

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

**DEPARTMENT FOR INTERNATIONAL DEVELOPMENT
(DFID)**

CROP POST HARVEST PROGRAMME

PROJECT R6688

2. Rice Production Systems in Ghana

2.2 - Baseline Survey of Irrigated Rice Production

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1.0	INTRODUCTION	1
2.0	TERMS OF REFERENCE	2
3.0	METHODOLOGY	3
4.0	SOCIO-ECONOMIC CHARACTERISTICS	3
4.1	General Features	3
4.2	Demographic Features	4
4.3	Land Ownership and Land Tenure	4
4.4	Economic Profile	5
4.5	Crop Production	5
	4.5.1 Cultivated Area	5
	4.5.2 Cropping Calendar and Cropping Patterns	6
	4.5.3 Sources of Inputs	7
	4.5.4 Seed Supply and Varieties	7
	4.5.5 Rice Yields and Seasonal Effects	8
	4.5.6 Farm Labour	10
4.6	MANAGEMENT PRACTICES	11
	4.6.1 Land Preparation	11
	4.6.2 Planting	11
	4.6.3 Water Delivery and Distribution	11
	4.6.4 Use of Fertilizers and Agro-chemicals	12
	4.6.5 Harvesting, Sales and Storage	13
	4.6.6 Credit and Marketing	14
4.7	FINANCIAL CROP BUDGETS	16
	4.7.1 Revenue	16
	4.7.2 Production Costs	16
	4.7.3 Gross Margins	17
4.8	CONSTRAINTS IN IRRIGATED RICE PRODUCTION	18

LIST OF TABLES

Table 4.1	Cultivated Varieties and Percentage cultivated by Project
Table 4.2	Credit Sources
Table 4.3	Interest Payment on Credit
Table 4.4	Points of Sale on Projects
Table 4.5	Summary of Financial Crop Budgets
Table 4.6	Typical Crop Budget for Pump and Gravity Schemes
Table 4.7	Reported Problems Facing Farmers on Sampled Projects (% Rating Index).

Appendices

- Appendix 1 - Summary of Socio-Economic Profile and Agricultural Data
- Appendix 2 - Tables on Financial Gross Margins.

0.0. EXECUTIVE SUMMARY

The Ghana Irrigation Development Authority (GIDA) was primarily set up to perform the functions of formulating plans for irrigation development and operations, and to develop Ghana's water resources for irrigated agriculture, fisheries and livestock department.

At present, GIDA has 20 on-going irrigation projects scattered throughout the country, covering an area of about 8,000 ha. The area developed for irrigation forms about 0.07% of the total agricultural land area of Ghana which is 13,628,179 hectares.

The survey covered nine (9) irrigated rice projects, distributed in the different agro-ecological zones in the Southern sector of the country, with the exception of the Bontanga irrigation project located in the Northern region

The distribution was as follows: Western, Central, Ashanti, Eastern and Northern regions (1 project each), while from Volta and Greater Accra regions, 2 projects each were surveyed.

Socio-Economic Characteristics

The average age of project farmers is 41 years, and males form 79.3% of the total project beneficiaries.

Most farmers on the projects are full time, (82.7%), who supplement their incomes from the irrigated rice plots with upland farming, cultivating food crops like cassava, plantain, yam and vegetables.

Literacy levels of farmers range from 20% to 90%, with an average of 75.2%

The average family size of a typical farmer is seven (7), comprising primarily the parents and children.

All farmers interviewed (100%) are natives of these areas and live in nearby villages within the project areas.

Age distribution broadly shows the typical pattern in rural Ghana, where about 92% of farmers have ages ranging between 25-45 years (active group).

The number of farmers on a project is largely dependent on the project size, and the plot size allocated to each farmer.

All irrigated project lands have been acquired by GIDA through a legislative Instrument. These lands are then leased out to beneficiary farmers, who were either displaced by the project or who are natives of the area. These beneficiaries pay no land rent to GIDA even though some of them sublet part of their plots, or lease them out to other farmers, for fees ranging between c50,000.00 to c100,000.00 per acre per year.

The average landholding for an irrigated rice plot is 0.84 hectares, while on the upland farms, this is 1.5 hectares.

While the major economic activity on the projects is rice cultivation, upland farming is practised by almost all farmers to supplement their incomes. The females also engage in trading activities apart from rice farming. When farmers are not engaged on their irrigated rice plots, they spend their time finding jobs as farm lands on other nearby irrigation projects or work on their upland farms. None of the farmers interviewed, find jobs in alternative employment apart from farming.

Crop Production

The average project size is about 221 hectares with rice as the main crop. The area cultivated to rice form between 90 - 95% of the total irrigable areas, while the remaining area are put under vegetables especially during the minor season when available water becomes limited.

The start of cropping activities is determined by the onset of the rains, with the major seasons beginning in March/April (Southern sector) and May/June (Northern sector). The second seasons (minor) begin from Sept/October and end in January/ February. The ability of any project to crop more than once a year, depends on the water storage capacity of the reservoirs and the availability of water in these reservoirs, impounded during the rainy season.

All farm inputs in the form of fertilizers and agro-chemicals are sourced from the open market by individual farmers or groups of farmers, sometimes with the assistance of GIDA's project staff.

All seed rice grown on the projects were originally provided by GIDA through its seed farms. With the abolishment of the seed farms by GIDA, farmers obtain seeds from their own sources, storing seeds from previous harvests for the following season.

Presently, these are about 13 different varieties of rice cultivated on the projects surveyed. These are all improved varieties obtained by GIDA from sources such as IITA, WARDA, IRRI and the University Research Station (Kpong). The important and popular varieties are GRUG 7, ITA 222, ITA 234 and GK88.

Rice yields vary from 4 mt/ha. to 6 mt/ha. with an average yield of 4.6 mt/ha. Yield levels are directly related to the amount of water available. Poor water supply during the minor season, could reduce yields by about 25% compared to the major season's yields.

Farmer preferences for particular rice varieties are influenced greatly by the variety originally introduced to the farmer, qualities like high level of yield, good taste, good grain appearance, good expandability when cooked and good cooking qualities (remain soft after preparation).

Both family and hired labour are intensively used on irrigated rice fields, the more tedious operations done by hired labour while the less labourious ones are executed by family labour. The ratio of hired to family labour is about 3:1 on these projects.

Management Practices

Land preparation is done either by the use of a power tiller or a 4-wheeled tractor. Most or all of these machinery are privately owned, and rented out to farmers at the start of the seasons.

Two types of irrigated schemes exist on the projects. Gravity schemes and pump schemes. Water distribution is therefore done through pumping or by gravity. Five out of the nine schemes surveyed are pump schemes and four are gravity schemes. The absence of water management practices on the projects leads to much water going to waste, and also raises the pumping cost on such schemes. To calculate the gross margin per quantity of water delivered therefore becomes impossible.

All farmers apply fertilizers and other agro-chemicals to their crops. The most common fertilizers in use are NPK (15:15:15), Sulphate of Ammonia and Urea.

A host of recommended agro-chemicals are also used, depending on their availability on the market.

The percentage of farm harvests sold is about 76.4%, with the remaining 23.6% going into seed rice and household consumption.

All the projects have adequate storage facilities. Even though warehousing facilities exist, farmers prefer storing their paddy in their homes. This is because the bulk of the harvests are usually sold off on the drying floors, and only the few bags that are to be used as seed and for home consumption are stored.

Access to formal credit is limited on the projects. The most common source of credit is from private money lenders, and pre-financing arrangements granted by some traders. Farmers own resources are also used to supplement these sources of credit.

Crop Budgets

These highlight the gross revenue, production costs and gross margins per hectare. The average gross margin per hectare for pump schemes is €882,400.00 and €861,775.00 for gravity schemes.

The average production cost per hectare for pump schemes is €1,482,600.00 and for gravity schemes, this is €1,333,225.00. Variations between gross margins for the individual projects appear to be quite minimal. They range from €817,500.00 to €913,500.00. The average gross margin for pump schemes was €882,400.00 and €861,775.00 for gravity schemes.

Constraints

About 14 different constraints were identified by farmers. The most important of these is the lack of mechanical services which had a rating index of 18%. This was followed by 'lack of formal credit to farmers' (16%), poor levelling of fields (11%), insufficient water delivery (11%), poor maintenance of irrigation systems (9%), lack of good market for rice (5%), high input costs (5%), etc.

1.0 INTRODUCTION

The Irrigation Development Authority was set up within the Ministry of Agriculture as a semi-autonomous institution in 1977, primarily to perform the following functions.

- (i) formulate plans for irrigation development and operations
- (ii) develop Ghana's water resources for irrigated agriculture, fisheries and livestock department and
- (iii) execute comprehensive programmes for land use planning for irrigation and in conjunction with other agencies for other water resource based activities.

Since the establishment of GIDA in 1977, a lot of emphasis was placed on the development of large scale irrigation projects for the production of rice. The ultimate aim here, was to reduce the country's dependency on imported rice while helping to conserve scarce foreign exchange and to make her self sufficient in cereal production with emphasis on rice.

In trying to meet these objectives, GIDA had been faced with a series of constraints, culminating in a World Bank Study, "Irrigation Subsector Review" to identify the weaknesses in the Authority as an organization, and to recommend appropriate interventions to improve this subsector.

In response to recommendations from this study, a 'Twinning Programme' to strengthen the capabilities of GIDA's professional staff in project feasibility studies from identification and selection to the implementation phase was initiated over a 3-year period (1989 - 1991). Follow-up programmes like the National Small Scale Irrigation Project (NSSIP, 1991) and most recently, the Small Scale Irrigation Project (1995 - 1997) were implemented to identify for detailed studies, about 4,000 hectares of small-scale community based irrigation schemes throughout the country.

At present, the total area developed by GIDA for irrigated agriculture stands at about 8,000 hectares, with anticipated increase to 13,000 hectares by the end of year 2000 when on-going schemes are scheduled for completion, including the Kpong Irrigation Project, covering about 4,000 ha.

GIDA has twenty (20) on-going irrigation projects scattered throughout the country with sizes ranging from less than 100 ha to over 2,000 ha. The agricultural land area in Ghana is about 13,628, 179 hectares, which brings the area developed for irrigation to about 0.07% of the country's agricultural land area.

Comparative studies done by GIDA, indicate that in 1997 when projected rainfed rice production is estimated at 84,300 mt from a total area of 50,000 ha, irrigated paddy production is estimated at 59,210 mt from an irrigable area of 8,850 ha. This indicates that the productivity of irrigated land for rice production is about four times that for rainfed production.

In terms of national demand estimated at 263,000 mt by year 2000, the contribution by irrigation is projected to be about 24%. It would thus be comparatively advantageous to put more land under irrigation for rice cultivation, as a tenfold increase in irrigated area from 0.065% of arable land area to 0.65% will increase paddy production to about 592,100 mt, which would be two times more than the projected national demand by year 2000.

