report entitled "**VALUE CHAIN ANALYSIS OF PADDY IN KUNDRA BLOCK"** submitted by me to the Department of Agri-Business Management (ABM), Centre for Post Graduate Studies, OUAT, Bhubaneswar , Odisha , is a bonafide work undertaken by me and it is not submitted to any other university or institute for the award of any degree certificate or published any time before.

Place:

Date: (Ananya Sahu)

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CHAPTER-1

INTRODUCTION

ABSTRACT:

Rice is one of the important crops grown in India. During the last five years there has been an abrupt increase in price of paddy affecting the purchasing power of middle and lower middle class consumer. Rice being the staple food of Odisha, it is of almost importance to analyze the way it is produced, marketed and the role of different actors in this chain.

This study mainly focuses on the trends and issues from farmers to consumers throwing light on the price margin of different actors involved in total paddy value chain. Levy systems, role of millers, govt agencies, and other systems of procurement of paddy are studied. Along with these issues involved with production of paddy with respect to power supply, irrigation, and increase in the cost of cultivation, net income, mechanization, labour issue, input usage, credit and marketing.

➢ INTRODUCTION:

Rice remains a staple food for two-third of the world's population and has become the item of commerce from last two decades. Throughout the history, rice has been one of man's most staple foods. About four-fifth of the total rice in the world is produced by small scale farmers. Rice cultivation is the principle activity and source of income for about 100million house hold in Asia and Africa.

Most believe that rice is originated in India, around 3000BC, when local discovered the plant growing in wild and began to experiment with it. Cultivation and cooking methods are thought to have spread to the West rapidly and by medieval times, southern Europe saw the introduction of rice as a staple grain. In several Asian languages, the words of rice and the foods are identical.

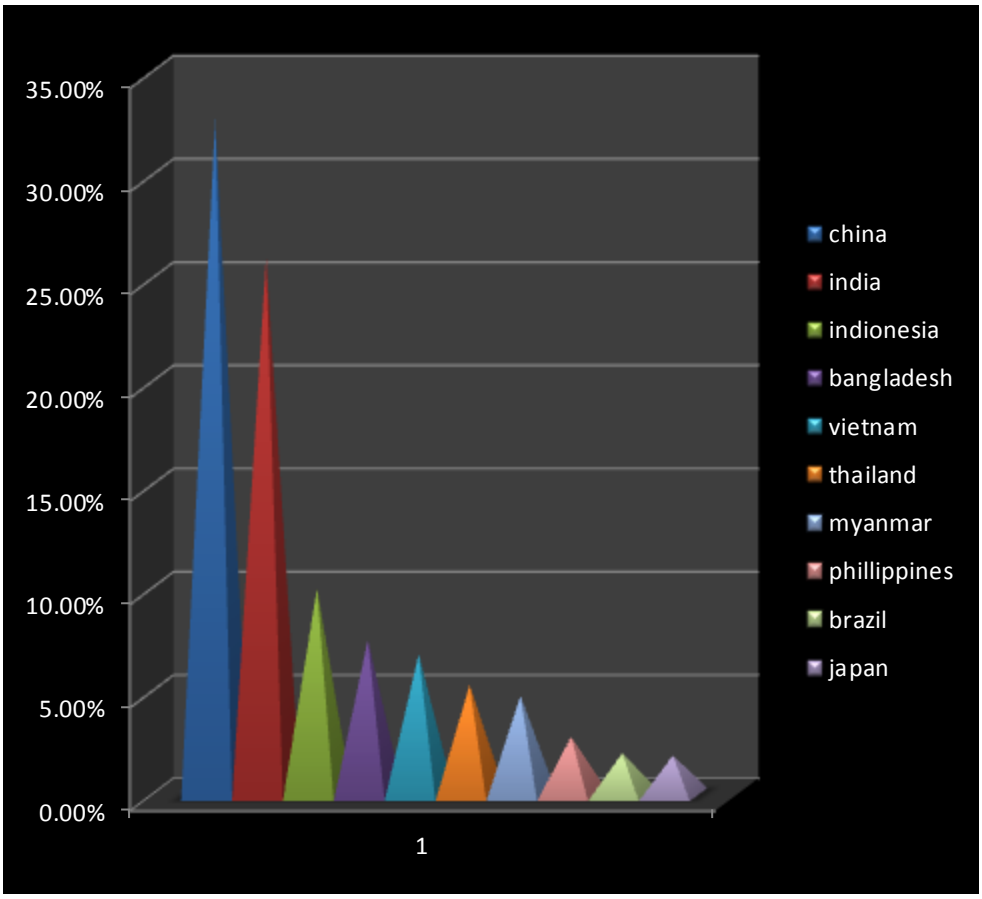
Rice cultivation has been carried out into all regions having the necessary warmth and needed moisture favourable to its growth, mainly sub-tropical regions. Fortunately, India has a conducive environment to produce rice.

India is the home country for rice production and it is staple food for more than 65% of its population. It is being grown in variety of situation. India is second largest producer of rice after China. In the year 2010 India's rice production was 132mMT, which is 26% of the global production.

The present study has three fold objectives that concern the agriculture economy of Kundra block, particularly paddy farming sector. First it examines the existing paddy production scenario in Kundra block. Secondly, it identifies the price discovery mechanism at different stages of paddy cultivation. Finally, it examines the government policies on paddy chain.

➢ WORLD PRODUCTION SCENARIO:

According to the Food and Agriculture Organisation (FAO) of theU.N.80% of the world rice comes from 7 countries. However, if we talk world rice production 2009-2010, the figures below show the world wide rice production by countries-in fact, the top ten countries of world counted for their rice production.



1. [**RICE PRODUCTION (% share country wise)]**

There has been a major decline in the world rice production since late 2007 due to many reasons including climatic conditions in top rice producing countries as well as policy decisions regarding rice exports by the government of countries with considerable rice production. Global rice prices started increasing 2009 after months of steadily declining since reaching an all high in may 2008. Problems related to rice supply in two major rice producing countries-India and the Philippines-have been the primary reasons for low world production of rice and the reversal of price trend.

India is the 2nd largest rice producer, followed by China. The production of rice in India has shown an increasing trend. It has increased from 34.58 million tons for the year 2012 and will require a

production level of 3ooo kg/ hectare significantly greater than the present average yield of 1930 kg/hectare. Government of India is targeting to achieve production of 129 million ton of rice by 2011-12 with the growth rate of 3.7% along with other food grains.

- **Rice production scenario in Odisha:**

In Orissa rice is synonymous with food; agriculture in Orissa to considerable extent means growing rice. Age-old social customs and festivals in Orissa have strong relevance to different phases of rice cultivation: ***Akhyatrutiya*** in May-June marks the seeding of rice, ***Raja sankranti*** in mid June marks the completion of sowing, ***Garbhana sankranti*** in October symbolizes reproductive phase of rice while ***Nuakhaee*** and ***Laxmipuja*** coincide with harvesting of upland and lowland rice respectively. ***Makar sankranti*** in mid January is celebrated as ***Chaita Parab*** by the tribal people as by this time rice is threshed and brought to the granary.

Rice variety	Predominant quality	festivals	Time of maturity (month)
Kala krishna	Scented	All festivals	January
Tulsi	Scented	Chaita parva	April
Macchakanta	White slender short grains, good taste	Manabasa and laxmi puja	November
Mer	Black grains with medicinal properties	Annual ceremony of forefathers	November
Kala jeera	Scented	Temple deities	November
Haladichuda	White slender long grains, good taste	Shakti puja	December
Deulabhoga	Bold and short grains, reddish ting on cooking with mild scent preferred during worship at temple	Temple deities	December

1. (**Some valuable rice land races preserved by Odisha tribal farmers for religious function**).

Rice covers about 69 per cent of cultivated area and is the major crop covering about 63 per cent of total area under food grains. It is the staple food of almost entire population of Odisha; therefore,

the state economy is directly linked with the improvement in production and productivity of rice in the state.

In the 1950s Odisha was a leading rice producing State in the country and used to supply sizeable amount of rice grain to the central pool of food-stock. But situation was very much reversed in the post-HYV period.

However, during the last 35 years rice area of the state has stagnated around 4 million hectares i.e about 10 per cent of the total rice area of the country.

Odisha's share in country's rice production was more than 11 per cent in the pre-HYV period, which gradually declined to 7.93 percent in 2008-09. Presently rice in Odisha is grown over and area of 4.4 million hectares, which accounts for 91 per cent of the area under cereals and contributes about 94 per cent of total cereal production in the state.

Period	Area (mha)		Production (mt)		% of contribution	
	India	Odisha	India	Odisha	A	P
1960-65	35.36	4.22	35.95	3.97	11.93	11.04
1970-75	37.64	4.56	41.63	3.90	12.11	9.36
2009-10	41.34	4.41	87.56	6.94	10.66	7.93
% of contribution	16.91	4.51	143.56	74.81		

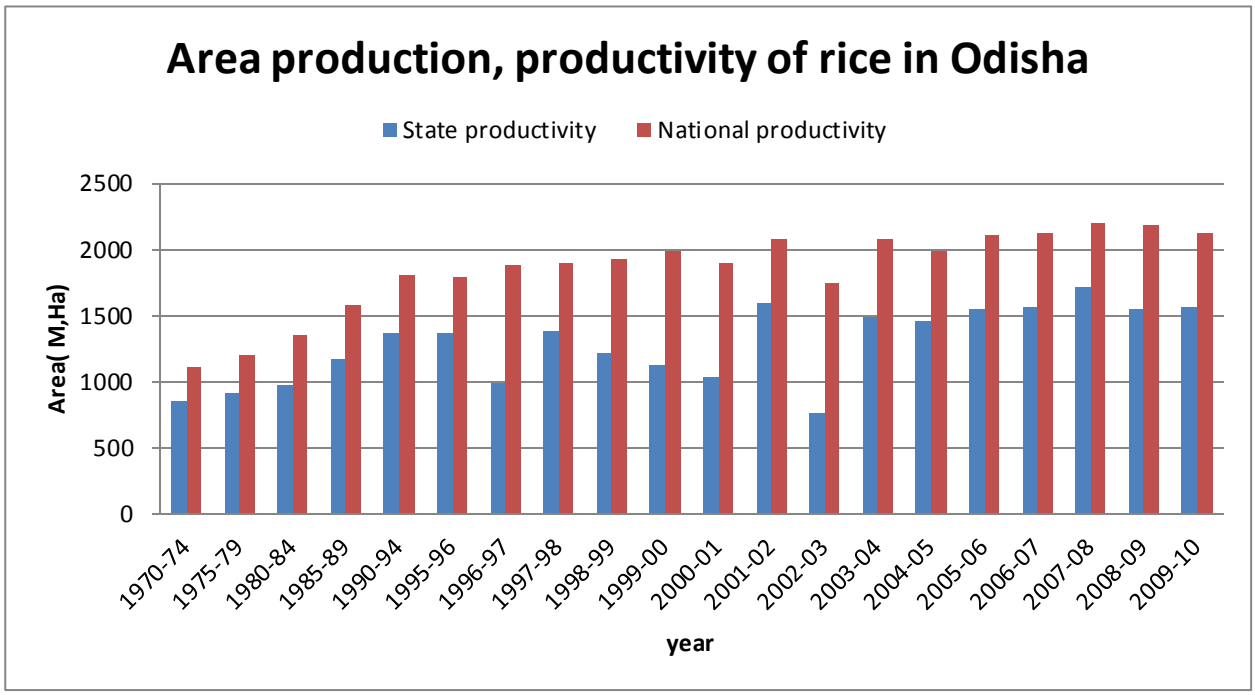
2. (Odisha's share in country's rice production in pre and post HYV periods.) Source-RKMP

In fact, introduction of high yielding varieties did not have any perceptible impact on rice production and productivity for over two decades; per hectare yield being fluctuated between 800-977 kg. Yield, however, showed substantial upward trend in 1986 onwards; all the same productivity continued to remain much below the national average.

