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TO THE

GLOBAL FOOD SECURITY RESPONSE WEST AFRICA RICE VALUE CHAIN ANALYSIS



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GLOBAL FOOD SECURITY RESPONSE GHANA RICE STUDY

microREPORT #156

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ACRONYMS

AFD	Agence Française de Développement (French Development Agency)
CEPS	Customs Excise and Preventive Service
EPA	Economic Partnership Agreement
EU	European Union
FBO	Farmer Based Organization
FDB	Food and Drug Board
GIPC	Ghana Investment Promotion Center
GRIB	Ghana Rice Inter-professional Body
Ha	Hectare
JICA	Japan International Cooperation Agency
MCA	Millennium Challenge Account
MiDA	Millennium Development Authority
MoFA	Ministry of Food and Agriculture
MT	Metric ton
NRDS	National Rice Development Strategy
PPRSD	Plant Protection and Regulatory Services
SME	Small and medium-sized enterprise
TTSP	Technical Training Service Providers
WARDA	Africa Rice Center

EXECUTIVE SUMMARY

Food security in Ghana can be enhanced both by reducing need through increased incomes and by increasing supply through more efficient production. For rice to become a competitive industry and contribute to food security, widespread and large-scale upgrading is needed. This will require significant investment to deliver into a market that will either pay premiums for the product or facilitate investments in improved production and post-harvest practices. Import substitution is the only strategy through which Ghana's rice industry can attract such investment. In the urban market channel, the demand is greatest for long-grain aromatic varieties, which mostly imported. Increasing productivity of these varieties on smallholder farms will ultimately drive down prices (and that supply response will benefit food security). This will also drive down prices for local brown rice varieties. Once buyer-driven upgrading results in a shift to higher levels of mechanization services, producers will likely adopt indigenous red rice (*Oryza glabberima*) as well as other locally demanded varieties.

The window of time to take advantage of this opportunity to upgrade rice in Ghana is short. The value of the Ghana cedi is expected to rise due to increased oil revenues, making importers and consumers indifferent to importing. Currently, high variability of global market prices is a sufficient incentive for the largest importers to invest in and collaborate with donors and implementers on local upgrading, but in three to four years, the appreciation of the cedi will weaken this incentive. Thus, donors, implementers and stakeholders must act quickly to stimulate upgrading in Ghana's rice sector by working with the importers who have the means and incentives to invest.

Even with these investments, Ghana's dependency on increasingly volatile rice imports and the consequent negative impact on foreign exchange balances will continue to increase without a significant policy shift in support of private investment in efficient domestic rice production, processing and quality upgrading. The principal change needed in the business enabling environment is reform within the Ghana Irrigation Development Authority that allows and encourages private ownership and management of Ghana's irrigation facilities. Currently, irrigation infrastructure is owned and maintained by the Irrigation Development Authority, an arrangement that results in underutilization of resources and inadequate maintenance. It is also difficult for small-scale farmers to acquire larger plots of land. Ownership and operational functions such as maintaining and cleaning canals should be shifted to the firms who assume the production risk—i.e., the farmers. The second major policy shift needed relates to equipment supply and maintenance. Currently, the government is the largest equipment provider, selling at a subsidized rate that discourages the growth of the private equipment supply sector. The stunted equipment sector in turn has the effect of inhibiting the growth of the equipment service and repair industry. In addition, there is a shortage of spare parts for imported machinery and lack of qualified providers. Incentives must be shifted to encourage growth of the private equipment supply and maintenance sectors.

Given that all countries in the region remain net importers, neither Ghana nor its neighbors are likely to become net exporters of rice in the near future. However, Ghana could become self-sufficient in rice by 2015 if the area under cultivation is doubled, yields increased by 50 percent on average and adequate investments are made in several areas:

- Access to seeds—particularly to varieties with import substitution potential—needs to be increased.
- Appropriate equipment needs to be made available through private distributors and service providers to allow production to become increasingly mechanized.
- Mechanisms need to be put in place to ensure the efficient use and sustainable management of irrigation infrastructure.
- Significant investment needs to be made in processing equipment.

Given the complex structure of large, government-controlled irrigation facilities, a significant part of any upgrading strategy should focus on commercially viable producers growing rice on relatively small irrigated sites.

I. INTRODUCTION TO GHANA'S RICE INDUSTRY

PRODUCTION

Ghana's rice production estimates range from 200,000 to 300,000 MT of paddy or roughly 120,000 to 180,000 MT of milled rice, the bulk of which comes from the Upper East, Northern and Volta Regions. Rainfall remains the greatest driver of production variance. Ghana's rice production can be categorized into three primary cropping types (see Table 1). Lowland rain-fed, which includes rice planted in the receding waters of the Volta and other rivers, accounts for 78 percent of production; upland rain-fed accounts for 6 percent; and irrigated rice accounts for 16 percent. Rice production expanded steadily from 1994 to 2004 primarily from an expansion of land under paddy production.

Table 1: Categorization of Paddy Fields in Ghana

	Lowland rain-fed	Upland rain-fed	Irrigated	Total
Planted Area (Ha)	93,750	18,750	10,200	122,700
Paddy (MT/Ha)	2.4	1.0	4.5	2.4
Paddy Production (MT)	224,700	18,750	45,900	289,350
% of Total Area	76	15	8	100
% of Total Production	78	6	16	100

Source: "The study on the Promotion of Domestic Rice in the Republic of Ghana," *MoFA and JICA*, (Final Report, March 2008).

By the end of 2008, rice production in Ghana was estimated at 301,921 MT of paddy, yielding roughly 181,000 MT of milled rice, produced on 132,921 hectares, resulting in an average yield of 2.27 MT/Ha of paddy for upland and lowland rice aggregated. It is generally agreed that current domestic production accounts for between 30 to 40 percent of domestic consumption (approximately 600,000 MT of milled rice).

Current rice yields vary considerably by cropping type but average yields are 2.5 to 4.2 MT/Ha in the major season and 2.1 to 3.5 MT/Ha during the minor season. This compares to 9.8 MT/Ha for Egypt, 7 MT/Ha for the U.S. and Japan, and 4 MT/Ha for Vietnam.¹ Vietnam is a high-volume rather than a highly efficient producer and Ghana's highest-yielding producers barely exceed Vietnam's national average. At the same time, Ghanaian yields are relatively high given the lack of access to improved seed, agro-chemicals and appropriate mechanization. It can be assumed that, given access to these resources, Ghana could produce rice at reasonably high levels of efficiency.

Ghana's potential for irrigated perimeters is 1.9 million hectares, roughly 0.46 percent of which is currently developed. Since the 1960s, 22 public irrigation schemes totaling 8,700 hectares have been established and are currently used for the production of rice, maize and vegetables. The ongoing Millennium Challenge Account-funded program seeks to bring an additional 5,200 hectares under cultivation, with 1,400 hectares in the north, 800 hectares in the Afram Basin and 3,000 hectares in the southern agricultural zone.

¹ "Mali Value Chain Finance Study," (draft, prepared under USAID AMAP Financial Services Task Order, 2007).

Mechanization levels in rice production are low throughout Ghana, although most farmers hire tractor services for plowing and harrowing. In the Northern Regions, bullock-drawn plows are also common. All other production and post-harvest activities are done manually, especially by smallholders. Other constraints to production include low land-leveling of paddy fields and lack of bunds to retain rain water; inadequate supply of certified seed, fertilizers and other agro-chemicals; and inadequate credit facilities to ensure investment in productivity-enhancing technologies.

GENDER CONSIDERATIONS

In Ghana, women dominate the small-scale trade in rice at the retail level and to a lesser degree at the wholesale level. Men and women are both involved to some extent at all levels of production and processing. In irrigated facilities, women have less access to the capital necessary for investments in equipment (in spite of the fact that they have a better repayment reputation than men). Women are also dominant in post-harvest services such as traditional winnowing and threshing. Because women are less politically connected, they are less able to avail themselves of government subsidies, especially for machinery and equipment. When undertaking interventions in the rice industry, it is critical for program designers to pay particular attention to gender-based disparities in access to new technologies and resources. If mechanization increases without increasing women's access to machinery and equipment, women could lose their major roles in such tasks as transplanting and threshing. Even if access for women is increased along with mechanization, some of their labor will be released by these technologies, and interventions should seek to refocus this labor in production rather than the specific functions of transplanting and threshing.

CONSUMPTION PATTERNS

Consumption patterns can be best understood in terms of three factors: i) demand shifts to rice from tubers as incomes rise, ii) rural versus urban patterns, and iii) varietal preference patterns. In Ghana, as is the case throughout the region, household consumption patterns shift to rice from other coarse grains and tubers as incomes rise. Demand for rice will therefore continue to outpace population growth as incomes rise.

Ghana differs from many other countries in the region in having large and diverse sources of dietary carbohydrates, whereas for coastal countries like Liberia and Sierra Leone, rice is the principal carbohydrate source. In Ghana, maize, millet, sorghum, cassava, yam, cocoyam and plantain are widely consumed starch staples and these are relatively cheaper than rice for most of the year.

Current rice consumption estimates range around 30 kg/capita per year (see Table 2) with projected demand in 2015 of as much as 63 kg/capita per year driven by steady gains in income and a population growth of 27.5 percent. Consistent with income patterns and Ghana's diverse range of carbohydrate sources, rice consumption in rural areas (where poverty levels are higher) is much lower than in urban areas. Rice comprises only about 10 percent of total carbohydrate consumption, and rural consumers—especially those producing alternative cereal and tuber crops—are less vulnerable to rice price fluctuation than urban ones. By contrast, in urban areas, there is a strong preference for long grain aromatic rice, which is principally imported from Vietnam or Thailand and for which there are few locally available substitutes.