2.0 TERMS OF REFERENCE

This study which has the project title 'Competitiveness and Marketability of locally produced Rice in Ghana, vis-a-vis Imports of the Commodity, is a component of the NARP Rice Programme.

The Socio-economic component study of different rice production systems which the present study is all about and for which GIDA's input, has to do with irrigated schemes, has the following as its terms of reference.

- 2.1 To assemble socio-economic data for large and small-scale irrigated rice production systems, both from existing secondary data sources and from primary data obtained from a specific formal survey. Data from the earlier project study of rice marketing costs and constraints will also be supplied.
- 2.2 The data assembled will meet the PAM model requirements as agreed at the meeting of socio-economic collaborators. Additional socio-economic data which will enable more general comparisons of the viability of different production systems will also be obtained.
- 2.3 In addition to the full spectrum of crop budget data and allied costs, the following elements should be identified.
 - Farmer preferences for varieties in different seasons.
 - Seasonal effects - yield differences in main and off-season.
 - Returns to water - gross margin/quantity of water delivered.
 - Opportunity costs - what would farmers do with their resources if not growing rice and
 - Constraints associated with irrigated rice production.
- 2.4 The format approved for this formal survey would be a modified SARI model. A range of project sites encompassing different rainfall patterns are to be examined in order to capture the effects of rainfall on water usage in these systems.

3.0 METHODOLOGY

In order to capture the effects of rainfall on water delivery and usage, projects were selected to cover the different agroecological zones in the country. These number nine and are distributed as follows:

Bontanga Irrigation Project	(Northern Region)
Nobewam Irrigation Project	(Ashanti region)
Afife Irrigation Project	(Volta Region)
Aveyime Irrigation Project	(Volta Region)
Kikam Irrigation Scheme	(Western region)
Okyereko Irrigation Project	(Central Region)
Asutsuare Irrigation Project	(Eastern Region)
Dawhenya Irrigation Project	(Greater Accra Region)
Ashaiman Irrigation Project	(Greater Accra Region)

Respondents were randomly sampled, and interviewed through semi-structured questionnaires. For each project, a minimum of 6 farmers and a maximum of 10 were interviewed and depending of the situation, farmers were either interviewed in their homes or on the rice fields.

Key informants included the Project Managers as well as the Project Agronomists on these projects, who provided information on general project characteristics. Visits to some of the farms where cropping activities were on-going, provided first-hand information to the team members on aspects of cropping/cultural practices.

4.0 SOCIO-ECONOMIC CHARACTERISTICS

4.1 General Features

Age of farmers on the different projects visited, range from 36 years on Afife Project to 51 years on Ashaiman project, with an average age of 41 years.

Male farmers on these projects form the majority of the farmer population, with the highest percentage of males (93%) found on Kikam project, while the least of 56% is located on the Asutsuare project. The average percentage of male population on GIDA's irrigation projects is thus 79.3%.

Most farmers on the irrigated projects are full time farmers, relying mostly on proceeds from their irrigated plots for economic sustenance. All the full-time farmers interviewed on the projects, indicated that they cultivate food crops like cassava, plantains, yams and vegetables outside the project lands to feed their families.

In the least case, Nobewam had 57% of farmers being full time while Ashaiman had 100%. The average percentage of full time farmers is thus 82.7%. Those who claim not to be full-time farmers spend part of their time engaged as artisans in the carpentry and masonry trade. A few were also teachers.

The percentage of educated farmers is also on the high side. Here, an educated farmer refers to one who has had some formal education either at the primary school level, middle school or secondary school.

The Project with the least percentage of educated farmers is Bontanga in the Northern region with only 20% educated farmers, while Dawhenya, Asutsuare, Afife and Ashaiman all had a high percentage rating of 90%. The literacy level on the irrigated projects is thus about 75.3%, the rest being illiterates who have had no formal education.

Family sizes ranged from as low as 5 on Nobewam project to a high of 11 on Bontanga project, while the average family size was 7. Here, the family refers to the nuclear family, comprising the parents and children.

The policy of GIDA and as such the Ghana Government with respect to allocating land on irrigation projects, has mainly sought to identify and to allocate plots, first to indigenous farmers before consideration is given to farmers from other areas. This was confirmed by the survey results, which showed that with the exception of Aveyime and Afife projects both in the Volta Region where 90% of the farmers were natives of the area, all the other seven irrigated projects showed that 100% of respondents were natives of the area, and lived in nearby villages.

4.2 Demographic Features

The population of farmers within each project site varies considerably, increasing or decreasing depending on the net irrigable area available for cropping. The age distribution broadly shows the typical pattern in rural Ghana, where about 92% of farmers have ages ranging between 25 to 45 years. This distribution in age, takes account of farm households size.

The size of farmer population per project therefore depends on the net irrigable area and the plot sizes allocated per farmer. This population ranges from 27 (Kikam) to 500 (Afife), with the average figure at 206 farmers per project.

4.3 Land Ownership and Land Tenure

GIDA acquires all project lands by legislation, and leases them out to interested inhabitants of the areas concerned on short term basis. Lands acquired by GIDA for irrigation development, are primarily distributed first to residents whose farmlands were affected by the project, and later on to other interested members of the community. No compensation is paid to owners of affected farmlands, and for this reason, some farmers see the plots allocated to them as their bonafide properties. This is however not the case, and has been a source of conflict between GIDA and some project farmers who fail to accept decisions by GIDA to eject them from allocated plots for non-performance. Such plots may be re-allocated to other members of the community who may show interest in acquiring project plots but who have not had the chance. Some farmers after being allocated plots by GIDA, lease these plots to other interested farmers for a fee, ranging from ₵50,000.00 per acre per year to ₵100,000.00.

The percentage of farmers working on leased land is zero at Kikam and 86% at Nobewam, giving an average figure of 28%. The average landholding for an irrigated plot is 0.84 hectares, while that for upland farms is 1.5 hectares. The irrigated plot size allocated per farmer depends on the net irrigable area and the number of interested farmers. However, in order to help farmers make reasonable and economic returns from their plots, a minimum plot size of 1 acre per farmer is allocated. Where pressure on irrigated plot is minimal, GIDA is able to allocate a plot size of 1 hectare, defined by GIDA as the economic plot size for irrigated rice cultivation.

4.4 Economic Profile

Income and Employment

The major economic activities of respondents include the following:

- Irrigated rice production
- Upland farming of cassava, plantain, maize, yam, vegetables and legumes
- Fishing and petty trading.

All households depend on irrigated rice production as the major source of cash income, supplementing this activity with upland farming, where food crops like cassava, maize, yam, plantain, cowpeas etc. are produced by the males to feed the family.

The female farmers also supplement their rice income through petty trading and sometimes assisting their husbands on their upland farms.

In times when water supply on the projects becomes limited, and farmers are unable to crop during a particular period, farmers indicated that, they spend their time working on their upland farms, or seek jobs as farm hands on nearby irrigated projects (Ashaiman, Dawhenya, Afife, Asutsuare and Aveyime), or on any other farm.

The females too indicated that, they normally engage in petty trading activities, or work on their upland farms. Some of the female farmers also act as 'middlemen' buying rice in bulk from fellow farmers, and distributing these to customers located in the bigger market centres in Accra and Kumasi. Some also retail rice in nearby markets during market days.

4.5 Crop Production

4.5.1 Cultivated Area

The total irrigable area on projects visited range from 27.5 hectares (Kikam) to 722 ha. (Afife). The average irrigable area per project is therefore about 221 hectares and crops grown are mainly rice (90% - 95%) with few hectares (5% of irrigable area) devoted to vegetables like pepper, tomatoes and okro cultivation. These vegetables are usually cropped during the minor seasons under supplementary irrigation.

Some areas that may be above command, may also be cropped with vegetables during the major season.

Maize may also be cropped before the start of the major rice growing season.

4.5.2 Cropping Calendar and Cropping Patterns

The start of the major cropping season is mainly determined by the onset of the rains.

This is usually between the months of March and June depending on the agro-ecological zone in which the project is located. In the southern sector of the country where there is a double rainfall regime, cropping usually starts in March or April. In the northern sector however, cropping usually starts in May/June.

It must be noted that major cropping seasons on all the irrigation projects start with the onset of rains. This is because the water levels in the storage reservoirs or dams are usually so low after the dry season or second cropping such that they would not be able to support rice production for another season unless the water levels rise during the rainy season.

The idea behind this is that, rice production in the major season would be dependent more on rainfall, with irrigation coming in to supplement this supply as and when needed. Water in the dams and reservoirs are thus conserved and used for the second cropping season Sept/Oct. - Jan./Feb. when there is a minimal amount of rainfall. This is to ensure that as much as possible, projects are able to do double cropping within a given year.

On some projects however, the reservoirs are silted up, reducing the effective storage capacity. In such cases, a limitation in the amount of rainfall for that year, means that only one cropping can be done by that project.

Some projects too, have small storage reservoirs, and cannot simply cope with a double cropping programme like in Aveyime and Kikam.

Inefficient water distribution on the projects, also have the effect of reducing available water supply for irrigation. This happens when cropping does not follow a uniform schedule, and individual farmers follow different cropping schedules. This makes the regulation of water distribution impossible rendering any water distribution programme ineffective. A lot of water is therefore wasted which consequently affects cropping intensities.

From the survey, three (3) projects, Okyereko, Nobewam and Aveyime were cropping once a year, while Dawhenya, Kikam, Bontanga, Asutsuare, Afife and Ashaiman cropped twice a year, except when there was a severe water shortage in the reservoirs in a particular year, to restrict cropping to once in that year.

The ratio of irrigated land to upland farms cultivated by project farmers is about 1:3. This ratio tends to increase in favour of upland farms where the geographical area is endowed with a lot of farmlands like in Okyereko where this ratio is (1:6), Asutsuare (1:4), Bontanga (1:3) and Nobewam (1:3).

On the other hand, areas with limited farmlands show a closer ratio eg. Dawhenya (1:1.3), Afife (1:2) and Ashaiman (2:1).

4.5.3 Sources of Inputs

GIDA formerly supplied all farm inputs in the form of agrochemicals, fertilizers and seeds to farmers before the start of cropping activities. The cost of these inputs were then debited to each farmer's account and recovered after harvests from individual farmers. This practice was however, discontinued because of poor recovery rates which led to the refusal of the banks to finance any such ventures. Farmers thus have to finance most farm operations from their own resources, leading to inadequate input utilization, inability to finance input purchases and, overdependence on private money lenders with high lending rates. This results in reduced outputs per unit area of land. Farmers purchase inputs from the open market, and with the privatization of agricultural input supply and the removal of subsidies on agricultural inputs, farmers have to contend with the rising cost of fertilizers and agrochemicals from private companies.

