

**IMPROVING THE COMPETITIVENESS AND  
MARKETABILITY OF LOCALLY-PRODUCED  
RICE IN GHANA**

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**2.3 - Rice Production Practices in the Inland Valleys of  
Southern Ghana - Alex Opoku-Apau, Ernest Otoo,  
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*Collaborators:*

*Natural Resources Institute (NRI)  
Crops Research Institute (CRI)*

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## SUMMARY

This report is based on a farmer survey carried out in September-December 1997. The study used both PRA techniques and a formal survey questionnaire to elicit information from 150 farmers selected from five (5) inland valleys in Southern Ghana. The report presents an analysis of the farmers' production practices, resources available to them, the level of use of improved technologies as well as the constraints farmers face in the production of rice for the local market.

Major highlight of the study is that majority of the farmers continue to use low input technologies:- Only few farmers plant improved varieties. Water management techniques (such as bunding) that help to retain water in the soil for a longer period to sustain rice growth are virtually non-existent. Very few farmers apply herbicides to control weeds or fertilisers to improve soil fertility levels.

The resultant effect is that yield levels are generally low (0.7-1.5 tons/ha) leading to low income levels for farmers. In addition to this, land owners charge very exorbitant land rents (about one-third of total harvest) thus, making rice farming very unattractive to especially the youth who form the bulk of the rice farming population in the study areas.

There is therefore the need for intervention from both Research and Extension as well as Government to arrest this situation. Research would have to breed for very high yielding improved varieties as well as develop sound management practices that will take into consideration production constraints such as low soil fertility and weed infestation. Extension would have to develop the right extension messages and mount vigorous education campaigns to educate farmers on new improved rice production techniques. Government, on its part, would have to create the right policy environment (such as a well functioning product market and the creation of a viable seed industry) for the development and transfer of new technologies for farmers.

# RICE PRODUCTION PRACTICES IN THE INLAND VALLEYS OF SOUTHERN GHANA

## Baseline Survey Findings And Implications for Research

### 1.0 INTRODUCTION

In Ghana, rice is one of the major food crops ranking next to wheat in the quantity imported (PPMED, MOA 1990). Its popularity is increasing among both rural and urban dwellers due mainly to the ease of its preparation and its ability to store over a longer period. Per capita consumption is about 8kg/head/year. Ghana imports nearly forty two percent (42%) of her rice needs of nearly one hundred and fifty thousand (150,000) metric tonnes a year.

In Ghana, rice is produced in three major ecologies:

- i. rainfed upland
- ii. rainfed lowland/inland valley swamps,
- iii. under irrigation.

The first two ecologies account for nearly ninety percent (90%) of total production (Dekuku in Otoo.E, 1994). Yield levels are generally very low (0.7 - 1.5tons/ha) except under irrigation where 4-6 tonnes/ha are obtainable. A lot of factors may account for the rather low yields. Some of these factors are; high cost of inputs, lack of adequate and dependable water supply, ineffective weed control measures and poor soil drainage and fertility management practices. However, wetlands, including inland valleys have been shown to have the potential for agriculture, fisheries, forestry and ecosystem conservation.

In Ghana, inland valley swamps have been put to very little use with only 2% of the total land area developed. For the country to attain self-sufficiency in rice production, a sure way is to expand production in the hither-to underdeveloped inland valley swamps where excess water rather than lack of it is the problem.

It is in the light of this, that this study reports on the socio-economic circumstances of rice farmers in the inland valleys of Southern Ghana. It was undertaken with a view to

identifying the farmers' production constraints and suggests ways by which research and extension can help overcome those problems/constraints.

## **2.0 OBJECTIVES OF STUDY**

The objectives of the study, were:

1. To describe the farmers' crop management practices (e.g. land preparation, planting methods, weed control, fertilizer management, storage, marketing and utilization, etc.)
2. To identify the constraints to production.
3. To spell out the implications for future research in the study area.

## **3.0 METHODOLOGY**

### **i. The Study Area:**

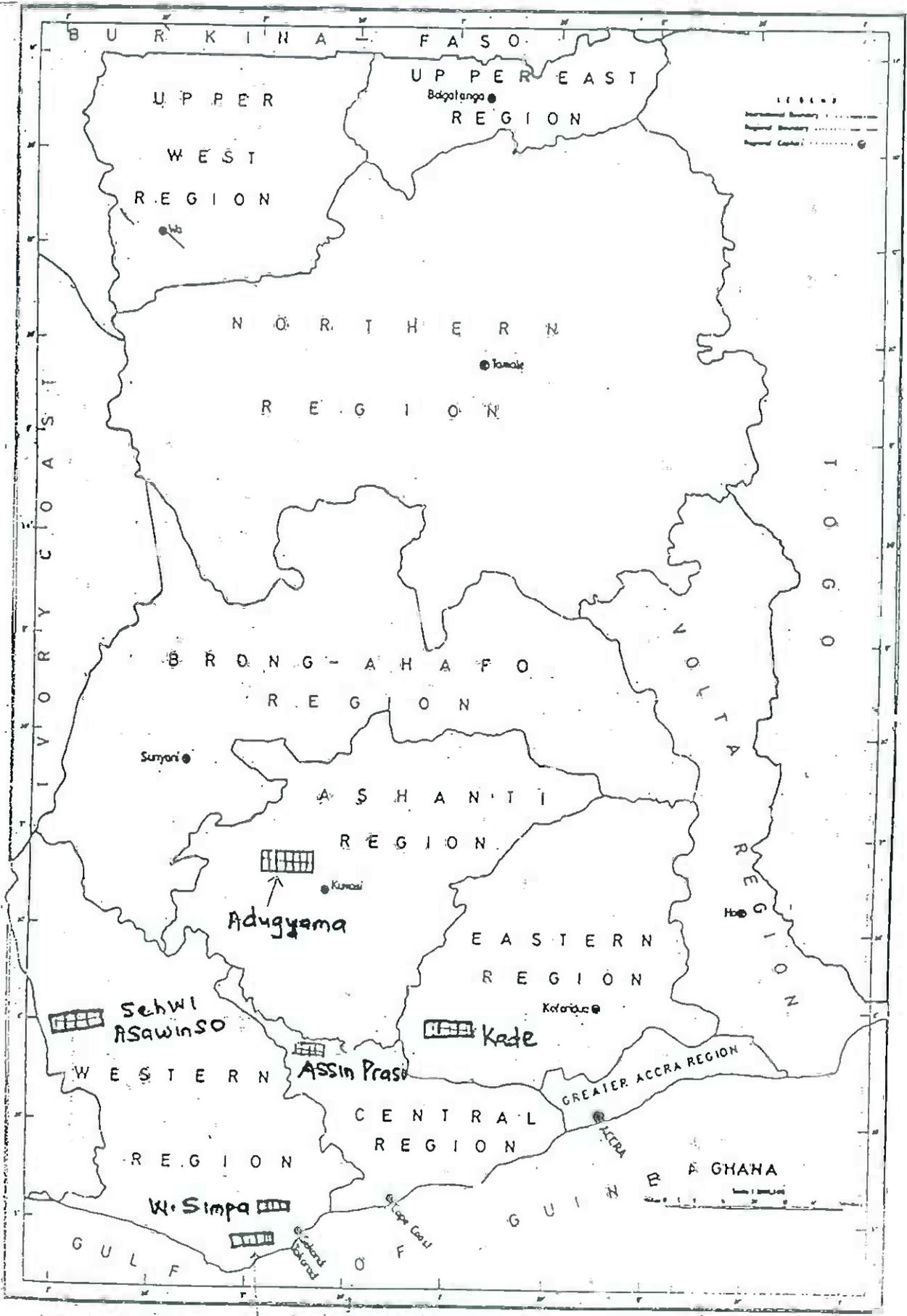
The study covered 150 rice farmers in 15 villages along 5 major Inland valleys across Southern Ghana (i.e. 3 villages per valley, 10 farmers per village). The valleys were Subi near Kade in the Eastern region; Sehwi Asawinso and Kobina Annokrom in the Western region; Assin Praso in the Central region; and Gbi-Godenu in the Volta region.

