FOOD RESEARCH INSTITUTE

RICE SECTOR SUPPORT PROJECT

TECHNICAL ASSESSMENT OF RICE PRODUCTION AND POST HARVEST PRACTICES

BASELINE AND NEEDS ASSESSMENT IN UPPER WEST REGION

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Table of Contents

1. INTRODUCTION

1.1 BACKGROUND

Rice Sector Support Project (RSSP) is part of the bilateral co- operation between the Government of Ghana (Ministry of Food Agriculture) and Agence Française de Développement. It is a follow up of the Lowland Rice Development Project (LRDP) which commenced in February 1999 and ended in December 2003 with the specific purpose of establishing lowland rice production and processing methods which are economically viable and sufficiently attractive for Farmers and the Women Processors responsible for processing and commercialising this production in the Northern Region of Ghana.

The overall goal of RSSP is to strengthen stakeholders of the rice sector with the view of contributing to reduce poverty in the northern part of the country and improve upon national food security as a whole. In furtherance of this goal the RSSP purposes to increase rice productivity (and production) and household incomes in northern Ghana through the adoption of appropriate technologies by low-income and/or resource poor farm households, rice processors, marketers and communities in targeted areas of northern Ghana. The project is being implemented in four regions namely; Upper-East, Upper-West, Northern and Volta with the under listed outcomes and expected outputs.

Outcomes:

- Strengthened rice value chain development in the Northern, Upper East, Upper West and Volta regions
- Strengthened national rice sector organization
- Developed research activities on cropping systems adaptable to the natural conditions of northern Ghana
- Improved rice processing techniques aimed at increasing the acceptability, marketing and consumption of local (Ghana grown) rice

Project outputs:

- Increased access to rural credit from banks and other financial institutions
- Enhanced adaptive research responsive to productive and environmental needs
- Improved project management and coordination, support to MoFA structures and Coordination Unit
- Strengthened External technical assistance

The Directorate of Crop Services (Ministry of Food and Agriculture) and CSIR-Food Research Institute have agreed to work in partnership on the improvement of rice parboiling and milling in the project implementation areas in order to improve the quality of the processes throughout the transformation chain and to produce local rice able to compete with imported rice on the national market. This is to be done through training, extension activities

and also research into continuously improving the post-production handling of rice and consumer demands in order to satisfy the various market segments.

To this end, FRI-CSIR is to conduct baseline surveys in all the three northern regions of Ghana (Northern Upper East and Upper West Regions) and the northern part of the Volta Region in order to establish benchmarks for monitoring purposes. This report presents the baseline survey findings in the Upper West Region.

1.2 Survey Objectives

A baseline survey is relevant in measuring impacts and gauging progress of implementation activities while the needs assessment aspects establish the urgent requirement for improved post harvest practices and processing activities. Information gathered from this survey also helps to gain a better understanding of the project areas for fine-tuning planned interventions. Key output from this survey is that needs of rice value-chain actors to consistently produce high quality rice established and recommended. Specific information related to the objectives and indicators of the project document are as follows:

At Farmer Level

- To investigate the current rice production practices in selected project areas
- To investigate the current rice harvesting and post harvest practices in selected project areas
- To investigate social interactions among rice farmers in relation to associations, financial support and technical assistance
- To assess constraints and needs of rice farmers in the selected project areas

At Processors Level

- To investigate the current rice processing practices in selected project areas
- To investigate social interactions among rice processors in relation to associations, financial support and technical assistance
- To assess constraints, challenges, opportunities and needs of rice processors in the selected project areas

At Millers Level

- To investigate the current milling practices in selected project areas
- To investigate social interactions among rice millers in relation to associations, financial support and technical assistance
- To assess constraints, challenges and needs of rice millers in the selected project areas

1.3 METHODOLOGY

The survey employed a combination of one-on-one interviews, participant observation and focus group discussions. As indicated in the methodological framework below, a comprehensive review of previous interventions by FRI was done. Secondly, primary information on the production, harvesting, post harvest practices and marketing were collected using the survey instruments. Data collection took place in September 2011. In the Upper West Region, a total of 26 farmers, 26 processors, 4 millers and 3 processor groups were interviewed. Quantitative data was analysed using Statistical Package for Social Scientists (SPSS), version 16.0 and Excel package.

