

# END-TERM EVALUATION OF 3 AGRA FUNDED PROJECTS IN GHANA

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FINAL REPORT

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**ALLIANCE FOR A GREEN REVOLUTION IN AFRICA  
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by

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## Acronyms and Abbreviations

<b>ACMV</b>	African Cassava Mosaic Virus
<b>ADP</b>	Agro- Dealer Development Programme
<b>ADRA</b>	Adventist Development and Relief Agency
<b>AEA</b>	Agriculture Extension Agents
<b>AFUF</b>	Academic User Facility Fees
<b>AGRA</b>	Alliance for a Green Revolution in Africa
<b>ANGRAU</b>	Acharya Ranga Agricultural University
<b>ASE</b>	Alpha Seed Enterprise
<b>CEO</b>	Chief Executive Officer
<b>CIP</b>	International Potato Centre
<b>CORAF</b>	West and Central African Council For Agricultural Research and Development
<b>CRI</b>	Corporate Response Initiative
<b>CS</b>	Certified Seeds
<b>CSIR</b>	Council for Scientific and Industrial Research
<b>DNA</b>	Deoxyribonucleic acid
<b>EACI</b>	Education for Africa Crop Improvement
<b>ECOWAS</b>	Economic Community of West Africa
<b>ER</b>	Eastern Region
<b>ERP</b>	Economic Recovery Programme
<b>EU</b>	European Union
<b>FGD</b>	Focus Group Discussions
<b>FIACC</b>	Fund for the Improvement and Adoption of Crops
<b>FS</b>	Foundation Seeds
<b>GAR</b>	Greater Accra Region
<b>GJ</b>	Golden Jubilee
<b>GLDB</b>	Grains and Legumes Development Board
<b>GNA</b>	Ghana News Agency
<b>GoG</b>	Government of Ghana

<b>GPRS</b>	Ghana Poverty Reduction Strategy
<b>ISSER</b>	Institute of Statistical Social and Economic Research
<b>KNUST</b>	Kwame Nkrumah University of Science and Technology
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MIDA</b>	Millennium Development Authority
<b>MoFA</b>	Ministry of Food and Agriculture
<b>MSc</b>	Master of Science
<b>NERICA</b>	New Rice for Africa
<b>NGOs</b>	Non- Government Organizations
<b>NR</b>	Northern Region
<b>NVRC</b>	National Varietal Release Committee
<b>OPV</b>	Open Pollinated Variety
<b>PASS</b>	Programme for Africa's Seeds System
<b>PhD</b>	Doctor of Philosophy
<b>PM</b>	Project Manager
<b>PPRSD</b>	Plant Protection and Regulatory Services Directorate
<b>QPM</b>	Quality Protein Maize
<b>SADA</b>	Savanna Accelerated Development Authority
<b>SARI</b>	Savannah Agricultural Research Institute
<b>SASSECC</b>	Savannah Seed Services Company
<b>SEPA</b>	Seed Production for Africa Initiative
<b>SG</b>	Seed Growers
<b>SSCIP</b>	Social Service Contractors Indemnity Pool
<b>SSS</b>	Senior Secondary School
<b>UCC</b>	University of Cape Coast
<b>UE</b>	Upper East
<b>UG</b>	University of Ghana
<b>WACCI</b>	West Africa Centre for Crop Improvement

## **Executive Summary**

A number of organizations/institutions in Ghana benefitted from AGRA funding and at the end of 2010, the projects had been completed. In view of this, the Institute of Statistical Social and Economic Research (ISSER) of the University of Ghana was contracted by AGRA to undertake an end-period evaluation of the AGRA projects in the country. The three projects undertaken in Ghana included one EACI project - *a M.Sc. Plant Breeding and Seed Science Programme at the Kwame Nkrumah University of Science and Technology which started in September 2008 and ended in 2010* ; and two SEPA projects, *the Sustainable Maize Seed Production and Promotion in the Forest and Forest Transition Zones of Ghana Project by Alpha Seed Enterprise and the Project to Supply Quality Seed of Cereals, Legumes and Oil Crops to Resource Poor Farmers in Northern Ghana by the Savanna Seeds Services Company Limited.*

This report is an independent evaluation that examined the activities of the 3 AGRA projects in Ghana. Specifically the objectives of this evaluation were as follows:

- To examine the extent to which project's major objectives were achieved
- To examine how economically project's converted inputs into results
- To examine the status of project outputs /results and whether results has translated into benefits to the smallholder farmer
- To examine the likelihood of continued, long term benefits from project results

With AGRA still supporting other EACI and SEPA projects in Ghana, an evaluation of the completed projects will help draw lessons for the on-going and new projects.

The evaluation followed the methodology prescribed in the Terms of Reference issued by AGRA. Essentially, the evaluation used a combination of qualitative and quantitative research to examine the performance of the three projects. It was undertaken in the months of August to October, 2011 and drew on information gathered from desk reviews, AGRA reports, stakeholders meetings, interviews and selected site visits.

The main findings of this evaluation can be summarized as follows:

**EACI Project** – The report finds that this programme is well aligned to Government of Ghana policies and programmes over the medium term. The report finds that the MSc Plant Breeding and Seed Science programme was well planned and implemented by all stakeholders involved. However the report notes that the programme is likely to have sustainability challenges without continued support from AGRA and other donors. The report commends the programme based on its effectiveness, relevance, efficiency and impact, and suggests its replication if possible in the sub-region.

**SEPA Projects** – In terms of principle of getting small private seed companies to start-up, the report is complimentary of the initiative behind these two projects. However, the report finds that the outcomes were less than anticipated. Some of the reasons cited in the report include inadequate feasibility that informed the selection of the seed companies, and inadequate monitoring and evaluation during programme implementation including the lack of operational and financial audits of the seed companies. The report also raises concerns about sustainability of the programme beyond the AGRA support. This is particularly so as the seed companies were subsidised to produce seeds and so could sell well below market prices.

Some of the key recommendations that the report makes as part of the conclusions are as follows:

- Public awareness on the M.Sc programme by the KNUST should be enhanced to ensure that they attract the best calibre of candidates as well as a lot more women;
- The process of dissemination of information on the improved seeds and new breeding techniques resulting from the programme to stakeholders should be expedited;
- The university should immediately commence the process of identifying other sources of funding to complement AGRA’s funding for the M.Sc programme.
- Criteria process for the selection of grantee seed companies need to be thoroughly reviewed.
- Monitoring and process evaluations needs to be more rigorous and frequent.
- AGRA should better integrate as well as support the development of seed policy and regulation in Ghana



## **1. Introduction**

### **1.1. Background**

Ghana is situated in West Africa bordering Cote d'Ivoire, Togo and Burkina Faso. It is the third largest member of the Economic Community of West Africa (ECOWAS). At independence, the Ghanaian economy was among the most vibrant in Africa. Economic growth in Ghana was often oscillatory and negative before the mid-1980s. This was a reflection of poor policies choices and missed opportunities and unsurprisingly some authors have labelled this period as the 'Black years' (see Killick, 2010). However this changed from the mid-1980s when Ghana started with the implementation of the Economic Recovery Programme (ERP). Between 1990-2000 economic growth averaged about 4.5% whilst over the 2001-2010 it has averaged about 5.6% annually. Meanwhile, Ghana's export sector still remains relatively concentrated in a few key commodities that have benefitted from rising commodity prices in recent years, but it remains vulnerable to a future downturn in its terms of trade. Ghana has been unable to tame inflation to single digits over the past decade, while the government's chronic budget deficits have spilled over into private credit markets.

According to data and reports from the Ghana Statistical Service poverty indicators have shown a remarkable improvement, almost halving from the 1991/1992 rate of about 51% to about 28.5% in 2006 (See Table 1-1). However inequality worsened over the period suggesting that not all benefitted equally from the growth that was experienced. Poverty in Ghana has remained a rural phenomenon and with an 'agricultural face'. Rural poverty incidence remains about 4 times that of urban poverty incidence. We note that within the rural areas, about 46% of food crop farming households are poor. In fact, for all the economic activities (except food crop farmers) major strides were made over the period in terms of the incidence of poverty – for all the categories the incidence of poverty at least halved between the periods 1991/1992 and 2005/2006.

Although agriculture has lost its number one spot in terms of its contribution to GDP, it still remains very important for employment generation and generation export earnings for the country. The assertion by earlier writers (see for instance Powell and Round, 2000) that

agriculture is critical in terms of sustainable growth and development in the Ghanaian economy is still true today.

**Table 1-1 Incidence of Rural Poverty, by economic activity (1991 – 2006)**

Period	1991/92	1998/99	2005/06
Rural Poverty Incidence	63.6	49.5	39.2
Urban Poverty Incidence	27.7	19.4	10.8
	Rural Poverty Incidence		
Public sector	39.1	25.2	13.9
Private formal	26.2	15.8	14.5
Private informal	35.4	28.9	14.1
Export farmers	53.3	30.1	16.3
Food crop farmers	58.3	50.1	45.5
Non-farm self-employed.	42.2	33.3	25.3
Not working	23.9	30.4	19.3

The agricultural sector accounts for about 56% of Ghana’s economically active population as well as about 32% of the country’s GDP, according to rebased GDP figures (Ghana Statistical Service, 2007). In spite of its importance to the economy, the sector is bedevilled with a myriad of problems with low productivity. A Ministry of Food and Agriculture report (2007) show that yield growth over the period 1992 to 2005 has been negative for all crops except maize (0.8%), groundnuts (0.9%) and rice (2.1%). Some of the problems which account for the low yields include low-input; high dependence on erratic rainfall; dominance of low employment of technology and skill levels, subsistence farming with small holder farmers which include many women or rely on women’s labour; and very poorly developed infrastructure and markets to support agri-business throughout the country.

Recent interventions in the sector have been targeted at improving agricultural productivity by addressing key challenges along the value chains of major staple food crops. The Alliance for a Green Revolution in Africa (AGRA) is spearheading comprehensive pro-poor initiatives to assist

in transforming African agriculture into a highly productive and sustainable system that would enable Africa to be food self-sufficient and food secure. AGRA was established in 2006 and aims to “increase the productivity of smallholder farmers, while seeking to protect biodiversity, promote sustainability and advance equity” (AGRA Mid Term Report, 2010).

The Programme for Africa’s Seeds System (PASS) is one of the four major interventions by AGRA to accomplish its overall objectives. PASS involves breeding improved seeds for African farmers’ use. It seeks to increase income, improve food security and reduce poverty by making available to small-scale farmers more than 1250 new varieties of at least 10 staples over a 10-year period. The Education for Africa Crop Improvement (EACI); the Fund for the Improvement and Adoption of African Crops (FIAAC); the Seed Production for Africa Initiative (SEPA); and the Agro-Dealer Development Programme (ADP) constitute the four sub-components of PASS. Each sub-component addresses a specific challenge on the PASS seed value chain. The EACI targets the training of a new generation of crop breeders and agriculture scientists while FIAAC funds the crop breeding in Africa. The main function of SEPA is to assist in getting produced improved seeds distributed to and adopted by small-scale farmers through public and private agro-dealers.

A number of organizations/institutions in Ghana benefitted from AGRA funding and at the end of 2010, the projects had been completed. In view of this Institute of Statistical Social and Economic Research (ISSER) of the University of Ghana was contracted by AGRA to undertake an end-period evaluation of the AGRA projects in the country. The three projects undertaken in Ghana include one EACI project - *a M.Sc. Plant Breeding and Seed Science Programme at the Kwame Nkrumah University of Science and Technology which started in September 2008 and ended in 2010* ; and two SEPA projects, *the Sustainable Maize Seed Production and Promotion in the Forest and Forest Transition Zones of Ghana Project by Alpha Seed Enterprise and the Project to Supply Quality Seed of Cereals, Legumes and Oil Crops to Resource Poor Farmers in Northern Ghana by the Savanna Seeds Services Company Limited.*

## **1.2. Objective**

This independent evaluation examines the activities of the 3 AGRA projects in Ghana. These projects which were implemented over the period 2008 to 2010 include one EACI and two SEPA completed projects in Ghana. More specifically the objectives of this evaluation are as follows:

- a) To examine the extent to which project's major objectives were achieved
- b) To examine how economically project's converted inputs into results
- c) To examine the status of project outputs /results and whether results has translated into benefits to the smallholder famer
- d) To examine the likelihood of continued, long term benefits from project results

## **1.3. Methodology**

This section outlines the approach adopted for the evaluation of the three AGRA projects. The consultant used a combination of qualitative and quantitative approaches to undertaking the evaluation. We drew on information gathered from desk research, interviews, and selected site visits and stakeholder meetings. The fieldwork for the evaluation was undertaken in the months of August and September, 2011.

The projects are evaluated the following criteria will be used:

- Relevance
- Effectiveness
- Efficiency
- Sustainability
- Impact

We discuss each of these in details below.

### **1.3.1. Relevance**

This refers to the appropriateness of each project's goals and objectives in relation to the problems that each project is supposed to address (i.e. contribute poverty reduction and food

security in Ghana), and to the context i.e. the physical and policy environment within which it operates. In the present case, it pertains to the situation that was prevalent in Ghana at the time of implementing each project.

All processes undertaken during the evaluation were consultative and participatory. The process enabled the consultant solicit and obtain practicable and realistic recommendations to enhance the design of future EACI and SEPA projects. Other measures aimed at improving and enhancing AGRAs interventions were derived from the findings of the overall evaluation.

### **1.3.2. Effectiveness**

The effectiveness criteria adopted by the consultant assessed the extent to which the EACI and SEPA interventions objectives were achieved, or were expected to be achieved. Effectiveness is a measure of the extent to which the three projects' intended outcomes have been achieved. Effectiveness explicitly analyses the relationship between each intervention and its desired outputs.

The achievement of the effectiveness of the three projects has a direct bearing on how it has been managed and implemented. Thus the implementation of each project was considered effective once planned activities undertaken had achieved the desired outcomes.

The consultant assessed the performance indicators used in the projects for assessing the effectiveness of the projects/activities. We established the evaluation activities that had been undertaken and determined whether these results were sufficient, valid and reliable for establishing the performance of the projects.

Having established the effectiveness of each project, we identified and examined the expected and unexpected factors that had an influence on project effectiveness. To achieve this we analysed the processes that had led to the outputs and impacts, the funding and control of activities as well as the institutional arrangements.

Data collection on effectiveness was undertaken in two stages. In the first stage the consultant analyzed all relevant secondary data, such as project reports, annual reports, relevant statistical information etc. to identify the indicators. Where no data was available we investigated the reasons why and proposed ways to improve data availability. This served as an assessment of the monitoring and evaluation activities that had occurred in relation to each project. In the second stage the team collected primary data. We arranged meetings for FGD and obtained the detailed information from key informants and met with stakeholders to have a number of in-depth interviews. The objective was to establish whether indicators used were an accurate representation of the performance of each project and to highlight factors that had an influence on project effectiveness.

### **1.3.3. Efficiency**

The efficiency of each project relates to its ability to achieve its results with the use of a reasonable set of resources. The consultant conducted a thorough analysis of the inputs used against the outputs delivered. The inputs to output ratios were compared to other sources of funding in the case of the EACI, the extent to which expenditure was within the budget and the production ratios of the seed producing companies.

Data in relation to the input and output of each project was gathered through:

- Analysing the delivery process and identifying relevant inputs were be linked to the outputs in each intervention's logic.
- Identifying the resources needed to deliver these products (i.e. time, money, etc.).
- Establishing the value for each of these resources.

The consultant conducted in-depth interviews with key persons involved with each project to identify the factors that have influenced the efficiency of the project. The interviews were guided by the items listed above.

#### **1.3.4. Sustainability**

This was considered as one of the most critical components of all three evaluations. This is in view of the challenges facing the agricultural sector and the need for replicating similar models throughout the country and the West African sub-region. An assessment was made on the likelihood that that benefits produced by each project, particularly the ownership of the projects by beneficiaries, policy support, economic factors, socio-cultural aspects, gender equality, etc. will continue.

The assessment of sustainability requires that the consultants look-back as well as look-forward. The issue of sustainability is being examined from the following perspectives:

- How was each project conceptualised?
- Who were involved in designing the projects?
- To what extent was the process consultative and participatory?
- What inputs did stakeholders make into the project?
- To what extent has the project empowered the project beneficiaries?
- Were the problems identified diagnosed correctly?

Data on sustainability of each project is based on interviews and interactions with beneficiaries, students and farmers, agro-dealers, plant breeders, lecturers, and project managers and non-governmental organizations associated with AGRA. This information was critical for outlining lessons learned for sustaining the impact of each project intervention.

#### **1.3.5. Impact**

Assessing the impact of a project involves obtaining evidence of changes resulting from project interventions. Impact to a large extent overlaps with effectiveness since the main approach is to establish if intended results were achieved. The consultant also established unintended effects/impacts that had occurred (both positive and negative). Indicators of each project were used as a measure for the intended impacts. For the unintended impacts the consultant developed new indicators through the logical framework in combination with a causal analysis of potential impacts.

In the consultant's effort to develop indicators to assess the impact of each project, the team assessed the relevance of performance indicators used in each project. In addition, we established evaluation activities that had already been performed before and during each intervention and determined the extent to which they resulted in sufficient information for establishing the performance of the three projects (increase in the number and quality of trained breeders, production of hybrid seeds, multiplication and distribution of improved seeds to farmers, improvement in the capacity of seed companies, increase yields of farmers, high levels of technology diffusion among farmers, etc.). The development of the "new" set of indicators was undertaken in a consultative manner to ensure acceptance and relative ease of measurement.