Presently, Wienco is the main distributor of fertilizers in the country, while companies like Reiss & Co., Chemico, Shell Ghana and some other oil companies deal in agrochemicals.

4.5.4 Seed Supply and Varieties

Rice Seed supply to project farmers are all sourced from GIDA, which used to have seed farms from which farmers were supplied with seed rice each year before cropping. This practice was to discourage the use of adulterated seeds by farmers to ensure uniformity in seed usage.

GIDA initially obtained its seed from sources like the Agricultural Research Station at Kpong(ARS), International Institute of Tropical Agriculture (IITA) Ibadan, Nigeria, West Africa Rice Dev. Agency (WARD), International Rice Research Institute (IRRI) The Philippines etc, These were then multiplied on GIDA's seed farms and distributed to the farmers.

This practice has however stopped, and farmers source their seed rice from different areas. Most farmers however, store seeds from previous harvests, and are used in the subsequent cropping season.

A hundred percent (100%) of farmers interviewed, stated that they initially got their supply from GIDA, and from there on kept their own seeds or purchased from other farmers either on the same project or from a different project depending on the availability of the variety that the farmer needed.

Presently, there are about 13 different rice varieties cultivated on the projects surveyed. These are all improved varieties, some "true to type" while others have resulted from crossing of different varieties.

The identified varieties are: GRUG 7, GRUG 88, GRUG 22, TOX, ITA 234, ITA 222, CIAT, GK 88, GK9, GRA, DS3, IRRI 3273, B-189.

On a particular project, between 2 - 5 varieties are cultivated. Kikam project is the only project which shows one cultivated variety, the GK 88. The rest range from two (2) varieties (Okyereko, Bontanga and Asutsuare) to five (5) Dawhenya.

These varieties are always cultivated in pure stands and are never mixed on the same plot. Farmers rotate the cultivation of these varieties after growing a particular type for 2 - 3 years at a stretch.

Some of these varieties after several years of cropping, have lost their vitality, and produce a lot of chaff (DS3). Such varieties have almost being abandoned by farmers, and for the DS3 presently grown on only Aveyime project, only 9% of farmers cultivate it. All rice varieties grown, have a maturity period of about 4 months, and according to farmers, any longer maturing variety -5months or more- would not be patronized by them. They see such varieties as adding to their costs without the corresponding compensational increase in yield.

4.5.5 Rice Yields and Seasonal Effects

Yield from paddy vary from project to project according to the varieties cultivated and the level of inputs coupled with the efficiency of management practices adopted. Yield levels range from 4 mt/hectare to 6 mt/hectare, giving an average yield of 4.6 mt/hectare.

The level of yield is also directly related to the amount of water available for the growing crop, thus the seasons have an effect on the yield.

During the major (wet) seasons, the storage reservoirs contain enough water to satisfy the growing needs of the rice plant. Yields are therefore high with the right complement of inputs. However, during the minor (dry) seasons, the level of water in most of the reservoirs fall so low that water becomes limiting, and the rice plants fail to get their full complement of water. This adversely affects yield, and depending on the severity of the situation, yields could be reduced by about 25% (field survey). Under such situations of low water supply, the projects cut down on the area to be cropped so that instead of a 100% cropping, about 25-50% of the total irrigable area may be cultivated in a particular season.

However, where there is an abundance of water during both the major and minor seasons to support two full crops, these variations in yield do not occur.

Farmer preferences to grow particular varieties of rice is not influenced by the season, but is rather dependent on certain factors, some of which are stated below.

- (i) Every project grows more of a particular variety which is popular with the farmers as a result of having been introduced to it by GIDA, which initially supplied all seed rice from its seed farms.

- (ii) Some farmers also purchase seeds from other projects which have appealing qualities to them. Qualities or characteristics such as high yielding varieties, better tasting ones, good grain appearance, high expandability, good cooking qualities (remains soft after preparation) are some of the reasons why farmers purchase particular seeds from other projects.

As stated earlier, each farmer has at least 2 varieties of seed rice, except Kikam where only one variety is cultivated is used. (This is a new project that has been operating for about 3 years).

On Dawhenya project, where five varieties of rice are cultivated, the percentage of a particular variety cultivated is as follows:

ITA 222 - 48%, GRUG 7 - 19%, CIAT -19%, ITA 234 - 10% and TOX - 4%.

According to farmers, ITA 222 and GRUG 7, yield better than the others, and also have good expanding qualities when cooked. The CIAT they claim, also has good expandability, has a lot of weight, good grain appearance and tastes good, but consumes a lot of inputs (Fertilizers) during cultivation. It is therefore not a popular variety as shown in the table below (4.1), where only the Dawhenya project grows it. Apart from this, only 19 % of this variety is cultivated on the project.

Below is a table showing the different varieties of rice cultivated on each project, and the percentage of that variety cultivated.

Table 4.1. Cultivated Varieties and Percentage cultivated by Project

Project	Varieties	% of Variety cultivated
Dawhenya	GRUG 7	19
	TOX	4
	ITA	10
	CIAT	19
	ITA 222	48
Kikam	GK 88	100
Okyereko	GRUG 7	77
	GRA	23
Bontanga	GRUG 7	17
	IRRI 3273	83
Nobewam	GRUG 7	72
	GRUG 88	14
	GRUG 22	14
Aveyime	GRUG 7	82
	DS 3	9
	GK 9	9
Asutsuare	ITA 234	33
	ITA 222	67
Jife	GRUG 7	53
	GK 88	20
	GRA	27
Ashaiman	TOX	21
	GK 88	57
	B-189	14

Some characteristics influencing farmer decisions to grow particular varieties of rice are:

- GRUG 7 is high yielding.
- GRUG 7 has good grain appearance (long grain).
- ITA 222 has a good yield even though it produces a lot of chaff.
- ITA 222 tastes good.
- CIAT is a heavy yielder, and also tastes good.
- CIAT requires a lot of inputs (fertilizer), because it is a heavy feeder.
- CIAT has good expandability when cooked, has a lot of weight and good grain appearance.
- GK 88 is high yielding, but hardens when left exposed after cooking.
- TOX has good cooking qualities, and stay soft after cooking.

From the table 4.1, one of the most popular rice varieties cultivated on the projects is GRUG 7, which is cultivated on 6 out of the 9 projects surveyed. The GK88, ITA 222, ITA 234 and the GRA also show some degree of popularity.

4.5.6 Farm Labour

Irrigated farm labour is sourced directly from (i) family labour and (ii) hired labour. These two forms of labour are employed by irrigated farmers, and depending on the activity involved, hired or family labour is used.

Family labour is usually made up of the farmer and his or her spouse, the direct children of the farmer who may be in school and therefore available only at certain times of the year, and some dependents under the direct care of the farmer.

Even though the average project family size is about 7 as stated in section 4.1 under 'General Features', the effective family labour force is about four (4). This may comprise the two parents and two adult children, the rest either unavailable or may be infants.

Family labour is used for certain farm operations like nursery preparation, broadcasting of seeds, weeding, fertilizer application, drying and bagging. Hired labour is used for the more arduous tasks like weeding, harvesting, threshing, winnowing and carting of fertilizer and paddy to and from the fields respectively.

The survey revealed that the ratio of hired labour to family labour on irrigated rice fields is about 3:1.

4.6 MANAGEMENT PRACTICES

4.6.1 Land Preparation

This activity is undertaken by using either a power tiller (wet tillage) or a 4-wheel tractor (dry tillage), and depends primarily on the soil type and the availability of a particular machinery in the project area or on the project. For instance, for the heavier soils of Asutsuare and Dawhenya, the power tiller is the most suitable machinery for this exercise.

In all, seven out of the nine projects use power tillers in land preparation, five of them using only power tillers, while 2 (Afife and Aveyime) combine the use of power tillers and tractors. Okyereko and Bontanga are the 2 projects using only tractors for land preparation. Most of these equipment are privately owned, whilst a few are owned by the individual projects.

The use of power tillers involves wet tilling and crossing, while with the 4-wheeled tractors, the field is first ploughed and harrowed twice in the dry state before used.

4.6.2 Planting

Farmers on the project adopt a variety of planting methods. While some do only broadcasting (Okyereko, Bontanga and Aveyime), others rely on transplanting only (Kikam and Nobewam), while the rest combine transplanting and broadcasting depending on the farmer's preference (Dawhenya, Asutsuare, Afife and Ashaiman).

Farmers who transplant, either do so in lines, rows or at random. It has been demonstrated on GIDA's research/demonstration plots at Asutsuare and Bontanga projects that transplanting yields higher than broadcasting, especially when done in rows/lines.

4.6.3 Water Delivery and Distribution

Two main systems of water delivery are practiced on the projects. The first is by pumps. Here water from storage reservoirs or dams are pumped with the help of diesel or electric powered generators through irrigation canals onto the rice fields.

In the second case, water is distributed to the fields by means of gravity through canals. Five of the projects visited used pumps for water distribution (Asutsuare, Nobewam, Dawhenya, Aveyime and Kikam) whilst the others rely on gravity. The gravity schemes are Okyereko, Ashaiman, Afife and Bontanga.

The efficiency of the distribution system on the projects depend very much on the condition of the irrigation system ie.on the state of repair of the system.

The main problems associated with the irrigation system, which limit their efficiency of operation are choked and silted up canals, damaged and leaking canals, poor levelling of fields, seepage and frequent breakdown of pumps.

GIDA does not practice any water management, and water pumped for farming operations is not measured. The non-uniformity in the cropping schedules means that individual farmers require different amounts of water at different times, resulting in the continuous pumping of water to the plots. Much water is wasted in this way, making the distribution inefficient, and also raising the pumping cost on projects which operated the pump system. Returns to water or the gross margin per quantity of water delivered therefore becomes impossible to calculate.

GIDA charges farmers for the use of irrigated water. These rates are however subsidized because any attempt to charge farmers competitive or economic rates would likely drive away most farmers from some of the projects especially during the major rainy season. The practice of some farmers is to abandon their irrigated plots in the wet seasons and attend to their upland farms, this way they avoid paying any irrigation service charge at this time when there enough water to support any farming activity on their upland farms. They however, troop back to the projects to continue with their irrigated rice culture during the dry months when water becomes a limiting factor outside the project areas.

Responses by farmers on the efficiency of water distribution indicated the following rating below.

<u>Water Distribution Classification</u>	<u>% by Farmers</u>
Excellent	17.5
Good	40.2
Fair	25.2
Poor	17.1

Water distribution from the farmers' perspective is therefore satisfactory enough for their needs.