Period	**State average**			**National average**
	Area (mha)	**Production (m.t)**	**Productivity (kg/ha)**	**Productivity (kg/ha)**
1970-74	4.56	3.90	855	1106
1975-79	4.39	4.03	914	1207

1980-84	4.21	4.13	977	1350
1985-89	4.30	5.07	1173	1584
1990-94	4.48	6.12	1364	1807
1995-96	4.53	6.23	1375	1797
1996-97	4.47	4.44	993	1882
1997-98	4.50	6.20	1380	1900
1998-99	4.45	5.39	1212	1928
1999-00	4.60	5.19	1127	1986
2000-01	4.43	4.61	1041	1901
2001-02	4.50	7.15	1589	2078
2002-03	4.27	3.24	759	1744
2003-04	4.50	6.73	1496	2077
2004-05	4.49	6.54	1455	1984
2005-06	4.48	6.96	1554	2102
2006-07	4.45	6.92	1557	2131
2007-08	4.45	7.65	1720	2202
2008-09	4.45	6.92	1553	2186
2009-10	4.41	6.94	1572	2118

3. {**Area, production, productivity of rice in Odisha**} **Source- RKMP**



2. Area production and productivity of rice in Odisha

The Koraput region situated in the Eastern Ghats is a high land plateau with number of hills and hillocks. The tribal people have indigenous knowledge system for their various agricultural practices. For example, they use their traditional knowledge to check viability of seeds before sowing, maintain soil fertility and conserve the landraces (old seed strains which are farmer-selected in areas where subsistence agriculture prevails largely) of rice and other crops. The knowledge is transmitted from generation to generation by families. Jeypore area in the Koraput region has rich genetic resources of medicinal plants. The place has over 1,200 medicinal plants that are used for curing bone fracture, malaria, gastro-enteritis and other ailments. Besides, Jeypore is also the place where many rice varieties originated; farmers in the area have conserved hundreds of rice varieties. Another important feature of their agricultural system is the tradition of maintaining sacred groves, which preserve plant genetic resources. Sacred groves are a biological heritage as well as a social mechanism through which a forest patches are protected and treated as deities by the tribal people. The biodiversity-conservation projects already undertaken by MSSRF include documentation and conservation of traditional knowledge through community biodiversity registers. The registers are now maintained by community biodiversity conservation corps drawn from among the primary conserver communities. The organization is also taking different initiatives to help tribal farmers gain intellectual property rights over their agro-biodiversity. Under the project, the MSSRF also wants to establish a genetic heritage park.

According to studies carried out by the Botanical Survey of India and the National Bureau of Plant Genetic Resources, Koraput region is a reservoir of rich floral diversity, comprising 2,500 species of flowering plants, angiosperms, gymnosperms and ferns. The agro-biodiversity recorded in the region includes 340 landraces of paddy, 8 species of minor millets, 9 species of pulses, 5 species of oil seeds, 3 species of fibrous plants and 7 species of vegetables.

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- **RATIONALE OF THE STUDY**:

Rice is one of the important food crops in Odisha especially in Koraput. The region of Kundra block under Koraput District has a tremendous potential for cultivation of rice crop and gradually the capacity of cultivation is increasing. Good soil, favourable climate, political support and farmer's enthusiasm are some of the factors for cultivating rice in large scale.

The region has tremendous potentiality in rice cultivation but the farmers some time suffering in many aspects like production and marketing which hampers their interest. It already has a ready market locally and regionally. But the trend of producing, processing, and marketing is hampered by knowledge and information gap to the famers at the various levels like production, post production and marketing. Following factors are generally minimize the production

- ✓ Water management.
- ✓ Disease & pest management.
- ✓ High labour cost.
- ✓ High level of drudgery at different stages of production & post production chain.
- ✓ High price of inputs & technology cost.
- ✓ Poor post production handling.
- ✓ Inadequate knowledge.
- ✓ Environment and gender issue throughout the chain.
- ✓ Quality issues due to poor handling.

CHAPTER-2

OBJECTIVE OF THE STUDY

- **OBJECTIVES OF THE STUDY**:
  - Conduct a study to analyze value chain in rice in Kundra block.
  - Explore the possibility of promotion of the micro-enterprises based on rice.
  - Explore the possibility of market linkage of the products.
  - Analyze the constraint & challenges in rice production, processing, & marketing.
  - Analyze drudgery of women involved in these activities and possibility of minimize drudgery at each level of the intervention.

CHAPTER-3

REVIEW LITERATURE

➢ REVIEW OF LITERATURE:

Asia's rice based livelihood systems are the contiguous and largest of all food producing systems of the world. Asia's rice lands produce 92% and consume 90% of the world's rice and provide livelihood base to slightly more than half of the total world population (little more than 3 billion). The total rice harvested area of 135 million hectares is mostly scattered among small and resource poor farmers and provides employment to a large number of landless rural. These rice lands also support more than 50% of the world's hunger. Rice is preferred staple food for more than one half of the world's population. Rice is rich in genetic diversity, with thousands of varieties grown throughout the world. In its natural un-milled state, rice comes in different colors, including brown, red, purple and even black. The rice supply chain provides livelihood to millions of people across the developing world. (Rice is the staple food for 65% of the total population in India). The global changes in trade and technology development have profoundly changed the situation today. The small and marginal farmers at one end of the chain are not only economically disadvantaged but often politically powerless, and when their interests are pitted against those of more powerful actors at the other end, they often lose. Therefore, understanding the institutional and political economy underpinnings of the organizational structure of a particular commodity or a sector is crucial for designing a set of measures that enables the poor to talk fuller advantage of greater access to markets.

Hundreds of millions of people spend more than half their incomes on rice to feed their families. At the same time, rice farming is a major source of employment, especially for the poor, and about four-fifths of the world's rice production is grown by small-scale farmers in low income, developing countries. All over the world, rural women have traditionally played, and continue to play, an importer role in both rice production and post-harvest activities. In many areas, task related to rice planning, weeding, harvesting and processing is the domain of women. Numerous actors take part in the value chain that links farmers to the final consumers: farmers, local traders, millers, wholesalers, retailers, and exporters in addition to the State Food Corporation and Public Distribution System.

Other participants include transporters, seed companies, agrochemical companies, agricultural equipment companies, irrigation companies, banks, inspection agencies, commerce and tax Departments, agricultural departments, farm organizations, miller organizations, research organizations, extension organization, policymakers, and consumer organizations. The relation among different participants in a sector determines the means by which benefits are distributed

within the chain. From the constraints identified, it is possible to derive policy recommendations to raise the returns of poorer households within the sector.

- **PRE-PRODUCTION:**

With the green revolution, the dependency of farmers on external inputs has increased. This dependency has increased the cost of cultivation and also created several ecological problems. The productivity oriented extension systems have encouraged excessive monoculture of the crop and varieties. India which once had 30,000 varieties of rice; today get 75% of its rice production from just 10 varieties. Availability of good quality seeds in sufficient quantities locally is a major requirement. Retaining farmers control over the seed is a major challenge with new legislation coming in, favoring corporate control over the seed. Similarly the various GM rice varieties in the pipeline for approval bring in the issues of patents and monopoly control over the seed by the MNCs in addition to posing new hazards.

The new GM varieties of rice boifortified with beta carotene, iron etc could add to the health problems rather solving them. In spite of the reports across the world on the GM contamination in rice, Indian government/research establishments are aggressively promoting the GM path.

In addition the IPR implications of such research are much less understood. Many of the successful models established by various organizations on local resources based organic production systems are remaining as isolated cases. The present support systems in the form of subsidies, credit or insurance favour only external inputs (chemicals, hybrids etc) based production systems. Government subsidies ultimately reach fertilizer and pesticides industries and do not support farmers to effectively make use of their local resources. This call for a complete recasting of the way government and financial institutions supports the provision of inputs.

The national and state governments recently initiated few programs on the capacity building on organic farming. All these initiatives are welcome, but without a paradigm shift in the conceptual understanding replacing the chemical inputs with bio-inputs may not really solve the problems of small producers and sustainability. All these are aimed at promoting certified organic production to fetch premium price in international markets.

- **PRODUCTION:**

Rice is grown under a wide variety of conditions in India. Rice is the only cereal that can create that can stand water submergence, and this helps to explain the long and diversifies linkages between rice and water. For hundreds of years, natural selection pressures such as drought, submergence, flooding, and nutrient and biotic stresses led to a great diversity in rice ecosystem. Historically rice cultivation has been a collective enterprise. The investment and shaping of the landscape that are needed for the ponding system require collective organization within the community. Water management also relies on collective interest: crop and water calendars must be organized for large block of fields in order to manage water efficiently and organize such work as land preparation, transportation and drying for harvesting. With construction of dams and after the green revolution, rice became predominantly a canal-irrigated crop. Traditional tank are totally neglected. Gradually farmers even in rain fed areas started cultivating rice under tube well irrigation.

This has led to exhaustion of the ground water and several cascading ecological and economical problems. An acre of rice production in ponding cultivation requires about 6 million litres of water which translates to 5000 litres of water for each kilogram of rice production. This shows the burden on the scarce natural resources. An innovative system of growing rice with less water was initiated in Madagascar named system of rice intensification (SRI). This system which is based on sound ecological and agronomic principles not only reduces water utilization by about 40% but reduces the seed quantity required to 2 kg/acre and increases the yields by at least 20%. SRI for the 1st time after green revolution has brought in several innovations from farmers into mainstream agriculture. SRI also clearly demonstrates the biological potential of soil to support the plant given suitable conditions. SRI is best suited for the organic production systems. While SRI is suitable for certain conditions, there are various other such successful initiatives which need to be understood and promoted.

Though paddy is a self pollinated crop and has wide variation, research scientists focused on developing hybrids – as a high end technology by public sector research and to retain control over the seed by the private companies forcing the farmers to buy seed every year. This would increase the cost of seed at least by three times.

- **POST-PRODUCTION:**

Most resource-poor farmers have very limited capacity for retaining their produce after the harvest until they get good prices. Prices are generally low immediately after the harvest and the access of the small producers to infrastructure like storage and processing facilities is quite limited. In addition, Lack of transparency and lack of awareness regarding the procurement by the Govt. agencies/mill owners add to the woes of the farmers. Also there are several moves to withdraw the minimum support process and market intervention operations. Procured rice is distributed through the Public Distribution System in the country. Similarly this rice is also used in the food for work program and national food assurance programs. While all these are aimed at providing food to the poor, such initiatives lead to 'Sanskritisation' of food habits which also lead to changes in cropping patterns. The millets were completely left out of the support structures, and the growers suffer due to lack of demand and effective markets. Some innovative ideas like Rice Credit Line, which advances food to labor in lean periods and gets in return their labor, have been tried in ODISHA.