Following the establishment of the project impacts, we also identified factors that had contributed to the achievements. The consultant analysed the processes that led to the direct project outcomes, the funding and control activities. These processes divided into two broad categories, mainly internal and external factors.

To collect data on impact, the team analysed all relevant secondary data, such as project reports, relevant statistical information, beneficiaries' assessments, etc. to identify the values of the indicators. Where no data was available the consultant investigated the reasons why and proposed ways to improve data availability. This approach provided us with an overview of the values of the indicators as well as served as an assessment of the monitoring and evaluation activities that have occurred in relation to the three projects.

#### *Selection of respondents for impact assessment*

The approach used for selecting respondents for assessing the impact was essentially non-random. However there were some minor differences ex post. The Consultant did not go seek for a sample for which findings can generalize to the entire target population<sup>2</sup>. Instead, the Consultant sought to find informants who could share their experiences in a compelling way and in enough detail so that our understanding of the issues was deepened. Generally the approach

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<sup>2</sup> This was based on discussions with the client on the cost implications of undertaking a quantitative impact assessment.



used purposeful sampling, looking for informants who were either a “typical case” or an “extreme case”.

### *EACI Project*

Primary data for assessing the impact of the EACI project involved the use of snowballing technique to conduct in-depth interviews of beneficiary students and their immediate superiors at their respective workplaces. Ex ante expectation for the consultant was to talk to all the students (either in person or by phone) plus the workplace supervisors. In total, all six Ghanaian students and five workplace supervisors were interviewed. One of the two Liberian students who benefited from the masters programme interacted with Consultant through the internet.

### *SEPA-PASS Projects*

Assessing the impact of the two SEPA- PASS projects differed slightly from that of the EACI project. After ascertaining from the seed companies the districts and communities in which each of the two seed company operated, the Consultant purposively selected some of the districts (The selection was motivated by the need to cover districts that span the two ecological zones and those that had a relatively high intensity of seed company activities) and communities. For Alpha Seed Enterprise which operates mainly in the Ashanti region, focus group discussions (FGDs) and in-depth interviews were conducted for beneficiary farmers in 9 communities. Besides the FGDs involving nearly 100 farmers, a total of 12 farmers including 4 females were purposively selected from these communities and interviewed using a semi-structured interview guide. Also, using the snowballing technique, 5 stockists were interviewed in their communities. Additionally, the Consultant also interviewed 5 agro-input dealers in Kumasi, and Mampong. The consultant also conducted site visitations involving seed farms sites, beneficiary farmers’ farms, Crops Research Institute (CRI) and seed company office at Kwadaso Hemang.

Similarly, for Savanna Seeds Services Company Limited which operates in the three northern regions of Ghana with much concentration in the Northern region, the Consultant conducted FGDs with about 65 farmers in 4 purposively selected districts and 8 communities in the Northern and Upper East regions. In addition a semi-structured interview guide was used to conduct in-depth interviews for 6 farmers. The Consultant visited and interviewed the owners of

8 agro-input dealers shops in Tamale and Bolgatanga. Finally, the consultant also conducted site visitations involving seed farms sites, beneficiary farmers' farms, Savanna Agriculture Research Institute (SARI) and seed company office at Tamale and Nyankpala. Interviews with staff of Plant Protection and Regulatory Services Division (PPRSD) in Pokuase near Accra provided data for assessing the impact of the two seed companies in Ghana.

### Data Analysis

As characteristic of most qualitative research, analysis of the data gathered in each of the three project evaluations began early at the data collection stage to serve as a guide for the entire data collection process. All the interviews and FGDs were recorded and partially transcribed to augment the field notes and comments compiled during the interviews and FGDs. The concepts of relevance, effectiveness, efficiency, sustainability and impact were useful in organizing and coding the data collected.

### Data Collection Team

The lead consultant Robert Darko Osei (PhD) together with Isaac Osei-Akoto (PhD), Thomas Ansre (MSc) and Ezekiel Clottey (MSc) constituted the team that designed the in-depth interviews and FGDs guides for the evaluations. The entire team undertook the field work, data analysis and report writing. No instrument was pre-tested as the nature of qualitative research allows for flexibility and probing. The objectives of the study and the approved evaluation methodology informed the guides used during the fieldwork.

#### **1.3.6. The Structure of the Report**

The report is structured as follows: Chapter 2 presents the evaluation of the EACI project. In Chapters 3 and 4 respectively we present the evaluations of the seeds production programmes undertaken by Alpha Seed Enterprise and Savanna Seeds Services Company Limited. The summary of the main findings and some recommendations are presented in Chapter 5.

## 2. Component 1: EACI

### 2.1. EACI Project

**Project Goal:** To contribute to improved food crops production, enhance food security and sustainable development

**Project Objective:** To train plant breeders and seed scientist at the MSC level with the requisite knowledge and skills to develop superior varieties of crops using both conventional and molecular techniques to deal with abiotic and biotic stresses

### 2.2. Overview of Progress to Date

**Table 2-1: Outcomes, Outputs, Activities, and Performance of the EACI**

Expected Outcomes	Outputs	Activities	Indicators	Status/ Assessment
<b>Objective 1:</b> Train plant breeders at the MSC level with the requisite knowledge and skills to develop superior varieties of crops				
Outcome 1.1: Improved knowledge and skills in plant breeding	6 students obtain MSc degrees in plant breeding	Train 6 students in plant breeding techniques through formal teaching and hands on training on specific local crops over a 2 year period Get students' placement and joint supervision of their research with institutions in plant breeding.	The MSc programme advertised in the Daily Newspapers in Ghana & on the AGRA website 6 candidates (2 females and 4 males) selected for the M.Sc course. All 6 students placed with Research Institutions and jointly supervised by plant breeding experts from research institutions All 6 students successfully complete the M.SC course in plant breeding within 2 years	Applicants from Ghana and neighbouring West African countries (Niger, Liberia and Sierra Leone) were interviewed & selected
Outcome 1.2: Improve seed and food quality	6 students obtain M.Sc in plant breeding;	Students were taken through taught courses on the	Graduates focused on: Drought tolerance in	List of graduates and crops they conducted research on:

Expected Outcomes	Outputs	Activities	Indicators	Status/ Assessment
	All 6 graduates acquire expertise in pollination & conduct successful pollination of major food crops in Ghana	<p>KNUST campus and field work. Location of the field work was dependent on the crop and the ecologies on the crop. S. Mustapha &amp; A. Magagi conducted their research in SARI, Nyankpala.</p> <p>S. Abebrese &amp; E. Newmah conducted their research on the outskirts of Kumasi</p> <p>P. Adofo-Boateng &amp; E. Obeng Bio conducted their research on the KNUST campus &amp; at the CRI of the CSIR</p>	<p>cowpea; Production of sorghum hybrids for adoption in Northern Ghana; Crossing varieties of Nerica (rice) to determine their use in breeding programmes as parents;</p> <p>Development of drought tolerant maize varieties;</p> <p>Development of high yielding and disease resistant rice varieties;</p> <p>Develop cassava land races resistance to disease (ACMV)</p> <p>All 6 students graduated and are employed in relevant sectors of the agricultural sector</p>	<p>Sam O. Abebrese: Rice</p> <p>Ebenezer Obeng-Bio: Maize</p> <p>Sanatu Alhassan Mustapha: Cowpea</p> <p>Priscilla Adofo Boateng: Cassava.</p> <p>Eric Newmah: Rice</p> <p>Abdou Magagi: Sorghum</p> <p>The extent of dissemination of the improved varieties from the graduate programme could not be established. Seed producing firms evaluated did not indicate that they had received the varieties produced by the plant breeding graduates</p>
Outcome 1.3: Improve performance of agriculture research institute and universities in the sub-region	All 6 graduates acquire skills in scientific writing & publishing of research work	All 6 students were taken through taught courses on the KNUST campus and field work	<p>6 draft manuscripts being edited by supervisors</p> <p>1 Thesis from a Ghanaian has been published as a book in Germany. A chapter from this book has also been published in the Journal of African Science and Technology</p> <p>4 Ghanaian graduates of the plant breeding programme employed in agriculture research &amp; academic institutions</p> <p># &amp; specific equipment supplied to</p>	<p>List of graduates and their present places of employment:</p> <p>Sam O. Abebrese: Research Scientist (Rice breeder) at SARI, Tamale</p> <p>Ebenezer Obeng-Bio: Programme Officer for West Africa on the CRI/SSCIP programme for sweet potato, Kumasi</p> <p>Sanatu Alhassan Mustapha: Lecturer, University of Development Studies, Tamale</p> <p>Priscilla Adofo Boateng: Research Scientist, CRI of CSIR. Presently pursuing a Ph.D at the West Africa Centre for Crop Improvement (WACCI)</p>

Expected Outcomes	Outputs	Activities	Indicators	Status/ Assessment
			collaborating agriculture research institutions & university departments # of staff of collaborating agriculture research institutions & university departments trained # AGRA research grantees supporting supervision of the M.Sc students	A major challenge identified was to get the foreign students to write and publish papers
<b>Objective 2:</b> Train seed scientist at the MSC level with the requisite knowledge and skills to develop superior varieties of crops				
Outcome 2.1: Improved knowledge and skills in seed sciences	4 students obtain MSc degrees in seed science	Train 4 students in seed science techniques through formal teaching and hands on training on specific local crops over a 2 year period  Get students' placement and joint supervision of their research with institutions in plant breeding.	MSC programme advertised in the Daily Newspapers in Ghana & on the AGRA website. 4 candidates (all males) selected for the M.Sc course. All 4 students successfully completed the M.Sc programme within 2 years All 4 students were placed with research institutions and research work jointly supervised by plant breeding experts	Applicants from Ghana and neighbouring West African countries were interviewed and selected for the programme.
Outcome 2.2: Improve productivity of staple food in the region	Seed health assessment and viability monitoring skills acquired	Students were taken through taught courses on the KNUST campus and field work	Research work of the graduates improved the productivity of staple crops (tomatoes, maize, cowpea, groundnuts and rice) in the region	List of graduates and crops they focused on: Hillary Bortey: Tomatoes David T. Sackey: Maize and cowpea Ernest Camara: Groundnuts Eric Torkpa: Rice The period under review is too short to

Expected Outcomes	Outputs	Activities	Indicators	Status/ Assessment
				realize improvements in the productivity of staple food in the region
Outcome 2.3: Improve seed and food quality	All 4 graduates acquire capacity and skills in seed health assessment and viability monitoring	Students were taken through taught courses on the KNUST campus and field work. All students undertook their research work in Kumasi and its immediate environs	Graduates focused on the effect of specific fertilizers on seed yield & quality of groundnuts; the study of fruit and seed qualities of tomatoes; control of specific fungal seed borne pathogens of maize & cowpea seeds; seed & grain quality characteristics relevant for selection of breeders. 2 Ghanaian graduates employed at the GLDB in higher positions than they were prior to the commencement of the M.Sc programme	Hillary Bortey: Assistant Planning Officer, GLDB, Kumasi David Teye Sackey: GLDB, Regional Officer, Ho Ernest Kamarra: Eric Torkpa:
Outcome 2.4: Improve performance of agriculture research institute and universities in the sub-region	All 4 graduates acquire skills in scientific writing & publishing of research work	All 4 students were taken through taught courses on the KNUST campus and field work	4 manuscript on seed science reviewed and ready for publication 2 of graduates from agriculture research institutions and universities trained under the M.Sc programme Specific disciplines graduates are trained in	List of graduates and their present places of employment:

## 2.3. Assessment of Performance

### 2.3.1. Relevance

The EACI project has been identified as a project aligned with the national development policies and specific sector policies. The project is aimed at providing formal degree training in Plant Breeding and Seed Science at the M.Sc. level to young people in the West African sub-region. It is anticipated that the project will contribute to improving the capacity of countries in the region to increase production of food crops, improve food security and ensure sustainable development. The M.Sc. training focused on the development of superior varieties of staple crops by engaging students directly in the use of conventional and molecular techniques in plant breeding and seed science.

The Vice President of Ghana’s statement on the importance of agriculture to the economy of Ghana sums up the government’s position on the relevance of the sector; “ *...the future of Ghana does not lie in the mining or oil and gas sector but rather in the growth and advancement of the agricultural sector*” (H.E. John D. Mahama, September 2011<sup>3</sup>). The project is targeted at addressing issues related to hunger and poverty amongst farming communities, increasing food crop productivity on a sustainable basis through the development of improved crop varieties and improved seed delivery systems, making available the relevant manpower to drive the agricultural sector and providing employment opportunities. Indeed, the project complements the GoG’s efforts at achieving the objectives of the Millennium Development Goals 1 (eradicate extreme poverty and hunger) and 7 (ensure environmental sustainability) as well as the agricultural objectives of the GoG’s Medium Term National Development Policy Framework. The objective of agricultural component of this framework development is to accelerate the modernization of agriculture; and a precondition for achieving the objective of modernization is the development of the relevant human capacity which this project seeks to achieve through the implementation of a comprehensive postgraduate training programme. In 2006, Ghana had only 37 breeders for food crops (AGRA Baseline Study in Ghana, August 2010), at the end of the M.Sc training for the 1<sup>st</sup> cohort (in 2010), four more breeders were produced; thus making a

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<sup>3</sup> <http://www.ghanatoghana.com/Ghanahomepage/mahama-future-ghana-gold-oil-agriculture>, accessed 28<sup>th</sup> September 2011

significant contribution to the total number of plant breeders in the country – an 11% increase in the number of breeders. The Project Manager, Professor Akromah emphasized the relevance of the training programme by noting that *“the products from the M.Sc training are graduates with a clear understanding of the science of crop improvement seed quality maintenance who have also gained practical experience and are capable of leading and executing crop improvement programmes for the development of new improved seeds, especially hybrids for high yields”*. All the six (6) Ghanaian graduates that the evaluation team interacted with “strongly agreed” that the M.Sc programme was relevant to AGRA’s efforts to improve food security and the income levels of smallholder farmers. They were all of the view that there was the urgent need to develop a critical mass of trained scientist who will develop new crop varieties. This is in the light of emerging challenges such as climate change, low yielding crop varieties and the rapid deterioration and degradation of soils.

The programme is a bold initiative targeted at addressing the absence of trained personnel in the field of plant breeding and seed science. This project is particularly important as it is designed to address most of the challenges inherent in developing the capacity of scientist in the sub-regions to conduct germplasm evaluation and utilization. The West Africa sub-region has very few plant breeders and seed scientist, this situation has been attributed to the low level of investment by the countries in the region and the relatively high cost of undertaking the programme. In the design of the M.Sc programme funds were made available for the procurement of equipment (computers and laboratory equipment) for the Department of Crop, Soil Science and Horticulture. Unfortunately however, because of procurement delays, the 1<sup>st</sup> cohort of M.Sc students had access to only the computers. The laboratory equipment was received at the end of the programme.

Some key requirements for enrolment were that; first, all candidates were supposed to be working with research institutions or the Ministry of Agriculture in their home country or a recognised private institution that will guarantee job placement for the student upon completion of the course. Second, they were to take formal study leave with full pay and be bonded to go back to their place of work. These requirements and the provision of a fellowship, stipend and research allowance for students under the programme addressed the financial constraints that



hinder many students from undertaking this programme. This minimized the financial burden of the students and facilitated their academic activities, thus enabling all the students in the 1<sup>st</sup> cohort to complete the programme in 24 months. Discussions with a number of self-financing students indicated that they spend a minimum of 36 months on the programme. The main constraint they identified was funding for the training. Some of them indicated that they had to contract loans to complete the programme. A self-financing graduate who is currently working in a research institution put the issue of financing into perspective. He noted that he had to contract a loan from a financial institution to complete his M.Sc programme. Thus, apart from the AGRA funded programme producing graduates at a faster rate than those who are self-financing, it minimizes the financial burden on graduates when they complete the programme.

Discussions with the Project Manager pointed to the fact that a conscious effort was made to attract an equal number of males and females onto the programme; however, this was not achieved because the number of qualified women who applied were few. For the 1<sup>st</sup> cohort there were 8 males and 2 females. This in our view was a good beginning and it suggested that gender considerations were an integral part of the selection of students for the programme.

The M.Sc programme was designed to meet the specific food needs of the sub-region. This relevance is further highlighted when we examine the food crops that the students conducted their research on - cassava, cowpea, sorghum, rice, groundnuts and tomatoes. These are food crops widely consumed in the sub-region but have not seen much research mainly on account of funding. The EACI students' research focused on developing drought and disease resistant varieties, crossing of seed varieties to produce improved and environmentally acceptable seeds, improving grain quality and yield, investigating the effects of specific fertilizers and adaptation of seed varieties for specific geographical areas. The choice of crops by the graduates reflected the national and food security interests of the countries they represented. In addition to the above, the graduates were taught to write scientific papers, thereby improving their ability to disseminate their scientific findings to both academic and policy audiences.

Over the last few years Ghana has achieved modest improvements in food crop production. However, it has been shown that most of this increase in production is attributable to an increase

in the acreage of the land under cultivation and not necessarily as a result of the adoption of improved and scientific farming practices (ISSER, 2010). This approach to the cultivation of food crops is not sustainable. Through the M.Sc programme students have been trained to produce drought resistant and high yielding varieties of seeds of the major food crops in the sub-region. This will contribute to the intensification of agriculture as well as minimize the effects of environmental degradation associated with unsustainable agricultural practices.

Some of the students trained were from Liberia and Sierra Leone. This is laudable as plant breeding and seed science is critical for these two countries that have gone through prolonged civil wars that disrupted virtually all their economic and institutional systems. The training of these students will in no small way help to kick start the seed industry in these countries and help ensure food security. It is worth noting that following the graduation of these two students from the EACI programme, they have subsequently benefited from AGRA grants to improve maize and rice seeds in their respective countries.