Fig. 1. A section of processors interviewed in Pole

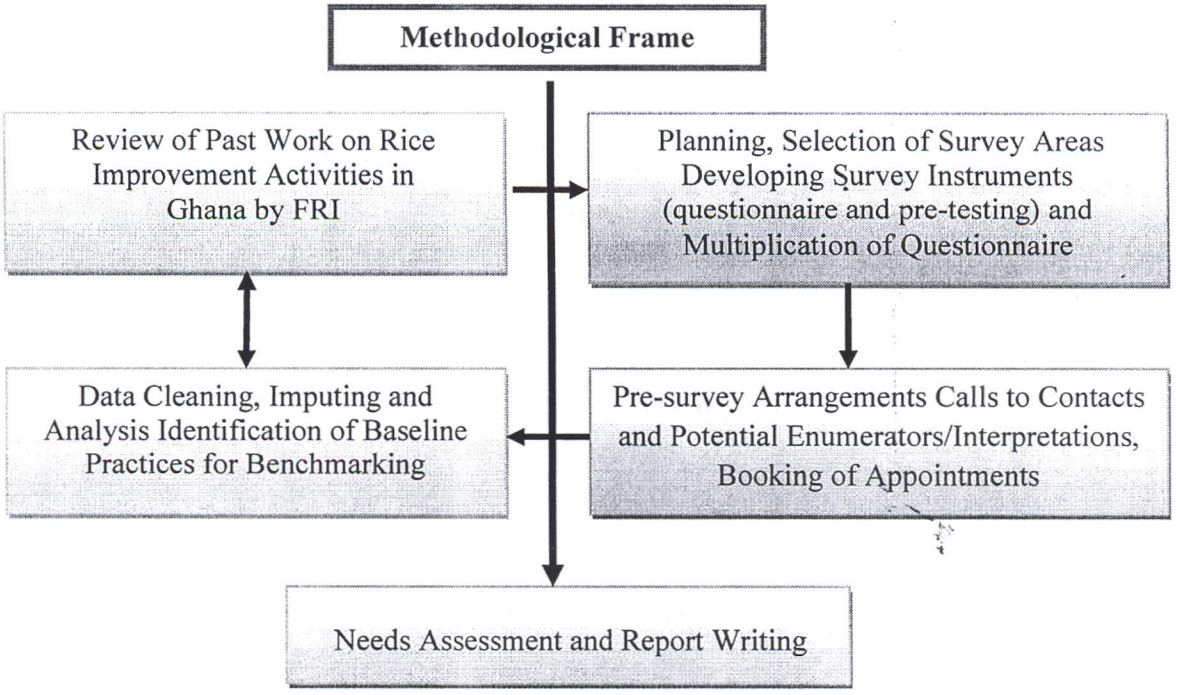


Figure 2: Methodological framework

Sampling

The table below shows the surveyed areas and the communities. A sampling frame consisting of members in the various farmers and processors groups was obtained from RSSP contacts in the districts. Random sampling was then used to select the respondents.

Table 1: Surveyed areas and the number of respondents

Surveyed Areas	Farmers		Processors		Millers	
Location/District	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Yaala 1/Wa East	4	15.4	5	23.1	-	-
Yaala 2/Wa East	8	30.8	6	19.2	-	-
Pole/Wa West	10	38.5	10	38.5	-	-
Sing/Wa Municipal	4	15.4	4	15.4	4	100
Jujeidayiri/Wa Municipal	-	-	1	3.8	-	-
Total	26	100.0	26	100.0	4	100

2. SURVEY FINDINGS

2.1 FARMER LEVEL FINDINGS

Profile of Respondents

Majority of the farmers interviewed were between 30-50 years of age and economically active. Close to 90% of the respondents were married, about 80% had no formal education. Close to 30% and 50% of the overall sample had less than 5 years and between 5-10 years experience in rice farming respectively. Rice farm sizes were between 1 and 2 acres. Table 2 shows the socio-economic background of farmers interviewed.

Table 2. Biodata of Farmers in the 4 communities visited

Characteristics	Percentage Response				
	Yaala 1	Yaala 2	Pole	Sing	Across all communities
Age					
21-30	-	-	10.0%	-	3.8%
31-40	50.0%	50.0%	50.0%	50.0%	50.0%
41-50	50.0%	25.0%	20.0%	25.0%	26.9%
51-60	-	25.0%	10.0%	-	11.5%
61-70	-	-	10.0%	-	3.8%
>70	-	-	-	25.0%	3.8%
			Sex		
Male	100.0 %	62.5%	70.0%	75.0%	73.1%
Female	-	37.5%	30.0%	25.0%	26.9%
			Marital status		
Married	100.0 %	87.5%	100.0 %	50.0%	88.5%
Single	-	12.5%	-	50.0%	11.5%

Educational Background					
No Education	50.0%	57.1%	100.0 %	100.0 %	80.0%
Basic level	50.0%	-	-	-	8.0%
Secondary and High school	-	28.6%	-	-	8.0%
Islamic basic	-	14.3%	-	-	4.0%

Experience in Rice Farming					
<5years	-	62.5%	10.0%	25.0%	26.9%
5.-10years	50.0%	37.5%	60.0%	50.0%	50.0%
10.1-15years	-	-	20.0%	-	7.7%
15.1-20years	25.0%	-		25.0%	7.7%
>20years	25.0%	-	10.0%	-	7.7%

Source: Field Data Survey, September, 2011

Other crops cultivated by rice farmers interviewed

In addition to rice, some other crops were cultivated by respondents. These include yam (reported by 60% of sample interviewed), cassava (7%) and cereals such as millet (26%), maize (100%) and sorghum (10%). Few respondents also cultivated legumes like *bambara*, cowpea, groundnuts and soybean as well as vegetables. Figure 3 shows the relative importance of selected crops cultivated in terms of sale for cash and household consumption.

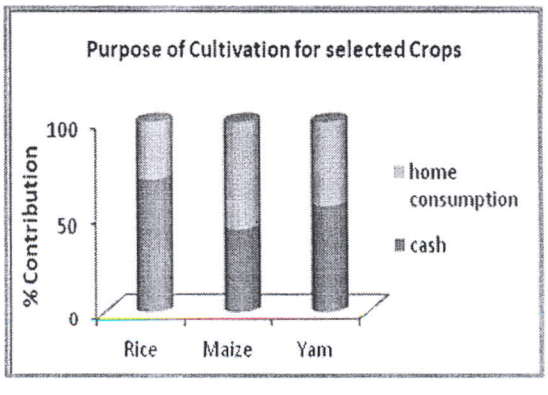


Fig. 3. Purpose of cultivation

Rice varieties cultivated

Varieties grown depended on availability, accessibility and level of introduction of improved varieties by RSSP/MoFA. For example in Yaala 2, the farmers had not yet been introduced to new varieties (Degan and Jasmine). Therefore local varieties including red and white varieties were cultivated. A combination of local and improved varieties (Jasmine) was cultivated in other surveyed areas as shown in Figure 4. According to the farmers, Jasmine is high yielding and early maturing. Local red was cultivated for household consumption and white varieties mainly for sale. Local varieties were said to be more palatable and did not require extensive fertilization as compared to the improved varieties.