Table 2: Estimation of Per Capita Rice Consumption in Rural and Urban Areas of Ghana

		Urban	Rural	Whole Country
	Population	9,170,000	11,360,000	20,530,000
Yearly Consumption	Per Capita (Kg)	38.0	9.2	22.1
	Total (MT)	348,500	104,800	433,300
	Consumption Ratio (%)	76.90	23.1	100

Source: Estimation based on interviews by JICA Study Team, 2006.

POVERTY

Although poverty levels are falling, it will be difficult for Ghana to achieve its Millennium Development Goal of reaching middle income status by 2015. In 2005, 43 percent of the population was estimated to be living below the poverty line, of which roughly two-thirds were from rural areas and one-third from urban centers.² Poverty rates are dropping nationwide, with 2006 estimates at 28.5 percent, compared with 39.5 percent in 1998 and 51.7 percent in 1991. Population growth is also dropping slowly. Current population estimates are around 23 million, up from 21.3 million in 2005. Fifteen percent of the population, or almost 3.5 million people, are estimated to live in Accra where pockets of extreme poverty can be found, especially among unemployed or under-employed migrants from other parts of the country.

TRADE

PATTERNS OF REGIONAL RICE

Cross-border trade of rice occurs for two main reasons: there is a price variance due to different import duties on rice across countries in the region; and there are local surpluses in key rice-producing areas in northeast Ghana around Navrongo, which are sold into neighboring Togo and Burkina Faso. Almost all the rice imported into Ghana comes from outside the continent, with Vietnam, Taiwan and Thailand accounting for about 94 percent of Ghana's rice imports in 2008. Vietnam, Thailand and the USA have consistently been the source of the bulk of rice imports into Ghana, however, in 2008 Ghana imported over 50 percent of its rice from Taiwan.

² 62 percent and 38 percent, respectively.

Table 3: Top 5 Countries from which Ghana Imported Rice between 2004 and 2008

Country	2004 (MT)	% of National Imports	2005 (MT)	% of National Imports	2006 (MT)	% of National Imports	2007 (MT)	% of National Imports	2008 (MT)	% of National Imports	Total (MT)
Vietnam	113,026	23.25	111,553	35.39	140,387	28.49	80,630	24.03	493,988	33.00	939,584
Taiwan	8,354	1.72	-	-	-	-	-	-	796,525	53.21	804,879
Thailand	169,470	34.86	83,199	26.39	112,066	22.74	102,118	30.44	122,656	8.19	589,509
USA	127,380	26.20	66,532	21.10	69,435	14.09	32,809	9.78	11,146	0.74	307,302
Pakistan	-	-	16,382	5.20	85,663	17.39	6,394	1.91	45,237	3.02	153,676
Sub-Total	418,230	86.03	277,666	88.08	407,551	82.72	221,951	66.16	1,469,552	98.17	2,794,950
Total National Imports	486,144		315,253		492,716		335,497		1,496,917		3,126,527

Source: Data Collected From Shipping Lines by ACDI/VOCA Study Team, 2009.

Ghana's imports from Côte d'Ivoire increased substantially to 4,415 MT in 2006 and 12,363 MT in 2008. Given that Côte d'Ivoire is also a net rice importer, it can be assumed that most of this rice was transited to Ghana through Côte d'Ivoire from a different country of origin. The spike in 2008 is probably accounted for by the fact that in that year Côte d'Ivoire removed import duties on rice due to rising global rice prices two months before Ghana did so.³ There is also likely to be considerable undocumented cross-border trade in both directions between Ghana and her neighbors as informal or illicit traders exploit temporal price variances between countries. Table 3 above summarizes the major exporting countries to Ghana from 2004 to 2008. Cross-border imports from Côte d'Ivoire represented a loss of market to the larger Ghanaian importers until Ghana removed import duties on rice in May 2008.

GHANA'S INTERNAL TRADE PATTERN

Locally produced paddy is moved from principal production areas to mills and on to the main areas of consumption, although flow volumes are low. Imported rice moves primarily from Accra and Tema to major urban areas and from there to all other parts of Ghana. The net deficit situation for all peri-urban areas of Ghana discourages importers from purchasing locally produced rice. In most peri-urban areas the farm gate price of local paddy tends to remain very close to the local wholesale price of imported rice. At these prices, large traders and importers have difficulty securing local rice of a quality competitive with Thai long grain at a price that allows them to transport this rice to Accra or other major urban centers without incurring losses. This phenomenon will remain a problem until local production levels increase substantially and producers obtain modern, efficient processing equipment that facilitates an improvement in the local rice quality and also causes local prices to fall relative to those of imports.

³ La Liberté, an Ivoirien daily, and Joy FM, a Ghanaian FM station, online reports.

MAJOR INDUSTRY TRENDS

CONCENTRATION OF IMPORTERS

There is a concentration of a few firms that import the bulk of rice into Ghana. The top five importers account for 77 percent of total imports and, judging from the trend, it is possible that these top importers might increase their share of the market in the coming years (see Table 4).

It is observed that there was an unusually large quantity of rice imported in 2008. Although the removal of import duties in May 2008 could have contributed to this large import volume, there may be other reasons that the study team was unable to find.

Table 4: Concentration of Importing Firms at the Top of the Rice Value Chain

Top 5 Rice Importers	2004 (MT)	% of National Imports	2005 (MT)	% of National Imports	2006 (MT)	% of National Imports	2007 (MT)	% of National Imports	2008 (MT)	% of National Imports	Total in MT
Royal Bow Co. Ltd	85,037	17.5	73,601	23.3	104,462	21.2	62,567	18.6	461,062	30.8	786,729
CCTC	73,696	15.2	77,680	24.6	109,349	22.2	88,928	26.5	326,523	21.	676,176
Cereal Investments Com. Gh. Ltd	29,863	6.1	5,231	1.7	2,494	0.5	12,386	3.7	199,366	13.3	249,340
Olam	36,074	7.4	22,768	7.2	28,393	5.8	34,906	10.4	28,542	1.9	150,683
Ezal Trading Gh. Ltd		-		-		-	2,600	0.8	137,191	9.2	139,691
Total Imports	486,144	46.2	315,253	56.9	492,716	49.7	335,497	60.0	1,496,917	77.0	2,002,619

Source: Data collected from Shipping Lines by ACDI/VOCA Study Team, 2009

CONCENTRATION OF VARIETAL PREFERENCE

The quality of rice is the most important criterion of consumers for choosing a particular brand. Taste, color, texture and cleanliness are some of the quality attributes that buyers and consumers interviewed revealed as most important. Their preference has also shifted from varieties such as Tox 3107 and 3108, Viwonor and NERICA, to aromatic varieties such as IITA 222, Grug 7, Jasmine, Aromatic Short and Togo Marshall.⁴ This has led farmers to grow more of these aromatic varieties. Indigenous brown and red varieties still dominate local production, especially in upland areas, although the largest growth market is in import substitution long-grain aromatic varieties.

⁴ Togo Marshall is the local name for the long-grain aromatic rice.

DECLINE IN FINANCIAL SERVICES TO THE AGRICULTURAL SECTOR

Lending to the agricultural sector is relatively low, especially for the commercial banks (see Figure 1, right). Part of the reason for the low level of lending for agriculture is the risks inherent in rain-fed production systems. A larger constraint in agricultural lending is a default culture where, historically, government-owned financial institutions dominated agricultural lending and put the need for votes before the need to recover loan funds. Where lending is available, the interest rates are very high. With good macroeconomic policies, nominal rates fell from 2000 until 2008 (see Figure 2), when rising local inflation and a steadily declining Ghana cedi drove interest rates up again. Currently, in 2009, interest rates are around 30 percent per annum and even higher among microfinance institutions, some of which charge rates of 42 percent.

Figure 1: Percentage of Loans and Advances to the Agricultural Sector

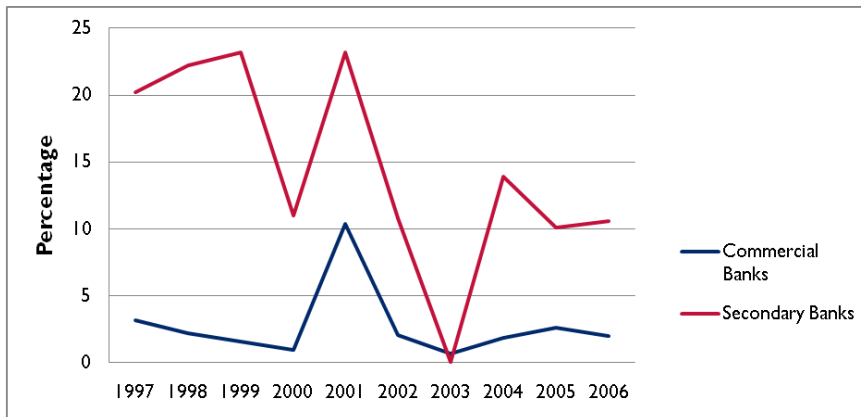
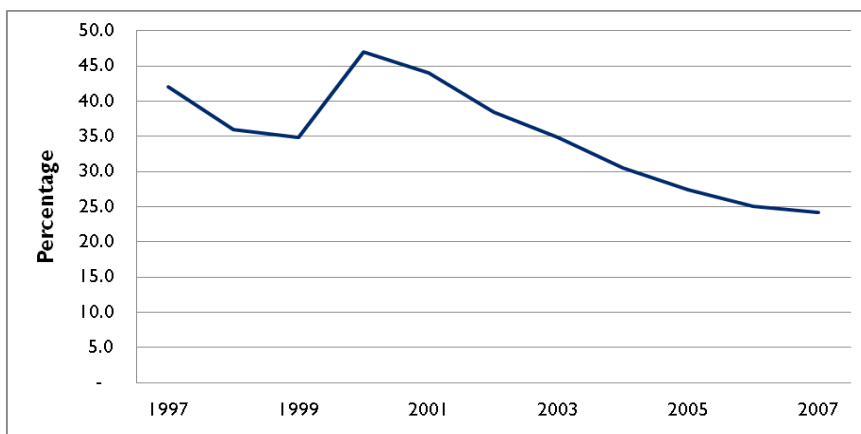


Figure 2: Interest Rates Charged by Commercial Banks for Agriculture



LOOKING FORWARD

With average yields lower than 2.5 MT of rice per hectare, future investment in domestic rice production will have to focus on increasing the productivity and efficiency in the production of long-grain aromatic varieties of rice. Due to seasonal labor shortages, significant increases in productivity will have to occur by transitioning to more capital-intensive production and harvest and post-harvest technologies. This will include increased production via transplanting, which will require adoption and scaling-up of small-scale transplanters, harvesters and threshers, and will eventually also include increased use of energy-efficient pumps to add an additional rice season for current rain-fed areas.⁵

⁵ ACDI/VOCA is currently working with the USAID-funded TIPCEE project (managed by Chemonics and other partners) to assist a local equipment dealer to identify a manufacturer who can supply and support small-scale rice manufacturing equipment.