### **2.3.2. Effectiveness**

The Departments of Crop and Soil Sciences and Horticulture of the Faculty of Agriculture at KNUST admitted 10 students for the 1<sup>st</sup> cohort for the two-year programme to train 6 plant breeders and 4 seed scientists to the M.Sc. level. The Department undertook a rigorous exercise to select the candidates. This included the criteria mentioned in section 4.3.1. It is the consultants' view that the rigorous nature of the selection process ensured that competent candidates were selected for the M.Sc programme. The requirement that candidates should be already employed in research institutions, the Ministry of Agriculture or some recognized private institutions (with full salary) minimizes students' financial burden. It is noted that presently, all the Ghanaian graduates are either employed in research institutions, the Ministry of Food and Agriculture or are pursuing further studies (i.e. Ph.D).

A key requirement for assessing the effectiveness of the M.Sc program is the extent to which it has stimulated interest in the trainers as well as students. Interactions with lecturers on the programme and self-financing students indicated that this programme was a good one as it

enabled the students to complete their programme on time whilst minimizing the financial burden on them. Our investigations also revealed that the department also benefited from the programme. The procurement of textbooks, computers and internet accessibility in the Department facilitated students and lecturers work. Through this arrangement the AGRA funded students on the programme and staff of the Department were able to gain access to relevant scientific text books, journal websites and online electronic libraries; thus on a regular basis they were able to access documents that had a direct bearing on the research work they were involved in. The graduates noted that without this facility they would have had some difficulty completing their work on time and they may not have had access to most current research findings in their fields of study. Other noteworthy efforts to strengthen the capacity of the Department included the refurbishment of lecture rooms, new furniture, a *screen house* and later on laboratory equipment for DNA analysis and deep freezers. Two staff of the Department also benefited from attending conferences and three had the opportunity of undertaking working visits to private seed companies. These were very useful opportunities for the staff.

The design of the programme sought to use the M.Sc programme as a mechanism for strengthening the collaboration between the Department of Crop, Soil Science and Horticulture and food crop research institutions. This was achieved through the engagement of researchers to teach specific courses on the programme whilst also hosting of students at various times at the institute. Each student received adequate supervision and benefitted from the inputs of 2 scientists in the execution of their project. Each student's thesis was also reviewed by 2 scientists in the research institution thus enriching the students' work. We also noted that the students were encouraged to jointly produce scientific papers with the lecturers for publication. These activities have contributed to strengthening the relationship between the Department and the research institutions whilst improving the general quality of the M.Sc programme. Interactions with graduates from the programme suggested that all the graduates of the M.Sc were very satisfied with the course. They acknowledged that the course was very useful and had given them more vivid insights into Plant Breeding and Seed Science as well as equip them with very relevant practical tools to undertake new challenges.

Table 2-2 presents the status of the M.Sc program graduates before the training and their position a year after completion of the programme.

**Table 2-2 M.Sc graduates gender, country of origin and place of work**

Name of students	Gender	Country of Origin	Place of work and position prior to enrolment	Place of work and position after graduation
Priscilla Adofo Boateng	Female	Ghana	CSIR- Crops Research Institute, Ghana. Assistant Research Scientist	CRI but continuing the PhD at WACCI, Legon. She is currently a Research Scientist
Alidu Sanatu Mustapha (Mrs.)	Female	Ghana	Tamale Polytechnic, Lecturer	University of Development Studies, Tamale, Lecturer
Samuel Opong Abebrese	Male	Ghana	Teaching and Research Assistant, KNUST	Savannah Agricultural Research Institute, Tamale. Research Scientist (Plant Breeder)
Hilary Mireku Bortey	Male	Ghana	National Service Personnel, Ghana Grains & Legumes Development Board, Kumasi,	Assistant Planning Officer, Ghana Grains and Legumes Development Board, Kumasi
David Teye Sackey	Male	Ghana	Ghana Grains and Legumes Development Board, Regional Officer, Ho	Ghana Grains and Legumes Development Board, Regional Officer, Ho
Ebenezer Obeng Bio	Male	Ghana	Teaching and Research Assistant, KNUST	CSIR- Crops Research Institute, Kumasi. Assistant to International Potato Centre (CIP) West Africa Regional Breeder
Ernest Kamara	Male	Sierra Leone	National Agricultural Research Institute, Njala, Sierra Leone	National Agricultural Research Institute, Njala, Sierra Leone
Magagi Abdou	Male	Niger	National Agricultural Research institute, Niger	National Agricultural Research institute, Niger
John Tamba Newmah	Male	Liberia	Ministry of Agriculture, Liberia	Central Agricultural Research Institute, Liberia, Research Scientist. Currently pursuing a Ph.D in India*
Eric Tokpah	Male	Liberia	Ministry of Agriculture, Liberia	Ministry of Agriculture, Liberia. Research Scientist, has received AGRA grant to improve rice in Liberia

Source: Project Manager, AGRA funded M.Sc in Plant Breeding and Seed Science, KNUST

\* John Newmah is with the Department of Genetics and Plant breeding, Acharya Ranga Agricultural University (ANGRAU), Ragendranagar, Hyderabad, India

As a result of the training three of the graduates have got new jobs with more responsibilities in research institutions (Sam Opong Abebrese, Research Officer, Savanna Agricultural Research Institute and Ebenezer Obeng-Bio, Research Officer, Crop Research Institute); One has a job in

an academic institution (Alidu Sanatu Mustapha, Lecturer, Faculty of Agronomy, University of Development Studies); another two have been promoted at their place of work (Priscilla Adofo Boateng, Research Officer, Crop Research Institute and Hillary Bortey, Planning Officer, Grain and Legumes Development Board). One of the graduates from the programme (Priscilla Adofo Boateng) has received a fellowship to pursue a Ph.D at the West Africa Centre for Crop Improvement (WACCI). She got the opportunity to pursue the Ph.D after a presentation she made at an AGRA workshop in Mali. Priscilla Adofo Boateng notes that *“the M.Sc has given me the relevant foundation I needs to pursue a successful Ph.D”*. David Teye Sackey remains a Regional Officer at his old place of work at the Grains and Legumes Development Board, but notes that following his graduation from the M.Sc programme his performance has improved tremendously. John Newmah is presently pursuing a Ph.D in plant breeding in India. Messrs Abdou Magagi, Eric Tokpa and Ernest Kamara are back in their respective countries and occupy senior positions with more responsibilities.

Following interactions and discussions with various stakeholders we identify some factors that have facilitated the effectiveness of the programme as follows. First is the use of KNUST’s institutional framework, i.e. the framework designed by the University for managing the M.Sc programme. Overall responsibility for managing the M.Sc programme was delegated to the Project Manager (PM), Professor R. Akromah, a staff of Department of Crop, Soil Science and Horticulture. The project also had a Deputy Project Manager, Dr. Olympio. The PM was tasked to run the administrative procedures of the project, co-ordinate academic affairs and organize regular meetings with all collaborating partners. The PM maintained regular contacts (telephone, e-mails, visits, meetings) with students and supervisors according to the needs of the on-going research and training. The level of information and its timely dissemination was considered satisfactory and very useful by all stakeholders.

Second, was the financial management system employed. Financial management for the programme was provided by the administrative unit of the KNUST. The management of AGRA funds followed the established accounting procedures at the university. In effect the university’s administrative system which has in place appropriate checks and balances to prevent abuse or mismanagement was used to support the smooth running of the programme. Three tranches of

funds were advanced to the KNUST over the 18 month period of the M.Sc programme. The advances were based on proposals submitted by the collaborating partners and the students. All proposals were vetted by the PM before being approved.

A third enabling factor was the commitment of the coordinators, lecturers and the students to succeed. This is evident in the depth of the course content, the joint supervision approach adopted for students, the calibre of scientists that supervised the students and the timeliness of the completion of the course by the students. Table 2-3 presents background on each student, their thesis topics, the supervisors and their qualifications and the proportion of time committed to each student by the supervisors.

**Table 2-3 M.Sc Graduates (PASS 035) Matrix**

Name of student	Gender	Thesis topic	Number of supervisors/ student	Name and institution of Supervisors	Qualification of Supervisors	Proportion of time dedicated supervisors
Priscilla Adofo Boateng (Mrs)	Female	Using marker assisted selection as a tool to identify cassava mosaic disease resistant lines in first backcross populations	2	Dr. Joseph Manu Aduening (CRI)	Ph.D	30% of year
				Prof. Richard Akromah (KNUST)	Ph.D	70% of year
Alidu Sanatu Mustapha (Mrs.)	Female	Genetic analysis of vegetative stage drought tolerance in cowpea	2	Dr. I.D.K. Atokple (SARI)	Ph.D	60% of year
				Prof. Richard Akromah (KNUST)	Ph.D	40% of year
Samuel Oppong Abebrese	Male	Crossability of selected progeny from Inter-specific crosses between <i>Oryza sativa</i> and <i>O. glaberrima</i> (NERICAs, New Rice for Africa)	2	Dr. P.K.A. Dartey (CRI)	Ph.D	30% of year
				Prof. R. Akromah (KNUST)	Ph.D	70% of year
Hillary Mireku Bortey	Male	Quality of farmer-saved tomato seeds and its effect on fruit yield in Ghana	2	Dr. E. Moses (CRI)	Ph.D	50% of year
				Dr. (Mrs.) N.S. Olympio (KNUST)	Ph.D	50% of year
David Teye Sackey	Male	Effect of farmer seed management practices on quality of maize ( <i>Zea mays</i> L.) and cowpea ( <i>Vigna unguiculata</i> L. (WALP) seed from five ecological zones of Ghana	2	Dr. Robert Asuboah (GGLDB)	Ph.D	30% of year
				Dr. (Mrs.) N.S. Olympio (KNUST)	Ph.D	70% of year
Ebenezer Obeng Bio	Male	Selection and ranking of local and exotic maize ( <i>Zea mays</i> L.) genotypes to drought stress in Ghana	1	Rev. Prof. Mensah Bonsu (KNUST)	Ph.D	100% of year
Ernest Kamara	Male	Effects of season calcium and phosphorous fertilization on the growth yield and seed quality of groundnut varieties	2	Dr. James Asibuoah (CRI)	Ph.D	40% of year
				Dr. (Mrs.) N.S. Olympio (KNUST)	Ph.D	60% of year
Magagi Abdou	Male	Evaluating sorghum hybrids for seed production and farmer adoption in Northern Ghana	2	Dr. I.D.K. Atokple (SARI)	Ph.D	50% of year
				Prof. R. Akromah (KNUST)	Ph.D	50% of year
John Tamba Newmah	Male	Morpho-agronomic characterization of newly developed upland rice germplasm from the Africa Rice Centre and Ghana	2	Dr. P.K.A. Dartey (CRI)	Ph.D	30% of year
				Prof. R. Akromah (KNUST)	Ph.D	70% of year
Eric Tokpah	Male	Seed and grain quality characteristics of 100 local rice varieties	2	Dr. P.K.A. Dartey (CRI)	Ph.D	50% of year
				Dr. (Mrs.) N.S. Olympio (KNUST)	Ph.D	50% of year

Source: Project Manager, AGRA funded M.Sc in Plant Breeding and Seed Science

All the supervisors for the M.Sc programme were highly qualified scientist with Ph.D degrees and of varying work experience. Each student with the exception of one (Ebenezer Obeng Bio) had two supervisors. In the case where the student had only one supervisor, the student was the only M.Sc student the supervisors had to supervise under the programme. Thus we can conclude (and agree with the graduates of the 1<sup>st</sup> cohort) that the quality of the supervisors and supervision for students on the programme was very comprehensive.

A fourth enabling factor identified was the opportunity for joint publications by the students and their supervisors. By successfully publishing their scientific findings the graduates have built their capacities in their fields of expertise, are able to contribute to knowledge and improve opportunities for promotion. This initiative also gave the co-authors the opportunity to share their knowledge with fellow scientists and the general public.

Our interviews with the graduates revealed that there were five major areas of concern. The first concern of the students of the 1<sup>st</sup> cohort was the unavailability equipment. The students expressed concern about laboratory equipment and a *screen house* to control for drought at the Department of Crop, Soil Science and Horticulture. The PM, however, indicated that the laboratory equipment had been procured and subsequent M.Sc. cohorts were utilising the new laboratory facilities. The students had to use the screen house at Kwadaso (a Ministry of Agriculture facility in Kumasi). However we got the indication that this structure was defective and consequently hampered research work. Other defective equipment mentioned were the water pump and water hose at the CRI.

Other concerns of the graduates were on the course work. They expressed dissatisfaction with the fact that they were not taught how to use the relevant softwares to do their analysis. They were of the view that if they had been taught during the first year, they would have been able to conduct their data analysis in a more systematic manner. The graduates also expressed dissatisfaction with the course content of Biometry, Soil Microbiology, Farming Systems and Crop Physiology. They were of the view that the content of these subjects were sub-standard and below the level of the M.Sc programme. They recommended that the course content should be upgraded and made more practical and relevant. It is important to mention here that, these



views of the students are not necessarily shared by the programme coordinators. Indeed it is worth noting that this programme was already on-going before the start of the AGRA project. Our position is that a proper course evaluation is undertaken by AGRA to get a better sense of the adequacy of the programme before the programme is continued in the future.

### 2.3.3. Efficiency

Essentially, this section assesses the inputs employed in the delivery of the programme against the realised outputs.

**Table 2-4 Funding for the M.Sc. Program in Plant Breeding and Seed Science**

Source of Funding	Amount (\$)	Activities funded
AGRA	387,000.00	Personnel costs, research and thesis allowance, tuition fees, research projects, field and office supplies, stipend, vehicles and vehicle operating cost. Other items included computers, laboratory equipment and maintenance, communication, local and international travel, project monitoring costs and administrative costs
Government of Ghana	200,000.00	Salaries of the staff of the Department, lecture theatres and laboratory space
Total	587,000.00	

Source: Project Manager, AGRA funded M.Sc in Plant Breeding and Seed Science, KNUST

A total of Five Hundred and Eighty Seven Thousand Dollars (\$587,000.00) was budgeted for the M.Sc programme over the two year period. The AGRA funding amounted to Three Hundred and Eighty Seven Thousand dollars (\$387,000.00) and the Government of Ghana’s support amounted to Two Hundred Thousand dollars (\$200,000.00). AGRA funding was for personnel costs, research and thesis allowance, tuition fees, research projects, field and office supplies, stipend, vehicles and vehicle operating cost. Other items included computers, laboratory equipment and maintenance, communication, local and international travel, project monitoring costs and administrative costs among others. Government of Ghana funding was mainly for the salaries of the staff of the Department, lecture theatres and laboratory space. At the end of the

two year programme, all 10 students from Ghana, Liberia Sierra Leone and Niger who enrolled graduated with expertise in plant breeding and seed science and were in a position to contribute to ensuring food security in their various countries. Their skills in the preparation and dissemination of research outputs had also been enhanced through the training programme, thus they could communicate more effectively with fellow scientists, farmers and the general public.

The timely transfer of funds from AGRA through the KNUST to the Department of Agriculture and Horticulture and the payments to various stakeholder (mainly students, service providers and suppliers) is critical to the success of the programme. Our survey revealed that funds for all planned activities were released in a timely manner. This suggests that the financial system in place i.e. financial reporting, budgeting and approval processes required for the release of the funds were well-organized, as a result it facilitated the implementation of the M.Sc. programme.

The financial records show that the full amount committed by AGRA was forwarded to the Department for all budgeted items. An assessment revealed that the Department for Agriculture and Horticulture expenditure did not exceed amount budgeted for. The department requested for \$387,000 for the M.Sc programme for 10 students and expended the same amount.

We establish the unit cost of training an AGRA funded student and use this figure as a basis of comparing the expenditure of a self-financing student and one funded by CORAF (another M.Sc funding organization). The purpose of this comparison is to enable us assess the cost of the AGRA funded programme for Ghanaian students. The focus is on Ghanaian students because they do not pay tuition fees to the KNUST and the inclusion of this will distort the analysis since it will bias the results. The consultant's computation is on what we term direct expenses. The specific direct expenses are arrived at through information from the PM, students funded by CORAF and two self- financing students. The variables taken into account were Academic User Facility Fees (AFUF), Research Allowance, Research Project, Stipend, Accommodation, Book Allowance and Settlement Allowance where it applied. In Table 2-5 we show the amounts committed by AGRA for the 10 students against the alternatives over the two year period.

**Table 2-5 Assessment of Direct Expenses of M.Sc. Students in Plant Breeding and Seed Science**

Direct Expenses	Amount (\$)		
	AGRA funded students	CORAF funded students	Self-financing student <sup>3</sup>
AFUF	640.00	700.00	1,200.00
Research/Thesis Allowance	1,500.00	500.00	160.00
Research Project /Fieldwork	3,000.00	3,000.00	933.33
Stipend/Living Expenses	7,200.00	7,200.00	2,433.33
Accommodation	3,000.00	1,000.00	1,600.00
Book Allowance/ Expenditure on Stationery	1,000.00	333.00	576.00
Settlement Allowance	-	400.00	-
Duration	2 years	2 years	3 years
<b>Total/student</b>	<b>\$16,340.00</b>	<b>\$13,133.00</b>	<b>\$6,905.66</b>

Source: Project Manager, AGRA funded M.Sc in Plant Breeding and Seed Science, CORAF funded and Self financing M.Sc graduates.