4.6.4 Use of Fertilizers and Agro-chemicals

The type of chemical fertilizers used on all the projects for rice cultivation are NPK (15:15:15), Sulphate of Ammonia and Urea. These are normally applied in 2 or 3 split applications by farmers depending on individual farmer practices passed on through GIDA's extension officers. All farmers (100%) on all projects surveyed, apply fertilizers to their rice crops.

Agro-chemicals are also intensively used, and the type of insecticide, fungicide and rodenticide used depends on its availability on the market. Thus for a period of time, a particular pesticide may be in use on a particular project, but this may change and a new pesticide used in its stead based on whether it is available or not and on its level of effectiveness.

Some of the Agro-chemicals used on the projects include the following:

<u>Type of Pesticide</u>	<u>Common Name</u>
Insecticide	Actellic
	Diazonon
	Karate
	Basagram
	Furadan
	Dursban
Fungicide	Fuji I
	Kocide
	Dithane
Rodenticide	Superturagil
	Klerat
	Yasodium
Herbicide	Stam F 34
	Saturnil
	Herbit Plus
	Surcopur
	Ronstar
	Avirosan

Source: Field Survey

There is 100% pesticide usage by farmers on all the projects, even though the right quantities or levels may not be applied.

4.6.5 Harvesting, Sales and Storage

Farmers engage in manual harvesting on all GIDA's irrigated projects because there are no mechanical harvesters. Farmers usually use the sickle or a knife for this operation.

After harvest, farmers sell off a percentage of their harvests to meet their financial obligations both to their creditors (for inputs) and to their households. Part of the harvest is also reserved as seed for the subsequent season, and part as food for home consumption. The survey showed that the percentage of farm harvests sold, varied from 66% for Asutsuare to 90% for Kikam, with the average at 76.4%. This means that about 23.6% of all harvests, go into seed rice and household consumption.

Storage facilities exist on all the projects, and for Kikam project, which is one of the two pilot small scale schemes recently developed by GIDA, a storage facility has been put up through funding from ASIP.

Farmers can either store their produce in the warehouses provided by GIDA or send them to their homes. No fee is charged for storage by GIDA, but most invariably, farmers prefer to store most of their produce in their homes, after initially selling off about 76.4% of their harvests to defray operational and household costs.

4.6.6 Credit and Marketing

Several sources of credit are patronized by project farmers. These are the formal credit sources like the commercial banks and the informal sources like the money lenders, traders, friends and farmers' own resources.

Access to credit from the commercial banks is very limited, and only Dawhenya, Kikam and Okyereko projects enjoy this formal source of credit as was revealed by the study.

The most common source of credit for these farmers is from own resources and private money lenders. There are also those farmers who get pre-financing from traders, with the condition to sell all produce to their financiers at the price prevailing when the deal was struck. Farmers on a project like Dawhenya, combine the use of formal and informal credit for their activities. Table 5.1 gives the sources of credit and the percentage of farmers sourcing credit from these quarters.

Table 4.2 Credit Sources

Credit source	Percentage of Farmers Using									
	Dawhenya	Kikam	Okyereko	Bontanga	Nobewam	Aveyime	Asutsuare	Afife	Ashaiman	Average
Bank	100	100	20	0	-	-	-	-	-	
Self	50	-	10	80	14	30	33	11	10	
Money Lender	20	-	50	20	71	70	22	89	10	
Trader	30	-	-	-	-	-	44	-	80	
Friends	-	-	-	-	14	-	-	-	-	
*Others	-	-	20	-	-	-	-	-	-	

Source : Field Survey

Others: Non- Governmental Organizations

Interest on credit varies from a low of 17.5% for six months from commercial banks, to 50% and 100% over a period of 3 - 12 months from informal sources.

It would be noted that from Afife and Aveyime projects both in the Volta Region, 89.5% of farmers indicated that they pay 100% interest on informal credit. The majority of farmers on all the projects however, pay about 50% interest on informal credit over a 3 - 6 month period. See table 4.2 for interest payment on credit.

Table 4.3 Interest Payment On Credit

Interest on Credit	Percentage of Farmers Paying									
	Dawhenya	Kikam	Okyereko	Bontanga	Nobewam	Aveyime	Asutsuare	Afife	Ashaiman	Average
17.5%	100	100	-	-	-	-	-	-	-	-
50%	30	-	80	20	57	10	22	-	10	-
100%	-	-	-	-	-	90	-	89	-	-

Source: Field Survey

All the projects are provided with drying floors, and for most farmers, this is the most important point of sale of their paddy. For most farmers, the preference would be that they are able to sell off their produce on the drying floors. This is however not the case, especially where farmers have difficulty in disposing of their produce. They are forced to cart their produce to their homes which serve as points of sale, or to transport these to nearby markets for sale. Under such circumstances, transportation costs incurred, reduce their profit margins.

Projects like Dawhenya, Afife, Ashaiman and Asutsuare show a high percentage sales on drying floors (100%, 89%, 90% and 67% respectively) is indicative of good and reliable marketing outlets.

Refer to table 4.3 for points of sales on projects surveyed.

Table 4.4. Points of Sale on Projects

Point of Sale	Percentage of Farmers Selling At									
	Dawhenya	Kikam	Okyereko	Bontanga	Nobewam	Aveyime	Asutsuare	Afife	Ashaiman	
Drying Floor	100	-	10	-	-	30	67	89	9	
Home	-	100	60	100	57	50	11	-	-	
Market	-	-	30	-	43	20	22	11	10	

Source: Field Survey

4.7 FINANCIAL CROP BUDGETS

Financial crop budgets for individual projects have been prepared and appear as appendix III.

These budgets are based on input requirements prepared by the project management division of GIDA and are meant to be indicative. Variations in their levels of application therefore, occur from project to project.

For the purpose of meeting the research requirements as indicated in the TOR for effective use in the PAM model, a summary budget, subdivided into the following has been prepared and submitted to ISSER as scheduled.

- i) Yield and Revenue
- ii) Variable Costs
- iii) Machinery Costs
- iv) Labour, Management and Credit costs
- v) Other charges
- vi) Total production cost
- vii) Processing cost by traders

4.7.1 Revenue

Revenue is obtained basically from the sale of paddy at prices prevailing at the point of sale, which in most cases is at the drying floors.

Output price per bag of paddy weighing 82 kg. which is quoted in the crop budgets refer to prices prevailing at the time of the study (April 1997).

For most of the projects, output prices are relatively uniform across the different varieties cultivated. These prices ranged from a low of ₦36,000.00 for Bontanga to ₦45,000.00 for Dawhenya, Nobewam and Afife projects. The only exception was at the Dawhenya project, where apart from the CIAT which was selling at a slightly higher price of about ₦50,000.00 per bag, all other varieties attracted a price of between ₦43,000.00 to ₦45,000.00 per 82 kg. bag of paddy.

4.7.2 Production Costs.

Production costs were computed from variable costs, machinery hire, labour and other management costs including irrigation service charge and credit costs.

As stated under section 4.7.1, all input prices represent prices over the period of the survey and are therefore assumed to be relatively uniform for all the projects.

The cost of inputs like fertilizers and agro-chemicals vary from one locality to the other, the price distortion probably caused by transportation costs from points of purchase to sales outlets by the dealers.

Labour charges for the different farm operations also vary from project to project. It depends on the availability of farm labour in a particular locality at a particular time of the year and the cost of labour per manday.

Land preparation costs per hectare, vary considerably. These variations result from the fact that almost all the projects rely on machinery from outside sources, and secondly, some projects use power tillers for land preparation while others use four-wheel tractors. Each of these machinery types attract different rates, to give the wide variations in prices.

Interest on credit is put at 17.5% for a six-month period, which is what prevails at the projects which have access to formal credit. The average production cost for pump schemes is about ¢1,482,600.00 while for gravity schemes, this is about ¢1,333,225.00.

4.7.3 Gross Margins

The difference between the gross revenue and the production costs is referred to here, as the gross margin. Variations in gross margins across projects is quite minimal and lie between ¢817,500.00 for Kikam project to ¢913,500.00 for Nobewam project.

The average gross margin/ha. for the pump schemes is ¢882,400.00 and ¢861,775.00 for the gravity schemes. The table below (Table 4.5) summarizes some important aspects of the crop budgets presented in appendix III, while table 4.6 represents a typical crop budget that cuts across pump and gravity schemes. This shows a production cost of ¢1,322,949.00 and a gross margin of ¢969,027.00.

Table 4.5 Summary of Financial Crop Budgets

Project Name	Irrigation System	Average Yield/ha. (Bag)	Unit Price/ 82 kg. Bag Paddy (¢)	Gross Revenue/ha. (¢)	Production Cost/ha. (¢)	Gross margin/ha. (¢)
Nobewam	Pump	50	45,000.00	2,250,000.00	1,336,500.00	913,500.00
Kikam	-do-	55	41,000.00	2,255,000.00	1,437,500.00	817,500.00
Dawhenya	-do-	60	45,000.00	2,700,000.00	1,800,500.00	899,500.00
Asutsuare	-do-	60	42,000.00	2,520,000.00	1,643,050.00	876,950.00
Aveyime	-do-	50	42,000.00	2,100,000.00	1,195,450.00	904,550.00
Bontanga	Gravity	50	36,000.00	1,800,000.00	928,300.00	871,700.00
Ashaiman	-do-	60	43,000.00	2,580,000.00	1,688,000.00	892,000.00
Afife	-do-	50	45,000.00	2,250,000.00	1,376,000.00	874,000.00
Okyereko	-do-	50	43,000.00	2,150,000.00	1,340,600.00	809,400.00

Table 4.6. FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 PRICES
PROJECT : Average for Irrigated Projects.

CROP: Rice

1. Cost	Item	Units	Quantity	Price	Value
a. Inputs	seed(Paddy)	bag	1	54,000.00	54,000.00
	compound	bag	7	34,444.00	241,108.00
	urea	bag	2	20,444.00	40,888.00
	ammonia sulphate	bag	3	11,056.00	33,168.00
	insecticide	lits	4	16,167.00	64,668.00
	rodenticide	kg/lt	1	5,000.00	5,000.00
	fungicide	kg/lt	7	6,278.00	43,946.00
	sacks	singles	84	1,539.00	129,276.00
	tools	lump sum			30,167.00
	sub total				
b. Labour	transplant/broadcast	ha	1	43,889.00	43,889.00
	spraying	ha	1	23,222.00	23,222.00
	weeding	ha	1	97,778.00	97,778.00
	bird scaring	ha	1	73,222.00	73,222.00
	cutting	ha	1	62,917.00	62,917.00
	threshing	ha	1	60,028.00	60,028.00
	winnowing	ha	1	15,389.00	15,389.00
	drying and bagging	ha	1	30,389.00	30,389.00
	carting fertilizer to field	bag	12	283.00	3,396.00
	carting paddy from field	bag	54	394.00	21,276.00
	other cost	ha			38,000.00
sub total					469,506.00
c. Machinery	land preparation	ha	1	158,333.00	158,333.00
d. Irrigation services charge	pump/gravity	ha	1	106,889.00	106,889.00
total inputs cost					265,222.00
e. Interest charge		ha	1	269,199.00	269,199.00
total costs					1,322,949.00
2. Revenue	paddy	bag	54	42,444.00	2,291,976.00
Gross Margin					969,027.00

4.8 CONSTRAINTS IN IRRIGATED RICE PRODUCTION

During the field survey, farmers were encouraged to list in ranking order, some of the constraints they face in their farming activities. Since this particular question was not structured, a host of constraints were cited, numbering up to 14.