II. THE RICE BUSINESS ENABLING ENVIRONMENT

HISTORY

From independence in the 1950s through 1982, the government intervened heavily in the rice sector. Stiff restrictions were imposed on imports to encourage domestic production, partially in response to an overvalued currency that made imports more affordable. Between 1983-1986 and 1987-1991, two phases of stabilization policies following economic crises were implemented. Despite a drastic decrease in protection of the food sector and subsidies for inputs, devaluations and trade and marketing reforms favored local production over imports. Imported rice was about 10 percent cheaper than domestic rice before the adjustment programs started in 1983, and over 25 percent more expensive at the wholesale level after 1984. In 2003, Ghana's parliament passed a budget that raised rice tariffs by 5 percent, but the increase was not implemented by customs and was then repealed in 2005.⁶

GLOBAL

Ghana signed an interim economic partnership agreement (EPA) with the European Union (EU) in December 2007 while a broader regional trade EPA is yet to be negotiated and signed. The interim deal is aimed at maintaining current trade relations. The trade deal will transition rice to "tradeable" with the EU and has as its end goal the creation of a regional free trade zone. Imported rice has a 20 percent ad valorem tariff to which a 12.5 percent VAT is added. The tariff is projected to go up to 25 percent sometime this year.

NATIONAL

The government of Ghana has, in the last few years, aimed at attaining macro-economic stability as evidenced by the stated desire to achieve single-digit inflation by the end of 2007.⁷ Inflation in Ghana is caused mainly by growth in the money supply, which in turn drives rising food prices. Rising food prices drive high inflation because about 52 percent of the consumer price index is made up of the food component. In addition to targeting low inflation, low interest rates were forecasted and expected to reduce the cost of credit, promote business and consequently stimulate private sector activity (ISSER, 2008). The Central Bank's efforts at ensuring macro-economic stability are also guided by the need to attain the West African Monetary Zone convergence criteria which would lead to the introduction of the common currency.

Ghana's economic growth, measured in terms of Gross Domestic Product, has been on a steady rise from 6.1 percent in 2006 and 6.2 percent in 2007 to 7.3 percent in 2008 (ISSER, 2008: Ghana Business News.com). Most of the growth has come from the service sector, with agriculture growing at a slower pace of 3.1 percent in 2007, most of which can be attributed to increased cocoa production.

⁶ deGrassi, Aaron. "Linking Research and Policy: the Case of Ghana's Rice Trade Policy," 14.

⁷ Inflation averaged 10.7 percent in 2007 compared to the government's projected 8.8 percent.

MECHANIZATION SUBSIDIES: A MIXED BLESSING

Generally, the level of mechanization in rice production is very low, although there is some effort by the government to provide tractors to encourage an increase in mechanization. As part of its support to the agricultural sector, and consistent with Ghana's Poverty Reduction Strategy (GPRS), the Growth and Poverty Reduction Strategy (GPRS II), and the Food and Agriculture Sector Development Policy, the Ministry of Food and Agriculture (MoFA) annually purchases tractors to sell on partially subsidized terms to farmers and service providers. This service is generally well-received. At the same time, the government's direct importation of tractors inhibits the emergence of private tractor dealerships and, more importantly, of qualified repair and service providers since there is a shortage of spare parts and a lack of qualified repair specialists. Private importers fear that unannounced tractor subsidies will reduce market prices for machinery. In addition, while the government of Ghana subsidizes tractors, it does not train operators or otherwise ensure the maintenance of tractors.

There is very little equipment for production, harvesting and post-harvest activities. Rice production through post-harvest activities include (i) harvesting, threshing and drying (see Figure 3); (ii) storage; (iii) parboiling⁸; and (iv) milling. There are no combine harvesters, small or large, for harvesting, there are very few threshers, and almost no mechanical transplanters.⁹

IMPORT TARIFFS

Presently, government policies favor the importation of rice into the country. In 2008, in light of rising global food prices and the response of other governments in the region, the Ghana government removed the import tariff of 20 percent on rice. While the benefits and costs of import duties can be argued from both sides, the effect of removing certain specific tariffs, thereby reducing the total tariff charged, meant reduced customs revenue, reduced production parity price for rice farmers, and a somewhat-reduced retail price for urban consumers for whom price is not an important purchasing criterion.

RESEARCH AND EXTENSION

Under the National Agricultural Research Program, the rain-fed lowland system was identified as a viable and sustainable option for rice production in Ghana. Rain-fed lowland production technologies are similar to irrigated systems but use the receding waters of the Volta and its tributaries as the primary water source. Some inland valley sites in the

Figure 1: Cutting at Upper Part of Panicle and Threshing



- (1) **Harvesting work. Panicles are cut about 40cm from the ground level. Navrongo, Upper East Region.**
- (2) **Threshing work at public concrete yard. Stacked panicles are beat by stick. Navrongo, Upper East Region.**

⁸ Parboiling of rice occurs only in the north of Ghana where lower post-harvest humidity levels result in higher percentages of broken rice from milling without parboiling.

⁹ During the course of this assessment, only one rice farm used small-scale machinery for planting, transplanting, harvesting and threshing. This farm was being run by a Korean Company producing short grain sticky rice for Korean off-shore fishermen. The company, Bok Nam Kim Agric School and Farm., Ltd, runs a school and rice demonstrations.

Western, Volta, Upper-East and Upper-West regions have participated in the WARDA-funded PADS (Participatory Adaptation and Diffusion of Technologies for Rice Based Systems in West Africa) and PLAR (Participatory Learning and Action Oriented Research) programs that brought researchers, extension agents and farmers closer. These approaches have been effective at facilitating technology transfer and diffusion processes but have been less successful at linking

introduced technologies into value chain market channels. Most of the research has focused on production and reducing losses through improved post-harvest and storage technologies. The research agenda has not been effectively linked to marketing systems. For instance, varietal research has not been focused on varieties that the market is willing to pay for, but rather on varieties with higher yields regardless of whether there is a market for that increased yield.

To strengthen the linkages between research and extension, Research-Extension Linkage Committees were put in place in the early 1990s, which typically review and prioritize the constraints of farmers and processors with their active participation. Inadequate funding means that many research interventions are not implemented and periodic reviews are not carried out at the district level.

DEVELOPMENT PARTNERS

A number of development partners have supported the rice sector over the years. They include the Japan International Cooperation Agency (JICA), the Canadian International Development Agency, the French Development Agency (AFD), and the Food and Agriculture Organization of the U.N. JICA support is focused in part on the rehabilitation and expansion of government irrigation projects and the introduction of improved technologies for them. Amongst other activities, AFD is providing financial support to the Ghana Rice Inter-professional Body (GRIB), a nascent industry association whose mission is to coordinate activities in support of a more competitive rice industry. GRIB is the main body that is organizing private-sector stakeholders and advocates for a favorable environment in the rice value chain to ensure benefits to actors at every step, from production to consumption. More recently, U.S. government investments are supporting activities in the rice value chain through the Millennium Challenge Account (MCA) and its Ghanaian implementing agency the Millennium Development Authority (MiDA). Little of this support has addressed structural and network constraints to the rice value chain that limit project benefits. Most of the support from these development partners has been project-based and the achievements and benefits during the project life have rarely been sustained after close-out. However, as explained above, GRIB has been an important exception, facilitated by the Food Security and Rice Producer Organizations Project and implemented by the Crops Services Directorate of MoFA with financial assistance from AFD.

Figure 2: Cutting at Ground Level and Threshing



(1) Panicles cut near ground level are dried on the sheet. Adujaya, Ashanti Region.

(2) Dried panicles are beaten on the oil drum on the sheet, to remove paddy. Adujaya, Ashanti Region.

Source: "The study on the Promotion of Domestic Rice in the Republic of Ghana," MOFA and JICA, (Final Report, March 2008).

PRODUCTION AND DISTRIBUTION OF CERTIFIED SEED

The rice seed system can best be described as weak in terms of introducing and testing new varieties, nationwide production and distribution and storage infrastructure. Foundation seeds are produced by the Crops Research Institute, Savannah Agricultural Research Institute, the University of Ghana Research station at Kpong and the Irrigation Development Center at Ashaiman, which also produces certified seed. The bulk of certified seed is produced by licensed private-sector seed growers under the supervision of the Plant Protection and Regulatory Services (PPRSD) of MoFA and the Grains and Legumes Development Board, often within the framework of specific projects. Licensed seed multipliers receive a price significantly above the local market price for paddy, and certified seed is then sold at a subsidized price to farmers. The licensing and price subsidy functions as a barrier to private-sector production. Because of the consistent use of the farmers' own seed, the productivity and quality of seeds being planted by most farmers has deteriorated. Even at subsidized rates, purchasing certified seed is an expense that many smallholder farmers cannot afford or prefer to avoid by using their own seed. This creates a vicious cycle because reduced yields and quality from use of their own seed result in lower income, leaving less money to invest in the purchase of certified seed for the next crop. Some smallholder farmers with slightly larger plots of land are able to invest in certified seed, but there is still an issue of inadequate supply.