Based on our calculations the direct expenses for an AGRA funded student for the two year M.Sc programme in plant breeding and seed science was **Sixteen Thousand Three Hundred and Forty dollars (\$16,340.00)**.

At the end of the programme all graduates funded by CORAF were each given a Dell Inspiron Laptop worth about Six Hundred and Seventy dollar (\$670.00). The total cost on each CORAF student is **Thirteen Thousand Eight Hundred and Three dollars (\$13,803.00)**.

<sup>3</sup> Funds for the AFUF were raised from a loan from employer's (Savanna Agriculture Research Institute) Credit Union. Books and stationery were financed from students monthly salary from employers. Student took a commercial loan from a bank and was also supported by SARI during his field work. Accommodation and living expenses were financed from student's monthly salary and by friends and relatives.

For the self-financing students we would like to state that it was difficult getting the exact figures from the self-financing students since they did not keep accurate records of their expenditure. Therefore some of the figures quoted for the variables (Research Project, Research expenditure, Stipend/Daily Subsistence Expenditure and Accommodation) are approximate figures. The total expenditure in US dollars for the self-financing student interviewed was **Six Thousand Nine Hundred and Five Dollars and Thirty Three Cents (\$6,905.33)**.

The cost estimates presented in Table 2-5 shows that the AGRA funded students were better resourced than any other category of M.Sc students. The fellowship to a large extent facilitated timely completion and a relatively less stressful M.Sc programme for the 6 Ghanaian students. As noted earlier, because of the financial difficulties the self-financing student encountered it took him 3 years to complete the programme.

It therefore suggests that with the appropriate investment, the rate at which students graduate from the M.Sc programme can be higher and consequently contribute to increasing the turn-around time for the critical mass of scientists necessary to move the country towards food self-sufficiency and poverty reduction amongst smallholder farmers in Ghana. It is also worth noting that students funded by CORAF were also able to complete the M.Sc programme within the same period as the AGRA funded students at a lower cost but under “more challenging” financial conditions.

Based on the analysis above a sum of **Five Hundred and Eight Seven Thousand Dollars (\$587,000.00)** was spent on 10 students over a two year period. The consultant concluded that this is an efficient use of resources to support and contribute to food security and poverty reduction in the West Africa sub-region.

#### **2.3.4. Sustainability**

The project has achieved a number of milestones including the development of the course, the acquisition of the relevant infrastructure, building of the capacity of a critical mass of Plant Breeders and Seed Scientist (whose training and areas of expertise are very relevant for improving productivity in the food crop sector) and strengthening the relationship between

academic and research institutions amongst others. Table 2-6 assesses the key sustainability parameters examined in the study

**Table 2-6 Assessment of sustainability parameters under the AGRA funded M.Sc Programme**

<b>Parameter</b>	<b>Sustainability Status</b>
Development of M.Sc programme	The programme was developed through a consultative process with key stakeholders. The programme is an integral part of the existing MSc programme in the Department. The institutional framework within which the programme operates is transparent, efficient and effectively monitored by the university's administrative system thus guaranteeing continuous implementation of the programme. The Project Manager indicated that the Department of Crop, Soil Science and Horticulture has shown overwhelmingly that they own the M.Sc programme
Acquisition of relevant infrastructure and equipment	Under the programme computers and modern laboratory equipment were acquired to ensure that students were able to undertake all their laboratory related activities
Building of the capacity of critical mass of Plant Breeders and Seed Scientists	The criteria for selection of candidates ensures that all the Ghanaian graduates of the MSc programme are employed in the food sector and are in a position to impart their newly acquired knowledge. The programme is in its fourth year and candidates of the third cohort have just been interviewed.
Strengthening the relationship between academic and research institutions	This design of the programme has provided an opportunity for academics and researchers to collaborate effectively on issues of interest and in some instances jointly publish research papers.
Funding	AGRA funding is critical for the successful implementation of the M.Sc programme, it accounts for 75.6% of the funding. It is very likely that if AGRA's funding is withdrawn the number of students that the programme has attracted as well as the completion rate of students will decline.

Notes: The PM indicated that the African Development Bank had provided funds for 3 students from Liberia for the 3rd cohort of students for the M.Sc programme. He also informed the consultant that they were had submitted proposals to a number of funding organizations

### **2.3.5. Impact**

This section of the report examines the impact of the programme. The assessment of the impact is looked at from the institutional, individual graduate level as well as the potential economy-wide impact of the M.Sc programme. The institutional impacts identified include the following:

- Given the quality of the programme and the skills level of the 1<sup>st</sup> cohort of M.Sc graduates, research institutions in the seed sector (GLDB, CRI, SARI) are eager to send their scientists on the programme;
- The success of the programme has enabled research institutions and academic institutions to recruit skilled plant breeders and seed scientists into their organizations thus enhancing their capacities to address the challenges of food crop production
- Table 2-2 on M.Sc Graduates Gender, Country of Origin and Place of Work). Hitherto, the research institutions were compelled to recruit lesser trained;
- The programme has fostered ownership and acceptability of the development of new and improved varieties of food crops amongst smallholder farmers. This was demonstrated by Mr. Abdou Magagi's research on Sorghum;
- The M.Sc programme has enhanced the image and capacity of the KNUST as a leading centre for training scientist in the sub-region. Scientist from neighbouring West African countries (Niger, Liberia and Sierra Leone) have graduated from the programme;
- In view of the facilities and funding support from AGRA, the KNUST has been able to admit 33 candidates over the last three years and 10 have graduated and are employed in the agricultural sector;

**Table 2-7 A summary of the individual impact on the graduates highlighted below:**

Level	Impact on Graduates
Your Personal Development	<p>Better understanding of seed production and handling;</p> <p>Enhancement of confidence, knowledge and skills in plant breeding and seed science;</p> <p>Knowledge and skills acquired has enriched my academic carrier and professional training;</p> <p>Journal papers produced from our thesis will give us a brighter chance of getting sponsorship for further studies</p>
At the organization/ institution you work with	<p>Improvement in performance and ability to plan and implement activities of my organization;</p> <p>Playing a significant role as a rice breeder in my institute;</p> <p>Practising breeding techniques of developing populations and recombining them for clones of specific characters.</p> <p>Ability to comprehensively analyse and present data to superiors and colleagues</p>
Your work output	<p>Improvement in the performance of duties;</p> <p>Ability to communicate more effectively with colleagues and superiors;</p>
Farmers	<p>Improved skills acquired in approaching, interacting and working with farmers during their Extension work;</p> <p>Ability to provide timely and relevant information to farmers who visit our organizations</p> <p>Develop unique and acceptable varieties of crops through advocacy and the employment of participatory approaches. It is anticipated that the adoption of the new varieties will improve the health status and income levels of farmers</p>

- Two of the graduates John Tamba Newmah and Eric Tokpah from Liberia have benefitted from AGRA grants to produce improved seeds of rice and maize in their country;
- All the graduates have assumed higher positions of responsibility since they returned to their employers. They attribute their new status to the training and the skills they acquired under the M.Sc programme (Table 2-7).

The potential impacts of the programme are listed below:

- The programme has the potential to contribute to food security in the sub-region. A review of the thesis topics indicate that students focused on traditional food crops and they also conducted research into varieties that were adaptable to the environmental conditions in the sub-region;
- Reduce poverty among food crop farmers since they will be able to increase their productivity (per unit area) as a result of the use of improved seed varieties that will be developed by the graduates of the M.Sc programme;



### 3. Seed Production for Africa Initiative - Alpha Seed Enterprise

Alpha Seed company submitted a proposal to AGRA to undertake the production and dissemination of hybrid seeds and the organization of demonstration and field days, capacity building programmes (training and workshops) and publication of relevant literature to assure food security and improve farmers’ income in the target districts. AGRA approved the proposal and granted ASE \$149,900.00 to undertake this project over a two year period.

#### 3.1. Project Objective

**Project Goal:** The project goal is to assure food security and improve farmer income in rural communities.

**Project Objective:** To help farmers increase their maize production and productivity through the use of improved seed and recommended technologies in the target districts.

#### 3.2. Overview of Progress to Date

**Table 3-1 Outcomes, Outputs, Activities, and Performance of the Alpha Seed Project**

Expected Outcomes	Target Outputs	Actual Outcomes	Status/ Assessment (%)	Comments/ Remarks
Objective 1: To produce good quality seeds for farmers in the target districts				
Outcome 1.1 Availability and use of improved seed by small holder farmers	Production of 16 tons of GH 110 and Entry 85 by project completion date.	6 tons of Etubi Foundation Seeds	37.5%	Figures of production were provided by Alpha Seeds Ent. The consultants were unable to verify any of these figures because they did not receive the full cooperation of ASE. In the consultant's estimation and consultation with other stakeholders, the ASE figures are doubtful.  However the consultants can confirm through FGDs with farmers
	Production of 240 tons of certified hybrid seeds by end date.	237.1 tons of Etubi CS produced	98.8%	
	Production of 40 tons of Golden Jubilee FS by end date.	20 tons of Golden Jubilee FS produced	50.0%	
	Production of 240 tons of Golden Jubilee CS by end date.	238.8 tons of Golden Jubilee CS produced	99.5%	
	Production of 14 tons of cowpea, soy bean, groundnut, rice and sorghum FS & CS by end date.	13.6 tons of assorted seeds produced	97.1%	

Expected Outcomes	Target Outputs	Actual Outcomes	Status/ Assessment (%)	Comments/ Remarks
				<p>in 5 major farming communities that improved seeds were made available for use by small holder farmers. Some beneficiary farmers complained they did not get enough for cultivating their farms.</p> <p>PPRSD figures obtained indicate much lower seeds production by ASE</p>
<p>Outcome 1.2 Provision of contracts for at least 60 seed growers (SG) and improving the livelihood of the rural dwellers when hybrids are adopted Provision of contracts for at least 40 seed growers</p>				<p>ASE confirmed through interviews that seed growers were trained in 2011. The # of trained SG is likely to be less than 10 and they are yet to have contracts and produce seeds.</p>
<p>Outcome 1.3 Golden Jubilee (GJ, yellow QPM) would boost the poultry industry by improving egg production and yoke colour.</p>				<p>Foase farmers confirmed sales of GJ, yellow QPM to some poultry farmers. Discussions with the maize farmers indicated that demand from the poultry farmers exceeded the quantities of maize they were able to produce. Information gathered from stakeholders in the poultry industry suggests that the colour of the yoke improved. Consultant could not confirm that it actually improved egg production.</p>

Expected Outcomes	Target Outputs	Actual Outcomes	Status/ Assessment (%)	Comments/ Remarks
Objective 2: To train farmers, extension agents and NGOs in crop production technologies and to promote the use of improved seed and technologies				
Outcome 2.1 Training, publications, fact sheets expected to benefit seed inspectors, seed growers, agric. extension agents, farmers, researchers, policy makers and other stakeholders.	At least 1000 smallholder farmers, 50 extension agents and 4 NGOs trained in the use of improved seeds and appropriate technologies by end of project.	1794 farmers trained.  48 extension officers trained.	Over 100%  96 %	Difficult to confirm number of trained farmers.  No training for NGOs in use of improved seeds and appropriate technologies.  ASE did not provide consultant with detailed information (venue, date, list of organizations/participants) on the demonstrations and field days  Publication were not made available to consultant for verification.
	At least 40 demonstrations conducted by end of project.	81 demonstrations were conducted.	Over 100%	
	At least 4 field days organized by end of project in selected districts.	28 field days were conducted	Over 100%	
	At least 2 publications and 40 fact sheets made by end of project	One publication done and passed the conference stage	50 %	
Outcome 2.2 Increased adoption of new varieties by farmers.				The adoption rates of new maize varieties by farmers appear quite high, it was however difficult to establish the percentage increase
Objective 3: To create awareness and avail seeds and other inputs to smallholder farmers.				
Outcome 3.1 Availability of improved seed to farmers. Maize farming business more attractive and prevent rural drift because of ready market	At least 50,000 smallholder farmers reached through extension education and outreach through programmes of 2 TV and radio stations.  8 micro-input shops linked to 3 big agro-input dealers in Kumasi, to sell the seeds produced and also supply shops with	Over 1 million farmers reached through radio adverts and programmes.  7 micro-input shops established and linked to big shops	>100	It was difficult to establish ASE's achievement in this regard. A large proportion farmers in the catchment area claimed they did not hear or see the programmes and therefore are not aware of the improved seeds Nearly all the 7 micro-input shops were not functional during and after the project.

Expected Outcomes	Target Outputs	Actual Outcomes	Status/ Assessment (%)	Comments/ Remarks
	other agro-inputs such as fertilizers, herbicides and pesticides for sale.			Though most farmers reported increased yields per acre, it is not possible to state the extent to which rural drift has been prevented..
Outcome 3.2 Increased patronage of improved seed by farmers				Consultant observed that patronage of improved seeds by farmers was high in only ASE operation areas except Dome and Aframso. None ASE operation areas did not show improved patronage
Outcome 3.3 Established distribution mechanism involving Alpha Seed, big input shops and village-based micro input shops.				No active distribution mechanism exists between ASE, big input dealers and the micro-input shops in both Mampong and Kumasi.
Objective 4: To monitor all planned activities of project				
Assurance of strict compliance to outlined project activities by all staff involved & farmers	3 monitoring trips carried out annually by contracted officers from MoFA M&E report to ASE, AGRA and relevant stakeholders	16 M&E trips done by MoFA officers  Quarterly reports from ASE to AGRA		ASE did not fully comply with project objectives: No SG training, less use of micro-input shops, etc.

### 3.3. Assessment of Performance

#### 3.3.1. Relevance of Alpha Seed (SEPA) Projects in Ghana

Alpha Seeds Enterprise (ASE) is one of the two beneficiary seed companies which received AGRA’ SEPA funding from 2008-2010 to make seeds more accessible to small holder farmers and to improve their income. We assess the relevance of ASE activities in terms of the following: *alignment to national development policies; appropriateness of project design; and how useful the project was in addressing the needs of resource poor farmers.*

### **Alignment of Projects to National Development Policies**

The seed industry in Ghana has been undergoing some changes over the past six decades. Like most agricultural policies, seed policies in Ghana have gradually shifted from state-led interventions to a more neo-liberal market-led approach which accommodates “civil society linkages with public-private partnerships to develop commercial markets in inputs and seeds” (Amanor, 2010:2). In the past two decades, from a public sector dominance of foundation seed production by the Grains and Legumes Development Board (GLDB), a growing number of small and medium seed companies have emerged after the privatisation of the Ghana Seed Company in 1989. From about 52 small scale seed growers in 1990, the number of seed companies and farmers’ have risen to about 2600 in 2011 (PPRSD, 2011). However, it is difficult to identify private seed companies which are able to introduce their own cultivars from private local or foreign breeding for maize and other major crops (Alhassan and Bissi, 2006). Moreover, most seed growers in Ghana are also farmers. Only a few are organised as seed companies. Alpha Seeds Enterprise was one of three registered private seed companies in Ghana.

AGRA’s SEPA goal to assist African countries like Ghana attain “an efficient seed industry that delivers high quality seed of improved crop varieties to Agro-dealers and hence to small-holders” fall directly in line with Ghana’s present policies to reform seed and agriculture industry as a whole (AGRA Mid-Term Report, 2010). AGRA support through SEPA facilitates the process of ensuring that improved crop varieties are produced and distributed through private and public channels (including seed companies, publicly- supported seed programmes, and public extension) so that farmers can adopt these varieties and eventually improve their productivity.

AGRA in its efforts to ensure that the seeds reached their primary targets, the small-holder farmers, subsidized the production of the seeds significantly. Hence, a kilo of Golden Jubilee maize seeds is sold by Alpha Seed at GH¢ 0.30 under the AGRA programme compared to the open market price of GH¢ 1.50. The maize hybrid Etubi which sells at GH¢ 2.00 on the open market is sold under the AGRA programme for GH¢ 0.50.

## **Appropriateness of Project Design**

AGRA's SEPA interventions targeted viable existing seed companies in the country which are strategically linked to research institutions, universities and are members of SEEDPAG, the self-regulatory association of seed companies in Ghana. AGRA's policy to support "a range of seed production initiatives including those that support farmer and community seed production efforts" in some African countries like Ghana informed the project design (AGRA Mid-Term Report, 2010). Alpha Seed Enterprise is a private seed enterprise registered under the Business Names Act.1962 (No.151) in Ghana based at 'Kwadaso-Agric' (part of Crops Research Institute) in Kumasi. The company is owned by Mrs Felicia Ewool, the Chief Executive Officer (CEO). Alpha Seed Enterprise was established in January 2007 to produce and supply good quality seeds to farmers. The enterprise is involved in the production and dissemination of improved seeds, mainly hybrid varieties of maize (white and yellow).

During our interaction with the CEO of Alpha Seed Enterprise the consultants were informed that the company had rented a 30 hectare land at Ampatia near Santasi in Kumasi and a 200 hectare plot at Ejura for its activities. Other assets listed by the CEO include a tractor, spraying machines, cutlasses, hoes, tarpaulin. Alpha Seed has an office at CRI and uses the available seed processing facilities of the institute at a fee. The facilities include drying and cleaning machines, a maize barn that can store about 100 tonnes of seed at a time and a seed laboratory for seed quality analysis. *Alpha Seed has 20 staff made up of 3 office personnel, 3 technicians and 14 labourers.* As an active member of SEEDPAG, Alpha Seed complies with its regulations, participates and benefits from all SEEDPAG programmes.