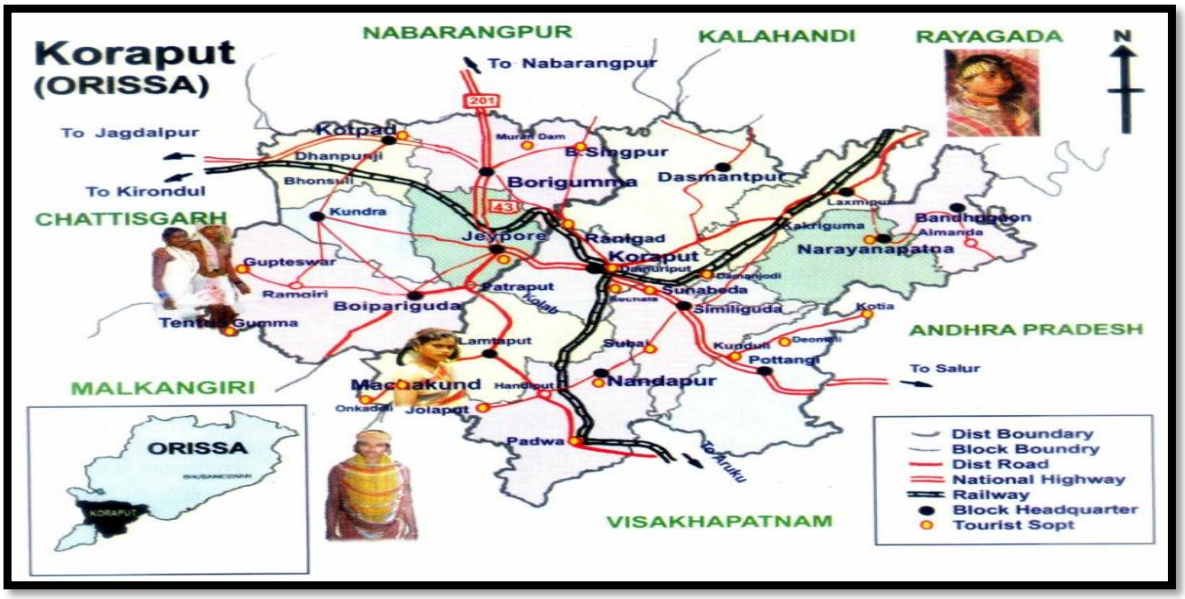
Growing awareness about the health hazards of the chemicals used in production processes has increased the demand for organic foods. Several organizations have stepped into the organic production systems to capture the premier (but now also increasingly those in Asia's bigger cities) western market. But it has limitations for small scale producers like high price of certification, inaccessible distant markets and difficulties to meet the strict international standards for organic production in a local/Indian context etc. National organizations like APEDA (Agriculture Produce Export Development Agency) have programs to subsidize the certification but focus on international markets. Local markets are only starting to develop.

- **<u>Activities</u>**:
  - ✓ Analyse the production, processing and marketing practices and their trend.
  - ✓ Document the status of rice mechanization and processing tools, equipment and other inputs and their accessibility by farmers and processors.
  - ✓ Identify the major constraints in the rice industry.
  - ✓ Analyse the factor that influence the adoption of rice.
  - ✓ Determine the effect of rice production on farming systems.
  - ✓ Analyse the local needs. i.e. the demand and supply trend.

CHAPTER-4
STUDY AREA & METHODLOGY

- **Study area and target groups:**

This study covered the 12 villages [**Nuagaon, Gunthaguda, Tentulipar, Pradhaniguda, Jhalaguda, Santeliguda, Heruguda, Kauriaguda, Barmeguda, Kusumguda, Chendia jhiligaon, Dhulo jhili gaon**] of Kundra block. This block is among the major rice growing area of the Koraput district. At the same time farmers, rice processors, agro-input dealers were also interviewed. Kundra Haat, Lima Haat, & Pradhaniguda Haat were also visited.



3. Koraput map

- **Methodology of the study:**

  There were five categories of respondents considered in the study: individual farm house hold, farmer's focus group discussion, rice related farm input dealers, key informant and rice processors. The method used for selecting respondent in the individual farm household category depended on the concentration of rice growing region. Random sampling method was employed to select respondents in the area that had very less rice growing households. Purposive sampling was used in focus group discussion for selecting respondents. Key informants were also purposively selected. They consisted of sarpanch, leaders of farmers association and volunteers of NGO.

- **Data collection method:**

  A non formal participatory research technique based on interactive focus group discussions was used for obtaining relevant information. This similar method was used in the collection of information from individual farm house hold respondent and in the focus group discussion. This was supplemented by on-site observation. In each villages the selected respondent were interviewed at their respective homes. To ensure high accuracy during data collection, the group discussion was held separately with the male and female groups. The required information was collected using survey tools, questionnaire, and check lists etc and by the previous data collected by MSSRF.

- **Data analysis method:**

  MS-excel software's used to aid the data analysis and presentation of graphs.

CHAPTER-5
RESULTS AND DISCUSSIONS

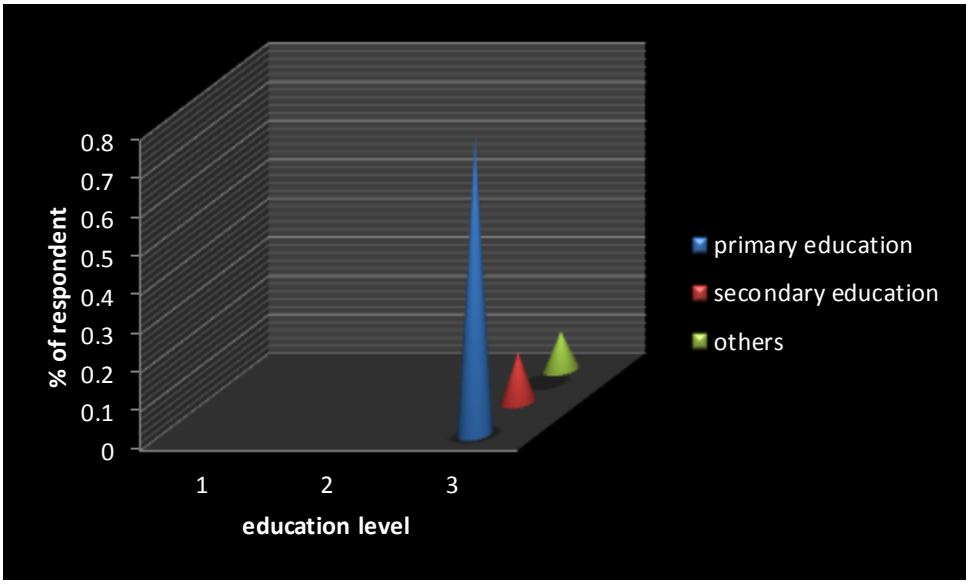
- **Survey finding:**

Numerous actors take part in the value chain of paddy cultivation that links the rice farmers to the final consumer. Farmers, local traders, millers, wholesalers, retailers and exporters in addition to state owned FCI and PDS. Other participators include transporters, seed companies, fertilizer companies, agriculture equipment companies, agriculture department, research organisation, extension organisation, policy maker & consumer organisation.

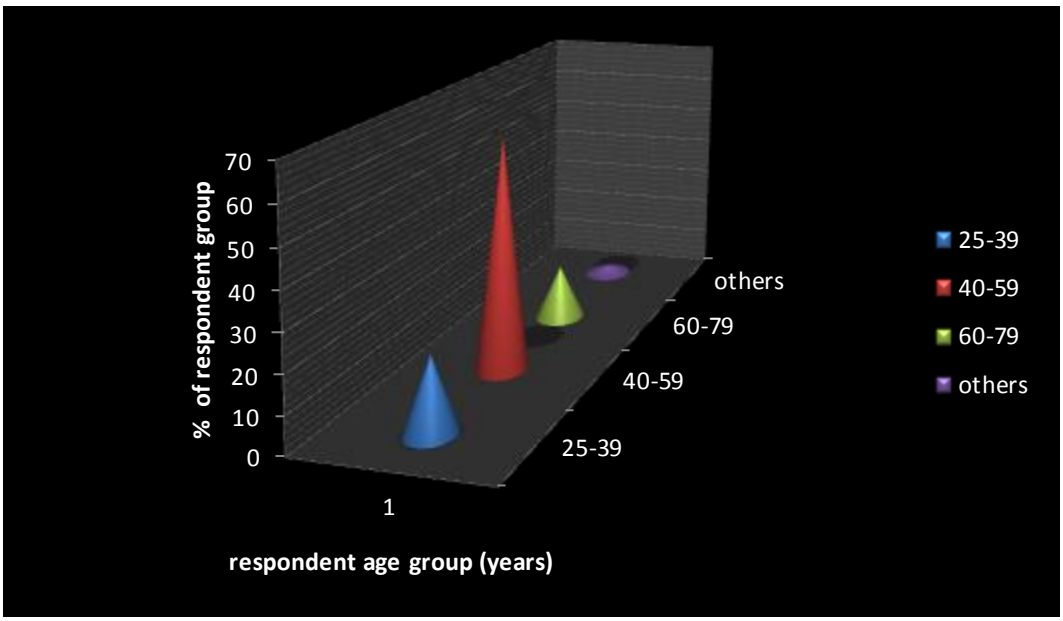
From the constraints identified it is possible to derive policy recommendation to raise the return of poor household with in the sector.

1. Socio-demographic Characteristics of Farmer Respondents:

The sample population of the farmer respondents interviewed during survey are 100 of whom 2% are female. Of the total 97% were male household heads and only 3% female headed. A total of 77% had primary education, 13%had secondary education and 10% did not attended school at all.



The majority of the household respondents are between ages 25-65yrs.



The survey also showed that majority were married that about to 90%, 7% were single and 3% are widowed. This shows that the sample population of the farmers are stable. The family size of the respondent household varies from a minimum of 3 to maximum of 8 members. The sample households had a relatively high numbers of dependent, the majority being below the age of 15 and above the age 80. The survey indicates that the household must ensure enough food to feed the dependents. It must also have enough income to meet the wants, education as majority of them were school going children. It must also have the capacity to meet the medical expenses & other cost.