These valleys were selected to reflect the importance of rice cultivation in the South of Ghana (Figure 1). However, some equally important valleys in other regions could not be reached because they were not accessible by road at the time of the study.

### **ii. Survey design and Sample selection**

The study was in two parts; there was an informal survey which used participatory rural appraisal methods to elicit information from individual or groups of rice farmers, millers and traders in the study areas on their production practices, constraints to production and marketing, as well as consumer preferences, using a checklist (see Appendix 3). This was followed by a formal survey in which the information obtained from the informal survey was used to design a questionnaire for the farmers. The questionnaire was pre-tested and administered to one hundred and fifty (150)

ADMINISTRATIVE REGIONS AND CAPITALS



Kobina Annokrom

Study Areas

farmers, randomly selected from fifteen villages along the five inland valleys. Thus, thirty (30) farmers were selected from three villages in each valley (i.e. 10 farmers per village) .

The data obtained from the interviews was coded and analyzed using the STATPAC Software. In all, the study took ten weeks to complete (17<sup>th</sup> September- 30<sup>th</sup> November 1997).

## **4.0**

## **RESULTS FROM SURVEY**

### **4.1 FARMER PROFILE**

This section talks about the age distribution, family size, educational level and nativity of the farmer respondents and the effect of these parameters on rice technology generation and transfer.

#### **i. Age**

Almost half (45%) of the farmer respondents were in the active age group i.e. the youngest age group of between 20- 30 years old. The oldest age group (over 60 years old) constituted a very small percentage (3.3%) of the farmers. Of the middle-aged farmers, those in their forties constituted the single largest age group. The average age of all the respondents was 42 years.. This has implications for technology generation and transfer in that the very young farmers are always eager to take up and experiment with new ideas.

#### **ii. Family size**

Majority of the farmer respondents (85.5%) were married, with average family size of 9 - 5 children and 4 adults (both male and female). Such large family sizes could mean that there would be more hands to work on the rice fields. There was evidence in some of the valleys, especially at Kobina Annokrom and Sehwi Asawinso, that some family heads with large families tended to farm large acreages of rice. The adult women mostly did the planting, and to a lesser extent weeding, whilst the children did the bird scaring.

### **iii. Education**

Even though 22.7% of the farmers had no formal education, more than half of them (64.7%) had up to 10 years of formal education. Only 2.70% had over 10 years of schooling (highly educated). The assumption here is that because the farm families are educated they would be more receptive to technological innovations than an uneducated one.

### **iv. Nativity and Gender**

Almost half (46.7%) of the farmer respondents were natives with the remaining 53.3% being settlers. Migrant farmers of northern extraction (who are traditional rice farmers) form the bulk of settler farmers (about 80%) in these valleys. Ewes from the Volta Region constitute the remaining 20%.

Majority of the farmers (75.3%) were males with only 24.7% of them being females. There were however, two extreme cases:- at Sehwi Asawinso, all the farmer respondents were males. This is because in this particular traditional area, only men can have access to marshy land (the type used for lowland rice cultivation). Rice cultivation therefore becomes male dominated. On the contrary, rice is a female crop at Gbi-Godenu in the Volta region where about 90% of the farmer respondents were females. This is because during the major farming season, the men in the Hohoe district will be attending to their tree crop farms such as cocoa and coffee, whilst the women will migrate from areas like Lolobi, Nkonya and Akpafu in the Hohoe district to the inland valley in Gbi-Godenu to cultivate rice. The women farmers used the proceeds from their rice farms to buy their special needs such as clothes and jewelry and also provide food for the house. The men will also use their money to pay for the kids school fees and also pay for medical bills.

### **v. Land ownership**

A large majority of the farmers (59.30%) rented their lands for rice cultivation. Whereas 28.70% of them owned the land or cultivated on family lands, only 12% of the farmers share-cropped. Almost all the farmers at Kobina Annokrom rented their lands or share cropped because they are settler farmers and do not own the land on which they farm.

## 4.2 · CROPPING SYSTEMS

### i. Crops Grown In The Study Area

Rice farmers in the inland valleys (constituting about 80% of the total farming population) mostly cultivate rice as a sole crop in the valley bottoms. They may however, have other upland fields cultivated to important crops like cocoa, rubber, oil palm, citrus, plantain, yam, maize, vegetables, legumes, etc. Only 5.3% of the farmers cultivated some upland rice. All the crops mentioned above could be grown either as sole crops or in an inter-crop. On the average, most of the farmers (79.3%) had only one rice field with an average farm size of 2.0 acres. Another 4.6% of the farmers however, had two fields.

### ii. Planting calendar

Majority of the farmer respondents (52.0%) planted their rice between March and April, at the beginning of the major rains (especially those in the Assin Praso, Sewhi Asawinso and Kade valleys). Another 32% of them planted in June-July, after the rains have stabilised (especially those in the Kobina Annokrom and Gbi-Godenu valleys).

Even though majority of them (86.5%) planted their rice as a sole crop, few stands of maize, to be harvested green, were grown normally in the bunds. This served as food supplement when they were tilling their rice fields. Others also intercropped their rice fields with cowpea (but in fields where flooding did not occur).

### iii. Crops Rotation/Sequences

On the average, rice farmers in the sample area cultivated that same piece of land for only one year. This means that after only one season's cropping, most farmers would want to move to another field. Where farmers stayed on that same piece of land for more than a year, about (31.34%) of them preferred growing rice after the main season's rice harvest. Another 11.34% of them would prefer planting maize after rice harvest. Another sixteen percent of them (16%) planted vegetables with only 4.0% of them planting cowpeas, especially in the off season.

### 4.3 FARMER MANAGEMENT PRACTICES

#### i. Land Preparation

As shown in table 1, five (5) basic operational methods were used by farmers in the sample area to prepare their lands for rice planting:- majority of the farmers (64%) would slash the thicket with a cutlass and burn the stubble and mulch. Only 2.7% of them would slash the thicket with a cutlass but leave the stubble on the land to serve as mulch. Another 28.7% of them used power tillers to prepare their lands. Even though (3.3%) of the farmers tractor-ploughed their fields, only 1.3% of them used herbicides to control the weeds before planting. None of the farmers interviewed used animal traction or planted on mounds/ridges.

There were however, some extreme cases:- e.g. whereas all the farmers in the Assin Praso, Kade and Sehwi Asawinso valleys were practicing the slash and burn method, all those in the Kobina Annokrom valley were using power tillers to prepare their lands for planting. This might be due to the fact that Kobina Annokrom is always wet and farmers too have the resources to purchase the motorized tillers.