Then based on these reported problems from the individual projects, table 4.7 was constructed, to calculate the percentage rating index for each reported problem.

The value of the average percentage rating index is an indication of the severity of the reported problem facing farmers on the projects. The index is calculated by finding the frequency of responses given to a particular problem by all farmers interviewed. This frequency is then converted into numbers by giving the problem with the highest frequency 14, followed by the next with 13 and so on and so forth till the least problem which gets a score of 1. When this is divided by the maximum possible score, (14 multiplied by the total number of farmers), the weighted percentage can be calculated. This weighted percentage is what is referred to in the text as the average percentage rating index.

From the table, the problem with highest rated index of 18% was the lack of mechanical services. Agricultural machinery for land preparation activities are virtually absent on the projects. This is because the projects do not own any such machinery including tractors and power tillers. These are all owned by private individuals, and are not available at the critical periods in the cropping programme when needed by these farmers. This adversely affects the cropping programmes, cropping patterns etc. leading to projects inability to schedule water delivery to the plots.

The second spot is taken by the lack of formal credit to farmers, which attracts a rating of 16%.

From the tables on financial crop budgets, production costs are in the region of €1.3 million per hectare. Most farmers do not have such capital to start a cropping programme, and unless they receive some form of credit, problems arise, and they are either unable to crop, or may just apply a fraction of required inputs, resulting in poor yields and losses to farmers.

The next ranked problems are the poor levelling of the fields and insufficient water delivery especially in the lean seasons. Each of these attracts a rating of 11%.

The other constraints mentioned, follow in the following order; poor maintenance of irrigation systems (9%), marketing problems (5%), high input prices (5%), shortage of labour (5%), Crop damage by birds (5%), poor maintenance of irrigation pumps (4%), lack of farm inputs (4%), small size of farm holdings (4%), power failures (where pumps use electricity, 2%) while the least reported problem was high irrigation service charge (1%).

TABLE 4.6: REPORTED PROBLEMS FACING FARMERS ON SAMPLED PROJECTS (% RATING INDEX)

PROBLEM/CONSTRAINTS	AFIFE	ASHAIMAN	ASUTSUARE	AVEYIME	BONTANGA	DAWHENYA	NOBEWAM	OKYEREKO	KIKAM	AVERAGE
a. Levelling of plots	16	0	20	13	0	0	18	17	17	11
b. Insufficient water	14	17	0	16	0	15	16	18	0	11
c. Lack of credit	14	17	0	13	34	15	16	14	17	16
d. Marketing problems	12	16	0	0	0	0	0	0	16	5
e. High input prices	14	17	0	0	0	14	0	0	0	5
f. Lack of mechanical service	15	17	20	14	33	14	16	17	17	18
g. Shortage of labour	0	16	19	0	0	15	0	0	0	5
h. Maintenance of irrigation system	15	0	21	14	0	0	17	18	0	9
i. Maintenance of irrigation pump	0	0	0	16	0	0	17	0	0	4
j. Lack of farm inputs	0	0	20	14	0	0	0	0	0	4
k. Power failure	0	0	0	0	0	15	0	0	0	2
l. High irrigation service charge	0	0	0	0	0	12	0	0	0	1
m. Crop damage by birds	0	0	0	0	0	0	0	0	17	5
n. Small size of holdings	0	0	0	0	33	0	0	16	16	4
Total	100	100	100	100	100	100	100	100	100	100

Source : Field Survey Data

Appendix 1

Summary Of Socio-Economic Profile and Agricultural Data

General Features

Average Age of Respondents	44
% Male Farmers	80%
% Full Time Farmers	80%
% Education	20%
Average Number of Children	5
Average Family Size	11
% Farmers Leasing Land	20%

AGRICULTURE

Cultivated Area and Land Tenure

Land Type	% Cultivated Area Leased	
-Irrigation		15
- Upland		0
-total		15
Rent payment(¢)		
- Ave. rent on land		81,543

Average Land Holding (ha)	
Irrigation	Upland
3.0	3.0

Cropping Pattern and Crop Seasons

Rice Variety	% of rice variety cultivated		Crop Season	
		%	Planting Months	Harvesting Months
GRUG7		17		
IRRI3273		83		
GRUG22		0		
B-189		0		
DS3		0		
GK9		0		
CIAT		0		
ITA222		0		
		100		

Cropping Intensity

farmers cropping	%
once	20
twice	80
other	0

Crop Production and Sales(ha)

Crop	Average Crop Yield		% Sold
	Unit		per season
Rice	tonne	4.1	68

Farm inputs and Machinery

farmers using	% by farmers
Hired labour	100
Tractor	100
Power tiller	0
Organic manure	0
Fertilizer	100
Chemical	100
Other	0

Water Distribution

Distribution Being	% by farmers
Excellent	0
Good	80
Fair	20
Poor	0
Other	0

Source of seed supply

% obtaining seed from	% by farmers
own source	20
GIDA	80
Research station	0
Market	0
Other	0

SOCIO-ECONOMIC PROFILE

Demographic and Economic characteristics

<i>Age Distribution</i>	<i>% Overall Population</i>
< 5 years	0
5 to 10 years	21
11 to 15 years	0
16 to 25 years	15
26 to 45 years	50
46 to 65 years	14
Over 65 years	0
	100

<i>Adult Education(16+)</i>	<i>% Adult Population</i>
No Education	80
Literate	20
	100

<i>Adult Occupation(16+)</i>	<i>% Adult Population</i>
Farmer	
Trader	27
Student	
Artisan	0
Prof./Govt. Staff	
Fishing	
Other	
	27

<i>Origin and Residence</i>	<i>%</i>
% of farmers from area	100
% being native of area	100
other	0

Marketing and Credit

<i>Place of sale</i>	<i>%of farmers selling at</i>
<u>Drying floor</u>	0
Home	100
Market	0
other	0

<i>Source of credit</i>	<i>%of farmers obtaining credit from</i>
Bank	0
Self	80
Money Lender	20
Relations	0
Traders	0
Friends	0
other	0

<i>Interest charge on credit(%)</i>	<i>%of farmers paying</i>
17.5	0
50	20
100	0

General Features

Average Age of Respondents	37
% Male Farmers	86%
% Full Time Farmers	57%
% Education	71%
Average Number of Children	3
Average Family Size	5
% Farmers Leasing Land	86%

AGRICULTURE

Cultivated Area and Land Tenure

Land Type	% Cultivated Area Leased	
-Irrigation		90
- Upland		0
-total		90
Rent payment		
- Ave. rent on land		111,195

Average Land Holding (ha)	
Irrigation	Upland
2.0	2.0

Cropping Pattern and Crop Seasons

Rice Variety	% of rice variety cultivated		Crop Season	
		%	Planting Months	Harvesting Months
GRUG7		72		
GRUG88		14		
GRUG22		14		
B-189		0		
DS3		0		
GRA		0		
CIAT		0		
ITA222		0		
		100		

Cropping Intensity

% cropping	%
once	57
twice	43
other	0

Crop Production and Sales(ha)

Crop	Average Crop Yield		% Sold
	Unit		per season
Rice	tonne	4.1	82

Farm inputs and Machinery

farmers using	% by farmers
Hired labour	100
Tractor	0
Power tiller	100
Organic manure	0
Fertilizer	100
Chemical	100
Other	0

Water Distribution

Distribution	% by farmers
Excellent	14
Good	29
Fair	29
Poor	29
Other	0

Source of seed supply

% obtaining seed from	% by farmers
own source	71
GIDA	14
Research station	0
Market	14
Other	0

SOCIO-ECONOMIC PROFILE

Demographic and Economic characteristics

<i>Age Distribution</i>	<i>% Overall Population</i>
< 5 years	14
5 to 10 years	24
11 to 15 years	7
16 to 25 years	21
26 to 45 years	24
46 to 65 years	7
Over 65 years	3
	100

<i>Adult Occupation(16+)</i>	<i>% Adult Population</i>
Farmer	
Trader	31
Student	
Artisan	15
Prof./Govt. Staff	8
Fishing	
Other	
	54

<i>Adult Education(16+)</i>	<i>% Adult Population</i>
No Education	29
Literate	71
	100

<i>Origin and Residence</i>	<i>%</i>
% of farmers from area	100
% being native of area	100
other	

Marketing and Credit

<i>Place of sale</i>	<i>%of farmers selling at</i>
Drying floor	0
Home	57
Market	43
other	

<i>Source of credit</i>	<i>%of farmers obtaining credit from</i>
Bank	0
Self	14
Money Lender	71
Relations	14
Traders	0
Friends	0
other	0

<i>Interest charge on credit(%)</i>	<i>%of farmers paying</i>
17.5	0
50	57
100	0

Tables for Data Collection Report

Project: Afife

General Features

Average Age of Respondents	36
% Male Farmers	89%
% Full Time Farmers	89%
% Education	90%
Average Number of Children	4
Average Family Size	7
% Farmers Leasing Land	22%

AGRICULTURE

Cultivated Area and Land Tenure

Land Type	% Cultivated Area Leased	
-Irrigation		46
- Upland		25
	-total	71
Rent payment(¢)		
- Ave. rent on land		88,956

Average Land Holding (ha)	
Irrigation	Upland
4.0	3.0

Cropping Pattern and Crop Seasons

Rice Variety	% of rice variety cultivated		Crop Season	
		%	Planting Months	Harvesting Months
GRUG7		53		
GK88		20		
GRUG22		0		
B-189		0		
DS3		0		
GRA		27		
CIAT		0		
ITA222		0		
		100		

Crop Production and Sales

Crop	Average Crop Yield		% Sold
	Unit		per Year
Rice	tonne	4.1	78

Cropping Intensity

farmers cropping	%
once	89
twice	11
other	0

Farm inputs and Machinery

farmers using	% by farmers
Hired labour	100
Tractor	78
Power tiller	78
Organic manure	0
Fertilizer	100
Chemical	100
Other	0