The above attributes of Alpha Seed were useful in designing the project. ASE had to meet the following AGRA criteria which served as project design benchmarks and justification for its selection:

- Seed companies must be formally registered with structures
- Have the capacity to receive BDS services
- Have staff who can be trained
- Possess facilities/resources which can help produce FS and boost CS multiplication

- Have the capabilities to organize farm demonstrations and hold field days (brochures, fliers and posters); and
- Increase the number and capacity of agro-dealers selling improved seeds to smallholder farmers (AGRA Mid Term Report, 2010:23)

### **Seed Companies' Usefulness in Addressing Needs of Farmers**

The AGRA's support to Alpha Seed was to enable it produce good quality seeds for small-holder farmers in the forest and forest transitional zones of Ghana. These areas include parts of the Ashanti, Brong Ahafo, Central, Volta, Eastern and Western regions of Ghana. The mandate of Alpha Seed is to:

- Ensure that certified seeds reach smallholder farmers on time and at affordable prices.
- Raise awareness of small-holder farmers about the availability of seed and other inputs
- Train smallholder farmers in cultivating new crop varieties released from CRI and similar breeding companies.

The overall seed target for Alpha Seed for the two year period was the production of 550 tonnes of seeds comprising of maize, sorghum, cowpea and rice for farmers in their catchment area.

As part of this evaluation we purposively selected 8 smallholder farmer communities from a list of communities given to us by Alpha Seeds for Focus Group Discussions (FGDs) and interviews. The basis for the selection of these specific communities was the fact that they fell within one the country's major bread basket zones. The purpose of the focus group discussion was to ascertain the usefulness the Alpha Seeds intervention and the possible impact on the livelihood of the beneficiaries. The communities selected for the focus group discussion were Woraso (where the consultants met with farmers from Foase, Bosomkyekye, Sekruwa and Atonso Agya), Aframsso, Mampong and Dome. Key informants interviewed included the Odikro of Woraso and the leaders of the farmer's groups in the various communities. Below are the highlights of the FGDs and key informant interviews held with members of the farming communities from the selected areas.

**Table 3-2 Some findings from Farmers’ Focus Group Discussions**

Key Issues	Community/Individual Response
Access to improved seeds on time and affordable prices	Prior to Alpha Seeds intervention, grains obtained from the best of previous harvest were kept for cultivation in the next farming season. The price of the seeds from Alpha Seeds was much cheaper than what pertained on the market and therefore affordable. In addition Alpha Seeds gave the seeds to farmers on credit and this really helped mitigate some of the initial investment costs.
Varieties of seeds kept for replanting	Prior to their involvement with Alpha Seeds maize farmers kept Obantampa (MoFA seeds), Dacosta (OPV distributed by MoFA in 1970s) and Abro Hema (local seeds).
Problems associated with replanted seeds	Low rate of germination and low yields. This problem is significantly reduced with the improved seeds from Alpha Seeds
Availability of agro input dealers in the communities	Although there are designated stockists/input dealers in the communities but they are not supplied with inputs from Alpha Seeds and this affects effective dissemination of the seeds.
Organization of farmers into a cooperative	Alpha organised the farmers into cooperatives. Started with a membership of about 14 and this has grown to about 300 in 5 farming communities.
Training for farmers (field days & demonstration plots)	Alpha held demonstrations and field days which the farmers found very useful.

Source: Interviews and FDGs with farmers (August 2011)

On the issue of getting improved seeds on time and at affordable prices, farmers remarked that what they typically did before the Alpha Seed intervention was to keep the best of their local seeds obtained from previous harvests. The maize varieties that farmers kept included Obantampa (MoFA seeds), Dacosta (OPV distributed by MoFA in the 1970s) and Abro Hema (local seeds). The major problem with these seeds was that they generally do not germinate well and the yields have been decreasing over the years.

*“Before Alpha Seeds Enterprises commenced operation in our community, we had no agro-input dealers. We take the best seeds from our harvest and plant in the next season. It gets to a point that the maize becomes diseased. We the farmers are not organised we could not get to the AEAs... We kept the maize on the cobs in the barns*



*for preservation. Once you don't take it from the cob, it can stay for a year. We put Atelic (an agro chemical) on it". (a male farmer in Woraso).*

Many farmers commented on the training by Alpha Seeds. During the project's two year lifespan, Alpha Seeds claimed it held about 81 demonstrations for farmers and conducted 28 field days. Though the consultant could not verify the exact number of demonstrations and field days held, a farmer observed that;

*"Alpha Seeds have really helped us with farm education through field day demonstrations. In Woraso, field days are organised thrice in a year" (Male farmer, Woraso).*

Another farmer remarked;

*"I just joined the cooperative this year. Until now I have been doing Cos 90 work (cosine 90=zero). I have learnt a lot from Alpha Seeds field days and demonstrations. The seeds I obtained from Alpha Seeds are sweeter and give a much better yield than what I planted in previous years" (a female farmer in Woraso).*

These statements are indicative that Alpha Seeds' intervention has been useful and beneficial to these.

### **Effectiveness of Institutional Arrangement**

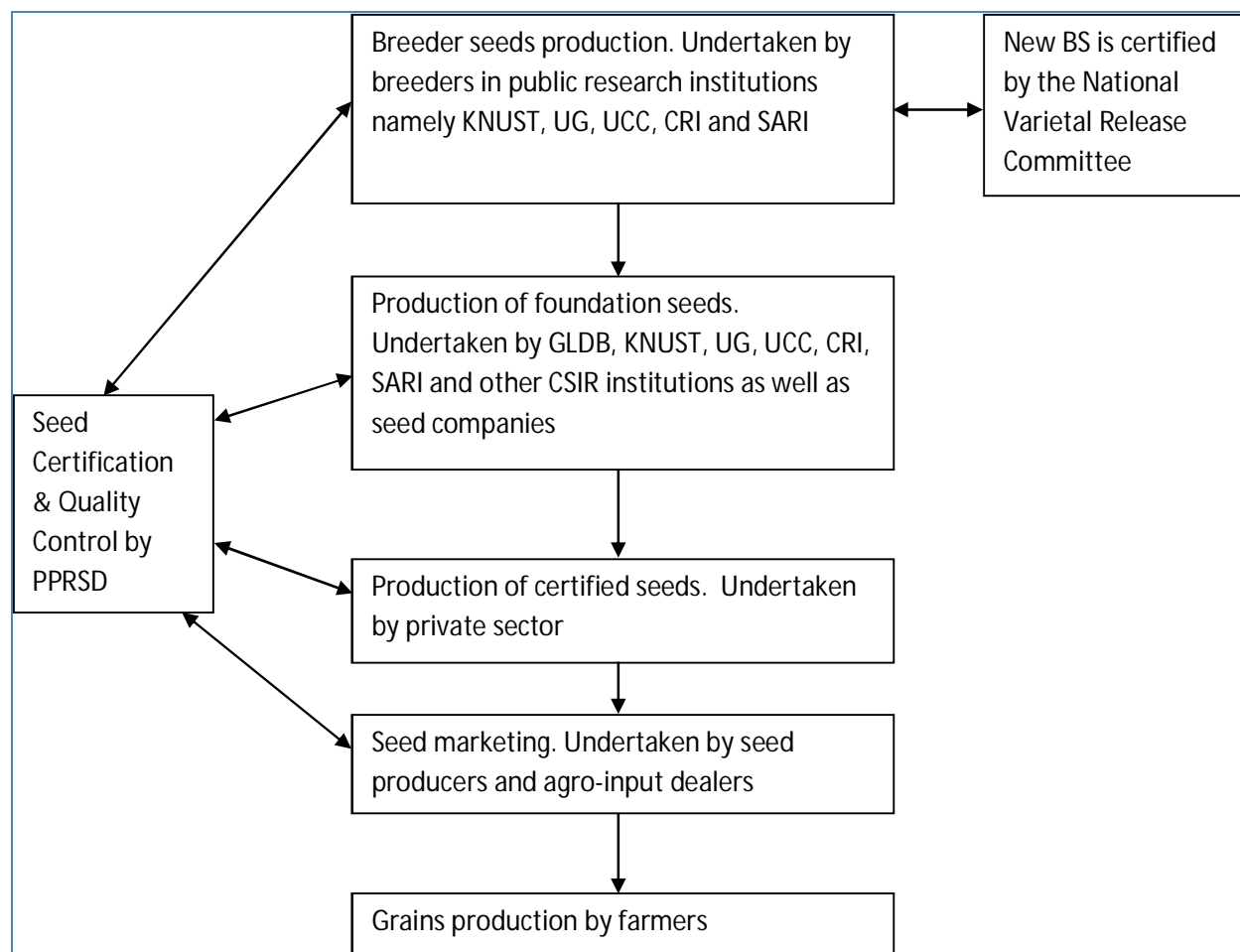
In assessing the effectiveness of institutional arrangements of the AGRA funded Alpha Seed project, the consultant reviewed the legal framework for producing seeds in the country and looked at the organizational characteristics of Alpha Seeds in performing its core functions.

The AGRA/ ASE project was timely as it coincided with the process of seed industry reforms in Ghana. In 2010, the Plants and Fertilizer Act, 2010 (Act 803) was passed. This new seed law follows years of decline by the Grains and Legumes Development Board (GLDB) in producing

foundation seeds for farmers throughout the country (Amanor, 2010:16). Act 803 (2010) essentially reversed the monopoly of the GLDB in producing foundation seeds in the country and allowed private seed companies which met certain legal requirements to produce foundation and certified seeds in the country. The law amongst others sought to cut down on bureaucracy, reduce the time involved in disseminating seeds and make certified seeds more widely available to all stakeholders in the seed industry. Thus AGRA’s funding to Alpha Seeds and other seed producing companies has coincided with a new and enabling working environment that facilitates optimum production by all authorized seed companies.

The figure below illustrates the improved seed production process in Ghana after the passage of the Plant and Fertilizer Act (Act 803, 2010)

**Figure 3-1 Seed Production Process in Ghana under Act 803**

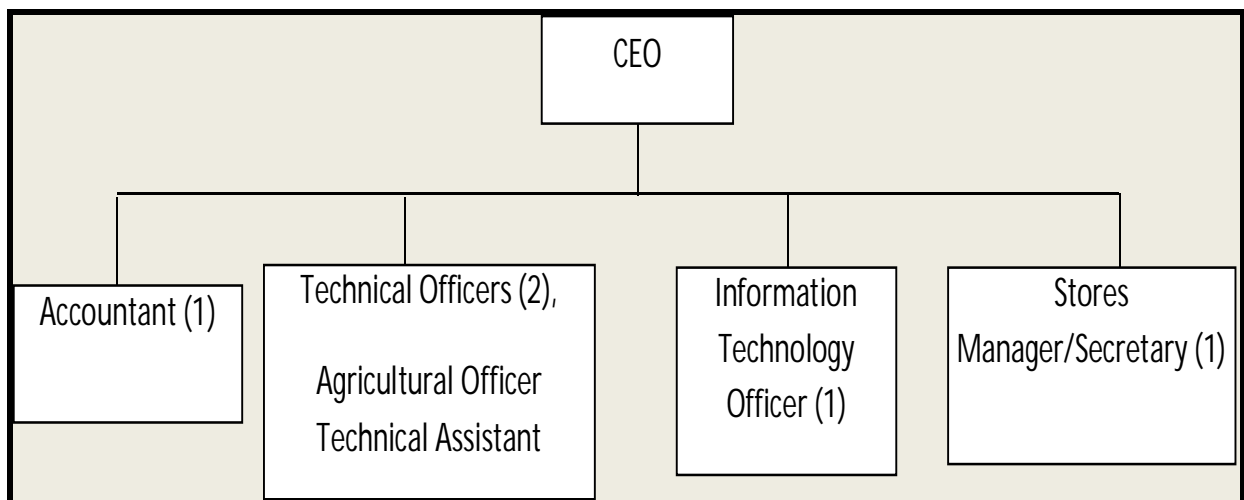


Source: PPRSD, 2011

Breeder seeds are the parent for foundation or basic seed. Under the old legal regime, the GLDB was the only institution mandated to produce foundation seeds in Ghana. The new seed law allows the GLDB, KNUST, UG, UCC, CRI, SARI and other CSIR institutions as well as seed companies to produce FS from BS after the breeder seeds have been approved by the NVRC.

Seed companies and seed growers throughout the country produce certified seeds from FS under strict supervision and regulation by PPRSD of MoFA. Each year, the PPRSD keeps a record of the activities of seed growers and companies. Its staff in the regions report on the plots, tonnage harvested and acreage of seeds under cultivation and regularly visits these farms to monitor the progress and make projections for both the major and minor growing seasons. By law, the PPRSD of MoFA is the only institution that can certify seeds produced. Without PPRSD certification, any seed produced by any company, organization or individual will be classified as grain.

**Figure 3-2 Organogram of Alpha Seed Enterprise**



Source: Consultants construct

From its main office at Kwadaso in Kumasi, the CEO manages staff engaged in seed production on its numerous plots located in different parts of the Ashanti region. The seed production process begins with a breeder based at CRI, KNUST or SARI releasing a new variety that is certified by the NVRC of the Ministry of Food and Agriculture. The breeder sends a small quantity to GLDB for foundation seeds to be produced. Seed companies such as Alpha Seed then

buy the foundation seeds from the GLDB and/or CRI and grow/multiply certified seeds under regulatory specification. This is then sold to farmers directly and/or agro-input dealers. Farmers buy CS directly from Alpha Seed Enterprises or through their seven agro-input dealers who supply farmers in the Ashanti, Volta, Eastern, Central and Brong Ahafo Regions.

In Alpha Seed Enterprises proposal to AGRA, it was to produce foundation seeds (Etubi and Golden Jubilee varieties of maize). In addition it was to train some out-growers in seed production. A quick analysis of the institutional arrangement at the national and company levels suggests that Alpha Seed Enterprises’ ability to produce foundation seed was bound to be problematic as the company did not have a trained breeder as part of its staff. We also note that until the latter part of the third quarter of 2010 (when Act 803 (2010) was passed), only the GLDB was legally mandated to produce foundation seeds.

### 3.3.2. Effectiveness

The effectiveness of the Alpha Seed Enterprise project can be assessed by the extent to which the project’s objectives were generally achieved. The overall objective of Alpha Seed Enterprise was to help farmers increase their maize productivity through the use of improved seeds, and recommended technologies in targeted districts. We show in the targeted districts of Alpha Seed Enterprise:

**Table 3-3 Target districts of Alpha Seed Enterprise**

Ecological Zone	District	Location
Forest	Kwadaso	Kwadaso-Agric
	Atwima-Kwanwoma	Foase
	Atwima-Kwanwoma	Yabi
	Atwima-Kwanwoma	Heman
	Suhum	Amanase
	Offinso	Offinso
Transition	Mampong	Mampong
	Ejura	Woraso
	Ejura	Aframso
	Techiman	Techiman

Source: Alpha Seed Enterprise (August 2010)

As part of the evaluation, interviews and focus group discussions were undertaken with farmers in six districts, namely Foase, Woraso, Atonsoegya, Bosomkyekye, Sekruwa and Aframso.

Alpha Seeds report that a total of about 515.5 metric tonnes of improved seeds were produced for distribution to farmers. This quantity of seeds is about 94 per cent of the targeted output of 550 metric tonnes. Alpha Seed Enterprises also report that they undertook about 81 demonstrations and 28 field days for 1,794 farmers. They estimate that over 1 million farmers have been reached through radio advertisements and other programmes. However, very few of the farmers that we spoke to, had heard Alpha Seed Enterprises advertisements.

Alpha Seed Enterprises indicates that they had in place mechanisms that ensured that the farmers got the seeds at the AGRA subsidised prices. For instance, a staff member was sent around on a regular basis to check out the prices at the stockists who had some arrangement with Alpha Seed Enterprises with respect to this. Additionally during demonstrations and seed trade fairs Alpha Seed Enterprises got feedback that seed prices as well as performance. Alpha Seed Enterprises claim that stockists sell only seeds produced by Alpha Seeds Enterprises but were free to add chemicals from any other source. Alpha Seed Enterprises promoted the use of improved seeds by donating to each farmer a cob of improved seed for planting.

Based on interactions with farmers and information from Alpha Seed Enterprises, we make the following observations on the effectiveness of meeting this project's objective.

Farmers have generally accepted the use high yielding seed varieties as supplied by Alpha Seed Enterprises. This is because of the relatively higher yields from these seeds. However there still remains a problem related to availability of adequate seeds for the farmers. We illustrate some of these benefits as well as problems using these examples.

At Foase in the Atwima Kwanwoma district, farmers who benefited from ASE's Golden Jubilee and Etubi maize seeds have an average of 3 acres of farm on which they grow maize. The farmers indicated that Alpha Seed Enterprises gives each farmer about 27 kilos of maize seeds for planting (9kg/acre). The farmers did indicate that majority of maize farmers (more than 50

per cent) patronise the Alpha Seed Enterprises' seeds. Golden Jubilee and Abontem varieties are the most popular maize seed varieties in this district.

At Woraso in the Ejura District, we found that it was only 14 farmers who benefited from seeds from Alpha Seed Enterprises in 2009. However by the end of 2010 about 300 farmers from a cooperative was reported to have benefited from the AGRA/Alpha Seed Enterprises subsidized seeds programme. One farmer remarked

*“...every farmer got seeds for planting. It was enough at the right time. We take the seeds on credit basis and we pay at the end of the season when we harvest our maize”* (a male farmer in Woraso).

However, there were also some farmers who informed the team that they were not able to get enough seeds from Alpha Seed Enterprises to cover large acreage. Other farmers also said they had to buy seeds from agro-dealers in Mampong to supplement what they received from Alpha Seed Enterprises. Alpha Seed Enterprises counter this claim by arguing that farmers must prove themselves before being given large quantities of seeds.