**Table 1. Land Preparation Methods**

Methods	No. of farmers	Percentage of farmers
Slash and Burn	96	64.0
Power tiller	43	28.7
Tractor Ploughed	5	3.3
Slash, no Burn	4	2.7
Herbicides	2	1.3
Animal Ploughed	0	0
Total (N)	150	100

#### ii. Rice Varieties

Within the past three years (1994-1997), majority of the farmers (58.7%) have been planting only local rice varieties which are either white or slightly red in colour, but which mature within 5 to 6 months. The remaining farmers (41.3%) have been cultivating some improved varieties - (mostly GRUG 7), as well as some later

introductions from La Cote d'Ivoire (which farmers simply refer to as “Abidjan”). These improved varieties mature within 4-5 months. At Kobina Annokrom, all the farmers planted improved varieties which they referred to as “Russia”. These are varieties the farmers brought along with them when they were migrating from their old site at the Afife Irrigation Project area in the Volta region to Kobina Annokrom.

Most of the farmers (42.7%) planted their own seed stored over the years, with only 14.7% of them buying from agricultural extension outlets. Another 38.7% of them acquired their seed from neighbors or friends. Table 2 summarizes the reasons why most farmers did not plant improved seeds:- based on the surveys, about half of the farmer respondents (54.0%) claimed they did not know about improved rice seeds. Some 9.2% of them knew about improved seeds but had no money to buy. Another 16.1% of the respondents claimed they could not get the improved seed to buy, but 20.7% of the farmers said they preferred the local to the improved varieties. All the farmers in Kobina Annokrom however, planted improved seeds. This is to be expected because farmers at Kobina Annokrom are well abreast with improved rice technologies and even came along with their own improved varieties, which they have planted over the years, when they were migrating from the Volta region to their present abode.

**Table 2. Reasons for not planting improved seeds**

Reason	No. of farmers	Percentage of farmers (%)
Does not know about them	47	54.0
Can't get seed	14	16.1
No cash to buy	8	9.2
Prefer local to improved	18	20.7
Total (N)	87*	100

\* This number refers to only those who did not plant improved seeds.

### **iii, Planting Practices**

From table 3, about half of the farmers (54.7%) seeded their rice fields by dibbling, and not in lines. Another 5.3% of them however dibble in lines, whereas (24.7%)

transplanted from a nursery in lines. Only 1.3% of the farmers seeded by drilling, but 14% of them did broadcast the seed. None of the farmers planted their rice on mounds or on ridges. Whereas all farmers at Kobina Annokrom transplanted their rice seeds from a nursery, all those at Kade dibbled (not in lines).

**Table 3. Farmers' Method of Plant establishment**

Practice	No. of farmers	Percentage of farmers
Transplanting (from Nursery in lines)	37	24.7
Broadcasting	21	14.0
Drilling	2	1.3
Dibbling (not in lines)	82	54.7
Dibbling (in lines)	8	5.3
On mounds/Ridges	0	0
<b>Total (N)</b>	<b>150</b>	<b>100</b>

#### iv. Water Management

How to manage water on rice fields has become the single most important problem confronting rice producers in Southern Ghana. Only 22.7% of the farmer respondents (mostly at Kobina Annokrom) did control water on their rice fields by constructing bunds around their rice fields to retain water. As to why they did not construct bunds, most of the farmers (46.7%) claimed they lacked the technical know-how. Another 43.3% of them claimed their soils did not retain water for long during the major rainy season, so there was no need constructing bunds. Only 6.7% of the farmers claimed bunding was a tedious job with (3.3%) of them admitting that even though bunding was a good management practice, they did not have the resources to do it.

#### v. Fertiliser Use

Although it is considered that most of the soils of the study area were poor of the essential nutrients, most of the farmer respondents (70%) did not apply fertilisers to their rice fields. The few that did (30%), used more of organic manure (poultry droppings) than inorganic fertilisers, and almost all of them came from Kobina Annokrom. Farmers, however, gave a variety of reasons for not applying fertilisers.

As summarised in table 4, 37% of the farmers felt there was no need to apply fertilisers to their rice fields because they considered soil fertility levels as adequate enough to ensure satisfactory yields. Another 26% of the farmers either did not know about fertilisers or that fertilisers were not readily available to them. However, a larger percentage of them (47%) indicated that they would like to apply fertiliser to their rice fields but were discouraged by economic considerations, such as the high cost of fertilisers or lack of funds to purchase.

**Table 4: Reasons cited by farmers for not using inorganic fertiliser on rice fields**

Reason	No. of farmers	Percentage of farmers
Land already fertile	37	37.0
Do not know about them	13	13.0
Fertiliser too expensive	13	13.0
Not easily available	3	3.0
No money to buy	34	34.0
Total (N)	100*	100

\* This number represents only those who did not apply fertiliser.

**vi. Weed Control:**

Generally, weed control practices in rice fields vary by soil type or farm size. As shown in table 5, most of the farmer respondents (66.7%) hand weeded their rice fields using either a hoe or cutlass. Another 19.3% of them applied weedicides such as Stam F34, Gramozone or Basagram. None of the farmers used a tractor or bullocks to weed their fields but 14.0% of them (all from Kobina Annokrom) did use power tillers for weeding.

In the Subi valley (near Kade) in particular, farmers controlled weeds by spraying salt solution. Farmers in the valley claimed it was very effective against broad leaves, such as Euphorbia spp, in particular. The most important weeds across all the valleys were Lantana camara, Imperata cylindrica, Euphorbia spp and Panicum maximum (in

order of Severity). Depending on the type of weeds and amount of labour available, majority of the farmers weeded their fields either once or twice before harvest.

**Table 5: Farmers' First Weeding Method**

Method	No. of farmers	Percentage of Farmers
Manual (hoe/cutlass)	100	66.7
Weedicides	29	19.3
Tractor	0	
power tiller	21	14.0
bullocks	0	0
<b>Total (N)</b>	<b>150</b>	<b>100</b>

**vii. Insect And Disease Control**

Insect and disease damage to the rice crop in the study area were very minimal. Only 7% of the farmer respondents had ever noticed stem borer infestation, termites or grasshoppers in their rice fields. None of the affected farmers, however, did apply any chemical to control them since they considered the damage as not economical.

The major diseases ever noticed were brown leaf spot, blast and yellow mottling of leaves and 8.7% of the farmers however, treated their seeds with chemicals (mostly wood-ash) before planting.

**viii. Management of Ratoon Crop**

After the major season rice harvest, 39.3% of the farmer respondents left their fields to ratoon. Management of the ratoon crop was poor. Only 13.6% of the farmers weeded their ratoon crop fields. 3.4% of them applied fertiliser to the ratoon crop, but 30.5% of the farmers did scare birds. It is estimated that the ratoon crop yield is about a quarter of that of the main crop harvest and farmers even claimed that seed from the ratoon crop is the best for planting since it is free from diseases and pests, and in most cases well dried.

### ix. Harvesting And Storage

Depending on when the rice was seeded as well its growth duration, majority of the farmers (48.7%) harvested their major season rice between August and September. Twenty four percent (24%) of them also harvested their crop around November and December.