The National Rice Development Strategy states that for genetic resource development and maintenance, germplasm will be collected and molecular tools used to characterize and evaluate them for the relevant ecologies (NRDS, 2009). The strategy document also states that the national seed law will be amended to reflect challenges and opportunities within the seed system and adhere to varietal release, quality control and certification mechanisms. Some of the key requirements for improvement of the seed system include rehabilitation of existing infrastructure and provision of new infrastructure, such as cold storage facilities and warehouses, and the development of human capacity for breeding and seed certification.

The Africa Rice Centre (WARDA) has been developing NERICA varieties and in 2004, the number of new varieties increased from 7 to 18 with the Variety Nomination Committee naming NERICA8 to NERICA18 as new rice varieties for the upland ecology of sub-Saharan Africa. Also, new lowland NERICA varieties have been released with potential yields of 6 to 7 MT/Ha, which are expected to make a big impact in Africa. By mid-2005, sub-Saharan African countries, including Ghana, had received seed samples for adaptive trials and participatory varietal selection using input from farmers on the most desirable varieties for specific upland and lowland localities.

Locally, what is missing from the seed production system is a more active role for the private sector. Under existing Ghanaian law, individual firms can fast track the importation of seed with PPRSD approval for their "own" use. Therefore in principle, large rice buyers could obtain approval for the importation of rice seed that would then be distributed to "their" growers through a dedicated supply chain governance structure. However, this occurs on a very limited basis since until recently, large buyers preferred to import rice than to hedge their bets with a mixed strategy of import and local production. Further, the global rice seed market is not well-developed and many exporting countries restrict the export of certified seed. A number of buyers interviewed indicated difficulties in finding certified seed outside of Ghana. In the past, efforts on behalf of large industrial buyers to source from smallholder farmers, such as through outgrower schemes, have met with little success due to side-selling and failure to honor production agreements. This experience has led to low levels of trust between producers and buyers and has discouraged the few large industrial buyers from repeating such failed initiatives. Yet the principal incentive for buyers to source from local smallholders—to hedge against global price volatility—remains, so buyers are still willing to invest resources in local sourcing, working in collaboration with a development partner. This is being tested yet again through an MCC-funded project that is attempting to connect large industrial buyers and smallholder farmers through trusted aggregators that can serve as intermediaries and dispel the mistrust from prior experiences. Private sector introduction of new seed varieties has been inadequately explored and needs further testing.

LOCAL

LAND TENURE

Ghana's land tenure system is complex. Overall, it aims to ensure that almost every Ghanaian national has access to productive resources on which to produce food, especially in the rural areas, and to ensure that traditional leadership structures, particularly the chieftaincies, continue to hold power as a counterbalance to the government. The land tenure system is less focused on facilitating the transfer of productive resources to those capable of making the most productive use of it. Detailed analyses of Ghana's land tenure system can be found elsewhere and are beyond the scope of this study.¹⁰ There are three broad categories of land ownership in Ghana: state lands, communal lands and family lands. Only the latter category can be bought and sold, though not even family lands can be sold to foreigners if the land is to be used for agricultural purposes. Communal lands are held in trust for the members of communities by chiefs. While land pressure is rising, most chieftaincies control lands that are not in use for either current or fallow agriculture production. These lands could be and increasingly are being leased to commercial investors for 15 to 30 years, and in some instances longer.

All large-scale irrigation infrastructure projects are cultivated by small-scale farmers on state lands that the government acquired in order to develop the physical infrastructure necessary to provide water to large tracts of land. In some cases, these lands were acquired without compensation, in exchange for which the government allocated plots to dispossessed farmers and communities and provided them with irrigation and sometimes even subsidized water. The transfer or redistribution of this land into private hands would mean that the investor would have to pay the compensation that the government did not pay to the dispossessed farmers and communities—an issue that most stakeholders agree may be better left alone.¹¹

Because both the land and the infrastructure of large irrigation projects are owned by the government and held and managed by the Ghana Irrigation Development Authority, any divestiture, even of management authority, requires an act of parliament to amend the law.¹² JICA has proposed exactly such a change to create a system of joint management of large irrigation sites between the government of Ghana, through the Irrigation Development Authority, and the communities using the land, in order to more effectively align resources, skills and incentives to maintain systems with owners and users in the Dawanya Irrigation site. ACDI/VOCA is also working with farmers and representatives of the government of Ghana to develop solutions that would allow the irrigation facility to re-open (their power was shut off for failure to pay for the electricity needed to run the pumps).¹³ No solution has yet been acceptable to all stakeholders and no act of parliament has yet occurred, though all stakeholders remain hopeful. The implication of this bottleneck is that new increases in yields will come from improvements in the productivity of existing farmers and expansion on non-government controlled site while the problems with joint public-private control of large infrastructure projects are worked out.¹⁴

¹⁰ MoFA and JICA, "The study on the Promotion of Domestic Rice in the Republic of Ghana."

¹¹ Fear of farmer reaction or reprisals against any effort to transfer through sale or lease to private investors of lands acquired without compensation was the most frequently-cited reason for the Ghana Irrigation Development Authority's reluctance to explore this.

¹² Laws governing irrigation lands are contained in Legislative Instrument (L.I) 1350 concerning land allocation and L.I. 604 concerning cooperatives.

¹³ The Ghana Irrigation Development Authority (GIDA) claims that the electricity should not have been cut since the resource is owned by GIDA, but the account was in the name of the Dawanya Cooperative. This case is still in litigation. Ownership and management issues remain unresolved at least in the view of the courts.

¹⁴ Concern over ownership and management structures of government-controlled irrigation sites is the reason the Millennium Challenge Account-funded MIDA program is investing only where management and ownership of structures are clear and infrastructure management will be in private (including cooperative) hands.

INVESTMENT CLIMATE

Attracting foreign investment is a policy priority for the Ghanaian government. The government recognizes that attracting foreign direct investment requires an enabling legal environment and has therefore passed laws to encourage foreign investment and has replaced regulations perceived as unfriendly to investors. The Ghana Investment Promotion Center (GIPC) Act, 1994 (Act 478), governs investment in all sectors of the economy except minerals and mining, oil and gas and the free zones. Sector-specific laws further regulate the sectors of banking, non-banking financial institutions, insurance, fishing, securities, telecommunications, energy and real estate. Foreign investors are required to satisfy the provisions of the investment act as well as the provisions of sector-specific laws. There are no specific laws governing the rice sector, but investment is subject to the general investment laws. Overall, the GIPC has streamlined procedures and reduced delays. More information on investing in Ghana can be obtained from GIPC's website, www.gipc.org.gh.

Significant expansion of lands under irrigation for rice cultivation will most likely be driven by small- and medium-scale farmers on communal lands outside of the 22 government irrigation sites that cover 8,700 hectares. The greatest potential is in the expansion of irrigated structures¹⁵ along the Volta and its tributaries, where a number of SME rice producers are now operating and a larger facility is being developed by an American company called Prairie Volta Ltd. (formerly Quality Grain Rice Company). In addition, a program funded by the Millennium Challenge Corporation is seeking to develop new irrigation sites and rehabilitate others, totaling an additional 5,200 hectares of irrigated area.

¹⁵ The yield on irrigated land (4.5 MT/Ha) is almost twice that of lowland rain-fed (2.4 MT/Ha) and four times that of upland rain-fed (1.0 MT/Ha).

III. END MARKETS

CURRENT END MARKETS

Rice is the largest cereal import (58 percent of cereals) into Ghana. Grade 1 rice represents about 5.5 percent of imported rice, and grade 2 rice represents 51 percent. No local rice is of grade 1, only 4.3 percent is of grade 2, and 82.6 percent is of grade 5.¹⁶ With an historic import levy of 20 percent, imported high-grade rice (low percentage broken) sells for \$650/MT and the lower grades for \$530/MT. Retail prices have changed only minimally since the removal of the tariff. Domestic milled rice sells at \$563/MT in production areas, although adding other distribution costs pushes the price up to \$626/MT in urban centers.

MARKET TRENDS

The principal sources for Ghana's rice imports are Vietnam and Thailand.¹⁷ Ghana produces very little long-grain aromatic rice that is competitive in quality to the imported Thai long-grain rice, which is preferred by consumers. There has been sharp increasing shift in taste from local rice to long-grain aromatic rice especially by urban consumers who consume about 76 percent of the rice. However, there is only limited access to certified seed for the local aromatic long-grain variety, 'Togo Marshall,' and the prospects for increased certified seed production remain limited for reasons cited above. Parboiled rice is consumed mainly in the northern parts of the country; only very small amounts are consumed in the cities.

MARKET SEGMENTATION AND HIGH-POTENTIAL MARKET SEGMENTS

Varietal trends significantly impact Ghana's rice promotion strategy and Ghana's vulnerability to global market volatility. The urban consumer with increasing income, purchasing power and political power is a sophisticated rice consumer. Shorter-grain, higher-gluten varieties are preferred for Omo Tuo (rice balls), a favored weekend dish, and local brown rice for certain occasions, but increasingly, urban consumers prefer long-grain aromatic and non-parboiled rice and they place more weight on quality and variety than price.¹⁸ The segment with the highest potential is the urban market where the main demand is for high-quality long-grain rice. This segment is controlled by imported rice, and to achieve import substitution great upgrading efforts are needed.

BENCHMARKING AND MARKET POSITIONING

The demand for high-quality rice is mainly in the relatively higher-income urban areas. In a 2008 JICA consumer survey, urban traders' most important selection criteria were the absence of stones and foreign matter (22 percent), grain uniformity (18 percent), minimal broken grains (12 percent), taste (12 percent) and price (10 percent). This suggests a willingness to purchase local rice that meets these characteristics since there was not a strong preference for the cachet value of imported rice. A recent ACIDI/VOCA consumer survey yielded similar results (see Figure 5 below). Based on the Ghana Standard Boards criteria,¹⁹ the average grade of domestic rice is 4.7 on a scale of 1 to 5

¹⁶ MoFA and JICA, "The study on the Promotion of Domestic Rice in the Republic of Ghana."