Membership to the farmers associations was a common feature among the rice farmers in majority of villages. The percentage of respondents who belonged to any group/associations ranged from 45-75%. It is worth noting that majority of farmers belongs to farmer group /association. It was also reported that the member farmers are benefited from training courses and to some extent about processing and marketing of rice. 25% of farmers surveyed had some training about rice aspects including planting, field management, harvesting, soil testing, fertilizer application etc. A number of private NGOs institutions have sponsored and actively participated in the training programme.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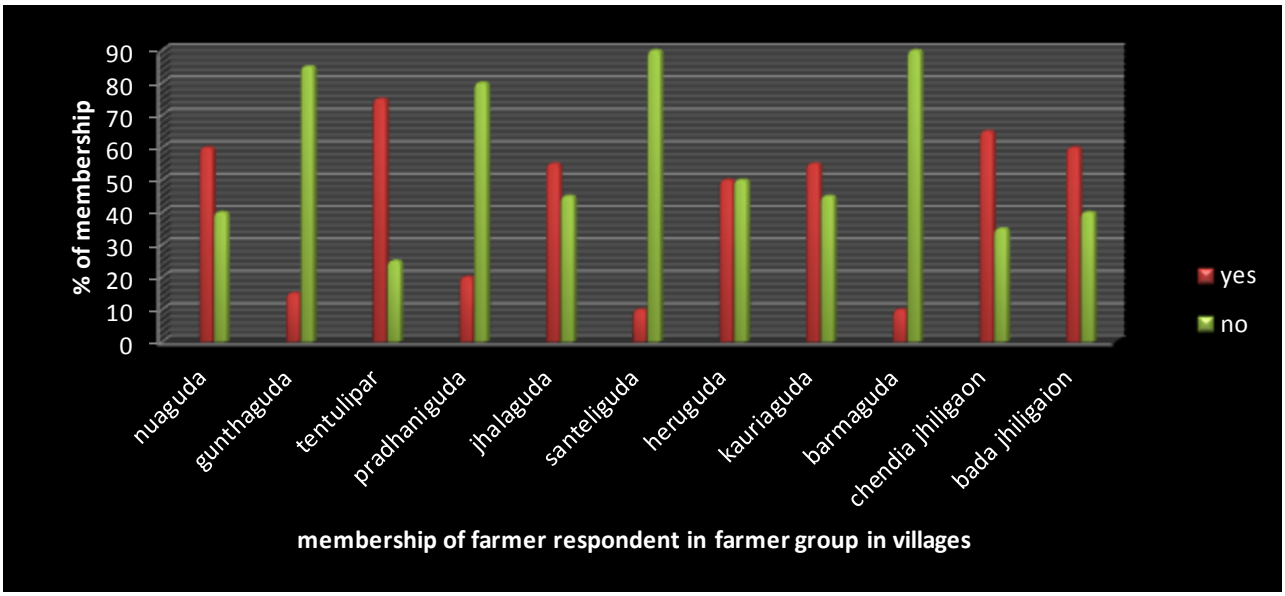
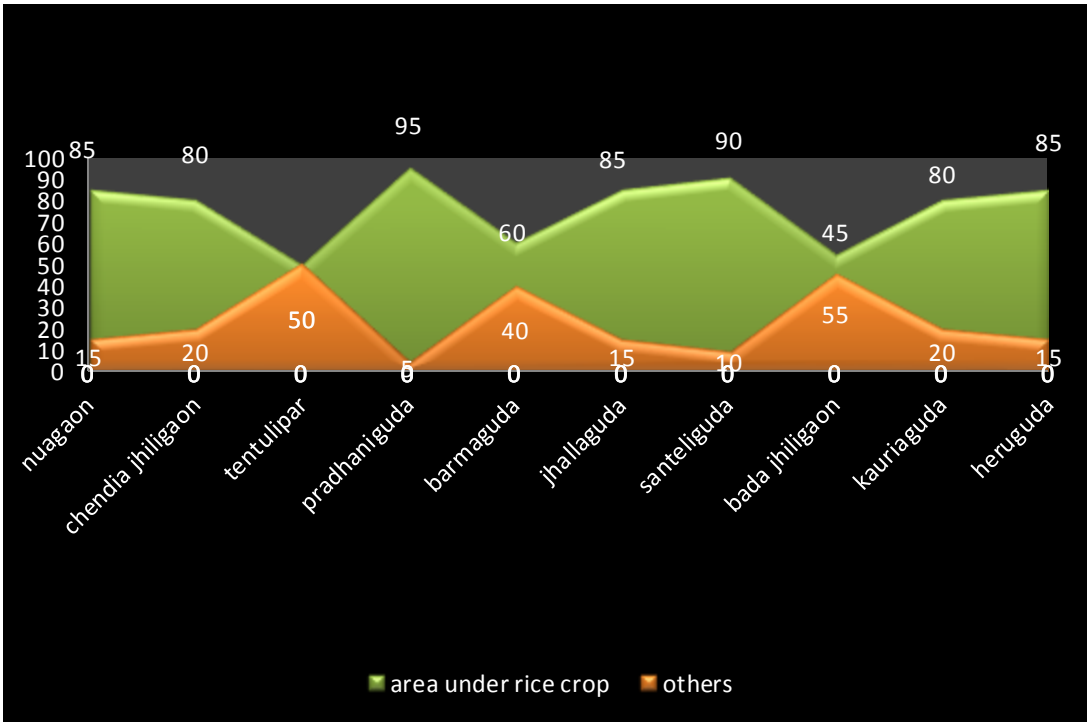


2. Farm characteristic:

Land used in the surveyed villages varied among different uses of land. The survey did capture the information of total land holding and the proportion of land under rice cultivation.



This explains the relatively high proportion of land is allocated to rice growing. This may indicate the benefits that these communities have gained from rice farming. Regarding the land ownership 95% 0f the sample household indicated that have their own land and 5%on leased land.

3. Rice production practises including mechanisation

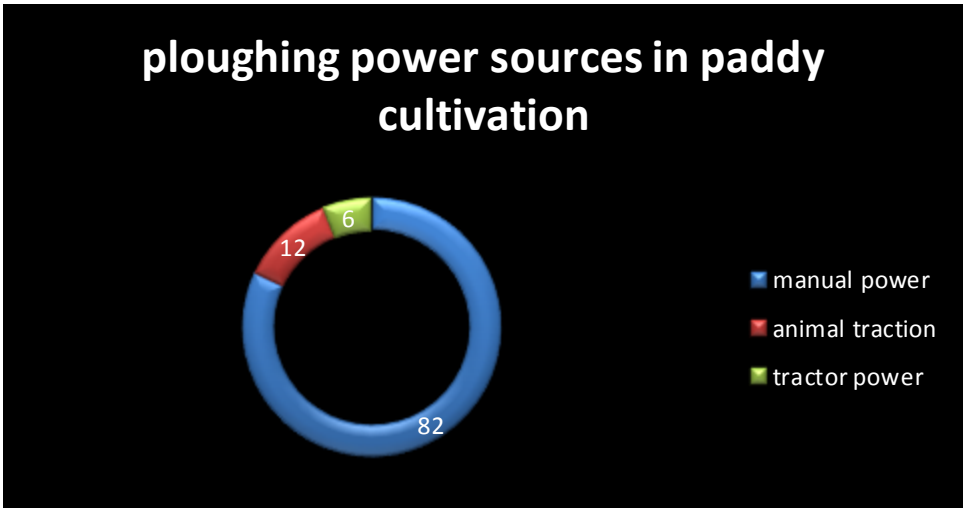
3.1. Land preparation:

In the upland cultivation, land clearing is done in January and July for the first & second seasons respectively whereas in lowland rain-fed area this activity is done in January and late august. The major reported source of power used for land clearing was manual 89.9% with the majority of the farmers using rudimentary farming implements such as axes, cutlasses, stashers and hoes. Animal traction contributed to only 0.8% while motorized power contributed 0.3%. The analysis of labour distribution showed family labour being predominantly employed in land clearing 75% whereas contracted labour contributed the remaining 25%.

3.2. Ploughing:

In upland rice first ploughing was done shortly after land clearing from late January through to mid February, for lowland rain-fed area however the first ploughing was done between late February and March.

It was noted that 82% of farmers used solely manual power, 12% use animal traction normally with combination of manual power and 5% use motorized power (hire tractor service). The hand hoe was the most predominant farm implement used in ploughing through a cross section of the rice growing community of the survey areas. This confirms why farmers reckoned the ploughing as a labour intensive and most time consuming operation.



3.3. Planting:

Plant spacing and method of planting significantly influence the seeding rate, optimum plant population and eventual crop yield. In the villages surveyed, the farmers mainly use the line transplanting and broadcasting method of planting.

Operational area of Kharif crops (In ha.) -

Paddy	**2010**	**2011**
Broadcasted	46378	40650
Transplanted	52877	58777
Total	99255	99427
Non paddy	194938	196569

3.4. Weed management:

Farmers reported weeds as one of the serious problem in rice production. Hand weeding is laborious and time consuming; yet labour is often expensive and in short supply making weed control imperfect and often delayed.

A wide variety of weeds infect the rice field. Among the weeds : **Digitaria Sap, Cypperus Rotundus, Eleusin Indica and Echinochloa Clona** and the broad leaf weeds: **Amaranthus Sap, Galinsoga Sap, Striga Sap, Commelina Sap** etc. The variability of weed species composition was reported both in upland and low land.

(Rice field covered with broad leaf weeds)

(Eleusine indica)

(Stinga sap)

(*Cyperus rotundus*)

(*Echinochloa collonus*)

Regarding the time of weeding only 5% of respondent start weeding their rice before 2 week after germination. 26% start weeding 2-3 weeks after germination, 30% after 5-6 weeks and 30% after 6-7 weeks and 5-8% farmer never weed their field at all. Farmers claimed that weeding is labour and time consuming activity, which is very expensive.

Manual weeding is most practised method of weed control in all the villages surveyed. This is labour intensive and time consuming activity predominantly done by women.

From the survey findings 80% of the weeding is done by women using a variety of hand tools ranging from hand held knives to hoes of different shapes and sizes.

HERBICIDE USE:- Although herbicides are thought to be one of the labour saving technologies, the importance of herbicides in weed control was insignificant as reported by only 10% of farmers. The cost and unavailability of herbicides was reported the major limitation to its wide adoption among the farmers. Farmers also cited limited knowledge regarding it safety and usage.

3.5. Soil fertility management:

Cultivation of rice in Kundra block is influenced by site-specific factor like the availability of nutrients in soil. Most farmers claimed that intensification of rice cultivation reduces soil fertility over time. 50% of the farmers in the village surveyed reported decline in fertility. The survey shows that most farmers use organic as well as inorganic fertilizer, with the most common explanation being that fertilizers are not easily available and are of high cost.

Among the fertilizers [DAP, SSP, MOP, UREA] commonly DAP & UREA are most frequently used by the farmers. A significantly number of farmers however use organic fertilizer such as cow dung, vermin compost, rice straw, Neem leaves etc. Regarding the time of fertilizer application, response

widely vary, most of the farmers respondent apply DAP at planting time and UREA 30-40 days after planting.

The official recommendations of fertilizer requirement in paddy cultivation is 1 bag of DAP, 2 bags of UREA, 40 bags of potash, but farmers use as per their own calculation and availability. The government provides a lot of subsidy and allotment but only the big farmers have access to the fertilizer. Majority of the farmers involved in the survey said that they are not getting fertilizers at time; most of them are unknown to the access to the fertilizer subsidy. The agencies have sold fertilizer bags more than MRP to the farmers.

3.6. Rice pest and their management:

Pests are among the most serious problem to both upland and low land rice production. They are very difficult and costly to control, and if not effectively controlled can cause a major crop loss in crop yield, quality, and market and nutritional value. Out of the farmers surveyed, 95% of farmers reported that they are suffering from rice pest and diseases attacking their crop, particularly birds and rodent. Birds chew, squeeze and feed on the grains on milky stage of the crop. The damage shows milky white substance covering the grain. At grain maturation, birds remove the entire



The study identified several bird control techniques that were being used by the farmers, amongst which were:

- Physical chasing, shouting and scaring off
- Beating sonorous bodies like tins
- Poisoning and trapping
- Use of scare crows

In the rice field, rats directly feed upon rice and other seeds. They pull up germinating seeds and cut or pull up transplanted seedlings. Tillers are also cut and chewed. Other serious pests reported by the farmers are termites, stem borers, cut worms, grasshoppers and caterpillars. These too cause serious loss and damage to the rice crop.



3.7. Position of rice in crop rotation:

Crop rotation is a system in which different crops are grown in succession and in definite sequence on the same land. Evidence indicates that crop rotation influences plant production by affecting soil fertility and survival of plant pathogens, physical properties of soil, soil erosion, soil microbiological composition etc.

From the survey, 40% respondent rotated rice after crops, 35% cultivated rice after fallowing their land and 25% didn't practice rotation at all.

Amongst the reasons presented by the farmers for practising rotation were:

- Improving soil fertility through soil-nitrogen fixing capacity of some crops.
- Effective utilisation of residue as compost fertilizer in the rice field.
- Conserving soil moisture
- Increase in yield due to soil fertility

3.8. Production:

The preference of farmers in selecting a particular variety differs from place to place, region to region and that to market preference of that particular variety.