In Aframso, only a few farmers patronized the improved seeds. According to the Alpha Seed Enterprises stockist based in Aframso, he received a single consignment of ASE seeds in 2009 which sold poorly. Alpha Seed Enterprises had to eventually go back and collect the bulk of the seeds they had supplied to this stockist. Another farmer noted that he had difficulty selling his maize in the market. In 2010, the stockist in Aframso did not place an order or request seeds from Alpha Seed Enterprises.

Such comments from farmers and the stockists in the targeted district cast much doubt on the claims of Alpha Seed to have met their objectives of farmers demand for seeds.

Essentially, Table 3-4 suggests that the reported production by Alpha Seed Enterprises was much higher than that reported by the PPRSD. The PPRSD records shows that Alpha Seed Enterprises only produced 88.2 metric tonnes of seeds from 2009-2010 farming seasons. In effect, the output

of seeds as reported by the PPRSD over the 2 years was just about 16 per cent of Alpha Seed Enterprises report. This suggests that Alpha Seed Enterprises may not have been able to meet the demand of farmers in its catchment area.

**Table 3-4 Seed Production Statistics of Alpha Seed Enterprises and PPRSD, by crop Type**

Crop Type/ Variety	2009		2010		2011 (Estimate)	
	ASE	PPRSD	ASE	PPRSD	ASE	PPRSD
Maize	-	81	501.9	3.2	134	-
Rice	-	3.5	13.6	-	2.1	-
Sorghum	-	-		-	2	-
Soybean	-	-		0.5	1.6	-
Groundnut	-	-		-	-	-
Cowpea	-	-		-	2.5	-
Total	-	84.5	515.5	3.7	144	-

Source: ASE and PPRSD (2011).

Notes: The numbers in the Table are in metric tonnes

We also note that the 7 micro-input shops appeared not to have functioned effectively in the delivery of seeds to farmers. The stockist at Woraso, the nerve-centre community of Alpha Seed Enterprises operations in the Ejura District for instance could not produce any documentation or state the quantities of improved seeds received and distributed to farmers during the project's lifespan. In both Afranso and Dome, the stockists received only one consignment of seeds from Alpha Seed Enterprises in 2009. This to a large extent supports the views expressed about the inadequacy of seeds at the Alpha Seed Enterprises stockist shops. Discussions with two of the five (5) big agro-input dealers based in Kumasi (Obek Limited and K. Badu Agro Chemicals) also suggested that Alpha Seed Enterprises only provided small quantities of seeds in 2009 or none at all over the subsequent two years. Hence, linkages of micro-input dealers with big agro-dealers through Alpha Seed Enterprises were not effective.

Alpha Seed Enterprises proposed to train 60 farmers as out growers for their seed production. However as at the end of the project in 2010 there was no evidence that this training had been undertaken.

### **3.3.3. Efficiency**

Here we assess the efficiency of this component of the programme by analysing the inputs used against the realised outputs. For this project funds were allocated for the leasing of capital items such as land, a truck, a pick-up, a warehouse, cold room and facilities for supplementary irrigation. Of the approved amount of \$13,000 for the leasing of these capital items, \$6,000 was allocated for leasing lands. By the end of 2008, Alpha Seed Enterprises reported that they had rented two plots of land, specifically a 30 and 200 hectare plots of land at Ampatia near Santasi and Ejura/ Mampong respectively for seeds cultivation. While it is difficult to ascertain the cost of leasing the two plots, since no documentation was seen, both narrative and financial reports provides little indication of how the fields were used during the project. Moreover, though the team visited two fields in the Ejura Mampong area, only a small portion of one parcel of land (about 3 acres) was under cultivation as at August, 2011. A larger field which was said to be about 20 hectares and shown to the consultants had been left to fallow.

According to Alpha Seed Enterprises, the leasing of capital items posed a lot of problems. Alpha Seed Enterprises reported to AGRA in 2008 that ‘The major challenge faced in the implementation of this project, during the period under review was the inconvenience of hiring equipment: unavailability of the necessary equipment for hiring; problems concerning terms of hiring, and consequent disappointment; and the unreliability of equipment owners (hirers)’ (Alpha Seed Enterprises Narrative Report, Oct-Dec,2008). Alpha Seed Enterprises therefore indicated in that report that it shall relocate to fields where it was relatively better to lease capital equipment.

The project documents show that about \$120,000 (about 80% of the AGRA funding) was to be used in purchasing field supplies. These include the cost of both foundation seeds and fertilizers and other chemicals used in producing certified seeds for farmers. From the evidence available to the consultants, it is very difficult to establish how efficiently the funding was used as only a



breeder seeds receipt from CRI for Golden Jubilee and Ent 85 maize varieties and a receipt from GLDB for FS of soybean were made available by ASE.

The team has been unable to reconcile seed production details provided by Alpha Seed Enterprise and with some of the statistics obtained from the PPRSD. The quantities of seeds the stockists indicated that they had received casts doubts about the figures provided by Alpha Seed Enterprise. Granted that the figures provided by Alpha Seed are accurate, the company failed to meet its target of foundation production by 35 per cent - it could only produce 26 tonnes compared to the targeted 40 tonnes of seeds. In 2009, no foundation seed was produced at all. Alpha Seeds Enterprise claim that their inability to produce target levels of foundation and certified seeds was greatly hampered by their lack of own irrigation facilities in most of the fields. By Alpha Seed's own figures, CS production declined to 161 tonnes in 2010 from 298 in 2009 and poor rains is cited as reason for this decline.

The PPRSD official figures of Alpha Seed Enterprises production for 2009 and 2010 farming seasons was 88.2 metric tonnes only, compared to a reported 515.5 metric tonnes by Alpha Seed Enterprises, i.e. over 580% in excess of the PPRSD figure. Alpha Seed Enterprises' production of seed on a 30 acre farm was only 16.2 metric tonnes compared to about 60 tonnes that they were expected to obtain (as per the PPRSD). This rather low yield per acre persisted for the entire period of the AGRA/ASE project. Below is a table on seed production figures by ASE and PPRSD:

The stockists at Woraso, Dome and Aframso confirmed receiving seeds from Alpha Seed Enterprises. With the exception of Woraso who received substantial seeds and agro-chemicals from ASE for farmers, the other two stockists only received small quantities of seeds and on only one occasion in 2009. The Woraso stockist told the consultant that though 14 farmers only got seeds from Alpha Seed Enterprises in February 2009 about 300 farmers each received about 1.8 kg of maize seeds for planting in the major season in 2010. The stockist however was unable to support his assertion with any documentary evidence. When asked to produce waybills for seeds received, the stockist explained that the waybills were with Alpha Seed Enterprises. The stockist also reported that he had received no training from Alpha Seed Enterprises.

Interviews and focus group discussions with key informants within the communities suggests that Alpha Seed Enterprises deal more directly with farmers than rely on their stockist for getting seeds to farmers. Though seeds may still get to farmers on time, it may not be the most efficient means of getting seeds to farmers as more resources may be needed to get to farmers whereas the stockists could more easily serve as link between Alpha Seed Enterprises and the farmers.. The Woraso stockist requested that training is provided for them so they could improve their efficiency. The stockists viewed Alpha Seed Enterprises’ direct engagement with farmers as undermining their role as middlemen thus depriving them of their business opportunities. The low participation of stockists in the Alpha Seed Enterprises seed dissemination processes may be said to be affecting the distribution efficiency of Alpha Seed Enterprises’ operations.

#### **3.3.4. Sustainability**

The sustainability of this component of the AGRA programme can be captured in this quote by CEO of Alpha Seed Enterprises; ‘after the PASS programme it will be a great challenge’ (interview with CEO of Alpha Seed Enterprises, August 2011). According to the CEO, Alpha Seed Enterprises has a 5-year business plan (2007-2011) with the aim of accessing a loan to expand production, purchase modern equipment and carry on with the demonstrations and field days for farmers.

According to Alpha Seed Enterprise, as of August 2011, about 144 tonnes of seeds had been sold to farmers. The 2011 sales quantity are 48% of the 2009 (298 tonnes) and 89% of the 2010 (161 tonnes) quantities. They estimate that the quantity of seeds to be produced in 2011 is likely to be more given that the reported is the harvest of the minor season. Generally however, this declining trend is not encouraging and raises questions about the sustainability of Alpha Seed Enterprises.

An important sustainability issue relates to the subsidies in the pricing of seed produced under this component of the AGRA programme. Seeds production was heavily subsidized by AGRA during the project so Alpha Seed Enterprises could sell to farmers on credit and at prices much

lower than the going market rates. In Table 3-5 we show the levels of the subsidy for the two main maize varieties produced under the project.

**Table 3-5 Level of Subsidy for Alpha Seed Maize produced under the AGRA project**

Food Crop	Market price (¢)	Alpha Seed price (¢)	% of Market Price
Maize, Golden Jubilee	1.50	0.30	20%
Maize, Etubi	2.00	0.50	25%

Source: ASE (2011)

Notes: Figures in parenthesis show the percentage differences between the market and the subsidized prices.

A kilogram of Golden Jubilee maize seed is sold at Gh¢0.30 by Alpha Seed Enterprises while the same product sold for ¢1.50, i.e. 20% of the of the prevailing market price. The maize hybrid Etubi which sells at ¢2.00 was sold Alpha Seed Enterprises to at ¢0.50 – 25% of the prevailing market price. With the removal of the subsidy from AGRA, it is unlikely that Alpha Seed Enterprises will be able to sell the same quantities of seeds on the market and remain solvent.

A related issue identified as a major militating factor against the sustainability of Alpha Seeds Enterprises activities is the high default rate by farmers who took inputs on credit from stockists. The stockist at Woraso reports that the default rate by farmers in paying for seed and agro-inputs supplied on credit is very high. The stockist notes that about 30% of the inputs credited to farmers for the 2010 farming season had not been paid as at August 2011 when they were interviewed.

Alpha Seed Enterprises multiplied foundation and certified seeds on nine leased plots paid for by AGRA under this programme. With the cessation of funds from AGRA, it is unlikely that the company will be able to maintain all the plots. Also, the issues of leasing equipment is a major challenge for Alpha Seed Enterprises because of the high cost of leasing and the unreliability of the owners of the equipment affects seed production. The alternative would be for Alpha Seed Enterprises to purchase its own equipment. However the company gave indication that it might be difficult for it to secure loans to cover such equipment.

Another constraint likely to affect the sustainability of this programme relates to the high costs of organizing field days and seeds trade fairs and also undertaking training for their staff. Though many (81) were reported to have been organized by the company, it appears unlikely to see similar numbers of field days and demonstrations being hosted by Alpha Seed Enterprises after the AGRA project ends. This as we understand it is simply because Alpha Seed Enterprises cannot afford it. In relations to the training the CEO of Alpha Seed Enterprises remarked in an interview that her staff still requires some training to enable them to perform very well. AGRA during the period of the project funded local and international training programmes for Alpha Seed Enterprise staff and the MoFA AEAs. The likelihood of the company to provide such funding for training in the future is not very likely.

Another likely aspect of Alpha Seed Enterprises activities which may not be sustained is the engagement of micro-input dealers or stockists to help in seeds and agro-input distribution to farmers. Of the seven micro-input dealers established by the company, two stockists, one at Dome and the other at Aframso in the company's major operating areas stopped operating before the end of the project in 2010. The main reasons given for their closure were low level of awareness of the varieties of maize and the low patronage of their products. They also note that the condition /guidelines given by Alpha Seed Enterprises to them are unlikely to be enforced as monitoring and supervision by Alpha Seed Enterprises are low. They believe that they will be adulteration and wrongful preservation of seeds. This could eventually result in low patronage of Alpha Seed Enterprises seeds.

### **3.3.5. Impact**

Generally, this section discusses the intended and unintended effects on all stakeholders along the seed value chain. Specifically, the impact of the increased use of improved seeds and agro inputs on farm yields and livelihoods of farmers, stockists and agro-input dealers is assessed.

Alpha Seed Enterprises CEO notes that company as a whole has generally benefited from the AGRA funding. From as low as 8 tonnes of seeds per annum, annual seed production has increased significantly to about 298 tonnes in 2009 where it peaked. Current seed production of nearly 145 tonnes in 2011 is a big improvement on the 16 tonnes the company produced in 2008

when AGRA began funding the company. Of course as noted earlier the reported quantities are far above the official figures released by PPRSD but are still indicative of the big increases that have been recorded.

The impact of the AGRA funding on the company goes beyond increased seeds production. Alpha Seed Enterprises through its operations has been able to acquire its own sheller, blower and a tractor. The staff of the company have enhanced their capacity in seed production and marketing, monitoring and evaluations and organizing training programmes for AEAs and, farmers among others.

From the individual interviews and FGDs, the impact of the activities of Alpha Seed Enterprises on farmers are generally positive. Farmers in Foase, Woraso, Bosomkyekye, Sekruwa and Atonsogya reported that AGRA intervention through Alpha Seed Enterprises has brought some positive changes in their farming businesses and livelihoods. Farmers noted that they have been able to increase their productivity and through the support of Alpha Seed Enterprises have guaranteed stable and reasonable prices for their crops. Farmers report of a 100% to 150% increase in maize yields – from about 5 maxi bags maize, farmers now cultivate about 10-12 bags of maize with the Alpha Seed varieties. The culmination of Alpha Seed Enterprises intervention is an increase in income for the farmers. The farmers note that with the increase in income they have been able refurbish and/or convert their old mud houses into concrete building. Some farmers noted that with the increase in income they are able to pay for their basic needs (like water) with relative ease. Others also told the consultant that with the increase in income they were able to pay their hospital bills and school fees for their children. In brief, it can be said that the standard of living of some of the Alpha Seed Enterprises beneficiaries improved.

The impact of these activities has resulted in increased yields and revenues. Previously, yields per acre of maize averaged as low as 5 bags maize. With the intervention of the Alpha Seed Enterprises project, farmers are now harvesting 10-12 bags of maize per acre. The chief of Woraso who is also a farmer had this to say “some farmers are increasing their farm sizes while other are decreasing. Both ways, the little you do, you reap much. We used to plant 10-15 acres

of maize and got small yields. Now with 6 acres, we reap 40-50 bags of maize. Education on agricultural practices and improved seeds has helped a lot”.

Living standards are changing among farmers in these communities as a result of the increase in incomes realized by the farmers. A young farmer who had received formal education observed during the interaction that *“we now have all our children going to Senior Secondary Schools (SSS). Previously, among my cohorts, we had less than 10 children from the whole community progressing to SSS. Also many of us are replacing our roofing or rebuilding our houses with modern building materials”*.

A lady farmer from Woraso also remarked *“these days the price of maize is good and our yield have increased too. I sent my child to the University of Ghana this year. I paid the fees”*.

From Sekruwa, a young male farmer disclosed *“I have rebuilt my house as a block house. I have three children in primary school. I can send them to school and even the university”*.

Despite these developments farmers had some challenges. They include the cost of labour, tractor services and equipment for processing the maize. Another big challenge to farmers in the area was the absence of a standard measure for a bag of maize. To a large extent the buyers control both size of the maize sacks and the price they pay for the product. The buyers have introduced “fertilizer sacks” which are much larger than the normal sacks previously used in the market but they still purchase the maize at the same price.

## 4. Seed Production for Africa Initiative – SAVANNA SEED SERVICES COMPANY LIMITED

### 4.1. Project Objective

**Project Goal:** The goal of the project is to produce seed and make them available to farmers in northern Ghana at very affordable prices.