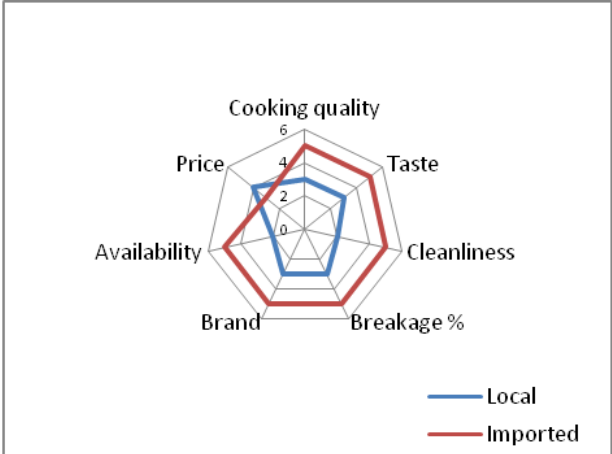
¹⁷ 2008 was an exception to this as Thailand introduced a ban on its rice exports, forcing importing countries to source elsewhere.

¹⁸ ACIDI/VOCA, Rice value chain assessment; MoFA and JICA, "The study on the Promotion of Domestic Rice in the Republic of Ghana."

¹⁹ Standard for classification: specification for rice in Ghana Standards Board, *Cereals, Pulses and Legumes*, GS 765: 3003.

whilst that of imported rice has a higher average grade of 2.8. Urban consumer preference for long-grain aromatic rice does create a unique and important challenge for Ghana. For locally produced rice to substitute for imported rice, it must be price-competitive, properly branded and available on the market regularly and with a consistent quality.

Figure 3: Comparison of Wholesalers’ and Retailers’ Perceptions of Local versus Imported Rice



BUYER CONTACTS

Most local-variety rice is sold by small traders or by aggregators at local markets and also sold to middlemen who resell in other markets, notably Ejura and Techiman. There are, however, a few major buyers of local rice who sell under various brand names. Locally produced improved aromatic varieties are sold through traders and wholesalers into Accra and Kumasi to compete with imported rice. Annex C provides information on the major distributors of local rice varieties.

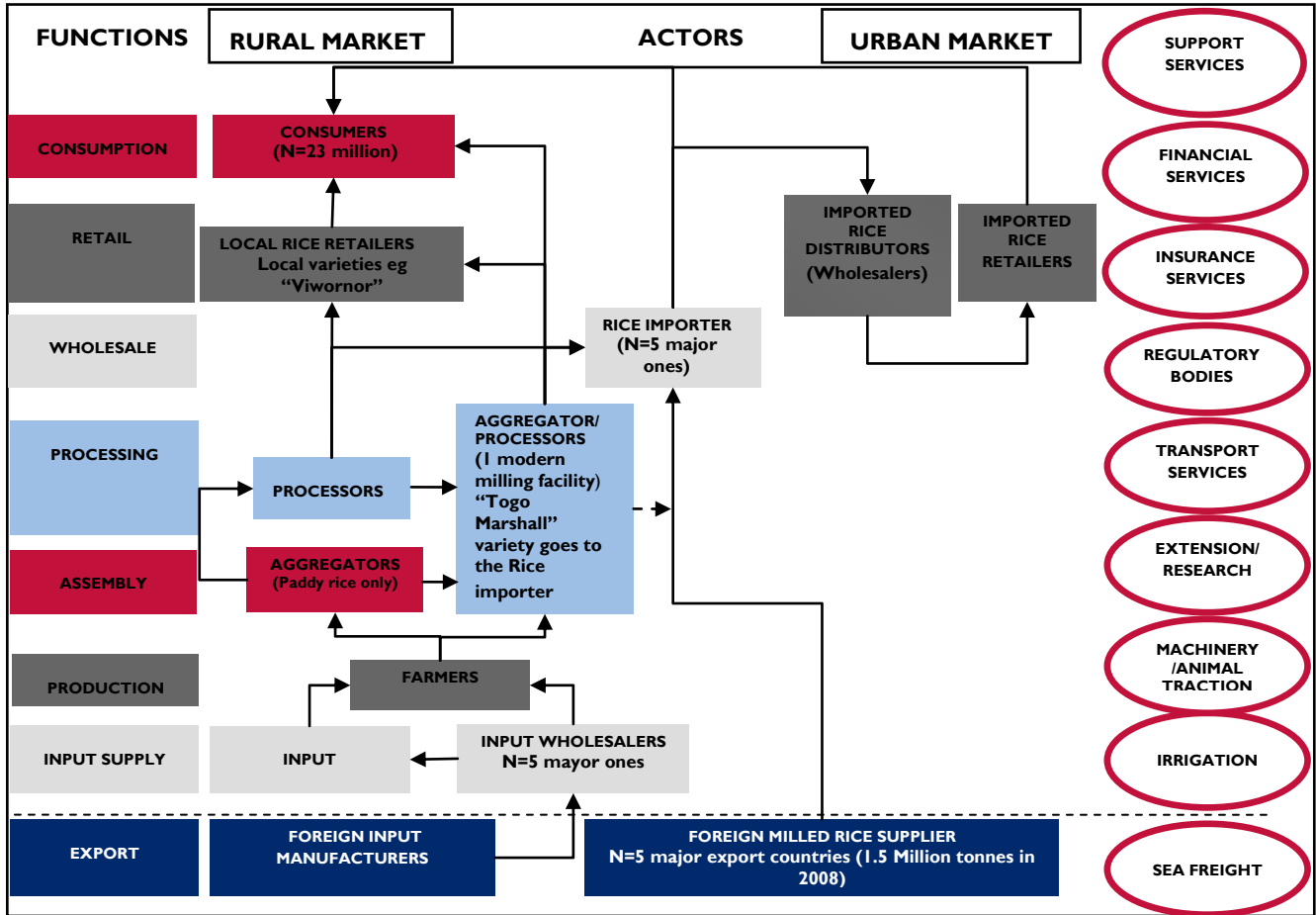
Figure 4: Map of Main Production Areas and Markets in Ghana



IV. CHAIN ANALYSIS

STRUCTURE OF THE RICE VALUE CHAIN

Figure 5: Ghana's Rice Value Chain Map



VALUE CHAIN ACTORS AND THEIR FUNCTIONS

The rice value chain map in Figure 7, above, shows that there are two channels in the rice industry in Ghana: the local rice channel and the imported rice channel.

LOCAL RICE CHANNEL

Input supply. Most inputs used for the cultivation of local rice are imported into Ghana. These include fertilizers and pesticides that are marketed by wholesale input distributors such as Dizengoff Ltd., Wienco Ghana Ltd, Yara and Agrimat Ltd. These companies supply the inputs to smaller wholesalers and retail shops. The inputs in the retail shops are sold to smallholder farmers and a few commercial producers for the production of rice. Certified seed is mostly not available in local input shops, so farmers resort to re-using their own seed, which contributes to low productivity.

Support services. Farmers receive land preparation services from agricultural machinery or animal traction service providers as well as irrigation services from the Irrigation Development Authority. There are some financial service providers that supply loans to small-scale farmers to increase land under production by hiring tractors or to purchase

inputs. The National Association of Agricultural Mechanical Service Centre Operators (NAMSECO) is the main body responsible for the provision of agricultural mechanization services to farmers in Ghana. It consists of about 12 member firms, each of whom runs two mechanization centers in their area of operation.

Producers. Rice cultivation across the country is done by smallholders. Holding sizes of typical rain-fed farmers in the northern regions are relatively larger than those in the southern regions. For instance, farm sizes in the Upper West and Northern Regions range between 2.33 and 2.79 hectares. Farm sizes are 0.9, 0.87 and 0.8 hectares for Ashanti, Western and Volta respectively. Almost all producers sell at least a portion of their crop for cash.

Aggregators collect rice paddy after harvest from smallholder farmers and sell to rice processors. While local rice aggregators have no formal contract with farmers, they often provide seeds and credit to farmers in order to secure the rice paddy at harvest. Local aggregators have fewer problems with side-selling than larger industrial importer/buyers, perhaps due to proximity of farmers or personal knowledge.

Processors buy paddy rice from either aggregators or farmers and parboil and/or mill it manually. Some all sent it to commercial milling places to have it milled. There are, however, **aggregator-processors**, who perform the dual role of aggregating and milling the rice paddy, after which it is packaged for sale on the local market. Some aggregator-processors have written contracts to supply local rice to the rice importers. These importers re-bag the local rice under various brand names. Togo Marshall is the most popular local variety that rice importers sell.

Millers form a part of the processor group. They may also buy paddy from some farmers for milling. There is only one modern milling facility at Aveyime (10 MT/hr) in the Volta Region of Ghana, where the bulk of high-value rice produced in the south is processed. The largest mill in the northern part of the country is at Nasia with a capacity of 4 MT/hr, however this mill is very old (it was installed in 1977). Other mills across the country have capacities of between 0.3 and 1 MT/hr and are generally inefficient. The mills are all privately owned.

Transport service providers assist aggregators in the collection of the paddy from farm to farm. Transportation costs vary from place to place and are also determined by crude oil prices. (See Annexes A and B.)

THE IMPORTED RICE CHANNEL

Rice Importers. The five major importers (see Table 4) are Royal Bow, CCTC, Cereal Investments Limited, Olam Ghana and Ezaal Trading Ghana Limited. These importers sell to wholesalers. The concentration of the large wholesalers has increased in the last decade as large importers set minimum sales volumes for their wholesalers. The rice importer transports the imported rice from the harbor to a warehouse from where it is distributed. The rice importer then sells the rice in wholesale quantities to the distributors (at least 100 MT a week). These distributors then sell to the imported rice retailers. The rice is then sold to the consumer in 1kg, 2kg, 5kg, 10kg, 25kg and 50kg bags. Some large importers also sell from their principal warehouse facility directly to retailers or large institutional consumers. Importers extend some trade credit to their distributors (imported rice retailers) who buy in very large quantities (over 2,500 bags on a weekly basis). This amount of credit varies by distributor. The credit is payable within 14 to 21 days.

