

Appendix 1

Rice Marketing System in Irrigated Schemes in South

IRRIGATED SCHEMES (south)

The irrigated areas account for about 7.5% of the area planted to rice ¹, and for about 28% of the production. The reason for the significance of irrigated rice is the higher yields, 4 to 5 tons per ha, and the ability to get two cropping seasons per year. Ghana Irrigation Development Authority plans to expand its irrigated area by 1,153 ha in 1997. This would come for on-going land development from the Kpong Irrigation Project. Feasibility studies on a further 4,000 ha of net irrigable land have been completed, of which 1,600 ha are in the north and 2,400 ha in the south. Rice may play a diminishing part in the irrigated sites in the south though, as vegetable and higher value crops are being encouraged instead, in an effort to diversify crop production on GIDA's irrigated schemes and with the aim of improving farm incomes.

The irrigation projects have had an uneven history, reflecting Ghana's own uneven economic history. Most of the projects have required major rehabilitation efforts in order to maintain their functioning. The Japanese government through Japan International Co-operation Agency (JICA) has completed rehabilitation feasibility studies on ten (10) existing projects. Five (5) out of these have been earmarked for rehabilitation. The Dawhenya project is to receive EU-funded assistance to raise the level of the dam to increase water storage and increased double cropping. The projects come under the management of the Ghana Irrigation Development Authority which is a semi-autonomous authority under the Ministry of Food and Agriculture. GIDA are responsible for managing irrigation development in Ghana, and increasingly are seeking to transfer more of the responsibility for managing and funding irrigation operations to farmer organisations. World-wide experience suggests that this is a slow process, and Ghana has been no exception with the process currently at different stages in different individual irrigation projects.

In addition, there is a change in emphasis in Ghanaian irrigation development. Previously, the irrigation development was seen largely as a contributor towards meeting a food self-sufficiency objective with a consequent emphasis on rice production. Today there is increasing emphasis on maximising the returns from the use of scarce irrigation resources, with a corresponding shift in thinking towards exploring the potential for production of higher value crops, principally fruit and vegetables. Similarly, GIDA is currently involved in feasibility study work on a national small-scale irrigation project which is concerned with identifying sites for smaller scale irrigation developments. These trends suggest that there are important questions about the future role of irrigated rice development in Ghana. For the purposes of this study of rice marketing, the three most important rice growing schemes were visited. These schemes are

¹ GLG-SOFRECO (Draft 1996)

- Dawhenya located 15 km north east of Tema. The scheme covers 200 ha, with yields said to average 5 tons per ha.
- Asutsuare is approximately 90 km from Accra and 60 km north east of Tema, close to the Volta River. The irrigable area of the scheme is 400 ha, with yields averaging 5 tons per ha.
- Afife is located close to Akatsi in the southern Volta Region. It covers an area of 880 ha, with yields at 4 tons per ha.

A1.1 Production Aspects

A1.1.1 Dawhenya

The scheme is the first of the GIDA schemes to be handed over to a Farmers Association to be managed - though there is still considerable GIDA support to the scheme. Effectively, the scheme is managed jointly by GIDA and by the Farmers' Association which has now employed a professional manager. The farmers on the scheme are charged an irrigation charge of ₵164,000 per hectare per season, which is designed to cover the running costs and electricity bills of the scheme. However, there are a number of facilities for which the farmers do not pay any charge including the provision of drying floor facilities and storage warehouses. There is some discussion of crop diversification on the scheme particularly during the minor season when, due to lower rainfall, pumping costs are higher. The thinking is that a less water-intensive crop could be grown.

The farmers association provides inputs to the farmers for production of rice including fertilisers, seed, weedicides etc. Farmers then repay the association in kind in the form of paddy at an agreed price per bag, which is currently ₵40,500 per maxibag (84 kg)². In addition the farmers pay an interest charge of 18% on their outstanding input costs and a 7% charge for the administrative costs of the farmers association. The farmers association sells the majority of the paddy to the Ghana National Procurement Agency (GNPA) - a parastatal now operating on more commercial lines. The paddy marketed through the farmers' association to GNPA is taken to a private rice mill in Pokoasi (north of Accra) for milling. GNPA then bag and sell the rice under their own brand.

The arrangement for marketing rice in this manner through the GNPA dates from 1994, and to some extent reflects a parastatal rather than a pure commercial motivation. The basic arrangement was that the GNPA would purchase as much rice as would be available at a negotiated price. GNPA provides an advance to the farmers association which is then used to finance input supply to farmers and to make purchases of paddy from the farmers.

² Maxibags are large jute sacks used for paddy (and other grains) in Ghana. They are usually assumed to contain around 84 kg. However, weighing trials and other evidence suggests that their weight is likely to be somewhat higher possibly in the range of 86-90 kg, depending on packing practices.

Farmers at the Dawhenya scheme are free to sell all their paddy through the arrangement organised through the association and GNPA, or they may retain the paddy which is surplus (i.e. above and beyond the amount needed to repay the production credit advanced) for sale through their own arrangements. The GNPA marketing arrangement currently provides a price of €40,500 per maxibag of paddy (each maxibag weighs approximately 84 kg). In addition, farmers sell some of their crop to itinerant market traders who purchase paddy from the scheme.

The main varieties currently grown are ITTA 222, CIAT 1970 and Bouake 189. GRUG 7 is another important variety at Dawhenya, but is now gradually being phased out as yields are reportedly declining. The supply of seed to the scheme is organised by the farmers' association, with seed sourced from the University of Legon farms at Kpong and multiplied on the scheme. Dawhenya appears to have the most organised arrangements regarding the supply of improved seed to farmers.

The recently introduced CIAT variety is the most popular among buyers. GNPA, for example, are offering a higher price of €42,500 per maxibag for supplies of CIAT paddy with the aim of encouraging its production, based on their assessment of the quality characteristics of the available varieties. The yield from CIAT is also reportedly higher than other varieties, **but** it is a longer duration variety taking 5 to 6 months to mature in place of 4 months for other varieties. It also reportedly requires higher applications of fertiliser and other inputs.

A1.1.2 Asutsuare

At present, most of the schemes are cropped only once in the year due to problems in the availability of machinery for cropping. However, the Asutsuare scheme crops twice in the year. There are 300 farmers on the scheme who are grouped into an association called the Asutsuare Co-operative Rice Farmers and Marketing Society. The plot size planted by each farmer varies, but the modal size is around 0.4 ha. The project is jointly managed by GIDA together with the farmers association, although the association appears to be somewhat less active than the Dawhenya association. Farmers purchase inputs, hire machinery and market their output on a largely individual basis.

The supply of seed to the farmers at Asutsuare appears to be less well organised than at Dawhenya. The main varieties grown are ITTA 222 and ITTA 234 with no CIAT cultivated on the scheme. Farmers frequently save their own seed from previous harvests while others purchase from local commercial suppliers such as Kpong Farms, Bok Nam Kims Farm or from Dawhenya or Ashaiman.

A1.1.3 Afife

This year 800 hectares of rice were planted for the major crop. The scheme is farmed by around 700 farmers, with yields of around 4 tonnes per hectare. Irrigation is entirely gravity-fed, and thus irrigation service charges are considerably lower than the other schemes surveyed at €50,000 per hectare. There is a farmers association which works with GIDA to manage the project, particularly with regard to the hiring

of land preparation equipment. However the farmers' association is not active in the marketing of the crop.

The scheme is divided into 11 sections, each with its own drying floor and storage shed facility. There are also 12 rice mills on the scheme which are privately run, together with one mill operated by the parastatal Ghana Food Distribution Corporation (GFDC) - although it is reported that this mill will now be divested from GFDC.

Seed supply at Afife was previously organised by GIDA, but farmers now increasingly rely on their own seed, or from friends. A range of improved varieties are grown at Afife including GRUG 7 (introduced by GIDA in 1992), CIAT (introduced in 1995, and now among the most popular) and TOX. In the field, a number of farmers were found to be cultivating a Thai variety which is reportedly very old (and therefore its quality must now have deteriorated).