Harvesting was mostly done manually i.e. by using a knife or sickle to remove the panicle one after the other. The panicle heads are then tied together for storage, either at home or on the farms, or threshed and bagged.

As shown in table 6, almost half (49.3%) of the farmers stored their harvested rice by tying the panicle heads together and storing them on barns or cribs (together with other harvested crops such as maize and yams) erected in the courtyard or in the kitchen. Some farmers would lit fire under the barns so that the smoke can drive away insects and pests thereby preserving the stored rice. Only a small number of farmers (3.3%) stored their harvested rice in barns on their farms. Some of the farmers (34%) too stored their harvested rice by threshing them into jute sacks for storage on barns or on raised platforms in their rooms.

**Table 6: Storage Method for Harvested Rice**

Method	No. of farmers	% of farmers
On the panicle heads in barns/cribs	76	50.7
On the panicle heads in the fields	5	3.3
On the panicle heads on raised platforms	8	5.3
Threshed and stored in sacks	51	34.0
Threshed but spread on floors in rooms	10	6.7
Total (N)	150	100

### x. Marketing and Utilization

Marketing outlets for rice in the study area are numerous: for example, rice farmers sell primarily to other farmers, local assemblers or itinerant middlemen. The middlemen (who come from major consumption centres like Obuasi, Kumasi, Accra and Takoradi) in turn sell to retailers and consumers or to wholesalers and public institutions like hospitals and schools.

More than half (58%) of the farmers claimed there was no price differential between the varieties grown locally by farmers (be it improved or local, red or white) even though most consumers preferred the white local ones. Most of the farmers (87%) however, agreed that there was always a price variation between domestically produced rice and imported rice which come in all grades and sizes. Imported rice, though more expensive, are mostly preferred by urban consumers because of their superior quality. The principal marketing problem the farmers faced was the fact that traders dictate prices and at times buy on credit which could take a longer time to be paid.

Even though rice is not a major staple food crop, from the valleys, a little over half of the farmers (54.6%) consumed up to about a quarter of their total harvest at home throughout the year. The two most common ways of consuming rice at home were either as rice with stew or rice balls with soup.

#### **4.4 RESOURCE AVAILABILITY**

This section discusses the resources available to farmers in the study areas and the way farmers utilise these resources for rice production.

##### **i. Access to Labour**

Labour availability and use have been a central issue confronting rice farmers in the study areas. Most of the farmers (60%) however, suggested that getting labour for the various farm activities was not a problem if only one has money to hire. The actual problem was getting it at the critical time or when most needed. Table 7, shows the activities for which labour was critical. Most of the farmers (50.8%) indicated that labour became a critical problem when they had to clear the land and prepare it in readiness for planting. Another 32.3% of them said labour was critical at weeding time whereas only a few of them (16.9%) saw labour as a critical problem at planting time.

**Table 7: Farm Activities for which Labour is very Critical**

Activity	No. of farmers	Percentage of farmers
Land preparation	33	50.8
(Trans) Planting	11	16.9
Leveling/bunding	0	0
Weeding	21	32.3
Fertiliser application	0	0
Harvesting	0	0
Bird scaring	0	0
<b>Total (N)</b>	<b>65*</b>	<b>100</b>

\* This number represents only those farmers who considered labour to be a critical problem in rice cultivation

There were four categories of labour sources for farm operations:- family labour only (i.e. husband, spouse, children), family and hired labour, hired labour only, and communal labour. The major farm operations in the area relied exclusively on family labour which together with a combination of hired labour met most of the labour requirements for land preparation, planting, weeding and harvesting. Communal labour was used exclusively in a minority of cases for harvesting, transporting the produce home, threshing and winnowing.

## ii. Credit

Only a minority of the farmers (40%) had access to credit within the last 5 years. As shown in table 8, only ten percent (10.0%) of the credit users had the money from the formal sector (banks). The rest (90.0%) had it from the informal sector (traders-23.3%, relatives-20%, neighbours/friends-35%, money lenders-8.3%, others-3.4%). Most of the credit users (51.7%) used the loans to hire labour for weeding. Others (25%) used the credit facility to hire tractor for land preparation. Only 11.7% of them used it to buy fertiliser whilst a few of them (1.7%) used the money to buy seed. The interest on such loans ranged between 30-40% in the formal sector, and 50-100% in the informal sector.

Credit in the form of inputs for rice farming was virtually non-existent in the valleys. Only few farmers (18%) have ever obtained input credit facilities in the form of seeds, fertiliser and cash, for rice farming (mostly from NGOs).

**Table 8: Sources of Credit for Rice Farmers**

Source	No. of farmers	Percentage of farmers
Banks	6	10.0
Neighbours/friends	21	35.0
Relatives	12	20.0
Traders	14	23.3
Money lenders	5	8.3
Others	2	3.4
N	60*	100

\* This number represents only farmers who have had access to credit (be it from the formal or informal banking sector within the last 5 years)

### iii. Land

It has been stated elsewhere in this report (page 6) that 59.3% of the farmer respondents rented the lands on which they cultivated rice. Only 28.7% of them owned their lands. According to the tenant farmers, even though land was readily available, the rent charged was always high. Rent, which was about 30% of total harvest, was charged on yield and mostly collected after harvest- either in kind or in cash. Knowing the total acreage of land to be released, some landlords collected part of the rent in cash well in advance of planting with the remainder to be collected after harvest.

Because of the high rent charge, most land owners would prefer renting out lands rather than farm themselves. Tenancy agreements were mostly for one year but subject to renewal. But because of the lucrative nature of such tenancy deals, most land owners continuously leased out lands for a longer period of time without paying particular attention to the reduction in fertility levels of the soils that transfers into low yields.

Most of the farmers (64.7%) however, claimed that rice (and for that matter rice farming) was the crop that provided the most cash income. This coupled with pressure on available land, probably explains why the farmers were agreeing to the terms of the tenancy contracts even though they knew the agreements were not favourable to them.

## **5.0 CONSTRAINTS TO RICE PRODUCTION IN THE INLAND VALLEYS AND THEIR IMPLICATIONS FOR RESEARCH**

Even though majority of the farmers(94.7%) claimed rice production was on the increase in the inland valleys as a result of rice becoming a more profitable crop, there were still some factors that constrained the expansion of rice cultivation in the valleys. These factors are discussed below together with their implications for agricultural research.

### **1. Weed Infestation in Rice Fields**

Majority of the farmers (44%) gave weed infestation as their most important constraint in rice farming. Weed infestation in rice fields is generally severe largely due to poor water control measures or tillage practices such as bunding. Meanwhile, manual labour for weeding is becoming more critical and very prohibitive. Researchers therefore, may want to begin experimenting with improved weed control methods (including use of herbicides).

### **2. Lack of Credit Facilities for Rice Cultivation**

The next most important problem was lack of credit facilities for the farmers to expand their rice fields. According to about 36% of the farmers, the banks were simply refusing to give them loans for agricultural purposes by insisting on collaterals which small scale farmers found difficult to provide. They were therefore compelled to go to the informal sector-money lenders, traders, friends, etc. - who also provide the loans at high interest rates (in most cases around 100%). The solution is probably for the banks to provide supervised credit to organised farmer cooperatives through the Agricultural Extension staff. Other NGOs like World Vision International,

Technoserve, etc. could also provide farmers with farm credit in the form of inputs like seeds and land preparation services.