Wholesalers concentrate on the sale of imported rice to a network of retailers. High transport costs create a situation where the wholesale price of imported rice in rice-producing communities becomes the effective farm gate price at which producers are willing to sell their product.

Retailers sell both imported and domestic rice. Some of the domestic rice is sold in the local open markets in Ghana—especially the brown rice, “Viwornor”—in 5kg and 10kg plastic bags.

Regulatory bodies such as the Customs Excise and Preventive Service (CEPS), the Ghana Standards Board and the Food and Drugs Board (FDB) perform important functions such as valuation of the rice for tax purposes (CEPS) and ensure the quality is suitable for human consumption (Standards Board and the FDB).

(Please refer to Annexes A and B for a detailed description of the profit margins made by some of the actors in the chain in northern and southern Ghana respectively.)

SYSTEMIC CONSTRAINTS IN THE VALUE CHAIN

BEE CONSTRAINTS TO THE FUNCTIONING OF THE VALUE CHAIN

Land tenure constraints and uncertainty regarding who holds usufruct rights reduce investment in irrigation and other land improvements. Increased commercial or economically viable agricultural systems will have require more secure land tenure rights, since land tenure insecurity is a disincentive for investments in land and soil improvement technologies, especially those with long-term benefits.

Other constraints are listed below:

- Rice import tariff variability and tax policies that do not favor local rice production
- Weak agricultural extension services to farmers leading to poor knowledge on current best practices in rice production
- Inadequate credit/finance from both primary and secondary financial institutions for all actors in the chain due to high default rates in agriculture
- High cost of inputs, especially fertilizer, due to global price increases and local transport costs
- Over-dependence on rainfall and also seasonal irregularities in water supply at irrigation sites
- Inconsistent power supply for processing

The constraints listed above serve as disincentives to existing producers and potential investors in the rice sector. In particular, the total removal of all tariffs on rice imports poses a threat to the competitiveness of locally produced rice.

CONSTRAINTS TO ACCESSING END MARKETS

Almost all rice that is produced in Ghana is consumed domestically by the producer, sold to nearby households and villages, or sold in local markets. A smaller but potentially highly lucrative and high-growth market is the urban market although it has high transport cost constraints. Several factors make local rice uncompetitive in terms of price and quality, and therefore constraint access to end markets. The main constraints are:

- Mediocre yields and high costs of production that make it difficult for locally produced rice to compete with imports
- Poor seed and varietal selection
- Poor threshing practices that result in a high percentage of broken grains, and poor milling that mixes whole and broken grains and makes the resulting product unclassifiable

Figure 6: A Typical Rice Milling Facility in Northern Ghana



- Inadequate warehousing and storage facilities

VERTICAL AND HORIZONTAL LINKAGES, GOVERNANCE AND INTER-FIRM RELATIONSHIPS

VERTICAL LINKAGES

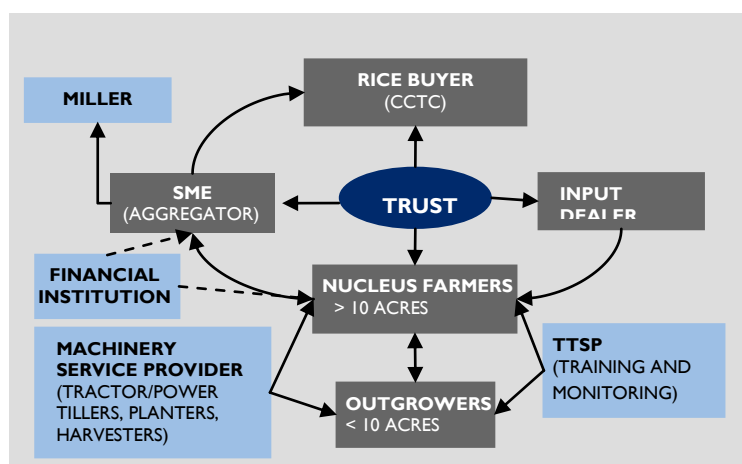
Quantitative analysis of the vertical linkages. Analysis of the operations and economic returns of the various actors along the rice value chain can be found in Annexes A and B. The analysis reveals that producers enjoy the highest returns in terms of gross margins²⁰: 39 to 42 percent per bag of 84kg of paddy. Aggregators make returns of between 6 and 9 percent. It may appear that retailers in the southern rice value chain are making a loss; however, this assumes that they incur the costs of proper warehousing. In reality, retailers avoid these warehousing costs to stay in business, but this can mean that quality is compromised through improper storage. Retailers in the northern region do not face the same problem with margins as there are few warehousing costs, although the issue of quality storage remains a problem.

Qualitative analysis of vertical linkages. Vertical linkages among actors in both the local and imported rice channels are characterized by a reasonably high level of trust and compliance between participants. Importers distribute rice to wholesalers, often with minimum purchase quantities set by importers, creating incentives for wholesalers to expand their distribution networks. The flow of information (prices, volumes available and distribution of prices in different market locations) is better in the imported rice chain than in the local rice industry and large importers are able to practice price hedging in the global market. The level of trust among importers, distributors and retailers is strong and has been established over time, and 95 percent of transactions among these actors are based on credit. Importers also have regular promotional activities and incentives (e.g., provision of delivery trucks) for their distributors.

In the local rice industry, aggregators are central to the value chain. Farmers prefer to sell their paddy to aggregators because they provide them with credit and seeds. Processors also prefer to buy from aggregators because the quality of rice as well as reasonable levels are guaranteed. Although there are a number of Farmer Based Organizations (FBOs) whose members produce rice, these FBOs are weak and mainly informal groups that come together opportunistically to take advantage of donor resources. As a result of mistrust between FBO members and their leaders, most members prefer to sell their produce individually.

Not surprisingly, vertical linkages and trust are weakest in the emerging cross-channel activity characterized by local production of import-substitution varieties marketed in the urban channel. Local producers require access to improved seed and inputs to shift to import-substitution varieties, and making this activity profitable requires the introduction of labor-saving and yield-maximizing technologies including transplanters and harvesters or

Figure 7: Rice Value Chain Financing Model



²⁰ Production cost includes labor and input cost. These costs were deducted from the farm gate price after which the profit margins were calculated. The proportion of the profit margin from the farm gate price was then calculated.

threshers. Both require injections of capital, which in turn require a high level of trust among the different participants and compliance with agreements needed to enforce that trust. Ghanaian culture in general does not place much importance on loan repayment, so a culture of voluntary compliance needs to be built and reinforced through effective use of mechanisms such as group guarantees.

There are, however, encouraging innovations. For example, firms such as CCTC have started branding local rice “Ghana Pride” to increase their consumer base and are upgrading local rice through better control of production and post-harvest systems to compete with imports in the domestic market. Other importers of rice have made moves to start producing rice locally. In collaboration with development partners, some large buyers are beginning to develop dedicated supply chains which link buyer, grower, input supplier, aggregators and financial institutions together (see Figure 9, above).

HORIZONTAL LINKAGES

In all channels, horizontal linkages are weak between firms performing similar functions. In the imported rice chain, importers acknowledge each other and exhibit some collaborative behavior to reduce or limit import duties, but otherwise do not cooperate. They are competitors and operate independently from each other.

The local rice chain has similar weak linkages among actors performing similar functions. Aggregators compete to secure paddy and sometimes pay higher prices to farmers even after their production has been pre-financed by another aggregator.

At the production level in the local rice industry, there are traditional labor-sharing networks where FBO members and sometimes loosely related farmers will share labor and less frequently will come together to purchase inputs. While there have been numerous efforts to strengthen producer groups, whether cooperatives or FBOs, most of these efforts have made the mistake of training groups of farmers in isolation and have been less focused on facilitating the development of networks between farmers, input and equipment suppliers, buyers and financial institutions essential to upgrading the chain.

SUPPORT MARKETS NECESSARY FOR UPGRADING

There are two elements that need to be considered in upgrading support markets. First and most obviously are the technologies and products that these markets can bring to accelerate upgrading. Equally important, however, is the establishment and strengthening of relationships among support and service market providers and value chain participants to reduce the risks of upgrading to all.

Mechanical service providers need to be upgraded so that they can provide tractor services—to include planting and transplanting services—as well as mechanical harvesting and threshing services, to increase efficiency, productivity and the quality of rice. There are currently only a few private tractor service providers who provide services from land preparation to the transport of paddy to local mills. Some FBOs own equipment such as power tillers and tractors and provide services to their members for a small fee and to non-members at a higher rate. Agricultural machinery is not readily available in Ghana; many importers will only import a machine upon request and payment of a deposit.

Financial service providers demand that farmers present some collateral for loans, which most farmers are unable to do. Farmers therefore find it difficult to access financial services. There are interesting exceptions to this in the emergence of value chain financing solutions that link buyers, input suppliers and farmers using an aggregator to reduce lending risk and attract loan funds without collateral. Improved storage capacity could also facilitate financial flows using a commodity warehousing receipt system and silos.