A1.2 Post Harvest

Harvesting

Harvesting is done manually using a knife. Farmers employ teams of casual labour to cut, stack and thresh the crop. The cutting is usually done by men and the threshing may be done by men or women. Harvesting is usually done from drained fields. In Asutsuare and Afife, harvesting takes place under variable conditions of drainage in the fields. Plots are planted at different times within the scheme, due to problems with the scheduling and access to equipment for land preparation activities. The water management system within the scheme is unable to allow plots which are ready for harvesting, but located next to more immature plots, to be drained. Thus, on occasion, plots must be harvested while still in a waterlogged condition. This results in the paddy being in a wet condition for a period of days, prior to drying at the drying floor. It also makes for muddy paddy. [see photo in appendix 5]

Threshing

Threshing is carried out using tarpaulins or threshing boxes in the field, or using bottomless threshing boxes on tarpaulins - [see photo in appendix 5]. Threshing boxes, by themselves, tends to result in some loss of grain, that makes the use of tarpaulins preferable. This may be carried out by teams of men or women, who are usually paid a share in the crop.

Threshed paddy is gathered and bagged (usually by women), and headed to the roadside where it is loaded onto a tractor and trailer for carting to concrete drying floors, well-provided for in most schemes. Dawhenya irrigation scheme has extensive drying floors for use by farmers.

Drying

Paddy is sun-dried on the drying floors by hired female labour. Proper and even drying is very important. Poor drying practises are perceived by farmers, traders and millers alike to be a cause of poor quality of milled rice and in particular high proportions of broken grains. It may not be the proportion of broken grains per se

which is the problem from the traders point of view, but possibly the fact that a high proportion of breakages is also likely to reduce the milling out-turn, which is a key determinant of overall profitability.

For this reason, traders often purchase the paddy from the farmers when it is on the drying floor (no evidence was found of this practice at Dawhenya, but it is possible that it takes place). A number of traders mentioned a custom whereby paddy is purchased from farmers after two days on the drying floor, with the trader supervising the finishing of drying for a final day. The reason for this given by traders is that they do not trust the farmers to dry the paddy properly, and prefer to supervise drying and winnowing themselves.

The Farmers Association at Dawhenya use moisture meters to ensure that paddy is purchased and stored at 11-12% moisture content.

Winnowing

Asutsuare may have a particular problem with chaff content of its paddy, as this was mentioned by both the project manager and traders interviewed at the scheme. It is also suggested by the observation of the use of a winnowing machine at Asutsuare alone among the irrigation schemes visited. Problems with chaff are reportedly related to low levels of fertiliser application. The 'winnowing machine' consists of an adapted pesticide spraying backpack unit, of a type which is reportedly commonly used in cocoa cultivation. The unit is adapted to spray a jet of air, rather than pesticide, which is used to winnow paddy as it is tipped from bowls held overhead. It appears that machines are hired on a piece-rate basis from their individual owner-operators, primarily by traders who are purchasing paddy at the drying floors.

The problem of chaff content and winnowing quality gives the trader a strong incentive to supervise the drying and winnowing of paddy, to ensure that the chaff content of the paddy they purchase is kept as low as possible. It appears that this practice is particularly common where there are credit connections between the trader and the farmer, allowing the process of purchase to be pre-scheduled with the trader playing a fuller post-harvest supervisory role. Even if paddy is purchased from farmers ready bagged, most traders report having to re-dry paddy. This frequently involves extra work or costs for the trader in employing labour to carry out drying operations. Drying and re-bagging can cost 300 to 400 cedi per bag.

However, the price paid to farmers for paddy does not vary on the quality of drying or winnowing, and there is therefore little incentive for farmers to improve their practices in this area.

A1.3 Marketing

A1.3.1 Point of Sale

In Dawhenya, there is a well organised farmers association that provides inputs to farmers. Farmers take their rice to the association for it to be weighed, and any production loan is deducted in paddy. The paddy is then put into the central store. No problems of losses in this central store were reported.

Most of the farmers at Dawhenya sell their rice to the association. It was also noted that most farmers sell their entire crop immediately after harvest and do not store paddy on the farm for later sale to take advantage of any price increases. The reason being that they have to pay-off personal loans contracted from money lenders and to fulfil other household and family commitments. Strategic storage in Dawhenya is undertaken by the Farmers Association to improve the price for its members.

In Asutsuare all of the paddy is marketed through market women, frequently taking place when the paddy is physically on the drying floor. This has a further advantage to the trader in that the quantity in each bag purchased can be measured out exactly using their own measures. This usually consists of 6 heaped buckets (No. 34 Nigerian bucket), which each weigh approximately 14.5 kg, thus producing an 87 kg maxibag (i.e. large size jute sack).

The most striking aspect of farmgate sales at Asutsuare is the prevalence of storage activity by farmers. Most farmers reported storing at least part of their crop as bagged paddy in the large project warehouse, with the aim of selling later in the year to realise better prices. The warehouse is administered by an GIDA member of staff, and there are no storage charges for farmers. Storage losses do not appear to be a significant issue, and are not perceived by farmers or traders as a problem, with only some minor rodent damage reported.

At the time of the survey the standard farmgate price at Asutsuare was ₦40,000 per maxibag. However, this price was found to vary depending on the terms of the relationship between buyer and seller. If the payment is to be made by a trader in cash the current price was ₦38,000 per maxibag. Similarly, if a farmer is selling to a trader who has advanced him or her production credit then the price will be ₦2000 - ₦3000 below the 'going rate' i.e. ₦37,000-₦38,000 per maxibag. One larger trader with extensive production financing operations among the Asutsuare farmers claimed to be purchasing paddy at ₦35,000 per bag, and this may reflect a degree of market power on the part of a particularly powerful trader.

A1.3.2 Dawhenya Market Women

Sales to market women may take place through the farmers' association or more commonly directly from farmers to market women. At Dawhenya there appear to be two main groups of market women who purchase from the scheme. Firstly there are market women based at Dawhenya, an example is given below. Around 20 Dawhenya traders have recently formed a traders association, which is now a registered co-operative. The grouping was inspired largely by the example of the farmers' co-operative at the scheme, and is seen as a means of accessing external finance or assistance e.g. bank financing, and of dealing on a collective basis with the farmers. The traders association also provides a means of rotating liquidity within the group. The group comes together to place an order with the farmers co-operative, those members who are able to make cash contributions, but all members receive an allocation of the purchased rice. Those members who received an allocation without contributing cash then repay the purchase price plus ₦500 per bag to those who advanced cash on their behalf.

The second group of market women are those based at the mills in Ashaiman. It would appear that this group on average has a higher turnover and more extensive trading and financing linkages. This group of traders is described more fully in section 1.3.5 below.

Case Study: Dawhenya Market Trader

Trader A lives in Dawhenya village. Trading in rice is her main activity. Rice is mostly purchased at Dawhenya, but she also buys from Asutsuare and Afife if rice is scarce at Dawhenya scheme. She is a member of a Dawhenya-based association of small rice traders the Dawhenya Co-operative Food Marketing Society Ltd. Rice is purchased both directly from farmers and sometimes through the traders' association. During the busiest part of the year she buys around 50 bags of paddy per month, going down to 2 bags per month during the slowest part of the year. She currently pays a price of ₵40,500 to farmers, but this price reflects the fact that she has extended credit to those farmers (i.e. it is lower than ₵42,000). Paddy is milled mostly in the mill at Dawhenya, but some is also milled at Ashaiman. Rice is sold to retailers in Ashaiman, Tema and Accra - she delivers the rice to regular customers, hiring trucks or taxis for transport. Rice is sold as soon as possible after milling to release funds. The rice is sold in fertiliser bags which are collected from customers after use and reused.

Her marketing costs are summarised below

Item	Cost
Cost of paddy	₵40,500
Milling charge	₵1,000
Transport to Accra	₵700
Loading/unloading	₵600
Total Cost per Maxibag of Paddy	₵42,800
Sales revenue	₵44,000 / bag milled rice (17 US tins)
i.e. Sales Revenue per Maxibag of Paddy	₵49,000 (19 US tins)

A1.3.3 Asutsuare

Like the farmers, traders at Asutsuare appear to engage in more inter-seasonal storage than is apparent at the other schemes - though the main method of operation for most traders is still to turnover stock as rapidly as possible in order to release funds for further purchases.

Trader B purchases rice from Dawhenya, Asutsuare and Afife. Asutsuare is the most important source of paddy, and trader B is also part owner of one of the mills located on the scheme at Asutsuare. All of the paddy purchased is milled at Asutsuare, and marketed to wholesale shops in Accra. Milled rice is marketed in non-returnable bags which are purchased new at a cost of ₵550 per bag. Purchases of paddy may be made on cash or credit terms - but always on cash terms during the peak period for rice marketing around Easter. Currently trader B provides production credit in the form of inputs and some cash to around 50 farmers on the scheme. Because credit has been provided she is able to purchase paddy at the time of the study at ₵35,000 per maxibag. At the present time some paddy is being stored in the project warehouse at Asutsuare, because the market is not currently promising. Sales to wholesalers in Accra are usually on the basis of two weeks to two months credit. The selling price is currently ₵39,000 - ₵40,000, and profits per bag at the present time of year are low. Profits will be higher during the peak period.