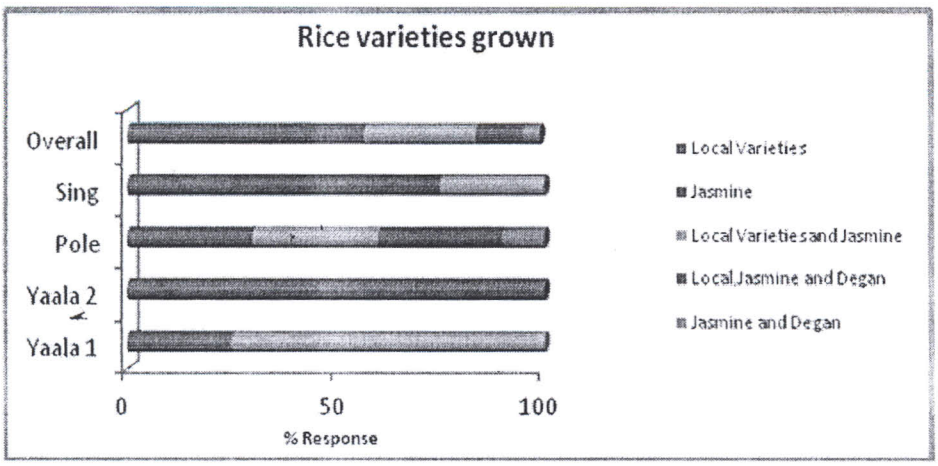


Figure 4. Rice varieties cultivated in communities surveyed

Planting time and Sources of Seeds

Local varieties are planted in March -May while improved varieties are planted in June – July depending on the rainfall pattern. There are differences in planting times with respect to varieties (local versus Improved).

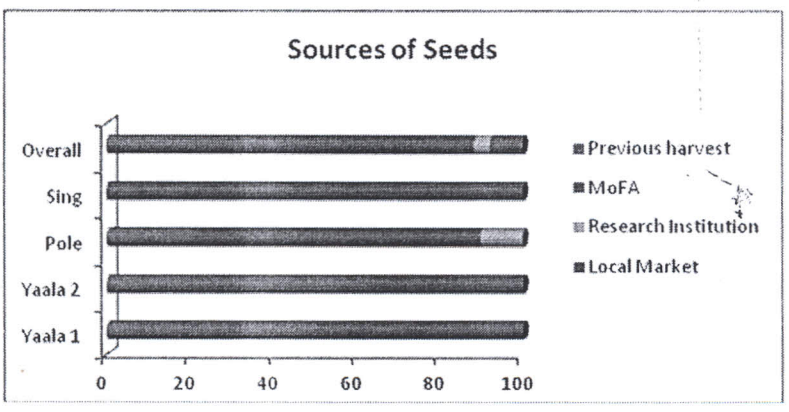


Figure 5. Sources of seeds for planting

The local rice varieties are late-maturing and therefore cultivated early enough to be able to take advantage of the dry season for post-harvest practices. On the average farmers weed or apply weedicides on their rice farms twice before harvesting. In some cases hand picking is done instead of weeding a second time. Seeds of local varieties were mostly obtained from previous harvest. However, seeds of improved varieties were mostly obtained from MoFA as seen in Figure 5.

Methods of Pest control on rice farms

Pest control methods used by rice farmers interviewed include use of scare crows, pesticides and physically driving pests away. In Yaala 1, only the use of scare crows was reported. In Yaala 2, the use of scare crows was ranked first followed by use of pesticides and physically driving them away. Again, in Pole the use of scare crows was ranked first followed by use of pesticides and physically driving them away. In Sing, only the use of pesticide was reported.

Harvesting

The optimum harvesting time after sowing ranged between 90 and 120 days depending on the maturation of a particular variety. Signs of maturity of a rice field given by farmers include brown colouration of leaves, dropping or falling of rice ears, browning of grains and lodging. Brown colouration of leaves was the most commonly reported sign in all the surveyed areas. The optimum condition for harvesting is a sunny weather. Harvesting was done manually in the surveyed areas. This involves the use of sickle and knife. Length of time of harvest is reported to have effect on rice quality and percentage losses during harvesting. On the average it takes about 3-5 days to harvest an acre of rice farm.

….. *'If harvesting can be done faster, it will increase rice quantity' (quotation from a respondent)* …….

Nearly 70% of respondents reported of incidence of lodging during harvesting. There were reported occurrence of shattering at harvest; Yaala 1 (75%), Yaala 2 (100%), Pole (80%) and Sing (100%). Causes of shattering include delay in harvesting, over drying of paddy on farm and pests attack.

Harvested rice is mostly sun-dried directly on the ground before threshing; Yaala 1 (50%), Yaala 2 (86%), Pole (90%) and Sing (100%). According to farmers drying before threshing reduces moisture content and improves ease of threshing as well as the final quality of milled rice.

Methods of threshing

Threshing of harvested paddy was done by beating panicles with sticks. Drying of paddy after threshing was commonly practiced in Sing. Only a third of sample interviewed in Yaala 2 and just about 10% of sample interviewed in Pole dry paddy after threshing. Drying of

paddy after threshing was said to reduce moisture and improve quality of milled rice. Drying was done directly on the ground.