Other upgrading opportunities include:

- Upgrading rice mills with de-stoners, sorters, graders and silos to reduce post-farm gate losses by as much as 20 percent and improve the quality of locally produced rice
- Providing market price information services (for example through text messages)²¹
- Delivering extension services through private technical training service providers to assist the efforts of the Ministry of Food and Agriculture. Presently, such services exist only on a small scale within specific donor-funded projects
- Strengthening the consumer voice in research into improved hybrid aromatic varieties and upgrading commercial seed multiplication programs to increase the supply of import substitution varieties to small- and medium-scale producers

Low levels of trust and weak relationships between producers, buyers, equipment service and input providers, and financial institutions have seriously reduced incentives for any of these participants to invest in upgrading. Tractor service providers and input supply companies are often unwilling to provide services on short-term credit unless farmers have fixed production agreements with buyers. Financial institutions that could help facilitate this process are also unwilling to lend to producers who lack firm purchase agreements. Buyers are generally unwilling to sign firm purchase agreements unless there are significant economies of scale that can be achieved using aggregators. Currently bringing together buyers, aggregators, input and equipment service suppliers and growers requires a set of network and trust-building skills brought by a development partner external to the value chain, though there are a few private-sector-led examples of this in other value chains in Ghana. Thus a significant challenge to upgrading services markets is the need to develop and strengthen networks that reduce risks for participants enough for them to invest in upgrading.

²¹ See for example www.esoko.com.

V. OPPORTUNITIES AND INCENTIVES FOR UPGRADING

Ghana has enormous potential to expand its rice cultivation in the short term through improved production and post-harvest practices and the shift to long-grain aromatic varieties that compete more successfully with imports.

PRODUCT

Generally, locally produced rice is of inferior genetic quality, meaning it lacks either the long grains or red hues preferred by Ghanaian consumers, or it has an excess of broken grains, produced by poor milling. Because of these factors, it commands a lower price than imported rice. A major constraint is the lack of certified seeds and adequate modern mills that will not break the grains. In addition, in the north, parboiling is a very common step, as it makes the husk easier to remove by hand. It also causes the rice starch to become gelatinized, resulting in harder, glassier rice that takes longer to cook and is firmer when cooked. Most urban consumers do not want parboiled rice, so the prevalence of this process in the north makes it difficult to penetrate the southern market and compete effectively with imported rice.

OPERATIONS

Producers have not responded as expected to price signals because the transaction cost of getting goods to market does not justify investments in upgrading in the short-term. One of the major constraints that rice importers face when trying to source locally is the unreliable nature of the local supply of the right quality and quantity being available at the right time. To overcome this constraint, smallholders must transform themselves into commercial farmers and expand their farm sizes (19 percent of holdings are less than 1.2 hectares and another 43 percent between 1.2 and 2 hectares). Also, there is a need to produce at least twice in the year even in upland areas with unimodal rainfall by introducing simple irrigation systems. It is also important to minimize post-harvest losses and improve the quality of rice for the market, while interventions to reduce post-farm costs—such as improving bulking and storage facilities and taking advantage of economies of scale in transport—could enhance profitability, since just over half of the costs in the rice systems emerge post-farm.

BRAND

There are a few companies that are wholesaling and retailing local rice under various brand names: Gbewaa rice, Rema, Ghana Pride etc. These companies are selling aromatic varieties comparable to imported ones. This development provides a unique opportunity to brand and market locally produced rice aggressively in the near future, as long as the qualities of the brands remain competitive. The most critical step in this regard remains establishing an enabling environment that will promote investment in processing equipment to ensure significant improvement in quality.

VI. STRATEGY

The principal challenge to upgrading the rice industry in Ghana is to increase the productivity (currently average yields are lower than 2.5 MT of rice per hectare) and production volumes of rice farmers through the expansion of dedicated supply chains that enable the producer to access i) improved seed through robust seed markets, ii) appropriate production through post-harvest services, and iii) the capital with which to procure these services. With relatively high labor costs, significant increases in productivity will have to occur as a result of a transition to more capital-intensive production, harvest and post-harvest technologies. This will include increased use of energy-efficient pumps to add an additional rice season for current rain-fed areas; increased use of production via transplanting, which, given high labor costs, will require adoption and scaling-up of small-scale transplanters; and small-scale harvesters and threshers. Increased productivity and production volumes will in turn stimulate demand for greater investment in milling and storage facilities proximate to production rather than import locales. Accelerating the process of upgrading the competitiveness of the production through post-harvest process using varieties that Ghanaian consumers are willing to pay premiums for will require:

- A strategic shift in emphasis from the smallest farmers to commercially viable and entrepreneurial firms better positioned to extend services to and buy products from smaller farmers. The purchase of produce from smallholders by larger commercial farmers creates a market for the smallholders and also an aggregation point where quality-control measures can be implemented.
- Increased availability of foundation and certified seed through:
 - The introduction of new varieties by large buyers in dedicated supply chains
 - Working on the policy side to accelerate testing and approval of new aromatic varieties
 - Working with policymakers to accelerate growth in private-sector seed multipliers
- Increased productivity of commercially viable rice farmers through the expansion of dedicated supply chains that enable the producer to access capital for improved seed and production through post-harvest services
- Expanded delivery of rice mechanization services through the development of private equipment suppliers and rice cultivation equipment service providers
- Increased access to irrigation facilities by SME rice producers

VISION FOR THE VALUE CHAIN AND FOOD SECURITY

Any development partner strategy or vision to upgrade Ghana's rice industry must recognize and support the government of Ghana's rice strategy. The current national rice development strategy states that "It is desired that Ghana will double local rice production by the year 2018²² so as to contribute to food security and increased income in rice production."²³ The modalities for achieving this are to be guided by the following goals and objectives:

Goals: To contribute to national food security, increased income and reduced poverty towards the attainment of self sufficiency from sustainable rice production.

²² Doubling of the production in a decade suggests an annual growth of 7.2 percent, an increase in productivity lower than current growth in the rice industry.

²³ Ghana Ministry of Food and Agriculture, "National Rice Development Strategy,"⁹.

Objectives: Three main objectives are identified in the rice development strategy: i) to reduce rice imports by 50 percent through the promotion of gender-sensitive, productivity-enhancing innovations of small and commercial local rice producers and entrepreneurs along the value chain, (ii) to promote consumption of local rice through quality improvement, value addition and both domestic and regional marketing, (iii) to promote stakeholder innovation capacity for the utilization of rice by-products (e.g., processing the rice stalk for livestock feed in the dry season) while ensuring sound environmental management practices.

At a recent industry planning workshop, rice farmers, buyers, millers and service providers came up with a much more ambitious vision for a doubling of production within five years. The right enabling environment encouraging the importation and approval of high-yielding seeds for import-substituting varieties, policies favoring the privatization of equipment markets, and the development of strong value chain and service provider networks could make the industry participants' more ambitious vision closer to reality and well in advance of the National Rice Development Strategy (NRDS).

In five years Ghana's domestic rice industry will provide high quality rice to meet 70 percent of domestic consumption requirements.

Vision statement, July 2008 rice industry action planning workshop, Dodowa Ghana.

VALUE CHAIN COMPETITIVENESS STRATEGY

Realizing the rice industry vision or the government NRDS, and thereby achieving higher levels of competitiveness, will be based on an import-substitution strategy focusing on long-grain and aromatic varieties into urban and peri-urban market channels. To achieve this, local rice production and processing must match the quality standards of imported rice. Productivity needs to be improved substantially in order to increase yields and significantly reduce the cost of producing high-quality rice. Such productivity gains will require well-organized networks of service providers and processors to:

- Strengthen seed systems starting from breeding, seed production and certification and distribution. Broad and functional networks are essential because operationalizing efficient seed systems requires links to input supply systems and financing.
- Promote links from medium- to large-scale mechanized commercial rice farmers and aggregators to commercially oriented smallholder outgrowers. Aggregating smallholder products entails high costs and can be most efficiently achieved either by large geographically proximate commercial farmers or aggregators who can facilitate the delivery of inputs and extension services and can aggregate the output of more commercially oriented small farmers.
- Facilitate access to appropriate mechanization technologies for small- and medium-scale rice producers. This includes mechanical planters, transplanters, integrated combine harvesters and threshing equipment to overcome scarce labor and high labor cost constraints to production. This, too, requires the development of strong networks to facilitate access to financing for producers or service providers.

UPGRADING TRAJECTORY

- Accelerate investment in import substitution market channel
 - Facilitate the development of dedicated supply chains and strengthen networks that link buyers, aggregators, input and service providers and financial institutions to increase capital flows and build trust among existing and new entrants into the chain
 - Accelerate small producer access to mechanization services through the establishment of local equipment dealers and hire purchase agreements with local service providers. Equipment includes planters, transplanters, harvesters and threshers
 - Expand the introduction and production of varieties competitive with imports, i.e., long grain aromatic rice
 - Facilitate the increased efficiency of current producers
 - Facilitate the expansion of acreage under irrigation with private irrigation schemes
 - Focus on commercially viable and commercially oriented producers; the others will follow
- Strengthen participant and service provider networks
- Strengthen private-sector (rice producer) and service provider input into the public policy dialogue

VII. RECOMMENDATIONS FOR USAID

The following recommendations are made:

- The USAID Mission should assess all the existing and upcoming initiatives and support activities that hold promise for enhancing import substitution of rice production in Ghana.
- The Mission should engage with the government at high policy levels (e.g., during bilateral meetings and negotiations) to advocate for policies that promote an enabling environment for the effective and efficient functioning of the rice sector.
- Strengthen value chain participant networks.
- Support expanded importation of certified seed for dedicated supply chain networks.
- Buy down risk associated with the transition to increased use of small-scale mechanization. This can be done through use of cost-sharing grants to equipment dealers and/or equipment service providers to accelerate the introduction of new machineries and technologies. Another way to buy down risk would be by structuring multiparty agreements for value chain financing among financial institutions, farmers, aggregators, equipment and service providers. Such multiparty arrangements can reduce risk for all involved. The financial institution's risk is reduced if the buyer agrees to repay the loan directly to the bank before paying the farmer. The farmer's risk of default is also thereby reduced, and the farmer's access to credit for inputs and equipment allows them to achieve higher yields, reducing risk for them and the buyer. Risk is reduced for the input and service provider because they can receive payment up front for their services rather than having to wait until harvest time.
- Shift from pushing a string to pulling a product. Pushing a string refers to the approach taken by most donor-funded programs in rice—particularly those aimed at improving food security—of delivering technical assistance to very small-scale producers to enable them to upgrade. These small-scale producers rarely have access to information and resources necessary to make significant investments in upgrading. Programs may be more successful when they target interventions higher in the value chain, for example by working with aggregators or offering payment premiums to small- and medium-scale farmers for delivering a greater volume than they can produce on their own (which gives them an incentive to organize outgrowers). These interventions would be considered pulling a product.