Drying of paddy is a major issue for trader B. All paddy purchased from farmers to whom production credit is advanced is purchased on the drying floor. Purchases are also made from other farmers in bags, but care must be taken to ensure that it has been properly dried. If the paddy has not been properly dried, it must be re-dried at extra cost. Three labourers can dry 20 bags of paddy in a day at a total cost of ₵6,000 (i.e. ₵300 per bag).

The most important problems for trader B is cash flow - this is particularly the case when cash has been tied up in inputs purchased for farmers and rice is not selling quickly. In addition, the chaff content of milled rice is too high and customers have complained about this.

Trader C is from Odumasi and purchases paddy only from Asutsuare. Paddy is milled at Asutsuare and milled rice is sold to regular customers who are either retailers or those who cook and sell rice in Kpong and the surrounding area. Paddy is purchased at ₵40,000 per maxibag and milled rice is sold at ₵42,000 per bag (containing 17 US tins). The profit margin for trader C is in the form of the extra rice which is obtained from milling one maxibag over and above the amount required to fill the bag of milled rice. This is usually one to two US tins per maxibag. This 'extra' rice is retailed at ₵2,500 per US tin.

Trader C advances production credit to three farmers in the form of inputs, and purchases from these farmers at ₵37,000 per maxibag. Purchases from other farmers are made at ₵40,000 per maxibag. At the time of survey (late November) business is slow - she only purchased 3 bags of paddy this month, and all sales must be made on credit. Business will be much brisker after Christmas and towards Easter, and sales will be made on cash terms.

Paddy is usually purchased in bags from farmers, and must frequently be re-dried, with trader C carrying out this operation herself. The major business problem cited by trader C was that of defaulting by customers who have received supplies on credit.

A1.3.4 Afife

All sales of paddy from Afife are made to market women. The market women who purchase from Afife tend to fall into two main groups. The first group are local market women who tend to deal in smaller quantities, buying paddy or occasionally milled rice from farmers. Milled rice is then sold by these traders at local markets in the surrounding region including Agbozume, Akatsi, Dzodze, Denu and Dabala. The rice is sold by some in olunka (enamel bowl) measures - a form of low-level wholesaling to retailers from villages and other women who prepare cooked rice for sale. Some of these traders actually retail rice directly. Many of these traders come from the village of Avalavi, very close to the irrigation scheme, and are attempting to organise an association of traders. The peak marketing period for these traders is around Christmas when they will be buying around 5 bags per market day. This group of traders have very limited financing connections to farmers. These traders also source rice from Lome in Togo at certain times of the year when rice is not available at Afife.

The second group of traders are the Ashaiman market women. This group of traders is more important in terms of the quantity purchased, and the amount of sales to Ashaiman women has reportedly been increasing over the past few years.

A1.3.5 Ashaiman Market Women

The market women based in Ashaiman are a major influence in the marketing of rice from the irrigated schemes of SE Ghana. Typically these traders live in Ashaiman and purchase from more than one of the irrigated schemes in the south-eastern part of the country i.e. Dawhenya, Ashaiman, Weija, Asutsuare and Afife. Afife and Dawhenya are generally cited as the most important sources of supply to these traders, and are also recognised to produce higher quality paddy.

In terms of turnover, traders cited purchases of up to 400 bags of paddy (i.e. around 30 tonnes per month) during the busiest period of the year, which from the rice traders' point of view is during the lean season between January and March, and around Easter time when demand for rice is increasing. During the slowest periods of the year, trade may virtually come to a standstill, particularly when large importations have reached the market. The seasonality of the rice trade is also reflected in the prices paid to farmers and in the terms on which transactions take place. During the lean season, when demand for rice is high and trade is brisk, prices are up to €10,000 per bag higher and payment is made in cash. Traders must pay farmers in cash, and similarly retailers must pay wholesalers in cash in order to secure supplies. During the slower times of the year, purchases and sales tend to be made on credit. No interest is charged, but payment can be made up to a few weeks after taking possession of stock.

The Ashaiman market women purchase paddy which is transported to Ashaiman for milling. Turnover is normally fairly rapid, as the women need to release funds quickly for further purchasing, and there is relatively little evidence of inter-seasonal storage to take advantage of price swings. However, the mills visited did have significant storage sheds close by in which traders can store either paddy or milled

rice for relatively short periods prior to its further movement through the marketing chain.

A1.3.6 Measures and Profit

The main source of profit margins for the Ashaiman market women appears to lie in the manipulation of relatively small quantities. Broadly one maxibag of paddy produces one 50 kg bag of milled rice, with an excess usually of between 2 and 3 American tins depending on the quality of the original paddy (i.e. 5.6 to 8.4 kg or 11 to 17% of the total output of milled rice). The milled rice is sold for a price which roughly equates to the cost of production, i.e. the cost of the paddy plus transport, loading and processing costs. Thus the extra American tins constitute the profit margins of the traders, and are clearly perceived as such by them.

The Ashaiman market women are active financiers of rice production, providing production credit to farmers on the irrigation schemes in the form of inputs or cash. The largest traders will sponsor up to around 50 farmers with production credit. No interest is charged on such loans to farmers, but they do hold a number of advantages from the point of view of the trader, as follows:

- supplies are secured, and a stable relationship with suppliers is established
- the price paid is generally €2000 to €3000 lower than the ruling market price, which represents an indirect interest.
- such arrangements reduce transactions costs for traders in sourcing supplies
- supervision of the drying and winnowing of paddy is more common where there is a credit relationship between the farmer and buyer.

Availability of credit is the major constraint for most of the Ashaiman market traders. With greater funds more supplies could be purchased, and the possibility of storage for price increases could arise.

A1.4 Milling

Dawhenya

Rice sold to GNPA is taken to Pokoasi mill (30 km for processing and is then marketed by GNPA in Accra in branded bags.

The rice procured by GNPA is transported to Pokoasi where it is milled in a private rice mill. GNPA then package the rice in GNPA branded packs of various sizes for distribution to wholesalers and retailers. Information gained from GNPA during a previous visit, suggested that little difficulty was experienced in disposing of this rice. However, GNPA are interested in improving the quality of locally produced rice, particularly in terms of cooking quality. As a result GNPA are offering a premium price for CIAT rice. The manager of the farmers' association at Dawhenya estimates that GNPA absorb approximately two thirds of the entire crop, with the remaining one third marketed through market women.

Asutsuare

There are three privately owned mills at Asutsuare which mill almost all of the crop. All the mills are Sataki-type machines, and are powered by diesel engines. The milling charge at Asutsuare is ₺1500 per maxibag, and reflects the higher costs of powering the mill using diesel in place of the electricity used at Dawhenya or Ashaiman. There does not appear to be a perception of any major differences in the quality of the milling between the three mills, though milling quality is perceived as a problem by traders. Traders at Asutsuare mentioned the problem of chaff and paddy present in milled rice, as well as the quality of polishing.

Paddy purchased by market women is generally milled either directly on site at private mills on the irrigation scheme or taken to a trade centre for milling. The main trade centre for milling is in Ashaiman. There are four rice mills in Ashaiman and traders tend to patronise one regularly.

Afife

A number of millers were interviewed. Mills appear to fall into two main groups - the more sophisticated 'Sataki-type' mills (see photo 13) often from China or Taiwan, and more simple 'huller-type' mills (see photo 14). Most of the irrigated rice is milled in the former type. Probably around 40% of the paddy is milled at Ashaiman, with the rest either milled at the mills located in the irrigation projects, or at Pokoasi under the GNPA purchasing arrangement (in the case of Dawhenya).

Miller at Asutsuare

This mill at Asutsuare is jointly owned by a female trader and a male miller. The mill reportedly used to be able to mill around 150 maxibags paddy per day, when it was purchased for ₺5 million three years previously. Now it is only able to mill around 50 maxibags per day. At the busiest times of the year, around 50 maxibags are milled. The machine is diesel powered and requires 5 gallons to mill 50 maxibags, at a cost of ₺2750 per gallon.