- Beating with sticks; Yaala 1 (100%), Yaala 2 (50%), Pole (80%) and Sing (75%).
- Beating with sticks and pounding in mortar; Yaala 2 (37.5%) and Pole (10%)
- Beating with sticks on the bare floor; Sing (25%).

Problems associated with manual threshing

- Loss of grains and development of cracks and breakages of grains
- Drudgery and time consuming
- Adulteration of paddy with stones and foreign materials

Source of financing and Supporting Agencies/Organisations

About 96% of the total sample interviewed used their own resource or finance for rice farming. The rest use resources from friends and family relations. Supporting agencies or organisations identified included MoFA/RSSP MoFA-Block farming and Plan Ghana.

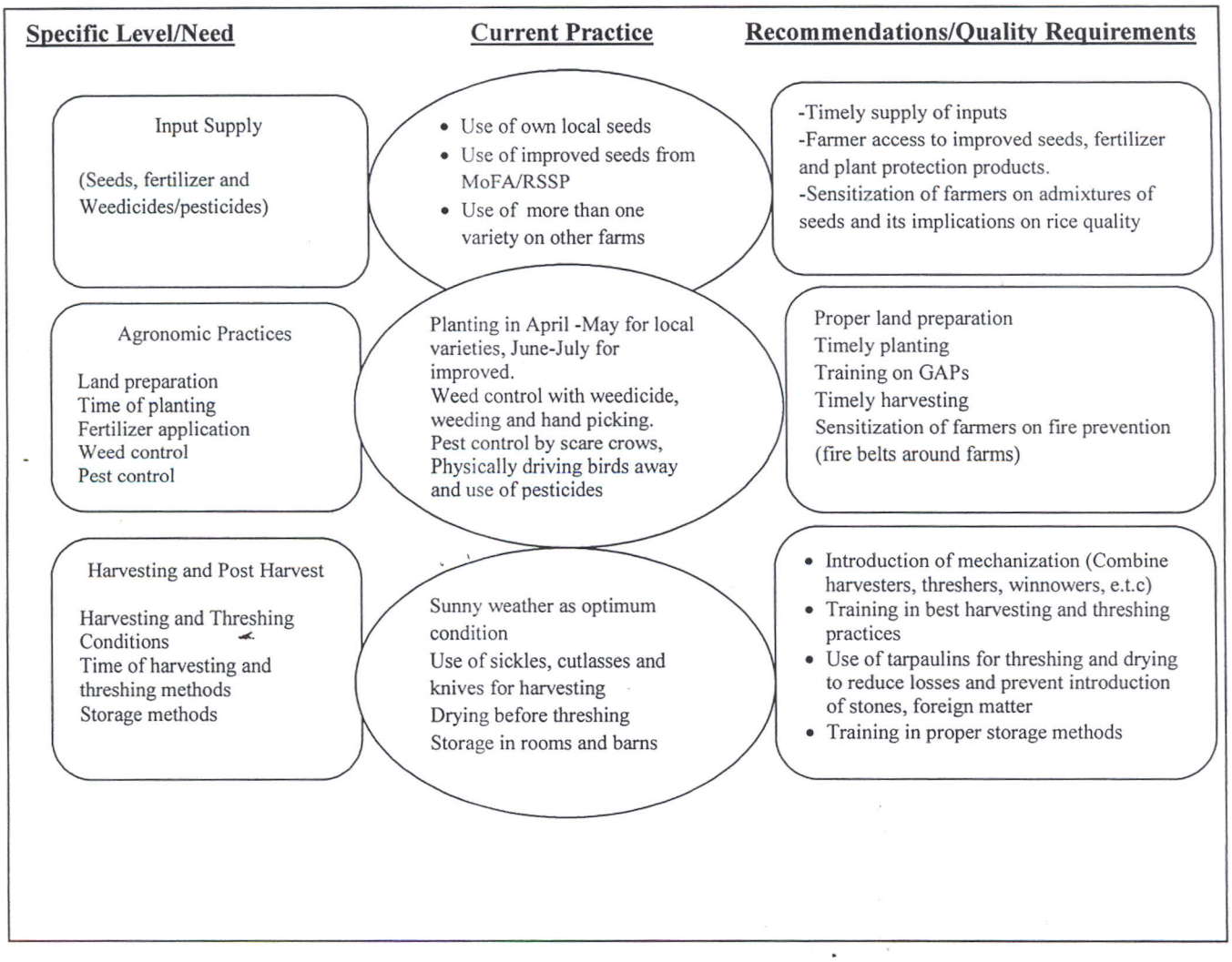
- Yaala 1- MoFA/RSSP
- Yaala 2- MoFA/RSSP and Plan Ghana
- Pole- MoFA/RSSP
- Sing - MoFA/RSSP

Problems/Constraints

Constraints and challenges in rice farming enumerated by respondents are listed below:

- Lack of milling facility
- Fire outbreak on rice farms
- High cost of fertilizer
- Lack of financing
- Lack of new varieties of rice and pest attack
- Birds attack on rice fields and unavailability of pesticides
- Unreliable rainfall patterns
- Lack of appropriate harvesting equipment and tarpaulins
- Lack of training in improved agronomic practices and post harvest practices
- Inadequate capacity in land preparation, ploughing and weed control
- Pest attack on stored milled rice

Overview of Farmer Level Needs Across surveyed communities



2.2. PROCESSOR LEVEL FINDINGS

Two categories of processors were identified; village level processors and urban level processors predominantly located in Wa municipal. At the urban level, already existing processor groups were indentified. Group membership ranged between 10 and 16. Urban level medium scale processors were already using the improved parboiling vessels but needed improvement in drying space, tarpaulins and improved stoves. The survey team had interactions with members of Nuntaa, Unity and Progressive Rice Processing Groups. The processors belonged to groups and owned parboiling vessels yet, they operated individually. The Nuntaa Processing Group had been linked to Agricultural Development

Bank (ADB) for financial assistance. They had a group bank account. Unity and Progressive Rice Processing Groups were also processing weaning food from rice and soybean. Characteristics of preferred rice varieties for processing included palatability and high recovery. Traditional method of processing was used at the village level processing. No improved vessel used at the village level processing. Table 1 shows the biota of respondents.