VIII. TOPICS FOR FURTHER INVESTIGATION

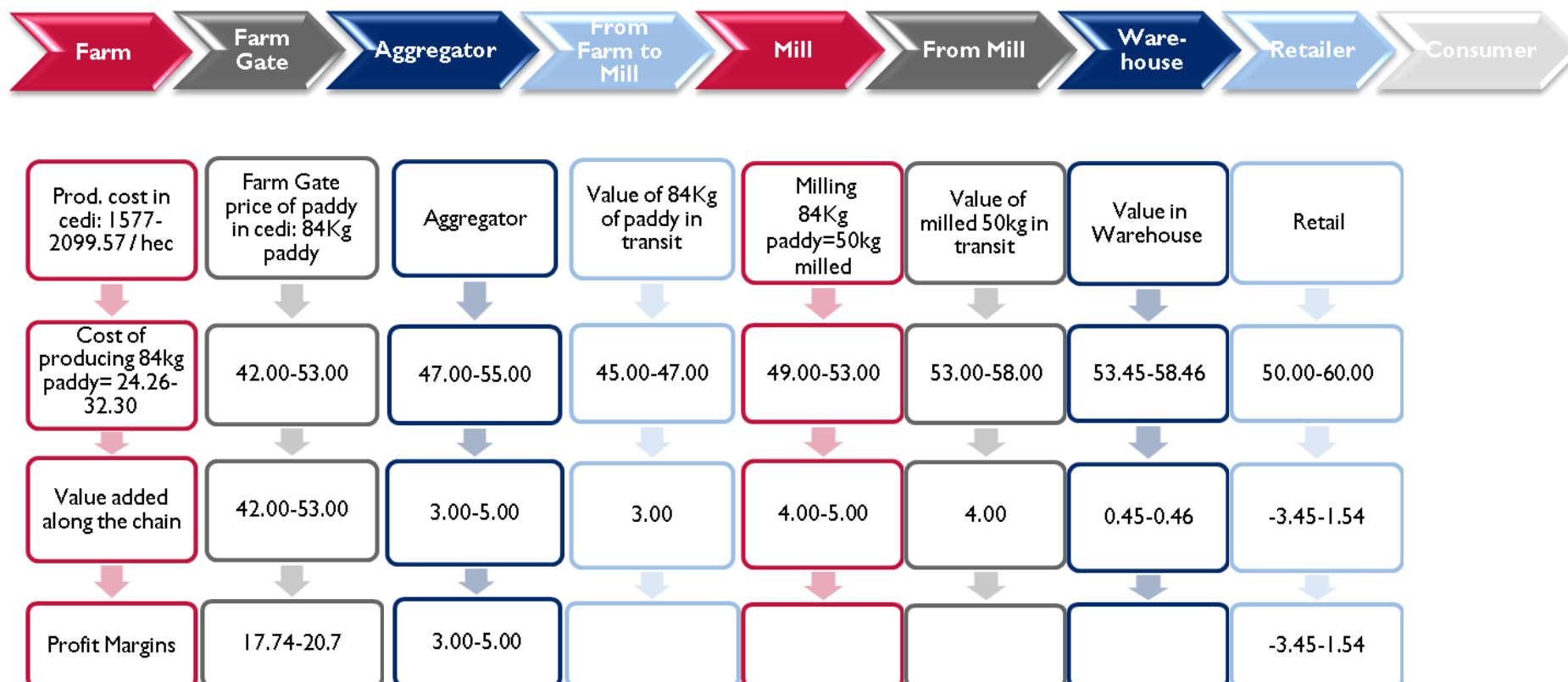
- Empirical testing of directing interventions toward commercially oriented small- and medium-scale farmers rather than very small-scale farmers.
- Commercialization of rice varieties: There seems to be substantial research in regionally adapted varieties, but the link remains weak between research institutions and market actors who could turn that knowledge into large volumes of commercially viable seed for upgrading.
- As mechanization is introduced for small-scale farmers for planting, transplanting, harvesting and threshing, there will need to be careful economic analysis on costs and benefits to show that this is significantly more profitable

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ANNEX A

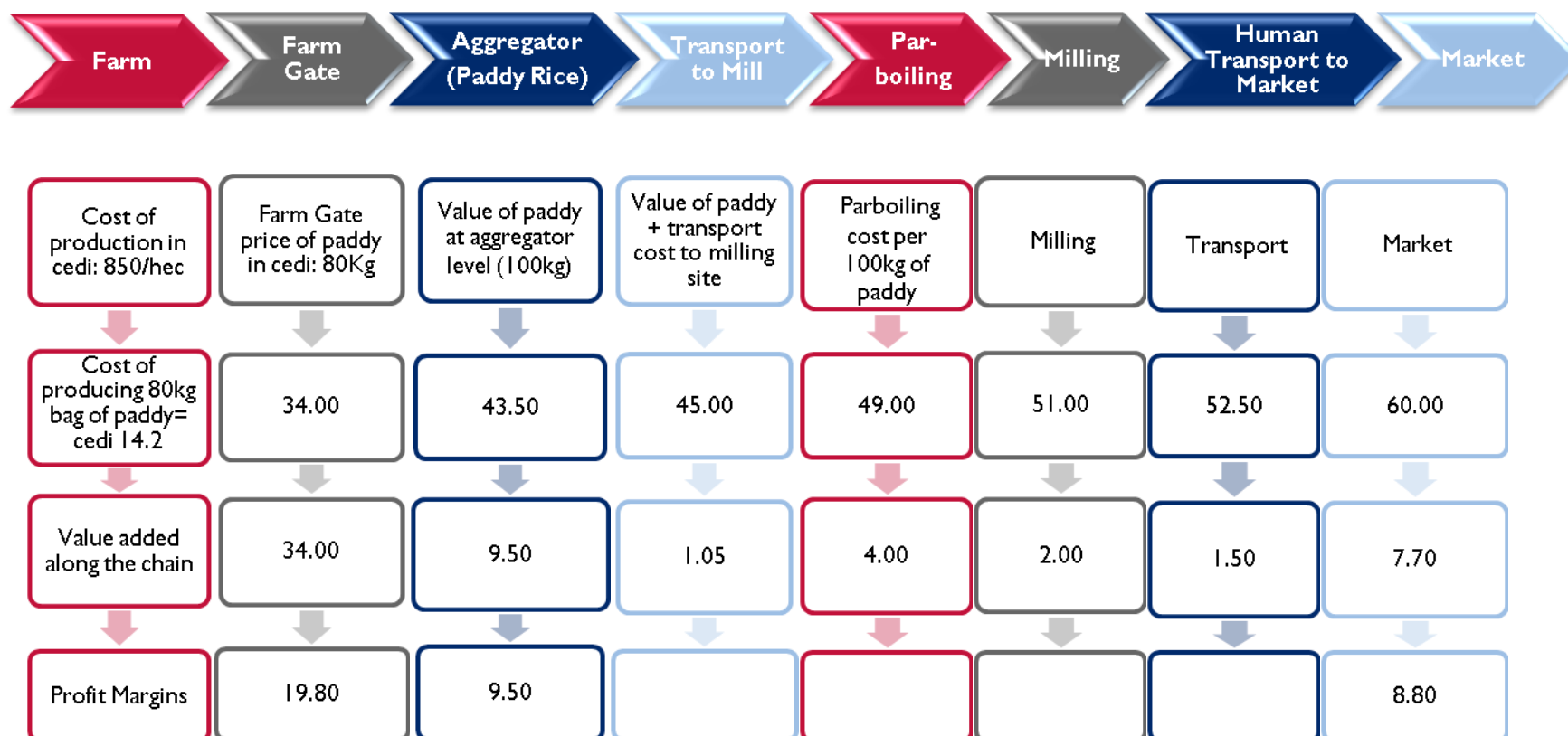
Figure 8: Southern Ghana Local Rice Value Chain²⁴



²⁴ 84kg paddy is equivalent to 50kg milled rice. This means that from the farm to the mill the prices are in Ghana Cedis per 84 kg of paddy. After being milled the rice weight becomes 50kg so the prices are in Ghana Cedis per 50kg milled rice. Negative prices occur when there is abundant rice on the market and actually retailers could experience losses as prices fall in the either in major season or due to cheaper imports due policies such as the removal of import tariffs on rice. Aggregator costs are mainly labor and transport costs which were considered in this analysis.

ANNEX B

Figure 9: Northern Ghana Local Rice Value Chain



ANNEX C

Table 5: Major Distributors of Local Rice

Name of Major Buyer	Main Buying Areas	Brand Name	Contact Address
CCTC	Afife	Ghana pride	Spintex Road, Lancaster Gate, Accra. 021 810161
Ofram Ent	Tono irrigation site in the Upper east Region	Gbewaa rice	Mrs Marfo (Director) Tel: 0244692227 020 8160585, 071 25746 071 91202
House of Rema	Afife	Rema rice	Mr Ralph Mends Oduro 0244 37375 022 410240 Fax: 022 410241
Mawu-Kawu Rice Processing Group	Hohoe	No brand name	Mr Amoah Duncan Raymond
Fredrick Kyei	From various locations	No brand name	Kyei Enterprise Ltd 020 5110727 027 7880530 024 6655064
Mabel Aseidu Kyei	Various locations	No brand name	Mabeldx Trading Ent. 020 8114920
Osei Akoto Kessie	Various locations	No brand name	Oak Brothers Transport 0244 4135776
Immoro Amorro	Various locations	No brand name	Thrive Ent. 021 238390 024 4429138
John Cobina	Various locations	No brand name	Johnny Enterprise Tarkwa 024 6537196