### **3. Lack of /Unavailability of Improved Seeds at the Farmer Level**

Breeding efforts should be stepped up to be able to release enough improved varieties for farmers. Such varieties should have very good agronomic and post harvest traits like good plant height, weed, lodging and insect resistance as well as good milling qualities and good taste.

Small scale farmers adjust rice planting dates and plant population densities according to the type of material being grown, indicating that they appreciate subtle differences in maturity and plant architecture of the varieties. Once improved varieties are introduced, they have to be backed by information on planting dates, maturity periods (which ought to be shorter than that of the local ones) and plant populations (which should be higher than is planted to the local ones). Research should work closely with Extension to develop appropriate training materials and learning tools for farmers.

### **4. Low Soil Fertility**

Given the intensive cropping systems of most of the farmers in the valleys, and the fact that fallowing of lands has almost disappeared due to high population pressure on land, the failure to recycle soil nutrients raises worrisome questions about the long term sustainability of the rice cropping systems. Researchers should consider implementing trials in farmers fields to monitor soil fertility levels over the longer term. Such monitoring trials should be designed to explore such improved fertility management practices as the incorporation of crop residues, stubble mulching, use of organic manure and chemical fertilisers.

### **5. Policy on Seed Management**

Small scale producers rarely replace rice seed. They prefer to save their own seed and frequently replant the same material for as many years as possible (refer to page 6). Although these practices may not greatly affect the yield potential of local varieties,

they introduce mixtures. Moreover, they effectively discourage adoption of improved materials.

Farmers would have to be educated on the need to replace seed more frequently, and the government, as well as the private sector, must have a very efficient seed distribution system in place to supply or sell seed to farmers at their door steps.

## **6. Policy on Price Stabilization**

The government as well as private marketing firms must help stabilize the price of rice by taking off the market the excess production in times of glut. These could be stored in national silos and later released onto the market when there is scarcity. The recent announcement by government that some Chinese firm is to establish a factory in Ghana to produce rice beer is a step in the right direction. It will help stabilise the price of domestically-produced rice.

## **6.0 CONCLUSION**

The study has so far described farmers production practices, production constraints as well as needs. There is the need to develop sound crop management practices that will take into consideration production constraints such as low soil fertility, weed infestation, and poor seed management. The agricultural policy environment will also have to be right:-the availability of inputs, and the smooth functioning of the product markets, all affect farm-level decisions about new technologies and farm level planning for the development of new technologies.

The potential for rice development and expansion, especially in the inland valleys, is great. Every effort therefore, must be made by all stake holders, to help alleviate farmers problems so that they can produce more to feed the ever-increasing population of Ghana.

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- 3. PPMED, MOA 1991, Agriculture in Ghana: Facts and Figures.

## APPENDIX 1

### SUMMARY OF CROP BUDGETS FOR THE VARIOUS VALLEYS

#### CROP BUDGET 1

**VALLEY:** Subi-Asuom (near Kade)

ACTIVITY/INPUT	RATE	UNIT COST (¢)	TOTAL COST (¢)
Land clearing (slashing)	10 man-days	3,500	35,000
Leveling	-	-	-
Planting (seeding)	15 man-days	3,500	52,500
First weeding (herbicide)	2 man-days	5,000	10,000
Second weeding (manual)	15 man-days	3,500	52,500
Fertiliser application	-	-	-
Harvesting	20 man-days	3,500	70,000
Bird scaring	30 man-days	3,500	105,000
Carting of produce home	6 man-days	3,500	21,000
Threshing (15 paddy bags)	6 man-days	3,500	21,000
Milling (15 paddy bags)	-	2,000	30,000
Transport to mill site	-	1,000	15,000
Sub Total			412,000
<b>INPUTS</b>			
Herbicide (eg. Gramozone)	5 litres	12,000	60,000
Sprayer rental			8,000
Seed	18 kg	1,500	27,000
Sub Total			95,000
<b>Total Cost of Production</b>			<b>507,000</b>

#### INCOME

Total yield/acre = 15 maxi-bags Paddy  
Milling ratio (2:1) = 7.5 bags (milled) at 50 kg/bag  
Average Price/bag = ¢ 90,000.00

Gross Returns/acre =  $7.5 \times 90,000 = \text{¢ } 675,000.00$   
 Net Revenue/acre = Gross Revenue-Total Cost of Production  
 =  $\text{¢ } 675,000 - \text{¢ } 507,000$   
 =  $\text{¢ } 168,000.00$   
 Net Revenue/ha =  $2.5 \times 168,000$   
 =  $\text{¢ } 420,000.00$

## CROP BUDGET 2

**VALLEY:** Gbi-Godenu (Volta region)

ACTIVITY/INPUT	RATE	UNIT COST ( ¢ )	TOTAL COST ( ¢ )
Land clearing (slashing)	8 man-days	4,000	32,000
Leveling	6 man-days	4,000	24,000
Planting (seeding)	15 man-days	5,000	75,000
First weeding (manual)	15 man days	4,000	60,000
Second weeding (manual)	10 man-days	4,000	40,000
Fertilizer application	5 man-days	4,000	20,000
Harvesting	15 man-days	4,000	60,000
Bird scaring	20 man-days	4,000	80,000
Carting of produce	6 man-days	4,000	24,000
Threshing (16 bags paddy)	6 man days	4,000	24,000
Milling (16 bags paddy)		4,000	64,000
Transport (paddy) to mill site		1,000	16,000
Sub Total			519,000
<b>INPUTS</b>			
Fertilizer (NPK)	1 bag	38,000	38,000
seed	20 kg	1,000	20,000
Sub Total			58,000
<b>Total Cost of Production</b> (per Acre)			<b>577,000</b>

## INCOME

Yield/acre = 16 maxi-bags paddy  
 = 8 bags (milled)  
 Average price/bag (milled) =  $\text{¢ } 90,000.00$   
 Gross Returns =  $8 \text{ bags} \times 90,000 = \text{¢ } 720,000.00$   
 Net Revenue/acre = Gross Returns-Total cost of production

= ₺ 720,000-₺ 577,000  
 = ₺ 143,000.00  
 Net Revenue/ha = ₺ 357,500.00

### CROP BUDGET 3

VALLEY: Assin Praso (Central region)

ACTIVITY/INPUT	RATE (UNIT/ACRE)	UNIT COST (₺)	TOTAL COST (₺)
Land clearing (slashing)		contract	20,000
Leveling	-	-	-
Planting (seeding)	20 man-days	4,000	80,000
First weeding (manual)	15 man-days	3,000	45,000
Second weeding (manual)	10 man-days	3,000	30,000
Fertilizer application	-	-	-
Harvesting	20 man-days	3,000	60,000
Bird scaring	20 man-days	3,000	60,000
Carting of produce home	5 man-days	3,000	15,000
Threshing and winnowing	10 man-days	3,000	30,000
Milling (14 maxi-bags paddy)	-	4,200	58,800
Transport to mill site	-	-	-
Sub Total			398,800
<b>INPUTS</b>			
Seed	18 kg	1,000	18,000
<b>Total Cost of Production (per acre)</b>			<b>416,800</b>