In the survey area 75% of farmers are growing **1001, 1010**, **Jagati, Lalata** etc, 15% of farmers are growing **Swarna, Puja, Aakash kusum, Khandagiri, Sadhana etc**, and only 5-7% farmers grow **Kalajira, Machakanta, BPT, Swarna masuri** etc.

As per farmer's voice they are only getting 35-45 bags/acre. Though the industry and government is pushing hybrid variety, there is very lesser acceptance by the farmers. The area under hybrid rice seed production in India has only increased by 1% in last decade.

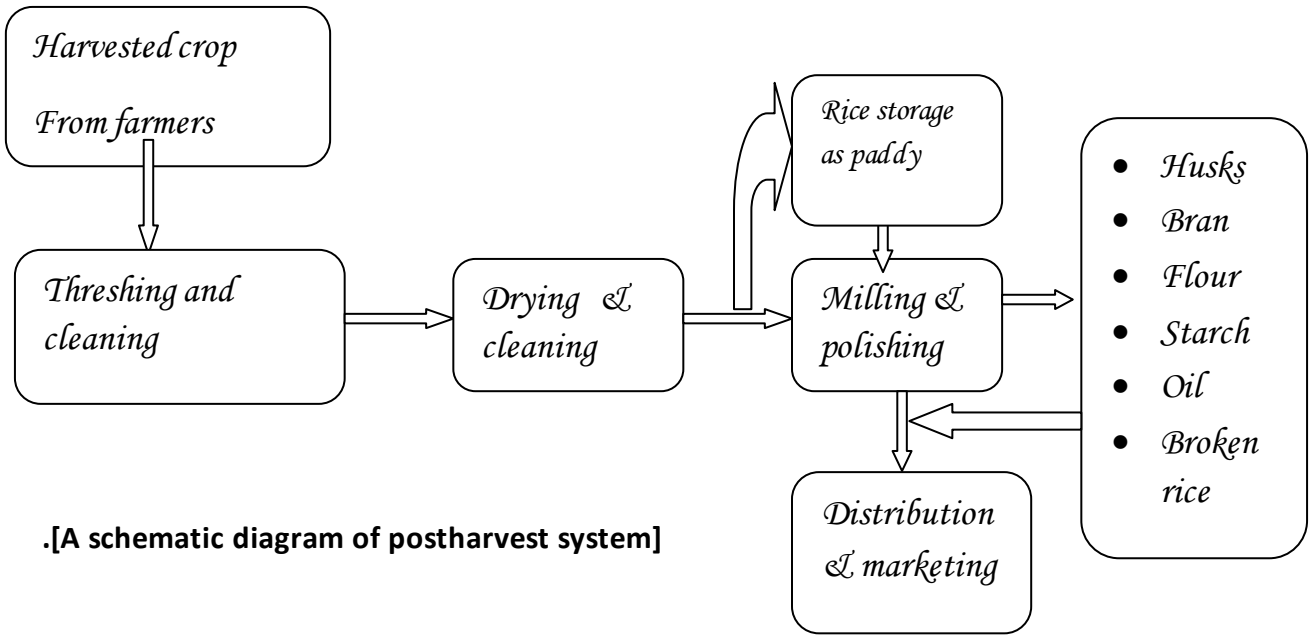
The agriculture university and the DRR in Odisha are also spending most of their resources on hybrid rice development. DRR has also collaborated with Mahyco research foundation to develop and market hybrid rice in India.

4. Rice processing practises:-

4.1. Post harvest loss-level:

Based on the survey findings, the normal sequence in the handling of the rice crop after it mature is harvesting and threshing, preliminary cleaning, drying, storage, milling, distribution to the market.

Severe loss can occur when traditional methods of handling are used. Studies conducted in several Asian countries reveal that 13-34% of crop is lost during harvest and post harvest operation, during harvest and threshing 5-15%, processing 3-7%, handling and transportation 1-3%. Other important losses are grain quality deterioration, under utilisation of by-products and financial losses due to inefficient post harvesting operation.



.[A schematic diagram of postharvest system]

4.2. Harvesting :

The chief consideration in harvesting is the degree of maturity of the grain, normally determined by measuring its moisture content using an appropriate moisture meter. The optimum harvest moisture for rice being 20-24% wet basis. Under tropical condition this point is generally reached

28-32 days after flowering. If the crop is allowed to stand in the field after optimum maturity, severe losses occur in field and during milling.

As recorded during the survey, considerable amount of grain simply shatters and fall to the ground before it is harvested. Additional losses come about during the harvesting process itself, because the grain is loosely held on the panicles. The problem is aggravated by the poor traditional harvest method based on the rudimentary hand-held sickle, a tool used in rice harvesting by 56% of the farmer interviewed, with 34% of farmer use hand held knives. The survey also indicates that the harvesting activity is predominantly done by women.

4.3. Threshing and cleaning:

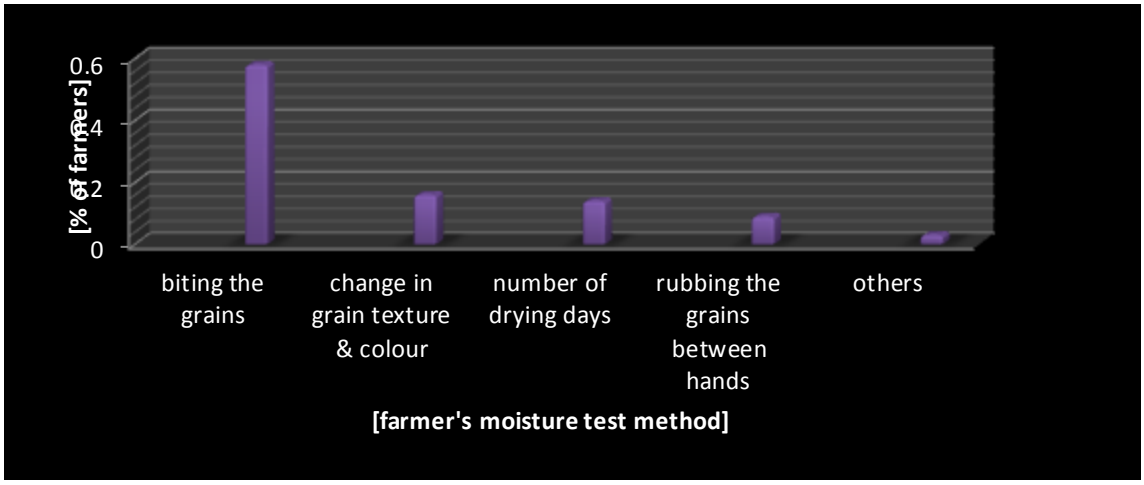
After harvesting, rice is immediately threshed in the field. This is currently done by beating the harvested crop, on plastic sheet, beating the crop on bare ground against a log, special wooden frame or by some conventional threshing machine (3%).

The poor traditional threshing and later drying methods are responsible for heavy contamination that the crop usually suffers from soil, sand, small stones, straw, immature grain etc. These materials have to be removed, to raise the final grain quality and market value.

4.4. Drying :

The moisture content of paddy is important from the time it is harvested until it is milled. Open sun drying was the only traditional rice drying method encountered during the survey. The drying mechanism ranging from spreading the crop thin layer on firmed ground, on the plastic sheet or woven mat.

Optimum milling moisture level for paddy is 13-14%. Most of the farmers clearly reported their ability to estimate the correct moisture level in rice through biting the grains (58%), change in grain texture and colour (16%), counting number of days of drying days based on the intensity of sun (14%), rubbing the grains between hand (9%).



4.5. Handling , transportation and storage:

Rice handling follows immediately after harvesting the crop. The survey in the villages, cited handling and transportation are among the most labour intensive and time consuming operations in rice production. The operation is done by women and man labour carrying hand loads of some 30-50kgs of the harvest per trip.

More energy enhancement option includes using bullock carts and hired tractors.

After threshing, the fresh paddy, preliminarily cleaned, has to be transported to the drying yard that is to the farmers place. This is equally difficult. The drying phase may last anything up to 5-7days depending on weather condition; the crop has to be carried several times between the drying yards to the shelter until it is safely dry. Transport to market places or mills may be done by bullock carts or hired motorized vehicles depending on crop volume.

4.6. Rice milling:

The basic objective of a rice milling system is to remove the husk and the bran layers, and produce an edible, white rice kernel that appeals to the customer: is sufficiently milled with maximum total milled rice recovery out of paddy, with a minimum of broken kernels and free of husks, stones, and other non-grain materials. Literature on rice milling report most rice variety consist roughly 20% rice hull, 11% rice bran, and 69% starchy endosperm also referred as total milled rice, containing whole and broken grains. The by-products in rice milling consists of fine broken grain, rice hull and bran layers.

Traditional rice milling involves pounding paddy in a wooden mortar to remove the husk followed by cleaning the grain using winnowing basket. Though the method is tedious, has very low out-turned and return in high breakages of rice kernel and incomplete removal of husk. Rice farmers have rapidly moved into using motorized commercial mills for better operation and efficiency. In such mills, husks and bran are removed separately and brown rice is produced as an intermediate product. This is further polished to obtain the white rice and the by-products discharged through separate outlets of the machine.

RICE MILLING PRODUCTS AND BYE PRODUCTS:

- ✓ ROUGH RICE:

This is paddy rice as it comes from the rice field. Rice kernels are still encased in their inedible protective hull which has to be husked, and separated through an air blast to obtain brown rice.

- ✓ BROWN RICE / HUSKED RICE:

This is the least processed form of rice. It has the outer hull removed, but still retains the bran layer that gives it a characteristic tan colour and a flavour. Brown rice is edible and has higher nutritional value than polished rice. Its cooking time is also longer than polished rice.

- ✓ MILLED RICE:

White rice is obtained after rubbing off the bran layer and germ from brown rice and blowing off the bran layer by air ventilation. This process usually takes 2-3 cycles within a milling machine, depending up on the required milling degree. To improve on quality, milled rice is separated into grades using appropriate sieves ready for marketing and consumption.

BYE PRODUCTS OF RICE MILLING AND THEIR USES:

Besides consuming as main course, rice and its parts have various other uses. The edible and non edible parts that go through the milling process can be transformed into following uses:

- ✓ RICE HUSK:

  Over 90% of the rice husks in the major rice producing countries of Asia are utilised as fuel, for commercial rice mill steam generators.

- ✓ RICE BRAN AND RICE OIL:

  The bran is most nutritious part of rice and provides a good source of vitamin B. Approximately 30-40% of rice bran is used to extract high quality cooking oil that is known to decreasing blood cholesterol levels in human.

- ✓ BROKEN RICE:

  Of the total milled rice, 45% may be classified as “broken rice”, coming in due to its low cost. Though such broken rice grain is normally turned into noodles and snacks. It is directly edible in nature. In the most efficient milling machine, 26% of the yield is broken rice, with the remaining 39% of whole rice, 11% bran and 24% husk.

- ✓ RICE FLOUR AND RICE STARCH:

  In mills very small broken rice are converted into rice flour. These by-products are used to produce rice pasta, chips and other snacks. Rice starch is also used as a thickener in making sauces, desserts and sweet syrup.

- ✓ RICE STRAW:

  According to the study, rice straws are left in the field. Elsewhere this product is popular as a medium to grow mushrooms and raw material for animal feed. A considerable amount is used in paper mill.