Table 3: Socio economic profile of Processors in the communities visited

Characteristics	Percentage Response (%)					
	Yaala 1	Yaala 2	Pole	Sing	Jujeidayiri	Across all communities
Age						
21-30		66.7%	55.6%	25.0%	-	40.0%
31-40	20.0%	16.7%	22.2%	50.0%	-	24.0%
41-50	40.0%	16.7%	11.1%	25.0%	100.0%	24.0%
51-60	40.0%	-	11.1%	-	-	12.0%
Sex						
Male	-	-	-	-	-	-
Female	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Marital status						
Married	80.0%	100.0%	100.0%	100.0%	-	92.4%
Single	20.0%	-	-	-	-	3.8%
Widowed	-	-	-	-	100.0%	3.8%
Educational Background						
No Education	80.0%	16.7%	100.0%	75.0%	100.0%	73.1%
Basic level	20.0%	83.3%	-	25.0%	-	26.9%
Secondary and High school	-	-	-	-	-	-
Islamic basic	-	-	-	-	-	-

Source: Field Data Survey, September, 2011

Processing Capacity

Processing capacities by the respondents in the communities surveyed were low; ranging from 1 – 5 bags (85-kg bag) per week. As shown in Figure 6, majority processed just about 1 bag per week. Processing levels largely depended on availability of paddy.

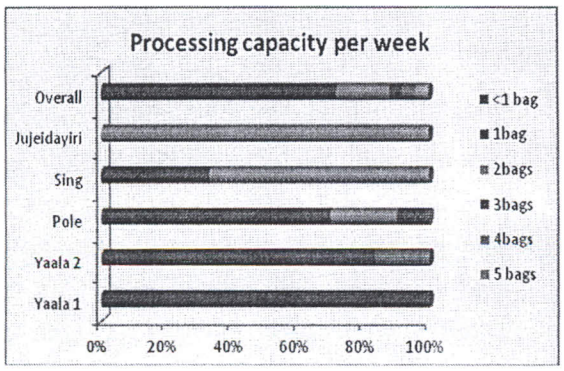


Figure 6. Processing capacity of Respondents

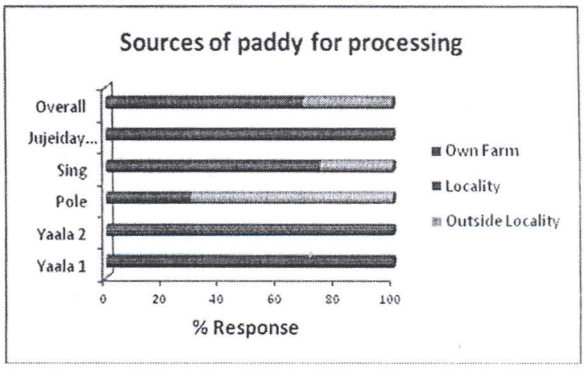


Figure 7. Sources of paddy for processing

Parboiling

Varietal Preference

Nearly 54% of respondents showed no preference for any variety for processing. These processors actually buy their paddy from many sources and consequently mix the varieties before processing. The other 56% of processors interviewed in the survey showed varying preferences for rice varieties for processing. Observation from the results indicates that processors' preference is basically dependent on which variety is available in the locality. At Jujeidayiri there was a 100% preference for local white variety as well as in Wa East District (Yaala 1 and 2) where many more processors (>50%) preferred processing local white varieties to the new varieties. This is because the new varieties have just been introduced to the farmers and some are yet to harvest for the first time. In addition, interviewers expressed sentiments that processors were not sure about quality and consumers' acceptability of the new varieties hence less than 20% of respondents in the Yaala communities preferred both local white and Jasmine. According to some processors the local white variety is more palatable and is the consumers' choice.

Cleaning

Processors in 3 out of 5 communities surveyed do cleaning before parboiling. The overall percentage of processors who do cleaning before parboiling is 80% which is a good practice since threshing method used add foreign materials to the paddy. Cleaning at this stage involves winnowing, removal of straw, soil particles and other foreign materials to enhance the quality of parboiled rice. Some respondents also wash the paddy in water and skim floating immature paddy and foreign materials.