**Project Objectives:**

1. To produce quality seed at affordable prices of the following improved crop varieties: maize, rice, sorghum, soybean, cowpea, groundnut,
2. To educate farmers in the Northern Region on the benefits of using improved seed instead of their retained seed
3. To undertake seed dissemination activities

### 4.2. Overview of Progress to Date

**Table 4-1 Outcomes, Outputs, Activities, and Performance of Savanna Seeds Services Ltd.**

Expected Outcomes	Target Outputs	Actual Outcomes	Status/ Assessment (%)	Comments/ Remarks
Objective 1: To produce quality seeds at affordable prices of the following improved crop varieties: maize, rice, sorghum, soybean, cowpea, groundnut				
Outcome 1.1 The livelihoods of 334 farmers who will be reached with 9 kilos of maize seeds for an acre each for grain production will improve.	Production of 30 tons of certified seeds of maize by project completion date	238.6 metric tonnes of certified seeds of maize produced	> 100%	Figures of production were provided by SASSEC. The seed company was unable to provide documentation to support this assertion. Figures provided by PPRSD are much lower.  However FGD with beneficiaries of SASSEC's seeds indicated

Expected Outcomes	Target Outputs	Actual Outcomes	Status/ Assessment (%)	Comments/ Remarks
				that there were modest improvements in the livelihoods of some of the farmers
Outcome 1.2 240 farm households who will use our rice seeds to plant an acre each will derive increased revenues from rice production thereby leading to poverty alleviation	Production of 96 tons of certified seeds of rice by project end date	294.9 metric tonnes of certified seeds of rice produced	>100%	Actual outcome exceeded the target output.. Discussions with the beneficiaries indicated that the income levels of farmers had increased. It was difficult employing a rigorous approach to assessing poverty levels since there was no baseline study
Outcome 1.3 7500 kilos of certified seeds of sorghum sold cheaply to resource poor farm households will lead to increased production of sorghum by 3000 farmers.	Production of 7.5 tons of certified seeds of sorghum by project end date	22.3 metric tonnes of certified seeds of sorghum produced.	> 100%	PPRSD figures shows that 5.60 metric tonnes was produced by SASSEC in 2009. PPRSD has no figures for SASSEC in 2010The bulk of sorghum produced are for consumption- Eldorado and Kadaga. Hence, it is not possible to help 3000 farmers increase production.
Output 1.4 2000 farmers to benefit from 30 tons of soybean seeds produced and sold to them at very affordable prices.	Production of 30 tons of certified seeds of soybean by project end date	75.8 metric tonnes of certified seeds of soybean produced.	> 100%	PPRSD figures indicate less than 12 metric tonnes of soybean produced by SASSEC This implies that less than 900 farmers may be assisted with affordable improved soybean seeds.
Output 1.5	Production of 4 tons of	14 metric tonnes of	> 100%	PPRSD figures



Expected Outcomes	Target Outputs	Actual Outcomes	Status/ Assessment (%)	Comments/ Remarks
500 farmers will benefit from the use of cheap cowpea seeds.	certified seeds of cowpea	certified seeds of cowpea produced.		shows that SASSEC exceeded the metric tonnes-5.53
Output 1.6 4 tons groundnut seeds will serve 266 farmers planting an acre each.	Production of 4 tons of certified seeds of groundnut by project end date	6.6 metric tonnes of certified seeds of cowpea produced.	> 100%	PPRSD recorded figures for SASSEC. Farmers are likely to be recycling seeds as groundnut seed production is low nationwide
Objective 2: To educate farmers in the Northern Region on the benefits of using improved seeds instead of their retained seeds				
Outcome 2.1 Farmers' awareness created on the benefits of using improved seeds.	20 educational talks given during the season on the benefits of using improved and affordable seeds.  At least 40 demonstrations conducted by end of project.	Many farmers educated on benefits of using improved seeds via 15 farmers training workshops, radio adverts and mobile seed sales and brochure distribution. About 46 demonstrations conducted.	75%	The consultants were unable to independently verify these. Relied solely on AGRA reports and interviews with SASSEC
Outcome 2.2 Farmers observe differences in crop performance and yields.	At least 6 demonstration fields established in Tolon-Kumbungu, Karaga, and West Mamprusi	5 field days for 205 farmers held in addition to 19 demonstration field plots established in N/R and U/E regions.	83%	No independent verification. Relied totally on AGRA reports.
Objective 3: To undertake seeds dissemination activities.				
Outcome 3.1 Farmers plan better as they get to know when, where and how to get improved and affordable seeds.	20 paid announcements made between February-June 2008/9/10 on the availability of very affordable and accessible improved seeds.	34 paid/unpaid radio adverts in 6 stations made in addition to GNA news reports on improved seeds.	> 100%	The radio stations used were across the country: Radio Justice (NR, Tamale) Obono FM (GAR) Talk FM (Somanya, E.R) Diamond FM (NR, Tamale) Savanna FM (NR, Tamale) Northern Star (NR, Tamale)
Outcome 3.2 Resource poor farmers in West Mamprusi, Tolon-Kumbungu and Karaga districts get direct	10 sales outlets established in 3 districts in the Northern Region during the first year of project.	4 sales outlets established at Babile, Saboro, Kandiga and Nandom.	40%	Outlets in Upper East appear more functional than Upper West

Expected Outcomes	Target Outputs	Actual Outcomes	Status/ Assessment (%)	Comments/ Remarks
access to certified seeds.				
Outcome 3.3 Farmers' access to certified seeds and agro-inputs.	20 agro-input dealers shops including, Wumpini and Vansado in the districts, selling the project's certified seeds.	2 agro-dealers sell SASSEC CS seeds. SASSEC sold bulk seeds to NGOs (ADRA) and government projects (MiDA).		It was difficult to ascertain the quantity of seeds sold by Wumpini and Vansado as neither of them were in Tamale during the evaluation period.
Outcome 3.4 Increased access to improved seeds by a wide scope of farmers in Northern Ghana	50 rural farming areas in Northern region covered through mobile van sales	Mobile sales van sold to about 1000 farmers in several rural farming areas.	> 100%	farmers interviewed confirmed buying seeds at prices lower than market prices

### 4.3. Assessment of Performance

#### 4.3.1. Relevance

Savanna Seeds Services Company Limited (SASSEC) is the second AGRA beneficiary seed company being evaluated. Savanna Seeds received a grant of **\$149,973** (One Hundred and Forty Nine Thousand, Nine Hundred and Seventy Three US Dollars) from AGRA for a two-year period from 2008-2010 to produce improved varieties seeds of maize, sorghum, groundnut, rice cowpea and soybean and make them available to farmers in northern Ghana at very affordable prices to farmers.

#### **Alignment to National Development Policies**

As noted earlier, Ghana's economy relies on agriculture as a major source of employment, revenue as well as to meet its food security needs. Agriculture in this part of the country accounts for 61% of employment (GSS 2007). Northern Ghana which ranks among the poorest parts of the country has agriculture as its mainstay. Given this situation, the region receives a significant amount of attention from government and the local and international donor community in addressing poverty and improving living conditions. After nearly a decade of implementing the Ghana Poverty Reduction Strategy I and II (GPRS I & II), the government in 2009 commenced

the Savanna Accelerated Development Authority (SADA) programme to enhance agriculture productivity and reduce poverty among Ghanaians living in the savanna areas of the country which includes the entire area of Northern Ghana.

The objectives of Savanna Seeds project are aligned with national development programmes aimed at assuring food security. This position is highlighted in various government policy documents and regional and district development plans. The project focused on the production and dissemination to resource poor farmers improved varieties of crops widely consumed in the sub-region. This has enabled resource-poor farmers who hitherto did not have this level of access to get access to quality seed, obtain high yields and quality grain from their farms. It is anticipated that this will ultimately result in higher incomes for the farmers and a useful mechanism for poverty levels.

Ultimately, in the short term it is increases in yields of farmers that will help improve their wealth. This project is particularly relevant because it focuses on a wide variety of crops that are the main staples of people in the Northern parts of Ghana. This project targets the food and nutritional content of staple food crops that are widely consumed by the populace. The growth of the staple food crop sector is an important pro-poor strategy since most smallholder farmers cultivate the staples both for subsistence and commercial purposes. It therefore follows that an increase in productivity will increase output and eventually lower the price of the staples and make them more affordable to the poor. Thus by AGRA's intervention, the project has filled an important void and provides an important service to smallholder farmers that otherwise would have remained unattended to for a very long time.

Indeed this funding for scientific research and the production of improved seeds in Ghana and has always been a major challenge for the government. Funding has always been inadequate, delayed and restricted to only public sector institutions/organization. Interviews with seed breeders in public sector institution such as SARI and CRI suggest that government pays only the salaries and administrative expenses and has virtually no funds left to fund research. AGRA's funding for seed production recognises the complementary role that the private and public sector play in the seed industry thus it has provided funding for both sectors. The

leadership of Savanna Seeds informed the consultant that funding for activities budgeted for have been timely and adequate, thus enabling the company achieve its stated objectives within the two year period.

Built into the AGRA project is a subsidy component for all improved seeds produced by the company. All seeds produced by Savanna Seeds are to be sold to farmers at a subsidized rate, with the subsidy being as about 80 per cent of the actual market price of the maize seed. By introducing the subsidy, the potential to make available improved seeds at low prices to a large proportion of farmers is very high. This is a significant contribution to the various efforts at reducing poverty in northern Ghana.

The interview with the CEO of Savanna Seeds revealed that there was no conscious effort by the organization to reach out to female farmers; both male and female farmers were treated equally under the project. Given the fact that women account for a significant proportion of food crop producers in the country and the peculiar challenges they often face (i.e. unequal access to land, extension services, labour and resources) in northern Ghana, it would have been ideal if there was a gender dimension that placed emphasis on evolving an appropriate approach to reaching out to women and addressing their specific needs under the project.

### **Appropriateness of Project Design**

The AGRA PASS project was designed for viable privately owned seed companies to produce improved varieties of seeds of the major food crops in the region to meet the demands and needs of smallholder farmers.. Prior to the intervention of AGRA (2008), Savanna Seeds produced nearly 43 metric tonnes of certified seeds of rice, sorghum, soyabean, groundnut and cowpea. However, with the support of AGRA, Savanna Seeds' CEO claims production of certified seed in 2009 increased by 620% to 270.3 metric tons.

The framework within which the project is designed is flexible and encourages collaboration with other stakeholders. Savanna Seeds has a close working relationship with Savanna Agriculture Research Institute (SARI). SARI is an institution under the Council for Scientific

and Industrial Research (CSIR). It is the largest and only public research organization devoted towards the development of improved food crop seeds. The CEO and the director of Savanna Seeds have both worked with SARI in the past and had gained considerable experience before establishing their private seed company.

The working relationship between Savanna Seeds and SARI also extend to the use of the professional staff of SARI as resource persons during the farmers' education and training programmes organized by Savanna Seeds. Savanna Seeds also uses this opportunity to facilitate linkages between SARI, agro-input dealers and farmers. Again, the company informed the consultant that it used this platform to establish linkages with big agro-input dealers like Wunpuni and Vansado based in Tamale to serve as distribution points of improved seeds produced by Savanna Seeds. On the educational component of Savanna Seeds' activities, the company produced 1,500 brochures on seed/crop production and the company's profile and distributed to about 1,000 farmers through its mobile van seeds programme. Between 2008 and 2010 Savanna Seeds organized 46 demonstrations including 19 demonstration plots for farmers and trained 24 outgrowers to grow certified seeds for the company. Unlike the demonstrations where farmers are gathered on a farm location to observe relatively new agronomy practices and technologies, the demonstration plots are jointly managed by Savanna Seeds and the farmers for the entire duration of the farming season.

The company through its networks and collaboration identified some opportunities and therefore put in place structures that allowed it channel some of its certified seeds to resource-poor farmers through a number of programmes. These programmes include AGRA Soil Health programme, Adventist Development and Relief Agency (ADRA) with the European Union, the European Union Food Security Resilience Project (EU-FSRP), Millennium Development Authority (MiDA), CARE International, SARI's N2 Africa projects.

### **Seed Company's Usefulness in addressing the Needs of Farmers**

Seed production has improved tremendously since the inception of AGRA's support to Savanna Seeds in 2009. In 2008 the company produced almost 43 metric tonnes of certified seeds

produced in 2008. Between 2009 and 2010, Savanna Seeds CEO claims the company produced about 652.20 metric tonnes of certified seeds and sold them at subsidized prices to farmers. Farmers prior to the project could not afford to buy improved seeds and to use adequate agro-inputs such as fertilizers and weedicide on their farms.

From a series of focus group discussions held with farmers from Nyankpala and three surrounding communities in the Northern Region, it was observed that farmers had difficulties raising money to prepare the land at the beginning of the farming season each year. The farmers also had challenges obtaining improved seeds timely and at an affordable price, and therefore relied on their own seeds from previous harvest. With Savanna Seeds' active engagement with the farmers after 2009, virtually all the farmers noted that they had access to quality seeds at reasonable prices. They also highlighted the fact that they cultivated smaller acreages than they previously did but got higher yields. Therefore the amount of resources required for farming in a season was considerably lower and they were able to save money and time for other economic activities that provided them with additional income.

The farmers informed the consultant that since 2009, Savanna Seeds has organized training workshops and educated them on the importance of using improved seeds and agro-inputs and on how to use them to obtain high yields. Savanna Seeds gave the farmers who had gone through the training improved seeds and agro-input on credit and engaged some of them to be out-growers for the company.

### **Institutional Arrangements**

As noted earlier the institutional arrangements for seed production in the country has changed since 2008. The new Plant and Fertilizer Act, 2010 (Act 803) currently determines the macro institutional arrangements for seed production in Ghana (this is discussed in Section 3 of this report). Moreover, the linkages already established by Savanna Seeds and SARI as well as agro-dealers, out-growers and farmers helped in ensuring that farmers got seeds on timely and affordable basis. The consultants found out that though Savanna Seeds had planned to distribute seeds through Wumpuni and Vansado, (the two main agro-input dealers based in Tamale), only a

small proportion of the seeds had been sold by the agro-dealers. Similarly, in Bolgatanga, the main agro-dealer shop (known as Simple Prince) had no direct relationship with Savanna Seeds.

#### 4.3.2. Effectiveness

We assess the effectiveness of the project by examining the extent to which the objectives of Savanna Seeds had been achieved. Based on the interviews and reports provided by Savanna Seeds and farmers, all the three objectives of Savanna Seeds can be said to have been achieved. The production of improved seeds exceeded the targets set for each of the improve seeds of the food crops produced i.e. maize, rice, sorghum, soybean, groundnut and cowpea. The training of 24 out-growers of which 22 produced improved seeds for Savanna Seeds was decisive for 2009 and 2010, with these years recording high output. However, the seed production figures obtained by the consultant from PPRSD indicate some variance with what Savanna Seeds reports (Table 4-2).

**Table 4-2 Reported Savanna Seeds Production by crop, 2007 - 2011**

Seed Production Figures from SASSEC and PPRSD								
Years								
	2007	2008	2009		2010		2011 (Estimate)	
Crop Type/ Variety			SASSEC	PPRSD	SASSEC	PPRSD	SASSEC	PPRSD
Maize	2	11.8	70.6	1.35	168	14.85	56	2.7
Rice	-	10.83	139.9	41.04	155	45.44	253.5	21.60
Sorghum	-	0.96	18.80	5.60	3.5	0	2.0	1.00
Soybean	-	16.8	35.00	2.43	40.80	8.37	126.0	7.06
Groundnut	-	0.08	1.60	0.00	5.0	0.00	5.0	0.00
Cowpea	0.45	2.08	4.40	2.88	9.6	2.65	4.8	2.32
Total	2.45	42.55	270.3	53.30	381.90	71.31	447.3	31.98

Generally, according to the seed production statistics officially certified by PPRSD, Savanna Seeds produced 124.61 metric tonnes of seeds over the 2009 to 2010 period. Compared to the previous annual production figures by Savanna Seeds, there appears to be an increase in seed production from 2.45tonnes in 2007 to 42.55 tonnes in 2008. By 2010, Savanna Seeds seed production had increased by nearly 68 per cent compared to the previous year. Perhaps, a major

source of the discrepancy in the seed production statistics lies in the fact that Savanna Seeds added the seeds produced by its out-growers. Nonetheless, Savanna Seeds' projections of producing 171.5 metric tonnes over the project period were not achieved as they officially produced 124.61 metric tonnes. This means Savanna Seeds fell short of its target by 46.89 metric tonnes (about 27.3%).

The strategy of piloting 19 demonstration plots in Northern and Upper East Regions coupled with mobile van seed outreach programme appear very effective in changing farmers' attitude towards the use of improved seeds. Savanna Seeds reports that about 1000 farmers bought improved seeds from them. In addition about 150 farmers received training while an estimated 400 farmers took part in the demonstrations organised by Savanna Seeds. This number includes the 19 farmers who jointly owned the demonstration plots with Savanna Seeds.

The consultants found that many of the farmers from the focus group discussions use improved maize seeds for cultivation. In the Upper East Region the main cereal cultivated is sorghum. This situation has been attributed to the climatic conditions, particularly the short rainy season. Discussions with officials at SARI showed that since 1998 efforts had been made to encourage the cultivation of maize on a larger scale by introducing improved varieties. Interviews with stockists suggests that with the introduction of Savanna Seeds' improved (high yielding, high protein content, short maturity period and drought resistant) varieties, there has been an increase in the quantities of maize seeds purchased and the acreage of maize cultivation. They attributed this to what farmers and stockists witnessed at the demonstration plots, the radio programmes Savanna Seeds used to enlighten the public on the improved maize varieties and the relatively low cost of the improved seeds. Of course, these claims do not necessarily establish attribution. However we can conclude that Savanna Seeds' activities have complemented SARI's initiative to increase the adoption of maize by farmers in the Region. Monitoring and evaluation of all activities was considered *in situ* by Savanna Seeds management. The Savanna Seeds CEO told the consultants that all activities were based on the proposal submitted to AGRA. The M & E component in the proposal and the training from AGRA ensured strict compliance.



### 4.3.3. Efficiency

In this section we examine how efficiently resources provided by AGRA have been applied by Savanna Seeds in the achievement of its outputs. We present a summary of Savanna Seeds budget for the two-year project in Table 4-3.

**Table 4-3 Budget for Savanna Seed Company, 2008 and 2009**

Line item	Year 2008	Year 2009	Total US\$	% of Total
1.0 Equipment Hire	6,886.00	6,642.00	13,528.00	9
2.0 Seed production	29,684.00	20,000.00	49,684.00	33
3.0 Materials and supplies	2,016.00		2,016.00	1.3
4.0 Seed dissemination	30,144.00	15,894.00	46,038.00	30.7
5.0 Human resource	9,216.00	9,216.00	18,432.00	12.3
6.0 Utilities	3,600.00	3,600.00	7,200.00	4.8
7.0 Travel	1,500.00	-	1,500.00	1.0
8.0 Meetings and training	2,880.00	2,500.00	5,380.00	3.6
9.0 Others	815.00	-	815.00	0.5
10.0 Monitoring and evaluation	2,880.00	2,500.00	5,380.00	3.6
Total	80,621.00	60,352.00	149,973.00	100

Source: Savanna Seeds Services Company

All the funds for this project (\$149,973.00) were provided by AGRA. Savanna Seeds' contribution was in the form of computers (2), a motorbike, office space and furniture, farming implements (hoes, cutlass, wellington boots etc), a donkey and cart and bicycles (3). The bulk of the budget - i.e. 72.7% was for seed production (production cost and cost of raw seed from contract farmers) and dissemination (field days, demonstrations, training/education and publicity as well as printing fees) and the hiring of equipment. Other lines of expenditure were mainly on recurrent expenditure such as fees and salaries for the staff, travel and monitoring and evaluation. Thus AGRA funding was generally meant to subsidize seed production cost. In an interview with the Managing Director of Savanna Seeds it was gathered that he that took personal charge of fund disbursement and made sure every expenditure item was justified in the approved budget by AGRA. He however noted that the hiring of seed production equipment sometimes hampered efficiency as the owners were unreliable.