- ✓ RICE USED IN BEVERAGE MAKING:

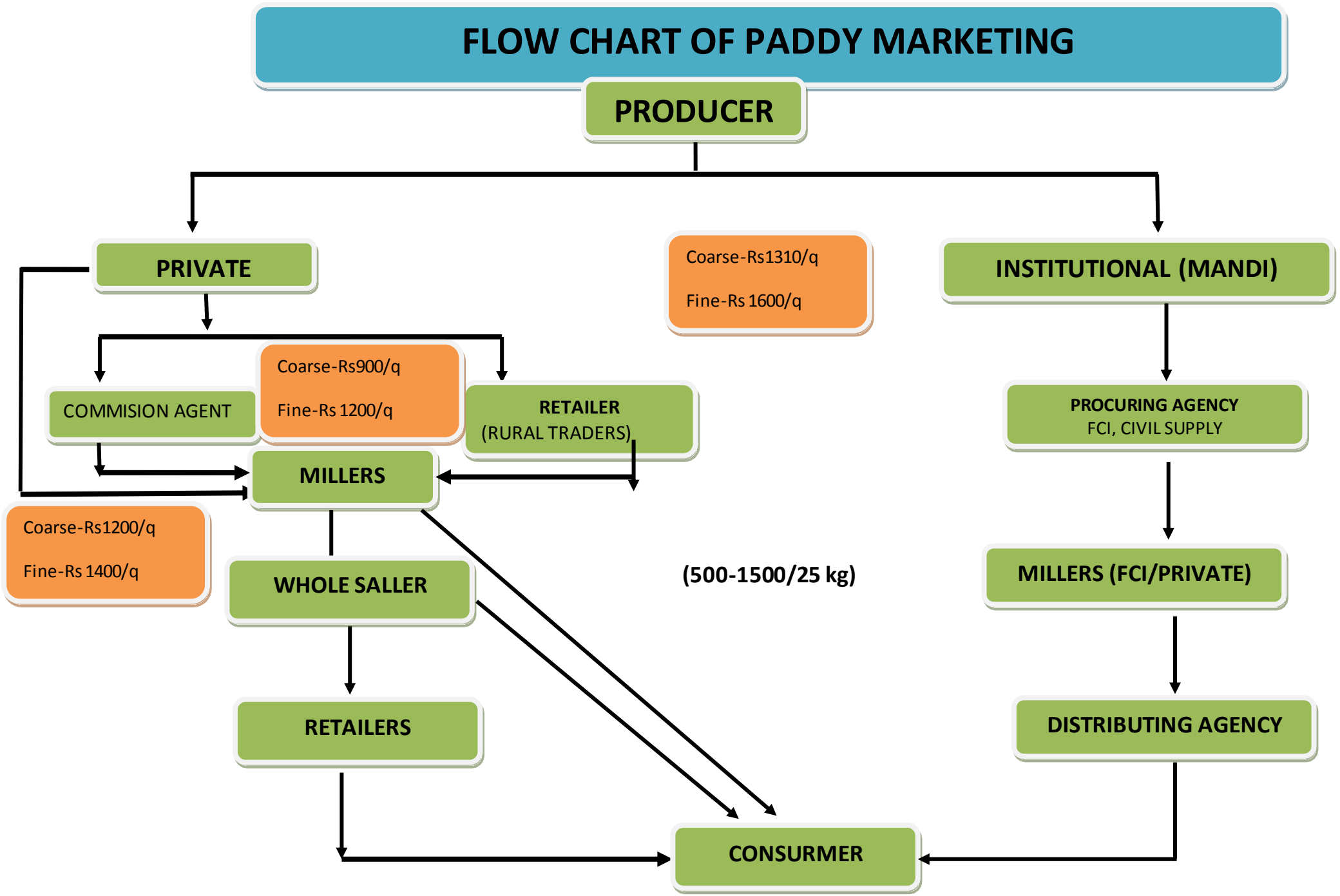
  Many alcoholic beverages include wine and beers are made up of rice. (Broken rice).

4.7. TRENDS IN RICE MARKETING:

The bulk of rice grown in Kundra block is typically produced by small farmers. However, unlike most of the food crops are grown to satisfy the household consumption and food security. Rice is consumed more in urban area, where it is one of the major food stuff. Unlike low land rice, the costs of production for upland rice are much lower due to extremely high labour costs in the low land rice cultivation.

The rice marketing outlets can be categorized into two types:

i. Private channel
ii. Institutional channel


FLOW CHART OF PADDY MARKETING
PRODUCER
PRIVATE
Coarse-Rs1310/q
Fine-Rs 1600/q
INSTITUTIONAL (MANDI)
COMMISION AGENT
Coarse-Rs900/q
Fine-Rs 1200/q
RETAILER
(RURAL TRADERS)
PROCURING AGENCY
FCI, CIVIL SUPPLY
MILLERS
Coarse-Rs1200/q
Fine-Rs 1400/q
WHOLE SALLER
(500-1500/25 kg)
MILLERS (FCI/PRIVATE)
RETAILERS
DISTRIBUTING AGENCY
CONSURMER

4.8. MARKETING CHANNELS:

The following are the important marketing channels existing in the market of paddy/rice.

i. PRIVATE

The major marketing channels identified in the private sector are:

Producer → rural trader's → Millers → Wholesalers → Retailers → Consumers.

Producers → private traders → Millers → Wholesalers → Retailers → consumers.

Producers→ Millers → Wholesalers → Retailers→ Consumers.

Producers→ Millers → Consumers.

ii. INSTITUTIONAL

It covers the both public and co-operative sectors. It plays a very significant role in procurement and distribution of paddy/rice.FCI is the main agency for procurement, buffer stock operation and distribution of rice. The main institutional channel for rice is

Producers→ procuring agencies (FCI, CIVIL SUPPLIES → Millers (FCI/Co-op/private) → Distribution agencies→ Consumers

PRIVATE CHANNEL:

- The first type of marketing involves the transaction and negotiation between farmers and the rural traders. Farmers usually with small acreage land (less than one acre) sell their paddy to the rural traders. These rural traders buy the paddy from the farmer at very low price i.e.800-900rs/quintal. Then these rural traders sell this paddy to the urban millers where he gets 1100-1200rs/quintal and gets a profit of 300rs/quintal.

  This marketing is characterized by:

  i. Limited competition
  ii. Inadequate market information
  iii. Inadequate storage facilities
  iv. Poor road networks, which are inaccessible
  v. Lack of awareness

- ✓ Again, the farmers bring loan from the money lender at the starting of the season and at the end of harvesting the farmer returns a quintal of paddy as against 500rs. The govt has

fixed the MRP 1310rs/quintal of paddy. The money lender gets 810rs profit per quintal of paddy.

The above system is characterized by

i. Limited competition
ii. Inadequate market information
iii. Lack of availability of finance
iv. Lack of awareness

- ✓ The govt is providing different types of loans such as agriculture loan, crop loans, soft loans etc but the farmers, due to lack of awareness have no access to these facilities and become prey of the money lenders.
- ✓ Again, the farmers do not have their proper land documents of their respective field. As a result they do not get the bank loans and they become the easy prey of the money lenders.

➢ Secondly, the data from the surveyed areas clearly indicate that 80% of the farmers sell their produce to the commission agents or the private traders, immediately after harvesting. The reason behind this activity is as follows:

- ✓ Delay in lifting paddy from the mandis by the procurement agencies of state govt force the farmers to sell their produce to private traders.
- ✓ The fear of distress sale haunts farmers, with thousand of quintal of paddy still lying in the mandis, after the targeted amount.
- ✓ The FCI and the civil supplies instead of purchasing directly from the farmers, they are procuring from millers, and paying the bonus to the millers instead to the farmers.
- ✓ The payment by the civil supplies and the FCI is by cheque and it takes 30-35 days to Ancash it, after selling their produce. But the private traders are giving spot cash or cash within 10-15 days. This attracts the farmers, even though they are getting very low price compared to the govt MRP.
- ✓ Govt procuring agencies are in cahoots with the rice millers and deliberate delay in lifting the paddy, which forces the farmers to sell their produce to the millers at very low price.
- ✓ The farmers are forced to sell their paddy to the millers i.e. 800-900rs/quintal for coarse paddy and 1200-1400rs/quintal for fine paddy against the govt MRP i.e. 1310rs/quintal for coarse paddy and 1600rs/quintal for fine paddy, due to the non opening of the mandis.
- ✓ Sources said the representative of rice millers are ruling most of the procurement centres. They resort to deduction of 5-8kgs paddy from 1 quintal on the plea of presence of different foreign matter and above 16% of the moisture content.

- ✓ Again from the surveyed area, most of the farmers are small and marginal farmers having up to 1 acre of land. So their produce is very less, due to heavy transportation charges they prefer to sell it to the private traders as they procure it from their door step.
- ✓ Farmers are facing a lot of burglary in marketing their product in the marketing their produce. Every year farmers are losing up to 17-20% of profit by immediately selling their produce in paddy to meet their daily needs.

- ➢ Direct marketing also takes place between farmers and millers. Now a day, mills are present in the rural areas for the easy access to the farmers. The farmer after harvesting immediately take their produce to the mills, because they get spot cash or within 5-10 days. The farmers get only 1200rs/quintal and 1400rs/quintal as compared to 1310rs /quintal and 1600rs/quintal i.e. the govt MRP for coarse and fine paddy respectively.
- ➢ The millers then sell it to the whole sellers then it comes to the retailer and then finally to the consumers.

INSTITUTIONAL CHANNEL:

The farmers directly sell their produce in the mandis, which are the govt procuring agencies. From the surveyed area the percentage of farmers directly selling their produce in the mandis is very low. But the farmers sell their produce in the mandis gets the exact MRP i.e. 1310rs/quintal and 1600rs/quintal.

4.9. CRITERATION FOR SELECTION OF CHANNELS:

There are many marketing channels involved in marketing of paddy/rice. The following are the criteria for selection of efficient marketing channel.

- ✓ The channel, which ensures reasonable return to producers, is considered to be good & efficient.
- ✓ Transportation cost in the channel
- ✓ Commission charges and market margins received by the intermediates such as traders, commission agent, wholesalers, retailers.
- ✓ Financial resources.
- ✓ The shorter channel with minimum market cost should be selected.

4.10. FACTORS INFLUENCING ADOPTION OF RICE PRODUCTION:

- ✓ Size and quality of cultivable land.
- ✓ Timely access to rice seed and other inputs.
- ✓ Availability to credit.
- ✓ Level of organisation by farmers.
- ✓ Market proximity.