### INCOME

Yield per acre = 14 maxi-bags paddy  
 Yield per acre (milled) = 7 bags (50 kg each)  
 Average Price/bag (milled) = ₺ 90,000.00  
 Gross Revenue/acre = 7 bags x 90,000  
 = ₺ 630,000  
 Net Revenue/acre = Gross Revenue-Total cost of Production

= ₺ 630,000-416,800

= ₺ 213,200

Net Revenue/ha = ₺ 533,000.00

## CROP BUDGET 4

VALLEY: Sehwi Asawinso (Western region)

ACTIVITY/INPUT	RATE	UNIT COST (₺)	TOTAL COST (₺)
Land clearing (slashing)	10 man-days	3,500	35,000
Leveling	-	-	-
Planting (seeding)	12 man-days	3,500	42,000
First weeding	12 man-days	3,500	42,000
Second weeding	10 man-days	3,500	35,000
Fertiliser application	-	-	-
Harvesting	15 man-days	3,500	52,500
Bird scaring	30 man-days	3,000	90,000
Carting of produce home	-	-	-
Threshing & winnowing	6 man-days	3,000	18,000
Milling (15 paddy bags)		2,000	30,000
Transport to mill site		1,000	15,000
Sub Total			359,500
<b>INPUTS</b>			
Seed	20 kg	1,000	20,000
<b>Total Cost of Production</b>			<b>379,500</b>

## INCOME

Yield per acre = 12 maxi bags paddy

Yield per acre (milled) = 7.5 bags

Average price/bag (milled) = ₺ 80,000.00

Gross Revenue/acre = ₺80,000 x 7.5 bags

= ₺ 600,000

Net Revenue/acre = ₺ 600,000-379,500

= ₺ 220,500

Net Revenue/ha = € 551,250.00

## CROP BUDGET 5

VALLEY: Kobina Annokrom (Western region)

ACTIVITY/INPUT	RATE	UNIT COST (€)	TOTAL COST (€)
Land preparation (power tiller)	contract		50,000
Leveling (harrowing)	contract		40,000
(Trans)Planting from nurseries	20 man-days	4,000	80,000
First weeding	20 man days	4,000	80,000
Second weeding	-	-	-
Fertiliser application (mixture)	1 bag NPK + 1 bag Ammonia	38,000 + 26,000	64,000
Harvesting	20 man-days	4,000	80,000
Bird scaring	30 man-days	3,000	90,000
Carting of produce home	contract		20,000
Threshing (17 maxi-bags paddy)	Free at milling site	-	-
Milling (17 maxi-bags paddy)		2,000	34,000
Transport of paddy to mill site	free	-	-
Sub Total			538,000
<b>INPUTS</b>			
NPK	1 bag		38,000
Ammonia	1 bag		26,000
Seed	20 kg		20,000
Sub Total			84,000
Total cost of Production			622,000

## INCOME

Yield per acre = 17 maxi-bags paddy  
Milling ratio (2:1) = 8.5 bags milled  
Average Price/bag (milled) = € 100,000.00  
Gross Revenue/acre = 100,000 x 8.5 bags

	= ₺ 850,000
Net Revenue	= 850,000-622,000
	= ₺ 228,000.00
Net Revenue/ha	= ₺ 570,000

## APPENDIX 2

### SUMMARY OF SOCIO-ECONOMIC PROFILE AND AGRICULTURAL DATA

**VALLEY:** Kobina Annokrom (Western Region)

#### 1. Farmer Profile

Av. Age of Farmers	40
% of Male Farmers	93.3
% Educated farmers	73.4
% Settler Farmers	100
Av. Family Size	7
% Married farmers	83.3

#### 2. Type of Field Cultivated

% Lowland Rice cultivated	100
% Upland Rice cultivated	0.0
Av. No. of Rice Fields cultivated	1.0
Av. Size of Rice Field	2.2

#### 3. Land Tenure

Tenurial Arrangement	% of Respondents
Own or family land	0.0
Rented	93.3

Share-cropped	6.7
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#### 4. Land Preparation Method

Method	% of Respondents
Slash and Burn	0
Slash, no Burn	0
Power Tiller	100
Animal Traction	0
On Ridges/Mounds	0

#### 5. Major Rice Varieties Planted

Variety	% Respondents
'Russia'	43.3
'Abidjan'	20.0
Mr. More	0.0
GRUG 7	0.0
Improved/Agric.	36.7
Local White	0.0
Local Red	0.0

#### 6. Cropping Calendar

Month Most Rice Planted	% of Respondents		Month Most Rice Harvested	% of Respondents
January	0.0		January	0.0
February	0.0		February	0.0
March	0.0		March	0.0
April	0.0		April	0.0
May	3.30		May	0.0
June	6.70		June	0.0

July	56.6		July	0.0
August	20.0		August	0.0
September	6.70		September	0.0
October	6.70		October	13.3
November	0.0		November	60.0
December	0.0		December	26.7

7. Planting Method

Method	% of Respondents
Transplanting	100
Dibbling in Lines	0
Dibbling, not in Lines	0
Broadcast	0
Drilling	0
On mounds/ridges	0

8. Source of Seed for Planting

Source	% of Respondents
Own	20.0
Seed Grower	0.0
Neighbour/Friend	46.7
Market	10.0
Agric Extension/NGO	23.3

9. Storage Method for Harvested Rice

Storage Method	% of Respondents
On the panicle head in the farm (on barns)	0
On the panicle head in the house (in cribs)	0
On the panicle head on raised platforms in the house	0
Threshed but spread on raised platforms in rooms	10
Threshed and stored in sacks in rooms	90

10. Principal Problem in selling Harvested Rice

Problem	% of Respondents
Difficulty in Finding Trader	33.4
Low Price	20.0
Transport to Market	0.0
Traders buying on Credit	23.3
Traders dictating Prices	23.3

11. Sources of Credit for farmers

Source	% of Respondents
Banks	0
Neighbour/Friend	50.0
Relative	16.7
Trader	33.3
Money Lender	0

12. Main Use of credit Facility

Main Use	% of Respondents
To buy fertiliser	44.5
To buy seed	0
To hire power tiller	33.3
Labour for Weeding	22.2
Labour for Harvesting	0

13. Important Constraints to Rice Production

Constraint	% of Respondents
Getting Improved Seed	0.0
Weed Infestation	13.3
Lack of Credit Facilities	70.0
Land Tenure Arrangements	0.0
Poor Seed Viability	3.3
Rodent Attack	0.0
Lack of Market	0.0
Bird Damage	6.7
Difficulty in Harvesting	6.7

Difficulty in Threshing	0.0
Presence of Stones in Milled Rice	0.0

## VALLEY: Sehwi Asawinso (Western Region)

### 1. Farmer Profile

Av. Age of Farmers	39
% Male Farmers	100
% Educated Farmers	60
% Settler Farmers	26.7
Av. Family Size	8
% Married Farmers	90

### 2. Type of Field Cultivated

% Farmers cultivating Lowland	86.7
% Farmers cultivating upland Rice	13.3
Av. No of Rice Fields Cultivated	1.0
Av. Size of Rice field	2.23

### 3. Land Tenure

Tenurial Arrangement	% of Respondents
Own or Family Land	53.3
Rented	36.7
Share-cropped	10.0

### 4. Land Preparation Method

Method	% of Respondents
Slash and burn	100
Slash, no burn	0
Power Tiller	0
Animal Traction	0
On Ridges/mounds	