Water Distribution

Distribution Being	% by farmers
Excellent	22
Good	11
Fair	56
Poor	11
Other	0

Source of seed supply

obtained from	% by farmers
own source	33
GIDA	22
Research station	0
Market	33
Other	11

SOCIO-ECONOMIC PROFILE

Demographic and Economic characteristics

<i>Age Distribution</i>	<i>% Overall Population</i>
< 5 years	15
5 to 10 years	28
11 to 15 years	8
16 to 25 years	18
26 to 45 years	26
46 to 65 years	5
Over 65 years	0
	100

<i>Adult Occupation(16+)</i>	<i>% Adult Population</i>
Farmer	
Trader	40
Student	
Artisan	0
Prof./Govt. Staff	
Fishing	
Other	
	40

<i>Adult Education(16+)</i>	<i>% Adult Population</i>
No Education	10
Literate	90
	100

<i>Origin and Residence</i>	<i>%</i>
% of farmers from area	100
% being native of area	89
other	0

Marketing and Credit

<i>Place of sale</i>	<i>%of farmers selling at</i>
Driving floor	89
Home	0
Market	11
other	0

<i>Source of credit</i>	<i>%of farmers obtaining credit from</i>
Bank	0
Self	11
Money Lender	89
Relations	0
Traders	0
Friends	0
other	0

<i>Interest charge on credit(%)</i>	<i>%of farmers paying</i>
17.5	0
50	0
100	89

General Features

Average Age of Respondents	43
% Male Farmers	80%
% Full Time Farmers	80%
% Education	80%
Average Number of Children	5
Average Family Size	7
% Farmers Leasing Land	20%

AGRICULTURE

Cultivated Area and Land Tenure

Land Type	% Cultivated Area Leased	
-Irrigation		27
- Upland		32
-total		59
Rent payment(¢)		
- Ave. rent on land		182,854

Average Land Holding (ha)	
Irrigation	Upland
2.0	4.0

Cropping Pattern and Crop Seasons

Rice Variety	% of rice variety cultivated		Crop Season	
		%	Planting Months	Harvesting Months
GRUG7		82		
GK88		0		
GRUG22		0		
B-189		0		
DS3		9		
GK9		9		
CIAT		0		
ITA222		0		
		100		

Crop Production and Sales

Crop	Average Crop Yield		% Sold
	Unit		per season
Rice	tonne	4.1	72

Cropping Intensity

farmers cropping	%
once	100
twice	0
other	0

Farm inputs and Machinery

farmers using	% by farmers
Hired labour	100
Tractor	90
Power tiller	10
Organic manure	0
Fertilizer	100
Chemical	100
Other	

Water Distribution

Distribution Being	% by farmers
Excellent	20
Good	10
Fair	50
Poor	20
Other	0

Source of seed supply

obtained from	% by farmers
own source	20
GIDA	80
Research station	0
Market	0
Other	0

SOCIO-ECONOMIC PROFILE

Demographic and Economic characteristics

Age Distribution	% Overall Population
< 5 years	9
5 to 10 years	15
11 to 15 years	13
16 to 25 years	25
26 to 45 years	30
46 to 65 years	5
Over 65 years	3
	100

Adult Education(16+)	% Adult Population
No Education	20
Literate	80
	100

Adult Occupation(16+)	% Adult Population
Farmer	83
Trader	
Student	
Artisan	17
Prof./Govt. Staff	
Fishing	
Other	
	100

Origin and Residence	%
% of farmers from area	70
% being native of area	90
other	0

Marketing and Credit

Place of sale	%of farmers selling at
Drying floor	30
Home	50
Market	20
other	0
Source of credit	%of farmers obtaining credit from
Bank	0
Self	30
Money Lender	70
Relations	0
Traders	0
Friends	0
other	0
Interest charge on credit(%)	%of farmers paying
17.5	0
50	10
100	90

Tables for Data Collection Report

Project: Kikam

General Features

Average Age of Respondents	.39
% Male Farmers	93%
% Full Time Farmers	89%
% Education	87%
Average Number of Children	4
Average Family Size	8
% Farmers Leasing Land	0%

AGRICULTURE

Cultivated Area and Land Tenure

Land Type	% Cultivated Area Leased	
-Irrigation		0
- Upland		0
-total		0
Rent payment(¢)		
- Ave. rent on land		

Average Land Holding (ha)	
Irrigation	Upland
0.9	4.0

Cropping Pattern and Crop Seasons

Rice Variety	% of rice variety cultivated		Crop Season	
		%	Planting Months	Harvesting Months
GRUG7		0	April/Oct	Aug/Jan
GK88		100		
GRUG22		0		
B-189		0		
DS3		0		
GRA		0		
CIAT		0		
ITA222		0		
		100		

Crop Production and Sales

Crop	Average Crop Yield		% Sold
	Unit		per season
Rice	tonne	4.5	90

Cropping Intensity

farmers cropping	%
once	100
twice	0
other	0

Farm inputs and Machinery

farmers using	% by farmers
Hired labour	100
Tractor	0
Power tiller	100
Organic manure	0
Fertilizer	100
Chemical	100
Other	0

Water Distribution

Distribution Being	% by farmers
Excellent	0
Good	60
Fair	30
Poor	10
Other	0

Source of seed supply

obtained from	% by farmers
own source	0
GIDA	100
Research station	0
Market	0
Other	0

SOCIO-ECONOMIC PROFILE

Demographic and Economic characteristics

<i>Age Distribution</i>	<i>% Overall Population.</i>
< 5 years	7
5 to 10 years	16
11 to 15 years	18
16 to 25 years	31
26 to 45 years	23
46 to 65 years	5
Over 65 years	0
	100

<i>Adult Education(16+)</i>	<i>% Adult Population</i>
No Education	13
Literate	87
	100

<i>Adult Occupation(16+)</i>	<i>% Adult Population</i>
Farmer	50
Trader	
Student	0
Artisan	
Prof./Govt. Staff	
Fishing	
Other	50

<i>Origin and Residence</i>	<i>%</i>
% of farmers from area	100
% being native of area	100
other	0

Marketing and Credit

<i>Place of sale</i>	<i>%of farmers selling at</i>
Drying floor	0
Home	100
Market	0
other	0

<i>Source of credit</i>	<i>%of farmers obtaining credit from</i>
Bank	100
Self	0
Money Lender	0
Relations	0
Traders	0
Friends	0
other	100

<i>Interest charge on credit(%)</i>	<i>%of farmers paying</i>
17.5	100
50	0
100	0

General Features

Average Age of Respondents	42
% Male Farmers	70%
% Full Time Farmers	70%
% Education	60%
Average Number of Children	5
Average Family Size	6
% Farmers Leasing Land	10%

AGRICULTURE

Cultivated Area and Land Tenure

Land Type	% Cultivated Area Leased	
-Irrigation		9
- Upland		0
-total		9
Rent payment(¢)		
- Ave. rent on land		49,420

Average Land Holding (ha)	
Irrigation	Upland
1.0	1.0

Cropping Pattern and Crop Seasons

Rice Variety	% of rice variety cultivated		Crop Season	
		%	Planting Months	Harvesting Months
GRUG7		7.7		
GRA		23		
GRUG22		0		
B-189		0		
DS3		0		
GK9		0		
CIAT		0		
ITA222		0		
		100		

Crop Production and Sales(ha)

Crop	Average Crop Yield		% Sold
	Unit		per Year
Rice	tonne	5	67

Cropping Intensity

farmers cropping	%
once	70
twice	30
other	0

Farm inputs and Machinery

farmers using	% by farmers
Hired labour	100
Tractor	100
Power tiller	0
Organic manure	0
Fertilizer	100
Chemical	100
Other	0

Water Distribution

Distribution Being	% by farmers
Excellent	20
Good	40
Fair	20
Poor	20
Other	0

Source of seed supply

%obtaining fseed from	% by farmers
own source	50
GIDA	0
Research station	10
Market	40
Other	0

SOCIO-ECONOMIC PROFILE

Demographic and Economic characteristics

<i>Age Distribution</i>	<i>% Overall Population</i>
< 5 years	6
5 to 10 years	10
11 to 15 years	20
16 to 25 years	32
26 to 45 years	22
46 to 65 years	6
Over 65 years	4
	100

<i>Adult Occupation(16+)</i>	<i>% Adult Population</i>
Farmer	
Trader	8
Student	
Artisan	25
Prof./Govt. Staff	17
Fishing	
Other	
	50

<i>Adult Education(16+)</i>	<i>% Adult Population</i>
No Education	40
Literate	60
	100

<i>Origin and Residence.</i>	<i>%</i>
% of farmers from area	100
% being native of area	100
other	0

Marketing and Credit

<i>Place of sale</i>	<i>%of farmers selling at</i>
<u>Drying floor</u>	10
Home	60
Market	30
other	0
<i>Source of credit</i>	<i>%of farmers obtaining credit from</i>
Bank	20
Self	10
Money Lender	50
Relations	0
Traders	0
Friends	0
other	20
<i>Interest charge on credit(%)</i>	<i>%of farmers paying</i>
17.5	0
50	80
100	0

Tables for Data Collection Report

Project: Asutsuare

General Features

Average Age of Respondents	39
% Male Farmers	56%
% Full Time Farmers	89%
% Education	90%
Average Number of Children	4
Average Family Size	7
% Farmers Leasing Land	44%

AGRICULTURE

Cultivated Area and Land Tenure

Land Type	% Cultivated Area Leased	
-Irrigation		50
- Upland		50
-total		100
Rent payment(¢)		
- Ave. rent on land		123,550

Average Land Holding (ha)	
Irrigation	Upland
2.0	3.0

Cropping Pattern and Crop Seasons

Rice Variety	% of rice variety cultivated		Crop Season	
		%	Planting Months	Harvesting Months
GRUG7		0		
TOX		0		
ITA234		33		
B-189		0		
DS3		0		
GK9		0		
CIAT		0		
ITA222		67		
		100		

Crop Production and Sales

Crop	Average Crop Yield		% Sold
	Unit		per season
Rice	tonne	6	66

Cropping Intensity

farmers cropping	%
once	33
twice	67
other	0

Farm inputs and Machinery

farmers using	% by farmers
Hired labour	100
Tractor	0
Power tiller	100
Organic manure	0
Fertilizer	100
Chemical	100
Other	0

Water Distribution

Distribution Being	% by farmers
Excellent	11
Good	22
Fair	22
Poor	44
Other	0

Source of seed supply

obtained from	% by farmers
own source	56
GIDA	44
Research station	0
Market	0
Other	0

SOCIO-ECONOMIC PROFILE

Demographic and Economic characteristics

Age Distribution	% Overall Population
< 5 years	8
5 to 10 years	12
11 to 15 years	18
16 to 25 years	38
26 to 45 years	18
46 to 65 years	6
Over 65 years	0
	100