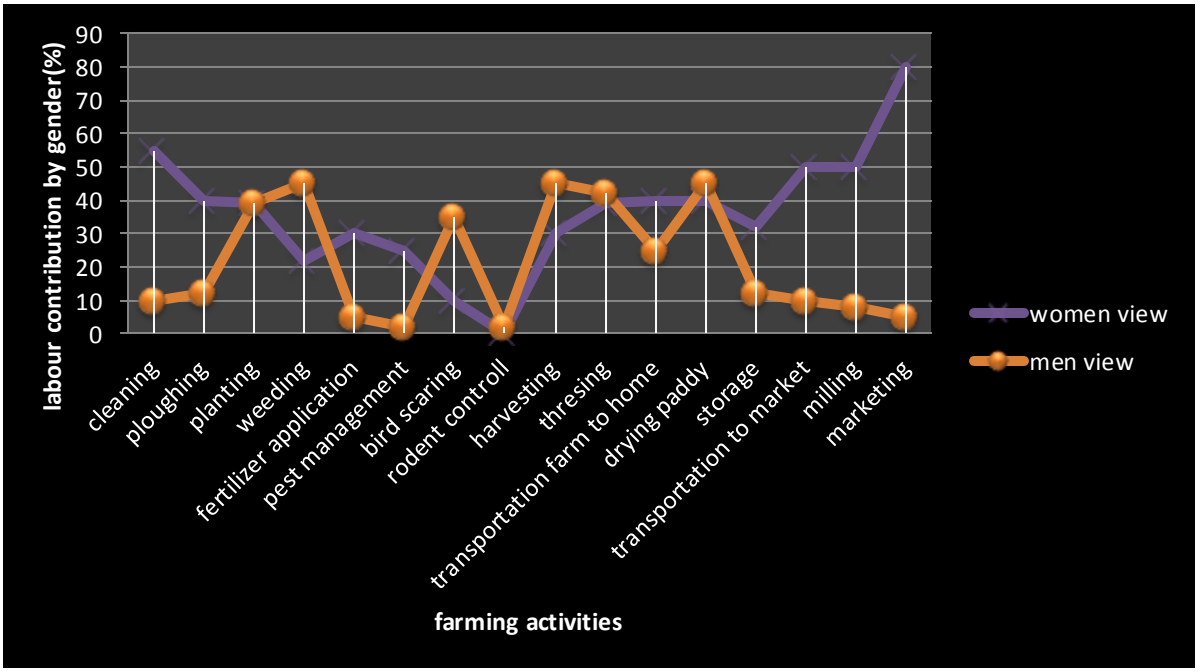
4.11. GENDER IN RICE PRODUCTION:

Women have played a very important role in rice farming systems, particularly where cultivation practises demand heavy manual labour input. However, research programmes and development projects has often inadequately taken these roles into account. The consequences have often been detrimental not only to economic security and social status of women themselves and their families, but also to the success of these programmes and projects in meeting regional and national development objectives.

The survey did examined different role of women in rice cultivation, processing and marketing and their implication for expanding production, increasing productivity and incomes.

The survey found a clear sexual division of labour between rice farming operations. Men were mainly responsible for land preparation, ploughing, preparing nursery beds, fertilizer and pesticide application, milling and marketing. Women on the other hand, were mainly responsible for weeding, bird scaring, harvesting, transporting and drying. Activities are almost equally performed by both men and women. It was noted in all the surveyed villages that men's close presence strike in with their keen oversight on most of the post harvest processes. After the crop dried men almost exclusively take over the responsibilities of milling and marketing of the crop.

Whereas, over all women may have greater input on rice production in terms of labour. The sharing of proceeds from the crop usually disproportionally goes to the men. Quite often the women may not even know how much money was earned from the sales of paddy; neither will she know the utilisation of the avenues.



4.12. RICE EFFECTS ON LIVELYHOOD & FARMING SYSTEM:

4.12.1. RICE EFFECTS ON LIVELYHOOD OF FARMERS:

Rice farmers, processors, agro input dealers livelihood depend on their capacities and assets (Natural, physical, financial, social & human) rationally applied through activities required for their means of living, including off farm employment. These include activities to improving household incomes, health, education and nutrition for children. They also include access to land, capital and shelter.

According to the survey of the rice farmers in the villages, it is reported that rice farming has first and foremost helped in the education of their children. This is vital contribution in the shaping of a lifelong future for next generation. Farmers reported using proceeds from rice farming to acquire household items and essentials and for enhancing household food security. The other benefits included improvement in shelter, clothing as well as buying foods, expanding farm land, medical expenses, acquiring improved mode of transportation, hiring labour and boosting income generating business.

4.12.2. RICE EFFECTS THE LIVELYHOOD OF PROCESSORS:

Majority of the rice processors interviewed were operating rice mills which were either locally made or imported and sold in the local market. The capacity of the mills ranged from 1 tonne-4 tonne per day. The mills mostly use electric power for their operation. The major complains by millers included high cost of powers, very unreliable power supply, expensive mill spare parts, high taxes etc. Despite these problems 91% of millers +interviewed indicated they were benefiting from their milling enterprise and that to their future plan is to expand rice processing.

Asked in which way they were benefited from the enterprise, majority cited the following:

- Being able to pay the heavy school/college fees at different education level of their children.
- Able to meet the heavy medical expenses.
- Expand the storage facilities of their mills and buy newer one.
- Procure large quantity of paddy from farmers, mill it and market it themselves.
- Buy vehicle for ease of transportation of paddy and the milled products.

From the above, it is evident that like the farmers, the processors have also positive benefits as having rice milling as an enterprise.

4.12.3. RICE EFFECTING THE LIVELYHOOD OF INPUT DEALERS:

The survey indicates that, there were no input dealers specially handling rice inputs alone. Most of the input dealers handled general agricultural inputs such as seeds, fertilizer, pesticides, sprayers etc. It was therefore very difficult to access the benefits of input dealers, accrued through selling rice inputs.

However, the result indicates that the interviewed input dealers want to expand their business. So one can easily infer that majority of the input dealers should have got some benefits from selling rice related inputs.

4.12.4. RICE EFFECT ON FARMING SYSTEMS:

The survey found

- ✓ Rice residue and by-products providing feed for livestock.
- ✓ Rice residue contributing towards soil fertility management.
- ✓ Land and livestock acquisition through rice proceeds.
- ✓ Increase in other crop production through proceeds from rice.

The negative aspects include:

- ✓ Labour competition: rice and other crops.
- ✓ Labour competition: rice and livestock enterprise.
- ✓ Reduction in land for other crops in favour of rice.
- ✓ Reduction in grazing land in favour of that of rice.

Regarding the environment issues:

- ✓ Indiscriminate clearing of farmland to give way for rice.
- ✓ Improper use of chemicals, which give rise to air and water pollution.
- ✓ Indiscriminate disposal of rice mill residue, which cause different health hazards and pollute the environment.

5. CONSTRAINTS AND CHALLENGES IN RICE PRODUCTION, PROCESSING AND MARKETING:

5.1. Constraint of rice farmers:

Most of the rice farming constraint in the surveyed villages were rather similar and were mainly based on production, processing and marketing. The constraints were obtained during individual household interview and focused group discussions. Farmers here discussed each of their constraint in detail. The constraints obtained from the individual household interview were almost same with the FGD.

5.1.1. Inadequate knowledge on rice farming:

Inadequate knowledge on rice farming is one of the major constraints faced by the farmers. The farmers are small and marginal, thus they follow the traditional method of cultivation. They are very much reluctant in accepting any new variety of hybrid rice. This may be attributed toward the significant amount of rice training by govt agency and NGO. Herbicide, pesticide uses, post harvest handling, processing and marketing, pest, disease, soil fertility management, irrigation and water harvesting skills are main training needs raised by the

farmers. The inadequate knowledge in post harvesting handling and processing is directly affecting the rice processors. All the processors interviewed reported that one of the biggest problem is the supply of low quality paddy, either wet or over dried or contaminated with foreign matter especially stones. This result into low quality milled rice thus affects the market.

5.1.2. Labour intensity in rice farming:

Strenuous and laborious rice farming operations were reported by all the surveyed area. It was the second most severe constraint in expansion of rice production. Cleaning, ploughing, planting, weeding, harvesting, threshing and transportation were cited as most laborious operation. Women, who are the main labour provider in different activities, are the biggest constraint in the rice farming area. According, to the farmers, this situation is aggravated by lack of appropriate farming tools, equipments. The equipment available is often too expensive for average farmers. Most farmers depend upon the rudimentary, labour & time consuming tools such as hoes, slashes, sickle, axes etc.

5.1.3. Lack of capital for rice farming:

Farmers in all the surveyed area cited lack of capital among the primary constraint in the rice farming. Although banks, micro finance companies exists but the farmers have no access to these. Most f the farmers reported that the policies, interest rates and other terms that most financial institution attach to agricultural loan do not favour farmers. So the farmers bring loan from the money lenders of the villages at the stating seasons and at the end of harvesting the farmer return a quintal of paddy as against Rs 500. Again most of the farmers do not have proper land document of their land so they do not get loan from bank and become easy prey of the money lenders, as capital is badly needed to purchase improved farm input (seed, farm tools, implement, equipment, pesticides and herbicides, and to hire labour and skill trainers etc).

5.1.4. High crop losses due to pests and disease:

High crop damage and loss caused by rice pests was reported as one of the constraints affecting rice farming. Pest reported includes; rodents, grass hoppers, cut worm, stem borers and termites. Birds are identified as the major element in crop damage. Crop loss due to rice disease was also reported among the priority constraints. The common disease include rice blast, brown spot, sheath rot, yellow mottle virus etc.

5.1.5. Lack of appropriate equipments and implements for rice farming:

The study results indicate that lack of appropriate implements and equipments for rice farming, post harvesting handling and processing was among the priority constraints faced by farmers i the surveyed villages. The constraints directly affect the quantity and quality of rice produced by farmers. Although a range of equipments are available in these area but these technologies have not effectively diffused among the farmers. Farmers lack the fund to acquire the rice equipments as these are rather expensive. They are forced to depend upon the rudimentary, inefficient labour and time consuming tools such as, hoes, slashers, sickles, and axes etc for various rice farming operations.

5.1.6. Depended on monsoon:

Rice is traditionally a wet land crop, requiring reliable amount of moisture especially during critical periods of growth. Despite good endowment in the amount of rainfall the district receives, koraput's rainfall is unevenly distributed both in space and time. The farmers reported that, they totally depend upon the monsoon; any other source of irrigation is dream for farmers. With the help of some NGOs in some villages pump sets are available, but due to unavailability of electricity and diesel they are not used properly. Other irrigation technologies are still very expensive and suitable ones not easily available.

5.Rainfall data – Koraput (Source- MSSRF)

S.No.	Month	2007	2008	2009	2010	2011
1.	January	0	0	0	0	0
2.	February	0	10.0	0	19.6	10.4
3.	March	0	110.6	2.7	0	1.6
4.	April	31.1	48.7	3.4	19.4	113.0
5.	May	37.5	58.5	53.8	63.2	76.2
6.	June	847.3	244.3	100.2	152.6	146.8
7.	July	281.7	327.5	491.8	646.6	225.6
8.	August	520.0	560.8	318.8	349.8	375.0
9.	September	441.5	386.1	142.3	494.4	321.6
10.	October	189.3	40.2	150.7	203.0	43.8
11.	November	2.7	3.8	48.2	77.4	0

12.	December	0	0	5	23.6	0
	TOTAL	**2351.1**	**1790.5**	**1316.9**	**2049.8**	**1314.0**

5.1.7. Farmers poor market system of rice:

The study identified farmer's poor marketing system as one of the factors that significantly impinge on farmer's rice proceed. Due to improper market, farmers sell their produce to middlemen and get very low amount of their produce. Again due to lack of transportation, the farmers sell their product in local markets instead of mandis, where they can get 1310rs/q and 1600rs/q for coarse paddy and fine paddy respectively.

5.1.8. Poor quality and expensive seeds:

Farmers cited the issue of poor quality and expensive seed among the priority constraints. During the study of individual household 60% reported that some seed companies sell seed of mixed variety, whose variety name is not indicated in the packet and that has very low germination percentage. Farmers cited these seeds are of very poor quality and are very expensive.