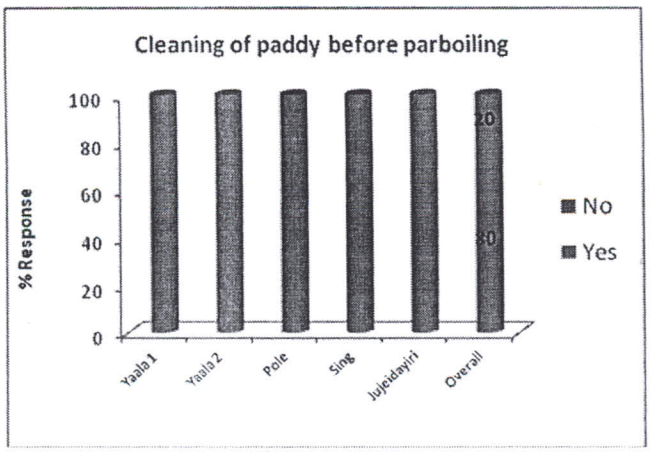


Figure 8. % Percentage dist. of Respondents clean paddy

Source of Water for processing

Communities in Wa municipal have access to pipe borne water and as such at Jujeidayiri 100% of respondents claimed that supply of water for processing is very reliable. On the other hand communities such as Pole, Sing and Yaala 1 and 2 used well and borehole water. 50% of respondents in Pole and Yaala 2 stated that water supply is fairly reliable owing to the fact that in the dry season water levels go down and have to rely on a river source.

Soaking of Paddy

100 percent of respondents from three out of the five communities surveyed used cold water for soaking for 24 hours while 60% and 33% of respondents in two communities soak for three days using cold water. On the other hand only 22% of respondents in Pole used warm water for soaking for three days.

Starting Temperature and boiling duration

Generally, water at room temperature is used in the parboiling process. According to respondents the length of time to reach boiling ranged from a minimum of 20 minutes to a maximum of four hours with the majority of respondents (72.7%) reporting 2 hours. Observations made were that the time required for boiling depended on the amount of paddy processed per batch and the intensity of the fire being used.

Draining

Results of the survey showed that the common practice of draining water after parboiling rice is by scooping with an improvised sieve as shown in Fig. 9 below. Alternatively a high percentage of respondents from Yaala 2 (83%) do not drain because the same water from the soaking stage is used for the steaming process. Some processors reported that they have adopted this method as a way of conserving water.

Figure 9. Improvised sieved bowl used for draining after parboiling rice

Type of stove used

All the processors interviewed use the traditional wood stove for parboiling except in Jujeidayiri community where a modified traditional wood stove referred to as *rim* stove is used. In general the fuel used is firewood which is a cheap source of energy and easily available.

Drying

The general drying practice is sun drying on a cemented floor or mat and is used by nearly 52% of all respondents. 30% of the processors interviewed dry parboiled rice on cemented floors in rooms; this was particularly found in Wa East district (Yaala 1 and 2). Others sun dry directly on the ground (8%) and in the shade under trees (8%).

An observation made showed that the cemented floors used by processors for drying were actually part of their houses. The floors had developed cracks and were not hygienic. The processors therefore require drying patios to facilitate quick drying. In Yaala 1 some respondents reported that they do not dry under direct sunlight because during pounding (local milling) the rice breaks hence reducing the quality.

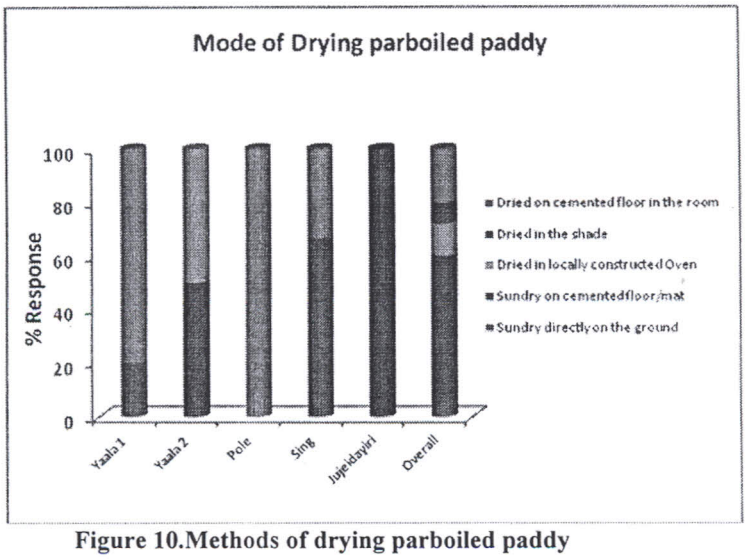


Figure 10.Methods of drying parboiled paddy

Time to dry

The results of the survey indicate that some processors dry for a minimum of one hour to a maximum of three days. It was observed that processors who dry in the room takes longer to dry compared to processors who use sun drying. Others reported that drying for long hours made the rice brittle leading to lots of broken grains during milling.

Processors interviewed indicated that turning of steamed during drying is between four and twelve times. Majority of the processors (75%) indicated that during drying turning is done six times to facilitate even drying. About 21 % of processors responded that turning paddy is regularly done but could not give a specific number of times. It was clear from respondents that the number of turnings depended on the intensity of the sun which in turn dictated the rate of drying.

Constraints in Parboiling

The results of the survey showed that there were a lot of constraints in parboiling. 96% of respondents expressed major constraints which included lack of mills, lack of improved parboiling vessels, the drudgery involved and high cost of transportation. Lack of mills was observed to be the most pressing need for about 60% of all respondents. Yaala1 and Yaala2 in Wa-East district did not have any mill available and resorted to pounding rice paddy using traditional mortars and pestles. This method of milling is laborious, inefficient and produces rice with a high percentage of broken grains and low quality. Other challenges processors face were lack of funds to operate, inadequate sizes of aluminium pots, lack of drying patios and access to more lucrative markets.