Maintenance of the machine, which is now around 20 years old, is a major headache: fanbelts, rollers and sieves must be replaced regularly. The problem is the poor quality of locally-manufactured 'imitation' spare parts. The miller quoted the need to replace sieves once every two weeks. New imported rollers cost ₺200,000 per pair - or ₺120,000 if the rubber roller is locally replaced, sieves cost ₺35,000 per pair. The miller explained that competition from electrically-driven mills in town which have lower running costs is affecting the business. The mill appears to save on costs (in comparison to the Ashaiman mills) by obliging the owner of the paddy to provide labour for feeding paddy into the mill. There is also some competition between the three millers on site at Asutsuare - on the basis of milling quality. The poor quality of spare parts can affect milling quality resulting in the presence of chaff and poor polishing in milled grain.

The table below provides a rough estimate of milling costs and revenues.

Running Costs and Revenues (based on milling throughput of 500 maxibags / month)

Item	Costs
Diesel @ ₺2750 per gallon (1 gallon needed to mill 10 maxibags)	137,500
Labourers	120,000
Spare parts (estimate)	200,000
Transport of rice bran @ ₺400 / bag (estimate)	40,000
Total Costs (excluding capital costs)	497,500
Revenues	
Sale of rice bran (100 bags of rice bran - 1 sack of bran produced per 5 maxibags paddy milled)	300,000
Milling charges @ ₺1500 / bag	750,000
Total Revenue	1,050,000

Clearly the milling business varies from season to season. The major problems consistently cited by all millers interviewed was the problem of spare parts for machines. Most millers use locally manufactured 'imitation' parts to replace sieves and rollers on machines. The quality of these spare parts is universally perceived to be low. Some millers do purchase imported spare parts - but these are difficult to obtain and considerably more expensive than local spares. Prices quoted for a pair of new rollers were ₺200,000.

A1.5 Rice in the production system

Rice is the major cash crop for farmers in the irrigated area, and very little is kept for home consumption. Increasingly though, farmers may turn to vegetable production, which yields a much higher return per acre and per cubic metre of water consumed.

Annex

MARKETING COSTS IN IRRIGATED AREAS:

Aa1.1. Milling Charges:

Milling charges vary quite widely. The standard rate at Ashaiman and also the mill at Dawhenya is C1000 per maxibag. At Asutsuare the standard rate is C1500 per maxibag, while at Afife the GFDC mill charges C2,500 per maxibag and other private millers generally charge one and a half 20 cm enamel bowls of milled rice in kind. This is equivalent to a charge of 4.5 kg of rice, worth approximately C4000 per maxibag. The variation in milling charges does not appear to be the outcome of lack of competition - because there are over 10 private mills at Afife. The mills at Ashaiman may be in a position to charge lower rates due to a higher overall capacity utilisation and their access to electrical power, which is reportedly cheaper than powering the mill with diesel. Mills at Asutsuare and Afife are diesel-driven.

Aa1.2. Trader Margin

Typical Build Up of Marketing Costs: Ashaiman-based Trader

Item	Cost
Cost of paddy (87kg maxibag)	C40,000
Transport costs	C1,000
Loading / unloading costs	C400
Redrying costs / labour	C500
Jute maxibag depreciation	C200
Cost of rice bags	C550
Milling charges	C1,000
Total	C43,650
Revenue (based on milling out-turn of 19 US tins per paddy maxibag and a wholesale price of C44,000 per 17 US tin sack of milled rice)	C49,000
Profit per maxibag	C5,350
<i>Profit as a percentage of cost</i>	<i>12.25%</i>

It is likely that many of the other traders will not be able to realise the same margins as the Ashaiman traders, due to the fact that they are likely to pay higher milling charges, and may not be able to realise economies of scale in transportation. A more exact analysis of the marketing margins for a representative group of traders would require more survey work, with direct measurement of quantities bought and sold, since the manipulation of weights and measures is a crucial determinant of trader profits. For example, practices such as the addition of an extra handful in measuring is common (see photo 11). Nonetheless, an initial assessment of trader margins would suggest that profits are not excessive. This would be expected given the large number of traders, and the competition which they face from imported rice in their main markets.

Aa1.3. Price Information

Summary of Farmgate Prices: Irrigated Areas

Source	Price / maxibag	Notes/Terms of Transaction
Dawhenya	C42,500	GNPA offer price for CIAT rice
Dawhenya	C40,500	GNPA price for other varieties - also paid by some traders
Dawhenya	C40,000	Prevailing farmgate price quoted by Ashaiman traders
Dawhenya	C38,000	Price to trader supplying production credit
Asutsuare	C40,000	Prevailing farmgate price quoted by farmers/traders - supply on credit.
Asutsuare	C35,000 - C38,000	Prices quoted for traders supplying production credit
Asutsuare	C38,000	Price to trader paying cash.
Afife	C40,000 - C42,000	Prevailing farmgate price
Afife	C40,000	Price to trader supplying production credit

Date: November 1996

Summary of Wholesale Prices: Local and Imported Rice

Source	Price per Sack Milled Rice	Comments
Local Rice		
Ashaiman Traders	C44,000	50 kg sack
<i>Ashaiman Retailer</i>	<i>C45,000</i>	<i>Price paid by retailer for sack of local rice</i>
<i>Asutsuare Trader</i>	<i>C40,000</i>	<i>Quoted wholesale price for sack</i>
Asutsuare Trader	C42,000	17 US tin (48.3 kg) sack
Asutsuare Trader	C50,000	20 US tin (56.8 kg) sack
Ashaiman Trader	C42,000	17 US tin (48.3 kg) sack
Imported Rice		
Ashaiman Wholesale Shop	C40,000	50 kg sack of GNPA Pakistani 15% broken LG rice
Ashaiman Wholesale Shop	C53,000	50 kg sack of IMEXCO ³ US style 'Lucky Rice' brand
Ashaiman Wholesale Shop	C56,000	50 kg sack of Thai premium 10% broken LG rice
Ashaiman Wholesale Shop	C45,000	25kg sack of perfumed Thai rice

Date: November 1996

³ IMEXCO are one of the major importers of rice in Ghana. They sell imported rice in 50 kg sacks under their own brand name of Lucky Rice.

Appendix 2

Rice Marketing System in the Inland Valleys of Central Ghana

A2. CENTRAL AREA - INLAND VALLEYS

This area falls mainly in the Equatorial Forest Zone, and is characterised by a bi-modal rainfall pattern allowing a growing period of more than 270 days. Drought stress and diurnal temperature fluctuations are low. The soils in the valley bottoms vary greatly, but on the whole are relatively fertile.⁴

The following areas were visited by the CRI research economist:

Western Region	Kobina Annokrom, Wassa Simpa and Sehwi Asawinso
Central	Assino Praso
Brong-Ahafu	Kenyasi
Volta region	Godenu
Eastern region	Asuom

Some major rice markets in Takoradi, Kumasi, Accra and Ho were also visited.

A2.1 Harvesting

Harvesting of the rice is done manually and in almost all cases, either by the farm family or communal labour. Hiring of labour is rare and tends to be expensive.

In harvesting, the panicles are cut with a sickle or knife and the panicle heads are stacked together and tied with a rope. The bundles are then left on the stubble (field) for some 2 to 3 days (in some cases up to 2 weeks) for them to dry. Alternatively they are carried direct to the house for drying and storage, if the fields are not too far from the homestead.

Threshing

Threshing in this area is usually done on the ground unless a tarpaulin is provided. Use of threshing boxes is not popular as the grain of the *glaberima* variety is considered too hard. One farmer in Kobina Annokrom estimated that 15 to 20% of rice could be lost in the field if employing threshing boxes. There is a tendency for admixture of varieties during harvesting and threshing.

Threshing is usually carried out by family or communal labour.

Drying and Winnowing

After threshing the paddy is sun dried on the bare floor or by the roadside for some few days. The paddy is then winnowed by pouring from a bowl held overhead and allowing the chaff to be removed by the wind. It is then bagged. Winnowing is usually done by women.

⁴ Otoo et al (1996)

Storage

About half the farmers store the rice on the panicle in a special wooden store. The bed of this type of rice store is raised off the ground, and women cook in these stores. The fire and smoke wafts upwards on to the rice floor helping to keep the rice dry and free from pests. [see photo in appendix 5]. Rice is threshed as and when the farmer wants to sell it.

The rest of the farmers store their rice in threshed form in jute bags.