Adult Occupation(16+)	% Adult Population
Farmer	
Trader	50
Student	
Artisan	20
Prof./Govt. Staff	0
Fishing	
Other	
	80

Adult Education(16+)	% Adult Population
No Education	10
Literate	90
	100

Origin and Residence	%
% of farmers from area	100
% being native of area	100
other	0

Marketing and Credit

Place of sale	%of farmers selling at
Drying floor	67
Home	11
Market	33
other	0
	100
	100

Source of credit	%Of farmers obtaining credit from
Bank	0
Self	33
Money Lender	22
Relations	0
Traders	44
Friends	0
other	0
	100

Interest charge on credit(%)	%of farmers paying
17.5	0
50	22
100	0
	100

General Features

Average Age of Respondents	38
% Male Farmers	70%
% Full Time Farmers	90%
% Education	90%
Average Number of Children	4
Average Family Size	6
% Farmers Leasing Land	20%

AGRICULTURE

Cultivated Area and Land Tenure

Land Type	% Cultivated Area Leased	
-Irrigation		14
- Upland		15
-total		29
Rent payment(¢)		
- Ave. rent on land		161,356

Average Land Holding (ha)	
Irrigation	Upland
2.0	9.0

Cropping Pattern and Crop Seasons

Rice Variety	% of rice variety cultivated		Crop Season	
		%	Planting Months	Harvesting Months
GRUG7		19		
TOX		4		
ITA234		10		
B-189		0		
DS3		0		
GK9		0		
CIAT		19		
ITA222		48		
		100		

Crop Production and Sales(ha)

Crop	Average Crop Yield		% Sold
	Unit		per Year
Rice	tonne	5.1	79

Cropping Intensity

farmers cropping	%
once	20
twice	80
other	0

Farm inputs and Machinery

farmers using	% by farmers
Hired labour	100
Tractor	0
Power tiller	100
Organic manure	100
Fertilizer	100
Chemical	100
Other	0

Water Distribution

Distribution Being	% by farmers
Excellent	20
Good	60
Fair	0
Poor	20
Other	0

Source of seed supply

%obtaining seed from	% by farmers
own source	30
GIDA	30
Research station	40
Market	0
Other	0

SOCIO-ECONOMIC PROFILE

Demographic and Economic characteristics

<i>Age Distribution</i>	<i>% Overall Population</i>
< 5 years	10
5 to 10 years	18
11 to 15 years	20
16 to 25 years	31
26 to 45 years	21
46 to 65 years	0
Over 65 years	0
	100

<i>Adult Occupation(16+)</i>	<i>% Adult Population</i>
Farmer	
Trader	43
Student	
Artisan	57
Prof./Govt. Staff	0
Fishing	
Other	
	100

<i>Adult Education(16+)</i>	<i>% Adult Population</i>
No Education	10
Literate	90
	100

<i>Origin and Residence</i>	<i>%</i>
% of farmers from area	100
% being native of area	100
other	0

Marketing and Credit

<i>Place of sale</i>	<i>%of farmers selling at</i>
Drying floor	100
Home	0
Market	0
other	0
	100
<i>Source of credit</i>	<i>%of farmers obtaining credit from</i>
Bank	100
Self	50
Money Lender	20
Relations	0
Traders	30
Friends	0
other	0
	100
<i>Interest charge on credit(%)</i>	<i>%of farmers paying</i>
17.5	100
50	30
100	0

General Features

Average Age of Respondents	51
% Male Farmers	90%
% Full Time Farmers	100%
% Education	90%
Average Number of Children	7
Average Family Size	7
% Farmers Leasing Land	30%

AGRICULTURE

Cultivated Area and Land Tenure

Land Type	% Cultivated Area Leased	
-Irrigation		29
- Upland		13
-total		42
Rent payment(¢)		
- Ave. rent on land		

Average Land Holding (ha)	
Irrigation	Upland
2.0	5.0

Cropping Pattern and Crop Seasons

Rice Variety	% of rice variety cultivated		Crop Season	
		%	Planting Months	Harvesting Months
IRRI13273		0		
TOX		21		
GK88		57		
B-189		14		
DS3		8		
GRA		0		
CIAT		0		
ITA222		0		
		100		

Crop Production and Sales

Crop	Average Crop Yield		% Sold
	Unit		per season
Rice	tonne	4	87

Cropping intensity

farmers cropping	%
once	0
twice	100
other	0

Farm inputs and Machinery

farmers using	% by farmers
Hired labour	100
Tractor	0
Power tiller	100
Organic manure	0
Fertilizer	100
Chemical	100
Other	0

Water Distribution

Distribution Being	% by farmers
Excellent	50
Good	50
Fair	0
Poor	0
Other	0

Source of seed supply

obtained from	% by farmers
own source	20
GIDA	70
Research station	10
Market	0
Other	0

SOCIO-ECONOMIC PROFILE

Demographic and Economic characteristics

Age Distribution	% Overall Population
< 5 years	2
5 to 10 years	22
11 to 15 years	11
16 to 25 years	28
26 to 45 years	35
46 to 65 years	2
Over 65 years	0
	100

Adult Education(16+)	% Adult Population
No Education	10
Literate	90
	100

Adult Occupation(16+)	% Adult Population
Farmer	
Trader	47
Student	
Artisan	53
Prof./Govt. Staff	
Fishing	
Other	
	100

Origin and Residence	%
% of farmers from area	0
% being native of area	100
other	

Marketing and Credit

Place of sale	%of farmers selling at
<u>Drying floor</u>	90
Home	0
Market	10
other	
Source of credit	%of farmers obtaining credit from
Bank	0
Self	10
Money Lender	10
Relations	0
Traders	80
Friends	
other	
Interest charge on credit(%)	%of farmers paying
17.5	0
50	10
100	0

Appendix 2

Tables on Financial Gross Margins

FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 CONSTANT PRICES

PROJECT : Bontanga

CROP: Rice

1. Cost		Item	Units	Quantity	Price	Value
a. Inputs						
	seed(Paddy)	bag		1	42,000.00	42,000.00
	compound	bag		5	34,000.00	170,000.00
	ammonia sulphate	bag		5	26,000.00	130,000.00
	fungicide	kg/lt		0	0.00	0.00
	insecticide	lits,		5	12,000.00	54,000.00
	rodenticide	kg/lt		0	0.00	0.00
	herbicide	kg/lt		3	12,000.00	30,000.00
	sacks	singles		70	2,000.00	140,000.00
	tools	lump sum				21,500.00
sub total						545,500.00
b. Labour						
	transplant/broadcast	ha		1	10,000.00	10,000.00
	spraying	ha		1	20,000.00	20,000.00
	weeding	ha		1	15,000.00	15,000.00
	bird scaring	ha		1	14,000.00	14,000.00
	cutting	ha		1	25,000.00	25,000.00
	threshing	ha		1	52,000.00	52,000.00
	winnowing	ha		1	10,000.00	10,000.00
	drying and bagging	ha		1	25,000.00	25,000.00
	carting fertilizer to field	bag		13	100.00	1,300.00
	carting paddy from field	bag		50	450.00	22,500.00
	other cost	ha				0.00
sub total						194,800.00
c. Machinery						
	land preparation	ha		1	105,000.00	105,000.00
d. Irrigatoin services charge						
		ha		1	83,000.00	83,000.00
total inputs cost						188,000.00
e. Interest charge						
		ha		1	384,750.00	384,750.00
total costs						928,300.00
2. Revenue						
	paddy	bag		50	36,000.00	1,800,000.00
Gross Margin						871,700.00

FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 CONSTANT PRICES

PROJECT : Nobewam

CROP: Rice

1. Cost	Item	Units	Quantity	Price	Value
a. Inputs	seed(Paddy)	bag	1	60,000.00	60,000.00
	compound	bag	5	30,000.00	150,000.00
	urea	bag	3	36,000.00	108,000.00
	ammonia sulphate	bag	0	0.00	0.00
	insecticide	lits	3	25,000.00	62,500.00
	rodenticide	kg/lt	0	0.00	0.00
	fungicide	kg/lt	2	8,000.00	16,000.00
	sacks	singles	100	850.00	85,000.00
	tools	lump sum			17,000.00
sub total					438,500.00
b. Labour	transplant/broadcast	ha	1	120,000.00	120,000.00
	spraying	ha	1	30,000.00	30,000.00
	weeding	ha	1	200,000.00	200,000.00
	bird scaring	ha	1	60,000.00	60,000.00
	cutting	ha	1	80,000.00	80,000.00
	threshing	ha	1	60,000.00	60,000.00
	winnowing	ha	1	20,000.00	20,000.00
	drying and bagging	ha	1	10,000.00	10,000.00
	carting fertilizer to field	bag	8	1,000.00	8,000.00
	carting paddy from field	bag	50	600.00	30,000.00
	other cost	ha			
sub total					618,000.00
c. Machinery	land preparation	ha	1	160,000.00	160,000.00
d. Irrigatoin service charge		ha	1	120,000.00	120,000.00
total inputs cost					280,000.00
e. Interest charge		ha	1	276,750.00	276,750.00
total costs					1,336,500.00
2. Revenue	paddy	bag	50	45,000.00	2,250,000.00
Gross Margin					913,500.00

FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 CONSTANT PRICES

PROJECT : Afife

CROP: Rice

1. Cost	Item	Units	Quantity	Price	Value
a. Inputs	seed(Paddy)	bag	1	75,000.00	75,000.00
	compound	bag	6	38,000.00	228,000.00
	urea	bag	4	38,000.00	152,000.00
	ammonia sulphate	bag	0	0.00	0.00
	insecticide	lits	6	15,000.00	90,000.00
	rodenticide	kg/lt	1	25,000.00	25,000.00
	fungicide	kg/lt	20	8,000.00	160,000.00
	sacks	singles	60	2,000.00	120,000.00
	tools	lump sum			46,000.00
sub total					821,000.00
b. Labour	transplant/broadcast	ha	1	10,000.00	10,000.00
	spraying	ha	1	10,000.00	10,000.00
	weeding	ha	1	60,000.00	60,000.00
	bird scaring	ha	1	80,000.00	80,000.00
	cutting	ha	1	40,000.00	40,000.00
	threshing	ha	1	40,000.00	40,000.00
	winnowing	ha	1	10,000.00	10,000.00
	drying and bagging	ha	1	10,000.00	10,000.00
	carting fertilizer to field	bag	10	100.00	1,000.00
	carting paddy from field	bag	50	400.00	20,000.00
	other cost	ha			14,000.00
sub total					295,000.00
c. Machinery	land preparation	ha	1	210,000.00	210,000.00
d. Irrigatoin service charge		ha	1	50,000.00	50,000.00
total inputs cost					260,000.00
e. Interest charge		ha	1	410,000.00	410,000.00
total costs					1,376,000.00
2. Revenue	paddy	bag	50	45,000.00	2,250,000.00
Gross Margin					874,000.00

FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 CONSTANT PRICES

PROJECT : Aveyime

CROP: Rice

1. Cost	Item	Units	Quantity	Price	Value
a. Inputs					
	seed(Paddy)	bag	1.00	50,000.00	50,000.00
	compound	bag	6.00	40,000.00	240,000.00
	urea	bag	3.00	40,000.00	120,000.00
	ammonia sulphate	bag	0.00	0.00	0.00
	insecticide	lits	1.00	25,000.00	25,000.00
	rodenticide	kg/lt	0.00	0.00	0.00
	fungicide	kg/lt	1.00	15,000.00	15,000.00
	sacks	singles	15.00	1,000.00	15,000.00
	tools	lump sum			25,000.00
sub total					440,000.00
b. Labour					
	transplant/broadca:	ha	1.00	5,000.00	5,000.00
	spraying	ha	1.00	20,000.00	20,000.00
	weeding	ha	1.00	100,000.00	100,000.00
	bird scaring	ha	1.00	80,000.00	80,000.00
	cutting	ha	1.00	50,000.00	50,000.00
	threshing	ha	1.00	30,000.00	30,000.00
	winnowing	ha	1.00	20,000.00	20,000.00
	drying and bagging	ha	1.00	80,000.00	80,000.00
	carting fertilizer to f bag		9.00	50.00	450.00
	carting paddy from bag		50.00	200.00	10,000.00
	other cost	ha			
sub total					395,450.00
c. Macninery					
	land preparation	ha	1.00	160,000.00	160,000.00
d. Irrigatoin service charge					
		ha	1.00	200,000.00	200,000.00
total inputs cost					360,000.00
e. Interest charge					
		ha	1.00	505,000.00	505,000.00
total costs					1,195,450.00
2. Revenue					
	paddy	bag	50.00	42,000.00	2,100,000.00
Gross Margin					904,550.00

FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 CONSTANT PRICES

PROJECT : Kikam

CROP: Rice

1. Cost	Item	Units	Quantity	Price	Value
a. Inputs	seed(Paddy)	bag	1	50,000.00	50,000.00
	compound	bag	10	34,000.00	340,000.00
	urea	bag	3	35,000.00	87,500.00
	fungicide	kg/lt	5	5,000.00	22,500.00
	insecticide	lits,	3	25,000.00	62,500.00
	rodenticide	kg/lt	0	0.00	0.00
	herbicide	kg/lt	5	8,000.00	40,000.00
	sacks	singles	70	1,500.00	105,000.00
	tools	lump sum			10,000.00
sub total					667,500.00
b. Labour	transplant/broadcast	ha	1	100,000.00	100,000.00
	spraying	ha	1	15,000.00	15,000.00
	weeding	ha	1	50,000.00	50,000.00
	bird scaring	ha	1	85,000.00	85,000.00
	cutting	ha	1	60,000.00	60,000.00
	threshing	ha	1	60,000.00	60,000.00
	winnowing	ha	1	26,000.00	26,000.00
	drying and bagging	ha	1	40,000.00	40,000.00
	carting fertilizer to field	bag	13	500.00	6,500.00
	carting paddy from field	bag	55	500.00	27,500.00
	other cost	ha			40,000.00
sub total					510,000.00
c. Machinery	land preparation	ha	1	140,000.00	140,000.00
d. Irrigatoin services charge		ha	1	120,000.00	120,000.00
total inputs cost					260,000.00
e. Interest charge		ha	1	116,800.00	116,800.00
total costs					1,437,500.00
2. Revenue	paddy	bag	55	41,000.00	2,255,000.00
Gross Margin					817,500.00

FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 CONSTANT PRICES

PROJECT : Okyereko

CROP: Rice

1. Cost		Item	Units	Quantity	Price	Value
a. Inputs		seed(Paddy)	bag	1	50,000.00	50,000.00
		compound	bag	10	33,000.00	330,000.00
		ammonia sulphate	bag	6	23,000.00	138,000.00
		fungicide	kg/lt	10	4,000.00	40,000.00
		insecticide	lits,	5	11,000.00	49,500.00
		rodenticide	kg/lt	0	0.00	0.00
		herbicide	kg/lt	3	12,000.00	30,000.00
		sacks	singles	70	2,000.00	140,000.00
		tools	lump sum			42,000.00
sub total						769,500.00
b. Labour		transplant/broadcast	ha	1	10,000.00	10,000.00
		spraying	ha	1	37,000.00	37,000.00
		weeding	ha	1	100,000.00	100,000.00
		bird scaring	ha	1	90,000.00	90,000.00
		cutting	ha	1	81,250.00	81,250.00
		threshing	ha	1	81,250.00	81,250.00
		winnowing	ha	1	10,000.00	10,000.00
		drying and bagging	ha	1	10,000.00	10,000.00
		carting fertilizer to field	bag	16	100.00	1,600.00
		carting paddy from field	bag	50	200.00	10,000.00
		other cost	ha			0.00
sub total						431,100.00
c. Machinery		land preparation	ha	1	90,000.00	90,000.00
d. Irrigatoin services charge			ha	1	50,000.00	50,000.00
total inputs cost						140,000.00
e. Interest charge			ha	1	384,750.00	384,750.00
total costs						1,340,600.00
2: Revenue		paddy	bag	50	43,000.00	2,150,000.00
Gross Margin						809,400.00

FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 CONSTANT PRICES

PROJECT : Asutsuare

CROP: Rice

1. Cost		Item	Units	Quantity	Price	Value
a. Inputs						
	seed(Paddy)	bag		1	50,000.00	50,000.00
	compound	bag		8	35,000.00	262,500.00
	ammonia sulphate & t s	bag		10	27,500.00	275,000.00
	fungicide	kg/lt		3	7,500.00	18,750.00
	insecticide	lits,		3	5,000.00	12,500.00
	rodenticide	kg/lt		0	0 00	0.00
	herbicide	kg/lt		3	12,000.00	30,000.00
	sacks	singles		150	1,500.00	225,000.00
	tools	lump sum				27,000.00
sub total						850,750.00
b. Labour						
	transplant/broadcast	ha		1	10,000.00	10,000.00
	spraying	ha		1	20,000.00	20,000.00
	weeding	ha		1	100,000.00	100,000.00
	bird scaring	ha		1	100,000.00	100,000.00
	cutting	ha		1	100,000.00	100,000.00
	threshing	ha		1	112,000.00	112,000.00
	winnowing	ha		1	17,500.00	17,500.00
	drying and bagging	ha		1	16,000.00	16,000.00
	carting fertilizer to field	bag		18	100.00	1,800.00
	carting paddy from field	bag		60	500.00	30,000.00
	other cost	ha				0.00
sub total						507,300.00
c. Machinery						
	land preparation	ha		1	160,000.00	160,000.00
d. Irrigatoin services charge						
		ha		1	125,000.00	125,000.00
total inputs cost						285,000.00
e. Interest charge						
		ha		1	120,000.00	120,000.00
total costs						1,643,050.00
2. Revenue						
	paddy	bag		60	42,000.00	2,520,000.00
Gross Margin						876,950.00

FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 CONSTANT PRICES

PROJECT : Dahwenya

CROP: Rice

1. Cost	Item	Units	Quantity	Price	Value
a. Inputs	seed(Paddy)	bag	1	60,000.00	60,000.00
	compound	bag	6	33,000.00	198,000.00
	urea	bag	4	35,000.00	140,000.00
	fungicide	kg/lt	10	4,000.00	40,000.00
	insecticide&farm manure	lits,trip	4	15,000.00	60,000.00
	rodenticide	kg/lt	2	10,000.00	20,000.00
	herbicide	kg/lt	5	8,000.00	40,000.00
	sacks	singles	70	1,500.00	105,000.00
	tools	lump sum			42,000.00
sub total					645,000.00
b. Labour	transplant/broadcast	ha	1	120,000.00	120,000.00
	spraying	ha	1	20,000.00	20,000.00
	weeding	ha	1	180,000.00	180,000.00
	bird scaring	ha	1	45,000.00	45,000.00
	cutting	ha	1	80,000.00	80,000.00
	threshing	ha	1	55,000.00	55,000.00
	winnowing	ha	1	15,000.00	15,000.00
	drying and bagging	ha	1	45,000.00	45,000.00
	carting fertilizer to field	bag	10	100.00	1,000.00
	carting paddy from field	bag	60	300.00	18,000.00
	other cost	ha			252,500.00
sub total					831,500.00
c. Machinery	land preparation	ha	1	160,000.00	160,000.00
d. Irrigatoin services charge		ha	1	164,000.00	164,000.00
total inputs cost					324,000.00
e. Interest charge		ha	1	104,738.00	104,738.00
total costs					1,800,500.00
2. Revenue	paddy	bag	60	45,000.00	2,700,000.00
Gross Margin					899,500.00

FINANCIAL GROSS MARGINS (Cedi/ha)
AT 1997 CONSTANT PRICES

PROJECT : Ashaiman

CROP: Rice

1. Cost		Item	Units	Quantity	Price	Value
a. Inputs		seed(Paddy)	bag	1	50,000.00	50,000.00
		compound	bag	10	33,000.00	330,000.00
		ammonia sulphate	bag	5	23,000.00	115,000.00
		fungicide	kg/lt	10	5,000.00	50,000.00
		insecticide	lits,	7	12,500.00	87,500.00
		rodenticide	kg/lt	2	10,000.00	20,000.00
		herbicide	kg/lt	7	12,500.00	87,500.00
		sacks	singles	150	1,500.00	225,000.00
		tools	lump sum			41,000.00
sub total						956,000.00
b. Labour		transplant/broadcast	ha	1	10,000.00	10,000.00
		spraying	ha	1	37,000.00	37,000.00
		weeding	ha	1	75,000.00	75,000.00
		bird scaring	ha	1	105,000.00	105,000.00
		cutting	ha	1	50,000.00	50,000.00
		threshing	ha	1	50,000.00	50,000.00
		winning	ha	1	10,000.00	10,000.00
		drying and bagging	ha	1	37,500.00	37,500.00
		carting fertilizer to field	bag	15	500.00	7,500.00
		carting paddy from field	bag	60	400.00	24,000.00
		other cost	ha			36,000.00
sub total						442,000.00
c. Machinery		land preparation	ha	1	240,000.00	240,000.00
d. Irrigatoin services charge			ha	1	50,000.00	50,000.00
total inputs cost						290,000.00
e. Interest charge			ha	1	120,000.00	120,000.00
total costs						1,688,000.00
2. Revenue		paddy	bag	60	43,000.00	2,580,000.00
Gross Margin						892,000.00