5. Major Rice Varieties Planted

Variety	% of Respondents
'Russia'	0
'Abidjan'	0
Mr. More	0
GRUG 7	0
Improved/Agric	10
Local White	30
Local Red	60

6. Cropping Calendar

Month Most Rice Planted	% of Respondents		Month Most Rice Harvested	% of Respondents
January	0		January	0
February	6.7		February	0
March	56.7		March	0
April	36.6		April	0
May	0		May	0
June	0		June	0
July	0		July	13.3
August	0		August	53.3
September	0		September	33.4
October	0		October	0
November	0		November	0
December	0		December	0

7. Planting Method

Method	% of Respondents
Transplanting	0
Dibbling in Lines	10
Dibbling, not in Lines	90
Broadcast	0
Drilling	0
On Mounds/Ridges	0

8. Source of Seed for Planting

Source	% of Respondents
Own	30
Seed Grower	0
Neighbour/Friend	60
Market	0
Agric. Extension/NGO	10

9. Storage Method for Harvested Rice

Storage Method	% of Respondents
On the panicle head in the farm (on barns)	13.3
On the panicle head in the house (in cribs)	83.3
On the panicle head on raised platforms in the house	3.4
Threshed but spread on raised platforms in rooms	0.0
Threshed and stored in sacks in rooms	0.0

10. Principal Problem in Selling Harvested Rice

Problem	% of Respondents
No Problem	100
Difficulty in Finding Trader	0
low Price	0
Transport to Market	0
Traders buying on Credit	0
Trading dictating Prices	0

11. Sources of Credit for Farmers

Source	% of Respondents
Banks	0.0
Neighbour/Friend	35.7
Relative	64.3
Trader	0.0
Money Lender	0.0

12. Main Use of Credit Facility

Main Use	% of Respondents
To buy fertiliser	0.0
To buy seed	0.0
To hire power tiller	0.0
Labour for weeding	92.9
Labour for harvesting	7.1

13. Important Constraints to Rice Production

Constraint	% of Respondents
Getting Improved Seed	0
Weed Infestation	40
Lack of Credit Facilities	50
Land Tenure Arrangements	0
Poor Seed Viability	0
Rodent Attack	10
Lack of Market	0
Bird Damage	0
Difficulty with Harvesting	0
Difficulty with Threshing	0
Presence of Stones in Milled Rice	0

## VALLEY: Assin Praso (Central Region)

### 1. Farmer Profile

Av. Age of Farmers	42.0
% Male farmers	83.3
% Educated farmers	80.0
% Settler Farmers	33.3
Av. Family Size	8.0
% Married farmers	80.0

### 2. Type of Field Cultivated

% Lowland Rice Cultivated	100
% Upland Rice Cultivated	0
Av. No. of Rice Fields Cultivated	1
Av. Size of Rice Field	2.17

### 3. Land Tenure

Tenurial Arrangement	% of Respondents
Own or family land	30
Rented	40
Share-cropped	30

### 4. Land Preparation Method

Method	% of Respondents
Slash and Burn	100

Slash, no burn	0
Power Tiller	0
Animal Traction	0
On ridges/mounds	0

#### 5. Major Rice Varieties Planted

Variety	% of Respondents
'Russia'	0.0
'Abidjan'	4.0
Mr. More	0.0
GRUG 7	0.0
Improved/Agric	4.0
Local White	92.0
Local Red	0.0

#### 6. Cropping Calendar

Month Most Rice Planted	% of Respondents		Month Most Rice Harvested	% of Respondents
January	0		January	0
February	0		February	0
March	50		March	0
April	40		April	0
May	10		May	0
June	0		June	0
July	0		July	6.7
August	0		August	66.7
September	0		September	26.6
October	0		October	0
November	0		November	0
December	0		December	0

#### 7. Planting Method

Method	% of Respondents
Transplanting	0
Dibbling in Lines	16.7
Dibbling, not in Lines	83.3
Broadcast	0
Drilling	0
On mounds/ridges	0

8. Source of Seed for Planting

Source	% of Respondents
Own	66.7
Seed Grower	0
Neighbour/friend	33.3
Market	0
Agric. Extension/NGO	0

9. Storage Method for Harvested Rice

Storage Method	% of Respondents
On the panicle head in the farm (on bams)	6.7
On the panicle head in the house (in cribs)	93.3
On the panicle head on raised platforms in the house	0
Threshed but spread on raised platforms in the house	0
Threshed and stored in sacks in the house	0

10. Principal Problem in Selling harvested Rice

Problem	% of Respondents
Difficulty in finding Trader	32.0
Low Price	12.0
Transport to Market	4.0
Traders buying on Credit	24.0
Traders dictating Prices	28.0

11. Sources of Credit for Farmers

Source	% of Respondents
Banks	10
Neighbour/friend	10
Relative	0
Trader	0
Money Lender	0
None	80

12. Main Use of Credit facility

Main Use	% of Respondents
To buy fertiliser	0
To buy seed	0
To hire power tiller	0
Labour for weeding	20
Labour for harvesting	0
Never borrowed cash	80

13. Important Constraints to Rice Production

Constraint	% of Respondents
Getting Improved Seed	3.3
Weed Infestation	56.7
Lack of Credit Facilities	23.4
Land Tenure Arrangements	3.3
Poor Seed Viability	0.0
Rodent Attack	0.0
Lack of Market	3.3
Bird Damage	10.0
Difficulty with Harvesting	0.0
Difficulty with Threshing	0.0
Presence of Stones in Milled Rice	0.0

**VALLEY: Subi-Asuom (Eastern Region)**

**1. Farmer Profile**

Av. Age of Farmers	42.0
% Male farmers	63.3
% Educated farmers	80.0
% Settler Farmers	56.7
Av. Family Size	8.0
% Married farmers	90.0

**2. Type of Field Cultivated**

% Lowland Rice Cultivated	86.6
% Upland Rice Cultivated	13.6
Av. No of Rice Fields Cultivated	1.0
Av. Size of Rice Field	2.43

**3. Land Tenure**

Tenurial Arrangement	% of Respondents
Own or Family Land	33.3
Rented	66.7
Share-cropped	0.0

**4. Land Preparation Method**

Method	% of Respondents
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Slash and burn	100
Slash, no burn	0
Power Tiller	0
Animal Traction	0
On Ridges/mounds	0

5. Major Rice Varieties Planted

Variety	% of Respondents
'Russia'	0.0
'Abidjan'	30.0
Mr. More	0.0
GRUG 7	0.0
Improved/Agric	0.0
Local White	26.7
Local Red	43.3

6. Cropping Calendar

Month Most Rice Planted'	% of Respondents		Month Most Rice Harvested	% of Respondents
January	0		January	0
February	10.0		February	0
March	60.0		March	0
April	20.0		April	0
May	6.7		May	0
June	3.3		June	0
July	0		July	43.3
August	0		August	46.7
September	0		September	10.0
October	0		October	0
November	0		November	0
December	0		December	0

### 7. Planting Method

Method	% of Respondents
Transplanting	0
Dibbling in Lines	0
Dibbling, not in Lines	100
Broadcast	0
Drilling	0
On mounds/ridges	0