A2.2 Farmer Sales

In almost all the valleys visited rice is grown as a cash crop with a very small proportion of the crop (10%) kept for home. The only exception was at Wassa Simpa (Western Region) where the local populace consumed all the rice produced in that valley.

Rice is normally sold by farmers as paddy but in some areas is milled and sold as rice. Paddy would usually be purchased by traders at the farm, whereas milled rice would be sold at the mill directly after milling by the farmer. There appears to be no difference in price at the farmgate for different types or varieties of paddy sold. A price differential is only apparent when selling milled rice.

There was little evidence of farmers storing their crop for long periods after harvest. Farmers generally sell their entire crop immediately after harvest or in bits over a short period of time. This is despite a widespread awareness of seasonality in rice prices - with prices generally higher just after Christmas (January - March) when a general food shortage is beginning to develop in the system and farmers have started preparing their fields for the next farming year. The glut period is around July - September when harvesting of rice starts.

A2.3 Marketing Chain

Within the inland valleys, the marketing channels for milled rice will be similar, but there are a number of permutations open to the farmer. The rice farmer sells to other farmers, local assemblers (usually women) or to itinerant traders (usually women). These traders in turn will mill the rice and then either sell direct to local consumers or on-sell to wholesalers, retailers or possibly to public institutions to fulfil prior contracts. During the main harvesting season the itinerant traders may trade in as much as 50 bags of rice per day.

Traders develop their networks of customers over time, and often establish credit relationships to help retain their customers. At the same time, there is a great fluidity amongst the traders, with a free movement of people into and out of the trade, with a close relative taking over the trade should one woman have to have a baby for instance.

In a few areas, farmers take their paddy directly to the mill, and undertake the milling on their own account and sell to itinerant traders at the mill. - see next section.

A2.4 Milling

Three examples of mills and transactions in different locations are given below.

Assino Praso : Farmers Milling Rice before sale

Assino Praso and Atobiase are two small trading centres located 100 km south of Kumasi on the border with the Central Region. This area in southern Ashanti had 19 mills operating, of which two were visited. Both mills operate Sataki mills with a rated capacity of about 50 bags per day, and powered by diesel engines. The marketing system here differs markedly from elsewhere in that the farmers bring their paddy to the mills and process it there, selling rice to traders at the mill. The mill is the trading point rather than the farm. The clients, from the millers' perspective, are therefore farmers not traders, and in order to maintain their customers, they are willing to extend credit to farmers where necessary and they will usually pay half the transport cost the farmer incurs in delivering the rice to the mill.

There appears to be strong competition between the mills, and hence the need to provide services such as credit, and subsidising farmer's transport costs from homestead to mill. Both the mills visited also provided tarpaulins for threshing and one supplied bags for the rice. The charge for milling was 4,300 cedi per maxi-bag of milled rice (about 96 kg) or 2,150 per mini-bag (about 48 kg). These milling charges are considerably higher than those obtaining in the irrigated area of the South East (¢1,000 to ¢1,500 per minibag of rice). This may be due to the fact that rice has only one season in the inland valleys and also due to the other services provided by the millers in south Ashanti.

The farmer was able to sell a bag of rice for 38,000 cedi at the mill, which is the equivalent of a farmgate price for a maxi-bag of paddy of 38,500 to 40,000 cedi depending on the weight of the bag sold.⁵

Adugyama : Traditional Engelberg huller

A small trading centre located 20 km on a main road west of Kumasi. There is only a small amount of rice grown in the valley and only one mill in the trading centre. The mill was the Engelberg steel-huller type powered by a diesel engine. Rice milling was charged at 1,500 cedi per tin of rice produced, and farmers sold their rice at 26,000 cedi per tin (weight said to be 30 kg). It was reported that traders only bought rice from the mill, and did not visit farms to buy paddy. The equivalent price per 50 kg mini-bag would be more than 40,000 cedi. This suggests that either the tins

⁵ This is calculated as follows:

- A maxi-bag of paddy at 87 kg makes 54 kg of rice at a conversion rate of 62%.
- One mini-bag of rice is 48.5 to 50 kg, so one maxi-bag of paddy yields 1.13 to 1.08 bags of rice.
- The sale realised from one bag of rice is 38,000 cedi less c2,150 (milling) less c250 (transport) = c35,650 multiplied by 1.08 or 1.13

contained more than 30 kg, and hence farmers got a lower price⁶, or, that proximity to Kumasi enabled a considerable price advantage over the south Ashanti area.

Kumasi market : Sataki mills

Kumasi has an area of concentrated rice milling in the town. There are more than 20 mills in wooden and iron sheet structures strung out on property owned by the Railways along the railway line. The buildings are of modest construction but fronted with large cement areas for drying rice. Village traders, predominantly women, bring paddy to the mills from Kuungo, Aduyama and Manrkanso in Ashanti region and Sehwi, Bekwai and Asawinso in Western region. They have the rice milled and then sell to wholesale and retail traders, also predominantly women, who congregate there. Again, the mill is the focal point of trade.

The traders reported that they prefer to buy paddy because rice from village located mills is expensive or there are no mills in the villages that they visit. They visit the villages and make arrangements to purchase. Then they arrange a truck to come and collect from assembly points for an agreed price per bag. Often three or four traders will share the hire of a lorry to get better rates.

The unit of measure for milling and selling is the “tin” which contains approximately 30 kg. The mills charge 1,500 cedi per tin (equivalent of 2,500 cedi per mini-bag of rice) - significantly higher than in the villages. These higher charges obtained at all the mills in Kumasi and were due to the better quality produced (they were all Sataki machines) and because they also offered the service of storing rice on behalf of traders for up to a week.

The women traders were able to sell at 28,000 cedi per tin. The wholesale price for rice in Kumasi is about 930 cedi per kg. Retail is 1,040 cedi per kg. The retail mark up is around 12%.

Trader Profile
 Muslim Lady at Kumasi market: Works with a capital of 5 million cedi and buys about 100 bags per months during the main season. During January and February she visits the villages and gives loans to secure farmer’s crop for next year. The interest is made inflation proof, in that the value of one bag of paddy at the time of the loan has to be paid back in the form of one and half bags of paddy. i.e. 50%!

She estimated that prices rise about 10% per month from December through to May, then drop off again. She will usually keep rice for one week or more to gain from the upward movement of prices during this season.

⁶ If rated at 33 kg, the price would be 38,000.

A2.5 Millers

The better millers operated Sataki mills that were rated at 50 bags of rice per day. These Japanese mills, had been brought in under a JICA project in the 1980s for sale through the MoFA. They have rubber rollers to draw the husk off and a blower to separate the bran from the rice. These mills cost over \$10,000, and can be powered by diesel generator or electricity. Electrical power is much cheaper, and milling charges are consequently cheaper. The lower milling cost incurred by using electricity may well influence mills to establish in towns where electricity is available, and therefore their milling charges can be more competitive.

The major problem the mills experience is stones in the paddy destroying the screens. Mill owners estimated that screens lasted two to three days, and rarely a week. At a cost of 50,000 cedi a pair, it proves expensive to maintain.

In other areas, Engelberg type hullers are operated. With these, the husk and bran are not separated from the grain, and the owner of the rice (trader or farmer) has to winnow the rice to clean it.

A further difference is that the Sataki mills produce a by-product - bran, that can be sold for chicken feed. One mini-bag of bran is produced from every 4 to 5 maxi-bags of paddy milled. Each bag of bran can be sold for 3,000 cedi. The Engelburg hullers, do not separate the chaff from the grain and therefore the bran-mix is only suitable as a pig feed.

Weights and Measures

Weights and measures vary according to location.. Frequent re-bagging makes the calculation of margins difficult. Paddy is wholesaled in jute bags of about 90 kg. In the Volta region the bags are slightly smaller, and in Sehwi area slightly larger. When traders buy from farmers at the farmgate, they often use oversized bags to get more for the same price, as all pricing is based on a per bag basis. Such sacks can contain up to 120 kg. When the trader women get to the wholesale level they re-bag into standardised sacks thereby making an invisible margin of 20 to 30 kg.

Appendix 3

Rice Marketing System in Northern Area of Ghana

NORTHERN GHANA - INLAND VALLEYS

In the last quarter of 1996, the SARI study was conducted in Northern Region and Upper West Region of northern Ghana. In the Northern Region, the study focused on Gbirimani in the Tolon-Kumbungu district where farmers were interviewed. Traders in the Katinga rural and Tamale-Aboabo urban markets were interviewed as well as rice millers in Tamale and Tolon. In the Upper West Region rice producers in Sing and traders in Wa market were the focus of this study. Secondary data were obtained from the Policy Planning, Monitoring and Evaluation Division of the Ministry of Food and Agriculture.