Marketing

Parboiled rice in all the communities surveyed is custom-milled and sold immediately at the milling sites or the local markets. Majority of the processors prefer selling immediately after milling to individual traders either for cash or on credit basis when there is excess supply. Processors did not want to bother themselves with marketing expenses although there were no barriers to market entry. Storage of milled rice was rarely done by processors. This observation was also made in previous projects implemented by FRI. Almost all the respondents sold parboiled rice by themselves. Cleaning of rice after milling was done by winnowing and hand picking of stones and other foreign materials. However, extensive cleaning of rice was not a common practice.

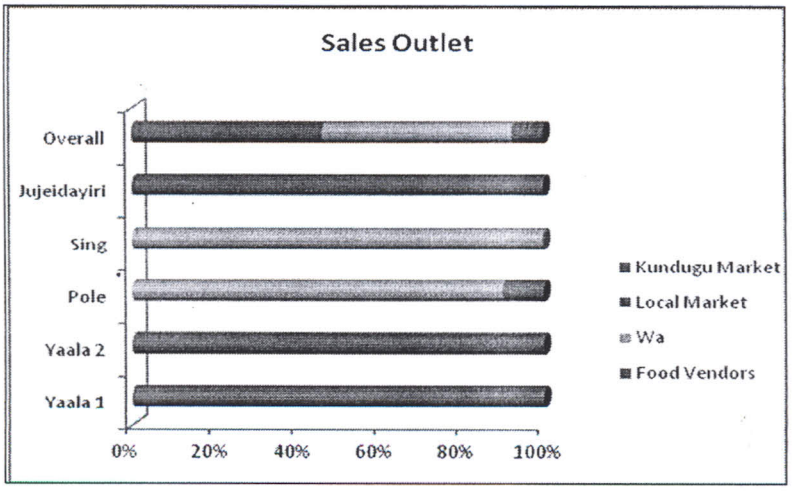


Figure 11. Sales outlets used by processors in surveyed areas

Figure. 12. Packaging in polythene sacks

Packaging of rice by processors in the communities surveyed was not common except for those in Wa who sometimes package rice in polypropylene bags for 'special sales'. Distribution channels for milled rice observed in the communities surveyed include the following:

- Direct sales to final consumers or food vendors
- Sales to itinerant traders coming from other localities for bulk purchases. Usually package milled rice in polypropylene sacks and truckload to urban markets in the south.
- Agents who buy rice at the mills on behalf of other traders

Table 4. Costing for village level processing 85kg-bag paddy/week

Item	1st Costing (GHS)	2nd Costing (GHS)	Average Costing(GHS)
Paddy	72.0	60.0	66.0
Water	Free	Free	Free
Labour	Free	Free	Free
Fuel	Free	Free	Free
Milling	6.0	7.0	6.5
Transport	4.0	9.0	6.5
Total	82.0	76.0	79.0
Revenue (Selling price * Quantity of rice processed)	90.0 (20bowls *4.5GHS)	88.0 (22bowls * 4GHS)	-
Gross Margin	8.0	12.0	10.0

Identification of intervention points and training needs for processors

Training needs of the processors interviewed were assessed based on interactions with them and reflections on observed processing practices to establish the knowledge and technology gaps. Critical quality control points were also identified. These include thorough cleaning of paddy before processing, soaking, steaming, drying, milling and packaging. Below is a summary of steps involved in the traditional parboiling of rice. Details of critical quality control points and proposed interventions are presented in Table 5.

Steps involved in traditional parboiling

Thorough Washing of paddy
(Removal of immature grains and organic matter)
↓
Cover cleaned paddy with water and heat to almost boiling point
↓
Transfer to another vessel and add water
(Ensure grain is completely covered)
↓
Soak overnight
↓
Drain water
↓
Place drained paddy in a small quantity of water,
covering and steaming until grains start to split open
↓
Draining
↓
Scoop paddy and spread to dry on cemented/ clay floors
↓
(Frequent) Turning of paddy
↓
Collection and bagging
↓
Milling

Table 5. Identification of intervention points and training needs for processors

Critical Quality Control Point	Training and Equipment Needs
Cleaning and Washing (Removal of stones, sand, foreign materials, immature grains)	Capacity building of processors / training, access to clean water sources
Soaking	Capacity building of processors on optimum conditions
Steaming	Capacity building of processors and provision of parboiling vessels
Drying	Capacity building, provision of drying patios, tarpaulins, wooden rakes for turning paddy
Storage	Capacity building of processors on storage practices
Milling	Capacity building of millers, rehabilitation of existing mills, provision of new standard mills to some communities especially Yaala 1 and Yaala 2. (*Processors in Sing have to travel 9Km to Wa for milling. Processors in Sing and Pole mostly travel to Wa municipal for milling services*)
Packaging	Capacity building in packaging for urban level processors

Other Needs of processors

- Hand holding and linkages to more lucrative markets down south for urban level processors
- Business development services for urban level processors
- Access to credit facilities for all processors for purchase of raw materials, equipment and business expansion

2.3 MILLER LEVEL FINDINGS

Profile of Respondents

The millers interviewed were located at Doble, Dondoli and New Wa in the Wa Municipal. The age of the respondents ranged between 32 and 67 years with 66% of them being married and the remaining 34% being single. Thirty-three percent each of the respondents had no formal education, basic level education and professional level education respectively. Sixty-six percent of the respondents had no special skills in agriculture whiles 34% were Senior Agricultural Technicians. The respondent's staff capacity was low, as 66% percent of the respondents had no employees while the remaining 34% of the respondents had only two male employees. While all the respondents did not provide training for staff, 33% indicated that the staff learnt on the job.