7. **Constraints and recommendation for farmers**

1.inadequate knowledge in activities pertaining to rice farming	✓ Train farmers on rice production, processing , marketing technologies. ✓ Provide rice farming and processing manuals.
2.strenous and laborious rice farming operation	✓ introduce appropriate farm implements and equipments. ✓ Actively promote use of herbicide.
3.lack of capital to pay for the usually high labour cost and expensive inputs and transportation	✓ Provide affordable loans for farming. ✓ Improve farmers capacity to access and manage loans. ✓ Form effective farmer groups to mobilize fund internally and externally.
4.crop loss caused by rice diseases specially	✓ Train the farmers on the value and safe

blast, yellow mottle virus, stem bores etc	use of agro chemicals.
5. lack of appropriate implements for rice farming, post harvest handling, rural transportation	✓ Need for soft loans to buy the necessary equipments.
6.depended on monsoon	✓ Proper irrigation facilities
7.poor marketing system	✓ Promote farmer co-op marketing
8.poor quality and expensive seeds	✓ Govt should enforce laws against seed companies that sell poor quality seeds. ✓ Farmers must also be trained to be sensitive to use good quality seed.
9.land shortage	✓ Provide soft loan to buy lands
10.declining soil fertility	✓ Train on crop rotation

5.2. Constraints of rice processors:

Rice processors surveyed experienced similar constraint in the area of technical performance of rice mills, access to repair facilities and services, quantity and quality of paddy from farmers and marketing and quality of milled rice and bran.

5.2.1. Technical performance of rice mill:

Unreliable and high cost of electricity and diesel were reported as one of the major current obstacles in rice milling. Irregular power cause unnecessary delays in milling resulting in millers failing to meet demand of their customers. As a coping strategy, rice millers also use diesel engines to run the rice mills. These have much higher operation costs compared to electrically powered mills. Frequent breakdown of rice mils was among the constraints reported. Some of the rice millers cited high breakages in milled rice as some of the problems.

5.2.2. Access to repair facilities and services:

Of the all rice millers interviewed majority reported that spare parts and repair kits for rice mills are not readily available. Majority of the millers have to travel long distance to obtain mill spares and repair services. The millers also lack trained technicians to repair the mills.

5.2.3. Quantity and quality of paddy received at rice mills:

Improperly dried paddy by farmers (either wet or over dried) was cited among the priority issue that need immediate attention. Majority of the farmers do not know when to harvest and how to properly and effectively dry paddy. Some farmers harvest rice when it is premature. The premature rice has poor quality when milled, it looks like white chalk. Other farmers after harvest cover the wet paddy before drying thus causing it to partial mould. The wet or over dried paddy causes high breakages during milling. Millers reported that some farmers bring paddy which is contaminated with foreign materials especially stones. The stones and other foreign material increase the rate of ware of rollers and often destroy mill sieves. Lack of paddy all year round was reported as some constraint rice miller are experiencing.

8. **CONSTRAINT AND RECOMMADATION FOR PROCESSORS**

1. Unreliable and high cost of electricity	✓ Acquire generator as fall-back situation. ✓ Govt should provide regular, stable and cheaper power.
2. Frequent breakdown of rice mills	✓ Introduce durable and more reliable rice mills in the market.
3. High milling breakages	✓ Train farmers on proper drying of paddy and rice millers to be sensitive on quality paddy.
4. Inadequate knowledge on rice milling	✓ Employ trained rice mill operators.
5. Spare parts and repair kits on . easily available	✓ Encourage traders/stockist to bring in rice equipment and spare part closer to the mill.
6. Lack of trained technicians	✓ Trained technicians to operate rice mills.
7. Paddy either wet or over dried	✓ Train farmers on proper rice drying method and encourage use of simple moisture meter.
8. Paddy contaminated with foreign	✓ Train farmers on proper post harvest

matters specially stones	handling methods. ✓ Employ de-stoner in rice processing.

9. CONSTRAINT AND RECCOMMADATION FOR INPUT DEALERS:

1. Transportation of inputs is expensive	✓ Arrangements be made to deliver inputs direct at stockists' premises ✓ Stockists to acquire own transport ✓ Stockists to buy inputs in bulk
2. Inadequate capital to carry out large scale business	✓ Provide low cost loans ✓ Reduce taxes on agricultural inputs
3. Low quality seeds: (some companies sell fake seed, with poor viability, ungraded, unlabeled, etc)	✓ Government to enforce law to punish seed companies that sell low quality seeds ✓ Farmer groups to be zero tolerant on poor quality seed.
4. Low markets for the products since farmers can afford only small quantities due to inadequate Finance.	✓ Provide low cost loans to farmers to buy agric inputs ✓ Improve marketing system for farmers' rice
5. Most inputs are unaffordable to majority of smallholder farmers	✓ Provide loans to farmers
6. Many of the inputs are packaged in quantities which are not desired or afforded by farmers	✓ Manufacturers should focus packaging as per most-farmer demand (small quantities)
7. Farmers have inadequate knowledge on importance and management of most inputs	✓ Sensitization and training on the value of agricultural inputs & on their correct application
8. Many farmers are not aware of the availability of the inputs	✓ Invest in advertising ✓ Promotion by manufacturers

CHAPTER-06

SUMMARY & CONCLUSION

SUMMARY:

Major constraint for improvement of livelihood/income of small and marginal rice producers is lack of knowledge about prices, quality parameters, and sustainability aspects of rice production and lack of lobbying power. There is number of agricultural labourers including a significant no. of women than cultivators. Lack of local earning source force them to migrate to other areas. There is a need to lobby for their wage rights while being sympathetic to the labour needs of small and marginal farmers. Planning activities that may enhance their capability to earn more will go a long way in ensuring food security of this vulnerable group. Organic rice production and manual processing of rice may help to generate employment for poor and especially for women.

CONCLUSION:

The objective of this study is to generate basic information on the status of rice production, processing and marketing in Kundra block with a view to contributing to future rice development initiatives in the Koraput district. The study analyzed socio-demographic characteristics of farmer respondents and the environment under which rice is grown in the areas covered. It particularly focused on rice production practices from land preparation, through to processing and marketing of the crop. It came out with a focused summary of constraints and challenges faced by farmers, processors and agro-input dealers in the rice industry.

The major problem in the rice cultivation seems to be high water and chemical usage and the resultant ecological and economical crisis. SRI, dry paddy cultivation must be promoted to avoid access use of water. Ecological farming methods are proven to sustain production and provide better margin to farmers. Organizing farmers and moving them up in the value chain can bring additional benefit to the farmers. We need to promote the participation of women in supply chain and make them independent in decision making from men. Organizing farmer's co-operatives and arranging finances for holding, processing and selling paddy on better price by the farmer collectives.

Way forward

Because of a number of its glaringly positive benefits and effects on the lives of farm households and processors in **Kundra,** it is recommended that rice be regarded as a strategic crop for food security and income generation in line with the Poverty Eradication Strategy.

1. **Training and skills development:** Farmers, processor, service providers and rural artisans be trained on specific rice related aspects to improve their knowledge and skills.

2. Intermediate technology: It is recommended that promising intermediate technology options for rice production, processing and value addition be carefully selected for adaptation to local conditions, and new ones developed.

3. Rice pests and diseases:

a) In view of the pressure on rice production by various pests and diseases, there is need, as a starting point, to quantify actual rice-crop losses attributed to these agents;

b) Farmers must encourage employing environmentally friendly methods for disease and pest management;

c) As a long term strategy, research should accelerate generation of varieties with biological attributes of early maturing, high yielding, tolerance to drought, diseases and pests; as well as having good milling and cooking qualities, taste and aroma.

4. Rice inputs:

a) Re-enforce the promotion of rural micro-finance to address availability of capital for agricultural production in general; and for the acquisition of rice farm inputs in particular.

b) Rigorously train farmers on access and management of loans, and to mobilize funding both within and outside their communities;

c) Farmers should be trained on the importance of quality seed, and as groups, be keen on seed quality at the receiving end.

5. Rice processing and marketing

a) Building farmers' institutional capacity to form vibrant rice cooperatives and associations that will enhance collective marketing and minimize exploitative middle-men;

b) There is need to sensitize private entrepreneurs and create a conducive environment for them to invest in rice processing at locations well known for producing large volumes of rice.

CHAPTER-7

REFERENCES & ANNEXURE

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ANNEXURE

QUESTIONNAIRE:

OBJECTIVE:

A field observation and a study on value chain analysis of paddy which includes Levy systems, role of millers, govt agencies, and other systems of procurement of paddy. Along with these issues involved with production of paddy with respect to power supply, irrigation, and increase in the cost of cultivation, net income, mechanization, labour issue, input usage, credit and marketing

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QUESTIONNAIRE FOR FARMERS:

1.Name of the farmer:						
2.Age :						
3:Gender:	MALE-1	FEMALE-2	OTHERS-3			
4:Education:	Illetarate-1	Primary education-1	High/higher education-2	Graduate and others-4		
5. family members:						
6.occupation of each family members:	Agriculture-1	Wage labour-2	Trading-3	Street vendor-4	Livestock-5	Others-6
7.land ownership:	Agriculture on own land-1	Agriculture on leased land-2				
8.total acre of acre:						
9.land area under rice crop:						

10.what varieties of local rice do you grow:							
11.availability of inputs	seed	Fertilizer	pesticide	ploughing	Farm equipments	labour	others

12.from where do you avail the inputs:	Self-1	Pvt/market-2	NGOs-3	Govt-4	Co-operative-5	Others-6	
13.what fertilizer and pesticide do you use:			Bio/chemical fertilizer		Bio/chemical pesticides		
14.how do you store your seed for next season:							
15. Are you aware of soil testing, seed treatment, fertilizer application etc:			Yes-1		No-2		

16.availability of finance:	Self-1	Pvt/market-2	NGOs-3	Co-operative-4	Govt-5	Others-6
17.where do you market your produce:		Local market-1	Haats-2	Mandis-3	Mills-4	Others-5

18.seeling price/quintal:	To Mandis	To millers	To wholesalers	To land owners	Others
19.what is your total income:					
20.what problems do you face:					

Irrigation-1	Availability of inputs-2	Availability of inputs-3	Transportation-4	Marketing-5	Infrastructure-6	Others-7

QUESTIONNAIRE FOR MANDIS:

1.name:						
2.from how many villages do farmer come here to sell their produce:						
3.infrastructure facility:	transportation	storage	Weighing	Grading	Packaging	Others
4.what facilities do farmer get:						
5.what amount govt has fixed:						
6.what was the amount fixed previous year:						
7.what specification you while buying:	shape	Size	condition	volume	Others	

8.what problems do you face:	Condition of paddy received:	Worthiness of farmers	Rodents	Others

QUESTIONNAIRE FOR PROCESSORS:

- ✓ Name of the mill:
- ✓ When was it established:
- ✓ Milling capacity:
  a. current installed capacity:
- ✓ Current demand for rice:
- ✓ How many MT do you process:(per month/per year)
- ✓ How many MT do you import:
- ✓ Do you buy locally produced rice? How?
- ✓ Is there any preference for locally produced rice:
- ✓ What specification do you look while buying:
- ✓ Who do you sell:
- ✓ Do you use broker to procure and sell rice:
- ✓ Do you participate in open tender:
- ✓ What challenges do you face:

QUESTIONNAIRE FOR WHOLESALLERS

- ✓ Name:
- ✓ Are you the single owner or do the business with partners:
- ✓ From how many years you are in this business:
- ✓ What is current demand for rice:
- ✓ How many MT of rice do you buy(per month/per year):

- ✓ *What varieties do you buy:*
- ✓ *Do you have any brokers:*
- ✓ *Do you buy any local varieties of rice:*
- ✓ *What is the demand for local rice in market:*
- ✓ *Do you have any infrastructure facilities for storage:*
- ✓ *What challenges do you face:*

QUESTIONNAIRE FOR RETAILER

- ✓ *Name:*
- ✓ *From how many years are you in this business:*
- ✓ *What is the current demand for rice:*
- ✓ *How much MT rice do you buy:*
- ✓ *What varieties do you buy:*
- ✓ *Do you buy local varieties of rice:*
- ✓ *What is the demand for locally produced rice:*
- ✓ *Do you have any infrastructure facilities:*
- ✓ *What challenges do you face:*