In addition visits were made to Bolgatanga, Navrongo in the Upper East Region and Tamale market in the Northern Region with the NRI economist.

A3.1 Production aspects

The north of Ghana receives only mono-modal rainfall, and the growing season is appreciably shorter than that in the inland valleys of central Ghana. In addition, during the winter months, the harmatan wind, reduces humidity, necessitating the parboiling of rice harvested after the main growing season.

In the northern region, rice is an important cash crop and is grown mainly in the Tamale, Yendi and Salaga areas⁷. Little or no rice is consumed on the farm, instead it will be sold to buy "food" - i.e. maize. The growing of rice helps spread the farmers risk in the farming system. It is felt that a rice crop grown in the inland valley is less likely to fail than a maize crop grown on the upland.

Rice is grown mainly by smallholders and also by a few big commercial farmers. The former have plots of about one acre or more whereas the latter will have farms ranging from 20 to hundreds of acres. Cultivation of rice in northern Ghana is carried out mainly in the inland valleys. Rice fields in Northern Region average 2.5 ha, about 50% of the total cultivated area. In the Upper West Region, they are about 1.5 ha, about 44% of the cropped area. Mean yields are about 1.15 t/ha in the Northern Region and 1.2 t/ha in the Upper West Region.⁸

The main varieties grown in the three visited by the SARI team during the survey are shown overleaf:

⁷ the Eastern side of the northern region was not visited although it is an important rice producing area. This was because farms are just getting back into rice production after recovery from several years of unrest.

⁸ Survey Results from SARI survey December 1996

Table A1: Main Varieties reported grown in northern Ghana

Gbirimani	Sing	Wiaga
1. Mande	Muikpong	White long grains
2. Afefe	Muibile	Abidjan
3. Farrow 15	Muikajia	Red coated
4. Rok 3		
5. Anyofula		
6. Bazolugu		

A3.2 Harvesting

Yields are low from 5 to 20 bags per hectare. Little or no purchased inputs, such as fertiliser are used on the smaller farms, and reduction in fallows has tended to depress yields over time.

Harvesting is similar to the rest of Ghana, but not constrained by residual water, as in the irrigated areas. Threshing takes place on earthen floors cleared in the rice fields. The harvested stalks have only to be carried a short way to the threshing floor.

The larger farmers depend on machinery to harvest. They are severely disadvantaged by the increasing age and reduced number of agricultural equipment - especially combine harvesters, which makes the harvesting operation difficult to complete on time. Trying to get and organise manual labour is considered difficult and expensive. Likewise, problems in obtaining labour to thresh results in some larger farmers using a tractor to drive round and round in a circle over the rice straw.

All rice in the north is threshed after harvest, and none is stored on the panicle. In the irrigated areas, rice harvested off-season (June), can be milled directly. For main season rice and non-irrigated rice, the low humidity in December means the moisture content of the rice can get too low (below 12%). This leads to shattering of the rice and crumbling of the rice on milling. To overcome this, rice must be parboiled.

A3.3 Farm Storage

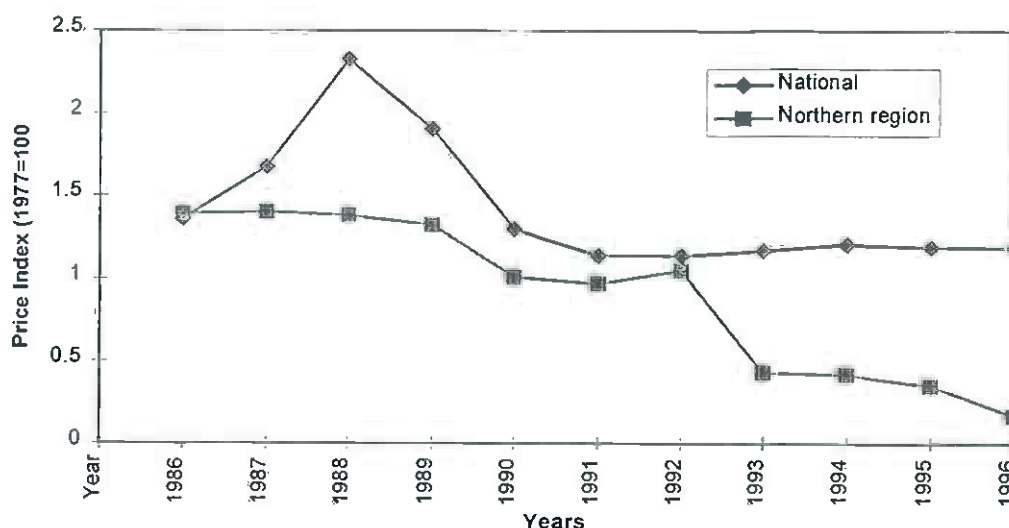
Harvested grain is stored by heaping in the room on a mat made of grass until required for sale, when it can be bagged. Large scale farmers, however store the grain in sacks. Between 6 to 20% of paddy is stored for seed. Mice and rats are said to be the major pest of stored rice. They are known to be destructive when grain is stored in sacks rather than heaped on the mat, as they find climbing heaped rice difficult. Few farmers use traps but the majority of them use poisonous chemicals to kill them.

A3.4 Farmer marketing strategies

Prices:

Although national figures for rice show that the real price for rice has maintained its real value and if anything improved slightly against the price of other staples - Maize, Sorghum and millet. The price of Northern rice has sharply declined in value in recent years - see figure 1

Figure A1: Development of real prices in northern region of Ghana (19977 = 100)



The fall in the real price of northern rice as against the national average is due to:

- The liberalisation of imports and the rice market. When rice production was mainly in the north, official agencies purchased in the north and sold in the south.
- The improved quality of imported rice, has resulted in a reduced demand for northern rice in the south.

Immediately after harvest sales are made to pay for labour. Where a combine harvester is used, operators prefer to collect a portion of the harvest, usually two and half bags per hectare, as payment. The rest of the crop will be stored. Farmers in the Northern Region sell later, probably because they are able to obtain credit from traders to meet their immediate needs. The bulk of the crop is sold between March and April. In Upper West Region there is less credit given and the bulk of the crop is sold in January and February.

Table: A2 Sales of rice at farm level in northern Ghana, 1995

Period	Time Period	Paddy price cedi/kg	Proportion of sale	
			NR Region	Upper West Region
1	December	300	6%	12%
2	January - February	400	16%	80%
3	March - April	500	75%	8%
4	May - June	550	3%	0%

Source field survey, SARI

The greater availability of credit in the Northern Region is probably due to the stiffer competition between traders. Credit advances help guarantee access to produce. Apart from bearing the risk and cost of credit, traders still visit farmers with cola nuts to solicit loyalty to reserve the grain for them to buy. When a farmer wants to sell his grain he invites traders, giving preference to his creditors and ones with whom he has a long standing relationship. Prices paid are, however, those traders quote as being the ruling ones in Tamale regional market. Because sales are made in the home female family members are not involved in the marketing.

In Upper West Region both men and women carry rice to the market for sale to any trader willing to buy. In some instances, however, farmers prefer to sell to their regular customers. Where possible traders intercept the produce on the way to the market and offer them prices lower than that ruling in the market.

The average farm-gate price for paddy at time of harvest in 1996 was 32,000 cedi per bag (rated at 80 kg, but possibly 10% more)

A3.5 Village level Traders and Parboilers

About 75% or more of rice output is sold to market women who go from house to house to buy paddy stored in the home. These women then parboil the paddy at their homesteads. The quality of parboiled rice depends on how well and evenly it is cooked and how well and evenly it is dried. Quality is usually denoted in the colour of the rice.

The parboiling process takes 48 hours. Usually a parboiler will use one pot which can process one bag of paddy. The paddy is heated up with water to boiling point. It is then left to soak overnight. Then the paddy is removed from that container and put in with a small amount of new water. This mixture is heated until the husks start to split. Then it is drained and dried. The paddy is not completely dried - to prevent too much breakage during milling. It is then stored in bags overnight and brought for milling soon after. Following milling the rice is winnowed and then is ready for marketing. In this way a parboiler can process a bag every two days.