Table 6 Characteristics of Mills

Name of Mill	Location	Year of Installation	Country of Origin	Capacity
Goldstar	New Wa	1990	India	15HP
Yanmar (Has a destoner)	Doble	2007	Japan	YHPC 600
Briton No. 7	Dondoli	1995	London, UK	15HP

The milling process

Cleaning the paddy before milling was not done by 66% of the respondents. Only one mill had a destoner. Sources of paddy were from the locality and the surrounding communities such as Nato, Tekpo and Sankana and were fairly reliable. The miller's clients buy paddy from farmers and other sources and sell the milled rice out. The millers charge between GHS 3 and GHS 4 per maxi bag of paddy milled. Milling does not go on all year round because of the seasonality of rice production but peaks from November to January.

The millers (66%) keep the rice bran after milling and later sell as animal feed especially for pigs while thirty-four percent of the respondents indicated that the rice husk is disposed off with difficulty. Sixty-six percent of the respondents used electricity as their source of power but complained of high electricity bills. Average monthly bills amounted to GH¢ 350 which affects their profit. Thirty four percent of the respondents used diesel as their source of power and reiterated that electricity would have been a better option since the cost of diesel is high. The millers milled between 400 and 5000 maxi bags of rice in the past year. The quantity of milled rice that is produced from one maxi bag of paddy which approximately weighs 85kg is between 56 and 70kg. Grading of rice is not usually done except in cases where there are colour differences.

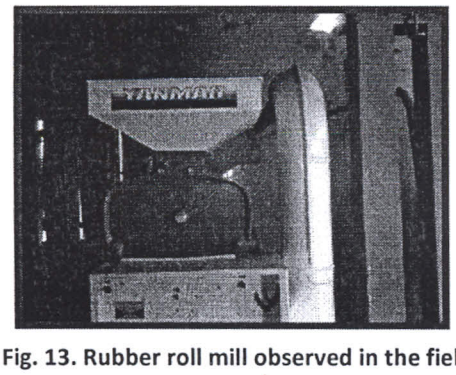


Fig. 13. Rubber roll mill observed in the field

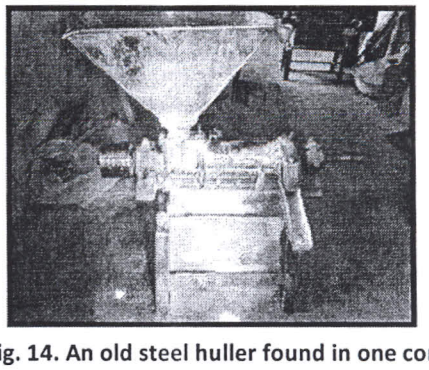


Fig. 14. An old steel huller found in one community

Cooperative Societies / Associations

Sixty-six percent of the respondents were members of the Upper West Rice Millers Association while thirty-four percent were not members of any association. Those who belonged to an association got some benefits such as bargaining power, conflict management and negotiation of electricity bills.

Financial and Technical support

The millers financed their own operations. The millers had technical challenges such as repair works and unavailability of quality spare parts. The millers are sometimes able to fix minor repair works but unavailability of quality spare parts is the major challenge confronting them. Sixty-six percent of respondents do not receive technical assistance from local or external agencies. Thirty-four percent of the respondents indicated that they had in the past benefited from technical training offered by a Non Governmental Organization called FABS.

Constraints

Sixty-six percent of the respondents could not obtain spare parts easily; the remaining 34% had access to spare parts easily on the open market. All the mills had not undergone any major replacement since their installation. Averagely, the operating capacity of the mills was 22 maxi bags of rice paddy per day. Seasonality of rice accounted for the reason why the mill was not operating at its maximum capacity.

3. CONCLUSIONS AND RECOMMENDATIONS

The following are the key farmer- related recommendations:

- Land preparation should be timely and properly done
- Farmers should be introduced to mechanization of some major farm operations (Combine harvesters, threshers and winnowers)
- Farmers should be trained in best harvesting and threshing practices
- Farmers should be assisted with tarpaulins for threshing and drying to reduce losses and prevent introduction of stones and foreign materials
- Framers should be trained in proper storage methods
- Provision of improved seeds, fertilizer and plant protection products should be timely
- Farmers should be sensitized on admixtures of seeds and its implications on rice quality
- Farmers should be sensitized on fire prevention (fire belts around farms)

Key recommendations at the processor level include the following:

- Capacity of processors should be built on improved parboiling technology
- Training in Good Hygienic Practices (GHPs) and Good Manufacturing Practices (GMPs)
- Processors should be assisted to acquire parboiling vessels
- Processors should be assisted to have access to clean water for processing
- Processors should be assisted with drying patios and tarpaulins to facilitate effective drying
- Capacity building of processors on good storage practices
- Capacity building of millers in milling operations, safety and preventive maintenance
- Rehabilitation of existing mills in Wa Municipal
- Provision of new standard mills to some communities especially Yaala 1 and Yaala 2 (however it must be noted that there is no source of electricity)
- Capacity building in packaging for urban level processors

The table shows the baseline of the identified project indicators for impact tracking purposes.

Table 7. A snapshot of benchmark indicators for impact tracking

Indicator	Baseline
Number of technologies transferred	-
Number of processors trained by gender	Mostly traditional methods are used. Need for training in improved processing practices
Number of millers trained by gender	-
Increase in processing levels	Estimated monthly processing level of 360kg paddy per processor
Increase in milling levels	-
Improvement in quality of parboiled rice	-
Additional income generated by processors	Estimated monthly income of GHS40 per processor
Additional income generated by millers	-