### 8. Source of Seed for Planting

Source	% of Respondents
Own	66.7
Seed Grower	0.0
Neighbour/Friend	33.3
Market	0.0
Agric. Extension/NGO	0.0

### 9. Storage Method for Harvested Rice

Storage Method	% of Respondents
On the panicle head in the farm (on barns)	0.0
On the panicle head in the house (in cribs)	73.3
On the panicle heads on raised platforms in the house	26.7
Threshed but spread on raised platforms in rooms	0.0
Threshed and stored in sacks in rooms	0.0

### 10. Principal Problem in Selling Harvested Rice

Problem	% of Respondents
Difficulty in finding trader	26.6
Low Price	26.6
Transport to Market	20.0
Traders buying on credit	10.0
Traders dictating prices	16.8

### 11. Sources of Credit for Farmers

Source	% of Respondents
Banks	10
Neighbours/Friends	30
Relative	30
Trader	20
Money Lender	10

### 12. Main Use of Credit Facility

Main Use	% of Respondents
To buy fertiliser	0
To buy seed	10
To hire power tiller	0
Hire labour for weeding	90
Hire labour for harvesting	0

### 13. Important Constraints to Rice Production

Constraint	% of Respondents
Getting improved seed	0.0
Weed Infestation	30.0
Lack of credit facilities	30.0
Land tenure Arrangements	13.3
Poor seed viability	0.0
Rodent Attack	0.0
Lack of market	6.7
Bird Damage	20.0
Difficulty with Harvesting	0.0
Difficulty with threshing	0.0
Presence of stones in milled rice	0.0

## VALLEY: Gbi-Godenu (Volta Region)

### 1. Farmer Profile

Av. Age of Farmers	43.0
% Male Farmers	10.0
% Educated farmers	56.7
% Settler Farmers	50.0
Av. Family Size	7.0
% Married farmers	90.0

### 2. Type of Field Cultivated

% Lowland Rice Cultivated	100
% Upland Rice Cultivated	0
Av. No of Rice Fields Cultivated	1
Average size of Field	1.3

### 3. Land Tenure

Tenurial Arrangement	% of Respondents
Own or family Land	26.7
Rented	60.0
Share-cropped	13.3

### 4. Land Preparation Method

Method	% of Respondents
Slash and Burn	20.0
Slash, No Burn	20.0
Power Tiller	43.3
Animal Traction	0.0
On mounds/ridges	0.0
Tractor Ploughed	16.7

#### 5. Major Rice Varieties Planted

Variety	% of Respondents
'Russia'	0.0
'Abidjan'	0.0
Mr. More	0.0
GRUG 7	13.3
Improved/Agric	30.0
Local White	33.3
Local Red	23.4

#### 6. Cropping Calendar

Month Most Rice Planted	% of Respondents		Month Most Rice Harvested	% of Respondents
January	0.0		January	0.0
February	0.0		February	0.0
March	0.0		March	0.0
April	0.0		April	0.0
May	3.3		May	0.0
June	63.4		June	0.0
July	33.3		July	0.0
August	0.0		August	6.7
September	0.0		September	16.7
October	0.0		October	40.0
November	0.0		November	36.6
December	0.0		December	0.0

7. Planting Method

Method	% of Respondents
Transplanting	23.3
Dibbling in Lines	0
Dibbling, Not in Lines	0
Broadcast	70.0
Drilling	6.7
On Mounds/Ridges	0

8. Source of Seed for Planting

Source	% of Respondents
Own	36.7
Seed Grower	0.0
Neighbour/friend	23.3
Market	0.0
Agric. Extension/NGO	40.0

9. Storage Method for Harvested Rice

Storage Method	% of Respondents
On the panicle head in the farm (on bams)	0.0
On the panicle head in the house (in cribs)	0.0
On the panicle head on raised platforms in the house	0.0
Threshed but spread on raised platforms in the house	23.3
Threshed and stored in sacks in rooms	76.7

10. Principal Problem in Selling Harvested Rice

Problem	% of Respondents
No Problem	90.0
Difficulty in finding trader	0.0
Low Price	3.3
Transport to Market	0.0
Traders buying on credit	3.3
Traders dictating prices	3.3

### 11. Sources of Credit for Farmers

Source	% of Respondents
Banks	16.7
Neighbour/friend	3.3
Relative	10.0
Trader	3.3
Money Lender	0.0
Non Credit users	66.7

### 12. Main Use of Credit Facility

Main Use	% of Respondents
To buy fertilizer	0.0
To buy Seed	0.0
To hire Power Tiller	33.3
To hire labor for Weeding	0.0
To hire labor for Harvesting	0.0
Non Credit Users	66.7

### 13. Important Constraints to Rice Production

Constraint	% of Respondents
Getting improved seed	0.0
Weed Infestation	53.3
Lack of credit facilities	46.7
Land Tenure Arrangements	0.0
Poor Seed Viability	0.0
Rodent Attack	0.0
Lack of Market	0.0
Bird Damage	0.0
Difficulty in Harvesting	0.0
Difficulty in Threshing	0.0
Presence of stones in Milled Rice	0.0

## APPENDIX 3

### CHECKLIST FOR THE INFORMAL SURVEY (PRA)

#### 1. CROPPING SYSTEMS

- List major crops grown in the area
- Are they grown by many farmers or just a few?
- Are particular crops grown by men and particular ones by women?
- Planting calendar of major crops and the target crop-based system.  
Is target crop monocropped or intercropped?

#### **Farmers' Practices:**

##### Varieties:

- Names of varieties of the target crop grown, majority time, colour preference. Reasons for liking that variety.
- Is the crop production increasing or decreasing in the area?
- Is the hectareage under production increasing or decreasing in the area?

##### Planting:

- Who plants the crop?

- . Planting time and season, important season
- . Is planting done in rows, mounds, random etc?
- . Number of seeds/hill, distance between hills.

#### Weeding practices:

- . Who does the weeding?
- . When, and how is weeding done?
- . Number of weedings.
- . Important weeds

#### Fertilizer application:

- . Who applies fertilizer?
- . Type, rate
- . When and how applied
- . Source, etc.

#### Insects and diseases:

- . Major insects and diseases
- . How do farmers detect the disease?
- . Control measures by farmers, and who does this?
- . How severe?

#### Harvesting and storage:

- . Who harvests and stores the produce (crop)?
- . When harvested
- . Storage, eg. Method, storage time

#### Seed selection and chemical use etc:

- . Who is responsible for these activities?
- . Preservation
- . Criteria farmers use
- . Selection in the field or in storage. Any special way

- . Selection in the field or in storage. Any special way of storage?

### **Marketing and Food Use:**

- . Who is involved in these activities?
- . Marketing problems?
- . Price differences between varieties?
- . Reasons for preferring one variety to another (Record whether women or men are responsible).
- . Major food preparations.
- . Any new foods replaced traditional ones?

### **Resource Allocation:**

#### Land

- . Availability
- . Tenancy arrangements
- . Record whether men or women are responsible

#### Labour:

- . Availability
- . Busiest time for labour requirement
- . Types of labour : e.g. family, hired etc.
- . Record whether men or women are responsible.
- . Machinery accessibility.

#### Cash:

- . Availability
- . Main sources of income.
- . Difficult period for cash
- . Note the reasons

.. record whether men or women are responsible

NOTE: Always thank the farmer for his or her time!