Case Study: Parboiler in Village near Navrongo

She prefers to buy from farmers direct, rather than at Navrongo market, as paddy is cheaper. Also she prefers to parboil rice that has been hand harvested rather than mechanically harvested as it has less broken grains.

Day 1:

In the morning heat grains in water to hand hot. Remove empty "glums", then stop the fire. In the evening, drain the water. Add water just to cover the paddy - not too much. Allow to boil until grains burst. Stop the fire, and allow to cool overnight. Remove stones from bottom of the pot. This pre-wash results in a whiter grain.

Day 2:

Drain water and dry on clean concrete floor. Mill immediately after drying. If you want to store the paddy, then it must be dried more. Drying is critical and it must be even.

Day 3:

Take to Navrongo market on “market day” and sell rice. She can sell 17 to 40 bowls per day (2.5 kg per bowl) at a price of 2,500 to 2,600 per bowl. After finishing selling she may purchase paddy at Navrongo market at 1,700 per bowl (4.5 kg, equivalent to 2.8 kg of rice).

The women in the Upper East Region - especially in Navrongo were considered the most expert in parboiling and as a result “Bolga” rice fetched a premium in Tamale market.

Similarly rice parboiled in the Upper West Region was considered superior to that from the Northern Region. The following in particular differentiated their preparation to that of the Northern Region. Firstly, effort is made to remove the stones during the cooking process and pre-washing allows empty glums to be taken out. Then the houses in the Upper West Region and Upper East Region had more suitable drying floors.

A3.6 Marketing Systems

Marketing systems vary according to the distance of farms from major market centres:

(a) In the villages far from the town, farmers will sell rice to women traders in the village when they need cash. Typically they will sell 70% of their rice after harvest to pay off their costs, will retain some for seed, and the rest they will sell in small quantities when cash is required.

Village women will parboil the rice and then take it to the main market town and sell at a mill. They will trade in fairly small quantities, possibly taking only one or two sacks per day to market.

(b) Farmers nearer to the market towns such as Tamale, Bolga or Navrongo will bring their paddy to market on market day (held every third day). The paddy is sold by the bowl to market women who measure out the paddy with their measure and a generous arm held along one side of the bowl. This armful, is part of the profit for the trader. The trader then takes the rice and parboils it at home and will sell it to the wholesale traders at the next market day.

The wholesale rice market held in Navrongo, held every market day, consisted of about 50 women tendering their rice in approx. 30 kg sized basins. The unit of sale was a bowl of about 2.5 to 2.7 kg weight. Buyers would fill their sacks but buy by the bowl. The buyers would stuff the sacks with as much rice as possible, to reduce their transport costs which are charged by the bag.

A3.7 Mills

Tamale has two large scale Sataki rice mills owned one each by Nasia Rice company, Ghana Food Distribution Corporation and Juni Agro Ltd.. These mills have capacities of 1 to 4 tonnes per hour and produce better quality rice. In the case of Nasia mills, lack of finance has meant operations have been hampered. Most small traders patronise the small millers operating engelbergs

The survey found that there was usually a small huller type (engelberg) mill within a 20 km radius of a village. In the village the Engelberg mill are powered by diesel and in the town by electricity. There are about 26 serviceable small mills in Tamale and 10 in Wa. In the towns there is a lot of competition between mills, but not on price. The milling charges observed in all regions was about 1,200 cedi per bag or 15 cedi per kg. To attract custom millers will offer credit to traders who do not have to pay the milling fee until they have sold the rice that they have milled. This could still take up to five days. Defaulting was reported to be slight

The quality from these mills is generally very poor with a high proportion of broken grains. Out-turn is low and the traders have to winnow the rice afterwards to separate the chaff and bran.

Some rice varieties such as kpukpula were said to pose problems of re-adjusting the shaft and reduced speed of milling due to its small size and hard testa. If rice is milled when not properly dried, a lot of power is drawn. Secondly the grain tends to be dusted with the dust from the mill thus making them unappealing to the eye. As rice is sold by volume, traders prefer to mill rice that is not quite properly dried because a large volume is obtained and hence more money than when it is properly dried. Retailers of such rice however face the problem of moulding or discoloration of the rice if not sold relatively quickly.

On the other hand if the rice is too dry or unevenly dried, the grains tend to break during milling and are subsequently blown away during winnowing. Unlike in the northern region where milled rice comes out with the chaff and has to be winnowed, in the UWR the grains are separated from the chaff and therefore no winnowing is required.

A3.8 Movement of rice in northern Ghana

From ↘	To →	Northern Region	Upper West Region	Upper East Region	Techiman market
NR		71%	20%		9%
UWR		1%	50%		49%
UER				80%	20%

The bulk of the rice going through Techiman market is from UER and UWR. This rice is preferred to that of the Northern Region and sells at a premium to NR rice. The bulk of rice produced in the Northern and Upper East region is consumed there.

A.3.9 Varieties and Quality Aspects

Traders assess the quality of rice on colour, the number of broken grains and stones. Generally, rice in the Upper East had a better appearance than rice from Tamale or rice from Kumasi. It was obvious in the more northerly markets that quality played a role in the marketing, and that there was considerable variation in price between one rice and another.

All local sativa varieties have colloquial names, and need to be properly categorised. In the parlance of Navrongo though, the preferred varieties were “Ninety days”, “Thailand” and “Abidjan”. Some traders complained that Abidjan rises too much when cooking and can get mashed. Interestingly, in Tamale, rice coming from the Upper East was not differentiated by variety and was merely referred to as “Bolga rice”

Rice from the Upper West and Upper East was generally considered better than Tamale rice and fetched a higher price. This was attributed to more timely harvesting, resulting in correct moisture content in the rice, leading to less breakage. In the Upper West, the buyers expect quality and discount paddy with a high number of broken grains.

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Appendix 4

Note of Meetings with Rice Merchants in Accra

Notes on Meetings with Rice Merchants (George Day) July 1996

A4.1. CCTC (Ghana) Ltd

Import around 30,000 tonnes per annum from Pakistan, India, US. Grades range from 15 to 25% broken.

Demand is somewhat seasonal though not strongly so. Sales tend to be higher in the pre-Christmas period and in May/June.

Market demand is growing for very good quality rice, the % broken acceptable in the market has gone down appreciably in the last few years. Demand is firm for high quality US and Thai rice. e.g. they had some 25% broken from India from last year which they have had great difficulty in selling. Lower grades sell much slower, and sometimes have to accept a loss.

Main customers are distributors and wholesalers who travel from all parts of the country to buy rice out of CCTC's Accra warehouse. Wide range of scale of customers.

Financing of purchases with their own capital. They rarely get suppliers' credit, but sometimes they do. Do not get bank financing.

Have had no involvement with local rice. Customers have reported not liking the taste of local rice. Consumers are also reported to favour a rice which has good swelling qualities.

Current import prices range from \$325 for low quality up to \$500 for higher qualities, but prices fluctuate quite a lot. Ghana basically gets world market prices. CCTC do not currently import fragrant rice, but are aware that there is a market for this type of rice mainly of Thai origin. Imexco and one or two other specialised importers e.g. Simavi are in this market.

Lot sizes are up to about 8,000 t, but minimum import sizes are quite large (2-5000 tonnes). Speciality rice can be imported in smaller lot sizes e.g. 500 tonne for fragrant rice. Most imports come in 50 kg bags, though some Thai rice has come in smaller packages 5, 10 and 25 kg bags with handles on.

Some local wholesalers undertake repackaging of rice into 5 and 10 kg packets for the supermarkets.

Imported rice does reach all parts of the country, even into the northern region. Northern buyers apparently buy from Kumasi and the Ashanti buyers buy in Accra.

CCTC perceive that the market for imported rice is growing at present, with a marked increase on high quality rice. The market is becoming relatively price sensitive with consumers prepared to pay sizeable premia to gain high quality rice.

CCTC's margins on imports are low, depending mainly on turnover to generate profits. Margins are in the region of 2 to 8%, but sometimes on particular lots you have to take a loss, depending on the competition in the market place. Competition among rice importers has intensified greatly over the past few years. 3 years ago there were 4 importers now there are 19. CCTC source their supplies through Glencore in Paris and Continental Grain (a US company based in Geneva).

CCTC are concerned about the impact of GNPA on the rice market, claiming they are undermining the market. CCTC currently have about 15,000 t of Pakistani 15% which they are selling at C42,000 per 50 kg. GNPA are selling a similar rice at a loss at C37,000 because they are unable to move stocks. GNPA's actions are undermining the market.

The overall size of the market is estimated by CCTC at between 170 and 200,000 t per year for imports. CCTC keep track of all shipments and claim that 170,000 t has arrived since Oct. 95.

CCTC's biggest customer is Kata Trading. Also CCTC mentioned their interest in diversifying business e.g. looking at milling and importing paddy.

A4.2. Imexco Ghana Ltd (French owned trading all over W Africa)

Imexco import about 20,000 t per annum. and sell much of it under their own brand name of Lucky Rice (going in 50 kg bags) (Lucky rice can be Vietnamese, Pakistani or Thai rice). The grades imported are US No 5, Thai/Vietnamese 5% 10% broken, Thai fragrant rice in 25kg bags. All other imports come in 50 kg bags.

Main customers are wholesalers. Import good quality rice as Ghanaians like good rice and poor quality rice will not move.

Landing US no 5 at US\$ 360-400. Prices are very volatile and they make use of the Public Ledger for prices.

Does not see any strong seasonality in demand. Last year in Aug. / Sept. demand was very heavy, but this year has not been the same. At present they are carrying very high stocks which are not moving fast enough.

Selling Lucky Rice at C49,500 / bag for a minimum lot size of 1,000 bags. They sell on a cash basis, with a maximum of 2 weeks credit to some customers - depending on who it is. Purchases are made with their own capital?

Major trends: towards higher quality - it is not now possible to sell 35% broken. They have not noticed any sharp changes in the market size, number of importers. Estimates the total size of the market for imports at 100,000 t

Major customers to contact in Makola market include: OAAC Ltd who are a big distributor and Mabking Enterprises. Kata are also a customer.

A4.3. Kata Trading Company

Import sugar, but not rice which they buy from other importers. The reason for this is the large minimum lot sizes required for rice imports. Buys rice from Nabb Bros, CCTC (is their biggest customer), GNPA and Imexco. Estimates annual turnover of around 36,000 t. Does not buy any local rice. Has heard of the GNPA local rice, is interested in purchasing local rice but so far the quantities offered have been too small. However, was impressed with the quality of the GNPA local rice, and notes that he has received enquiries from customers about the local rice.

He sells rice into all regions of the country except Upper West. Estimates rough shares of his rice as follows:

Region	Share	Contacts for customers
Ashanti	35	Attak Services, Milliants Ent (Kumasi)
Western	20	Devicas Ent (Takoradi)
Accra	10	self
Central	10	schools in Cape Coast
Eastern	10	Dankasco Farms (Koforidua)
Brong Ahafo	5	
Upper East	5	Comrie Ent (Bolga)
Volta	3	
Northern	2	Mary Manful (Tamale)

The seasonality of the trade has decreased. There used to be a marked period of higher demand during Sept. - June. Now there is virtually no seasonality - demand is constant. Though there is particular firmness in demand during the run up from now to Christmas.

He handles all grades of rice from 35% brokens to unbroken grades. In previous years there was demand for 35% broken rice, now there is a marked shift to higher quality rice, and it is very difficult to shift low quality rice quickly. People are prepared to pay a big price premium for higher grades.

Current selling prices:

C35,000 for 50 kg 35% brokens

C52,000 for Thai 10%

C60,000 for 'Grade B' Thai (no brokens)

Also mentioned a US no 5 long grain rice with 20% brokens which is selling very well due to its fragrant smell and good quality. People are prepared to pay a premium for this rice.

Selling terms - gives a max. of 14 days credit. Sells out of depot at Kaneshie, with no involvement in transport.

Buying terms - usually gets up to 30 days suppliers credit, with a 20% deposit down payment up front.

Margins on rice are low - around C1000 - C2000 per bag. Volumes and turnover are the key to profits.

Current buying prices are:

India 35% C33,000 (for 2000 tonnes plus)

Thai 10% C50,000

Vietnamese 25% C36,000

US No 5 C60,000

The overall size of the market is firm - rice is now becoming a staple food and is popular due to its easy cooking.

Major problem for him is the depreciating cedi which adds to the risks of doing business and means that suppliers tend to ask for stricter conditions and are less free with credit.

Generally purchases are financed with own capital and making use of suppliers credit - no involvement from banks. However, he sometimes gets short-term cover from banks for a few days to a week to settle accounts with suppliers when he has liquidity problems.

Competition in the market is increasing - there are now more importers, and there is need to devise new innovative incentives to attract and retain customers.

Appendix 5

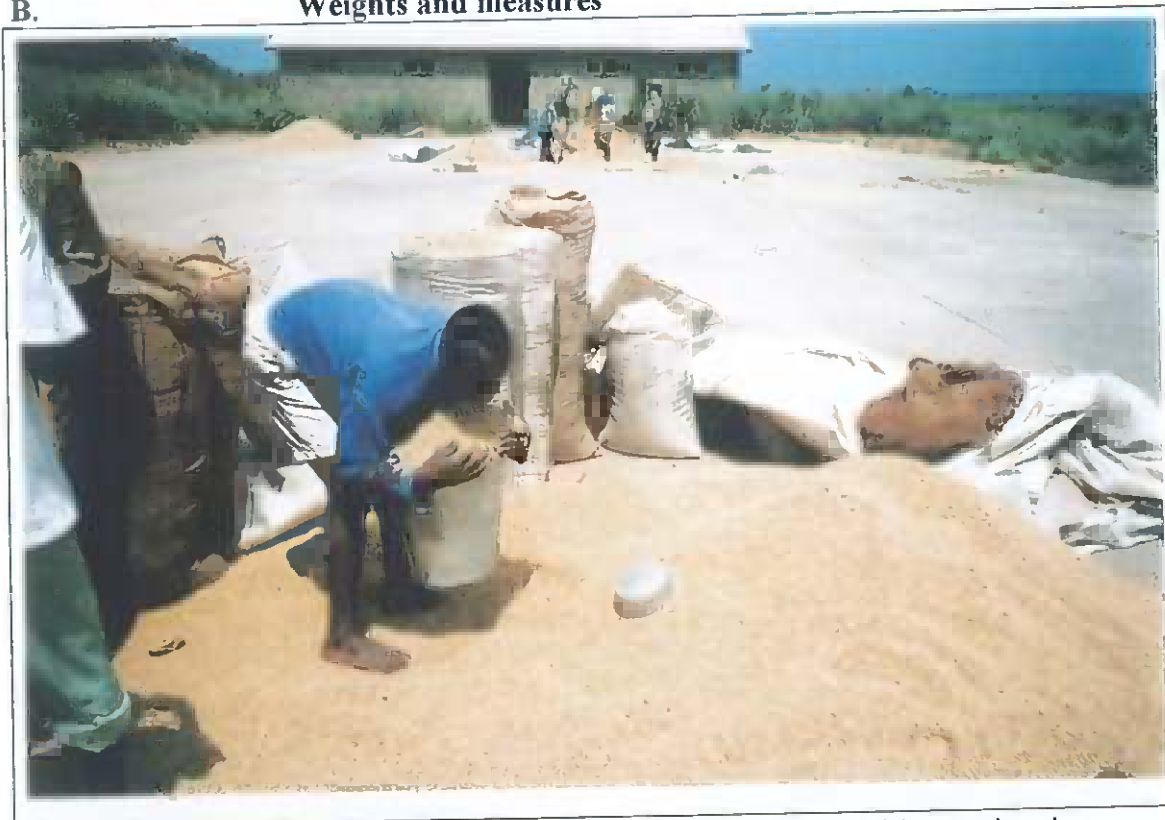
Photographs

A. Harvesting rice in Afifie

Threshing using box and tarpaulin



Harvesting under water-logged conditions. Afifie

B. Weights and measures

Measuring paddy from the drying floor into jute maxi-bags using the Nigerian bucket. Afife



Milled rice at the GFDC mill at Afife showing the 20 cm "enamel bowl" measure for rice

C. **A slip of the Hand in Afifie**



Trader buying rice in 20 cm enamel bowl. Note “extra hand”



Retailer selling rice in same measure but “less hand”

D. Typical small rice mills



Sasaki type



Steel huller type mill

E.

Workings of mills



Locally manufactured shaft in trad. mill



Broken screens and filets from Sataki mill

F. Storing Rice on the panicle in Central Ghana



Store in Assin Prasso, Central Region



Rice stored on panicle inside the store shown above.

G.

Parboiling