Savanna Seeds in its proposal to AGRA requested for an amount of \$149,973.00 to produce 171.5 tonnes of seed, educate farmers on the benefits of using improved seeds and undertake seed dissemination activities. We therefore also assess the seed production process of Savanna

Seeds. To do this generate the costs per output of seeds produced by Savanna Seeds and compare with the *ex ante* target levels. We note from Table 4-4 that the projected cost of a tonne of seeds by produced by Savanna Seeds was US\$874. Two *ex post* costs per tonne are calculated – one based on the tonnage reported by Savanna Seeds and the other based on the output of Savanna as reported by PPRSD. We note very large discrepancies in these two numbers. If we base the assessment on the per unit costs calculated from the reported Savanna Seeds production, then we would say that they were very efficient – about US\$229 per tonne compared to the *ex ante* cost of about US\$874. However quite the opposite conclusion will be reached if we base our assessment on the PPRSD reported output.

**Table 4-4 Estimated Average Costs of seeds produced, by Source**

Source	Output (Tonnes)	Cost per Output (US\$)
AGRA Target ( <i>ex ante</i> )	171.5	874.48
Base on Report by Savanna seeds	652.2	229.95
Base on Report by PPRSD	124.61	1203.54

Source: SASSEC Reports and Interviews with SASSEC CEO

Notes. Funds received for the two year period was \$141,973.00 and not \$149,973.00 as indicated in documents approving the proposal. An amount of \$8,000.00 was deducted from SASSEC’s approved budget. Reasons for the deduction are unclear.

It is also worth noting that, Savanna Seeds relocated its office from Tamale to Nyankpala where it actually does most of its production to cut down on operational costs. Savanna Seeds also bought and refurbished an old warehouse formerly owned by SARI for seeds storage thus cutting down on storage cost as well. We can therefore conclude that Savanna Seeds has been efficient in the achievement of its objectives.

#### **4.3.4. Sustainability**

We discuss the sustainability of the Savanna Seeds programme after AGRA withdraws it’s funding from five perspectives. These include pricing policy, production of improved seeds,

equipment, collaboration and institutional strengthening, and training and capacity building. We summarise the sustainability under these issues in Table 4-5.

**Table 4-5 Sustainability of Savanna Seed Company**

Variable	Sustainability Status
Pricing Policy for Seeds	The pricing policy adopted during the project period will not be sustainable. SASSEC sold its improved seeds to stockist and all others at subsidized rates when AGRA funding was available. With the completion of the project and the end of the funding, SASSEC will not be able to sell the seeds at the subsidized prices. It will be compelled to sell at the market price to enable it cover all its expenses and make some profit
Seed Production and Dissemination	Cost of seed production and dissemination is very high. These two activities accounted for 63.7% (i.e. \$95,712.00) of the amount received by SASSEC. It entails land preparation, purchase of foundation seed and agrochemical, planting, application of weedicides, insecticides and fertilizer and harvesting. This cost can only be sustained if subsidies are paid or market prices are charged on the seeds
Equipment	Plans to get a loan for a tractor. Pays for use of SARI dryers etc. Savanna Seeds suggests that this will be difficult to deal with around without support.
Institutional Strengthening and Collaboration	Savanna Seeds is working on getting affiliated to Africa Seed Trade Association based in Nairobi. Entered into agreement with big farmers to grow more seeds under SASSEC brand name.
Capacity Building	Strong reliance on out-growers and national service persons to grow seeds.

A major strategy of the company to sustain its operations is the re-investment of company profits in purchasing production equipment such as tractor, dryers and shellers. Also, Savanna Seeds is still working with out-growers to produce more seeds. Without AGRA funding the company is targeting to harvest 447.3 metric tonnes of seeds in the 2011 season which will be more than the 381.9 metric tonnes harvested in 2010. However these may be a bit optimistic when compared to PPRSD official projections.

#### 4.3.5. Impact

We assess the impact of the intervention from three perspectives - the national level impacts, that relating to Savanna Seeds, and that relating to the farmers who benefitted from the project.

From Savanna Seeds perspective the programme have had a positive impact on their activities and performance. The increase in seed production capacity and other complementary initiatives such as mobile vans improved farmers access to these higher yielding seeds, resulting in increased seed productivity and production in the country. This consequently improved the prospects of Savanna Seeds and other seed companies in Ghana. From a low of 2.5 metric tonnes of improved seeds produced in 2007, Savanna Seeds' report an output of 381.9 metric tonnes of seeds in 2010.

From the Savanna Seeds CEO's own perspective, the company has improved on its capacity and human resources through the training programmes organised. This is evident in the seed production statistics presented by the company as well as the PPRSD. Again, Savanna Seeds can now boast of a number of demonstration plots and close collaboration with 22 functioning out-growers who help the company meet its annual seed production targets.

Through this project Savanna Seeds is recognized both nationally and internationally as a major seed producer in Ghana. This has given the company the opportunity to share its' experiences and impart knowledge to other stakeholders in the seed production sector.

Savanna Seeds' access to the AGRA grant and the implementation of the project has given the company the leverage and the confidence it needs to access funds from other sources to undertake seed production. According to the CEO, the company has submitted a proposal to the African Enterprise Challenge Programme and the USAID Ghana.

By far, the biggest impact of Savanna Seeds' activities can be felt by the farmers in Northern and Upper East regions who have seen an average increase of about 250% in yield. In 2009 alone it is reported that about 1000 farmers bought improved seeds form Savanna Seeds (Savanna Seeds) By the end of 2010, some of these farmers numbering 22 operated as out-growers for Savanna Seeds. In the Upper East, maize production have grown steadily over the years as a result of the combined collaboration between Savanna Seeds and SARI.

From the farmers' perspective, they have realized a minimum of 200% increase in yield and this to a large extent has revived their enthusiasm in farming. A farmer at a focus group discussion in Nyankpala noted that *“now we realize that farming can be undertaken on profitable basis”*. Given the increases in yields the farmers at the focus group discussion noted that presently they are able to store some of their food crops for the lean season. In other words food security concerns usually associated with the lean (dry) season have been greatly reduced for these farmers over the last two years compared to the previous seasons.

The farmers showed a great depth of understanding of what was required of them to ensure a high level of yield. They noted that the Savanna Seeds approach was very participatory and did not involve an imposition of ideas/views. The farmers were encouraged to share lessons learned with other farmers.

At the national level we note from the GLSS V report that the probability of being poor is high for food crop farmers generally but particularly so for farmers in Northern Ghana. As a result the increase in yields for farmers who have benefitted from the AGRA programme is expected to increase their wealth and consequently reduce the depth of poverty amongst these farmers. Although we do not know the exact number of farmers that have benefitted from this programme nationally, our interactions with the few suggests that yields increased by a minimum of about 100 per cent. Overall therefore we believe that this programme has impacted positively on national income and poverty. However we are unable to quantify the exact magnitude of this impact nationally.

## 5. Summary of Findings, Challenges, Conclusions and Recommendations

### 5.1. Summary of Findings and Challenges

We summarise the key findings and challenges under the key evaluation criteria of relevance, effectiveness, efficiency, sustainability and impact for each of the three projects as follows:

**Table 5-1 Key Findings and Challenges – EACI Project**

Evaluation Criteria	Key Findings	Challenges
Relevance	<p>Programme is aligned to the Government of Ghana's agricultural policy, the Medium Term National Development Policy Framework and MDGs 1 and 7;</p> <p>An 11% increase in the number of Plant Breeders in Ghana;</p> <p>Emphasis on local food crops that hitherto would not have received any funding for research;</p> <p>Students and teaching staff showed a high level of satisfaction with the programme.</p>	<p>Without AGRA funding it is highly unlikely that plant breeding and seed scientist could be trained in any appreciable numbers to reduce the deficit of qualified plant breeders and seed scientists in Ghana. This is particularly disturbing as investment in science training in Ghana is low at all levels</p> <p>Attracting more women to enrol on the M.Sc programme is also very relevance for the successful implementation of the training programme</p>
Effectiveness	<p>Commitment of staff and the students to succeed;</p> <p>KNUST institutional framework and the project design (including students selection criteria);</p> <p>Timeliness in the completion of the M.Sc programme.</p>	<p>There should be increased publicity about the programme within the sub-region;</p> <p>Sustained commitment of the staff could be a major challenge in the future</p>
Efficiency	<p>Timely completion of the course and a comparison with self-financing students;</p> <p>Timely transfer and release of funds by AGRA and the KNUST;</p> <p>Expenditure for the programme was within the budget.</p>	<p>Regular maintenance of equipment by the KNUST</p>
Sustainability	<p>KNUST's proven capacity to implement the M.Sc programme;</p> <p>KNUST exhibited ownership of the M.Sc programme;</p> <p>Enhancement and maintenance of facilities and equipment;</p> <p>Strengthening the relationship between academia and research institutions;</p> <p>Continued funding by AGRA is critical for implementation</p>	<p>Effectively harnessing the knowledge and experience of AGRA grantees in Ghana to share experiences and lessons learned;</p> <p>Sustaining the interest of stakeholders (including governments and students) in locally produced food crops is critical</p> <p>Increased commitment is required by West African governments' to fund training of agricultural scientists within the sub-region;</p>
Impact	<p>Increase pool of skilled plant breeders and seed scientists; hitherto research institutions</p>	

Evaluation Criteria	Key Findings	Challenges
	<p>were compelled to recruit lesser trained scientists;</p> <p>All graduates interviewed are in higher positions of responsibility and/or are pursuing higher degrees (Ph.D);</p> <p>Ability of graduates to communicate more effectively with scientific community;</p> <p>Improved skills in approaching, interacting and working with farmers during extension work</p>	<p>The ability of the employers to retain the services of the trained scientists in their institutions/organizations;</p> <p>Granddaunts should be given the opportunity to impart and share their knowledge</p>

**Table 5-2 Key Findings and Challenges – SEPA Project, Alpha Seed Enterprise**

Evaluation Criteria	Key Findings	Challenges
Relevance	<ul style="list-style-type: none"> <li>• Aligned to national development strategy to privatise seed production in Ghana;</li> <li>• Useful in getting improved seeds to resource poor farmers at 15-25% market price;</li> <li>• Demonstration plots and field days has encouraged and helped farmers in adopting new improved seeds and modern agronomy practices;</li> <li>• Increased quantity of improved seeds in Ghana.</li> </ul>	<ul style="list-style-type: none"> <li>• Project did not integrate well with existing govt programmes- MiDA , Block Farming, Youth in Agriculture etc.;</li> </ul>
Effectiveness	<ul style="list-style-type: none"> <li>• Substantial increase in seed production in first year;</li> <li>• Relative success of seed dissemination attracted many farmers to use improved seeds;</li> <li>• Had feedback and monitoring mechanisms in place to ensure subsidized improved seed go to farmers.</li> </ul>	<ul style="list-style-type: none"> <li>• Institutional arrangement at the national and company levels suggests that Alpha Seed Enterprise's ability to produce foundation seed was bound to be problematic as the company did not have a trained breeder as part of its staff;</li> <li>• Inability to produce stated quantities of seeds hence unable to meet farmer's demands;</li> <li>• All micro-input shops (7) supported by Alpha Seed Enterprises appeared not to have functioned effectively and efficiently in the delivery of seeds to farmers;</li> </ul>
Efficiency	<ul style="list-style-type: none"> <li>• Problem hiring equipment for seed production;</li> <li>• Inefficient use and management of micro-input shops;</li> <li>• High cost and time loss in directly distributing improved seeds and farm inputs to farmers.</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of an efficient communication system that addresses the needs of all categories of food crop farmers within the catchment area;</li> <li>• Inability of farmers who planted new and improved varieties of maize to sell their produce on the market.</li> </ul>
Sustainability	<ul style="list-style-type: none"> <li>• Though relatively successful, the project has not engendered response from govt and seed market due to among others low publicity;</li> <li>• Project did not integrate well with existing govt programmes- MiDA, Block farming, Youth in Agriculture etc.;</li> <li>• Sale of seeds at subsidized prices and low</li> </ul>	<ul style="list-style-type: none"> <li>• Withdrawal of the AGRA subsidy has implications for the sustainability of the project;</li> <li>• Many farmers defaulted in paying credit for seeds and agro-inputs;</li> <li>• Seed production and dissemination policy is not sustainable;</li> </ul>

Evaluation Criteria	Key Findings	Challenges
	<p>integration with larger seed market imply grantee seed company will not be profitable;</p> <ul style="list-style-type: none"> <li>• Uncertain that farmers will be able to buy at real market prices-high default rate among farmers- over 30%.</li> </ul>	
Impact	<ul style="list-style-type: none"> <li>• Increased seed production in Ghana</li> <li>• Improvement in seed company's capacity and facilities (rental of office space, tractor, blower, sheller);</li> <li>• Improved yields for farmers;</li> <li>• Farmers perception of improvements in their living and working conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Some farmers in the catchment area yet to use improved seeds due to ignorance;</li> </ul>

**Table 5-3 Key Findings and Challenges – SEPA Project, Savannah Seed Company Limited**

Evaluation Criteria	Key Findings	Challenges
Relevance	<ul style="list-style-type: none"> <li>• Aligned to national development strategy to privatise seed production in Ghana;</li> <li>• Useful in getting improved seeds to resource poor farmers at 15-25% market price;</li> <li>• Demonstration plots and field days has encouraged and helped farmers in adopting new improved seeds and modern agronomy practices;</li> <li>• Increased quantity of improved seeds in Ghana.</li> </ul>	<ul style="list-style-type: none"> <li>• Project did not integrate well with existing govt programmes- MiDA, Block farming, Youth in Agriculture etc.;</li> </ul>
Effectiveness	<ul style="list-style-type: none"> <li>• Substantial increase in seed production year on year;</li> <li>• Relative success of seed dissemination (mobile van and agro input outlets) attracted many farmers to use improved seeds;</li> <li>• Had feedback and monitoring mechanisms in place to ensure subsidized improved seeds go to farmers.</li> </ul>	<ul style="list-style-type: none"> <li>• Institutional arrangement at the national and company levels suggests that SASSEC's ability to produce certified seed was bound to be problematic as the company did not have enough skilled personnel as part of its staff;</li> <li>• Inability to produce stated quantities of seeds hence unable to meet farmer's demands;</li> <li>• Weak linkage between SASSEC and agro-input dealers like Wunpuni and Vansado;</li> </ul>
Efficiency	<ul style="list-style-type: none"> <li>• Yields per acre on some fields were lower than standard</li> <li>• Based on reported tonnage by PPRSD, the SASSEC was inefficient (\$1,203.00/ton), however based on SASSEC's production figures the company was relatively more efficient (\$230.00/ton);</li> <li>• Unreliability of owners of equipment for hiring;</li> <li>• Company spends time on other activities at the expense of seed production;</li> <li>• High cost and time loss in distributing</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of an efficient communication system that addresses the needs of all categories of food crop farmers within the catchment area;</li> <li>• Inability of farmers who planted new and improved varieties of maize to sell their produce on the market.</li> </ul>



	improved seeds and farm inputs to farmers.	
Sustainability	<ul style="list-style-type: none"> <li>• Though relatively successful, the project has not engendered response from govt and seed market due to among others low publicity;</li> <li>• Project did not integrate well with existing govt programmes- MiDA, Block farming, Youth in Agriculture etc.;</li> <li>• Sale of seeds at subsidized prices and low integration with larger seed market imply grantee seed company will not be profitable;</li> <li>• Uncertain that farmers will be able to buy at real market prices</li> <li>• Seed production in 2011 (31.98 tons in August) likely to remain the same as the 2010 (71.31tons) figures (PPRSD);</li> </ul>	<ul style="list-style-type: none"> <li>• Withdrawal of the AGRA subsidy has implications for the sustainability of the project;</li> <li>• Seed production and dissemination policy not sustainable;</li> <li>• Over the long term seed production and dissemination could be affected as a result of the withdrawal of the AGRA subsidy;</li> <li>• Heavy reliance on out-growers national service persons.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>• Positive impact of AGRA training (Through training activities the company is in a better position to take advantage of existing opportunities)</li> <li>• Increased seed production in Ghana</li> <li>• Recognition as a major seed producer in Ghana;</li> <li>• In the process of leveraging funds to access funding for seed production (from African Enterprise Challenge Project);</li> <li>• Increase in maize production (250%) and income among beneficiary farmers in catchment area;</li> <li>• Farmers perception of improvements in their living and working conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Some farmers in the catchment area yet to use improved seeds due to ignorance;</li> </ul>

## 5.2. Limitations to the evaluation

Cooperation from stakeholders during the evaluation of the EACI was excellent and the team did not have any problems accessing information and undertaking the evaluation. The situation for the Seed Companies was slightly different. Limitations encountered by the consultant were general as well as specific. The consultant encountered difficulties in obtaining accurate and verifiable data from the seed companies. It was obvious that the companies did not keep accurate records hence some of the assertions they made were based on “word of mouth”, this to some extent limited the quality of the work of the consultant. A number of planned meetings with key informant did not take place due to various reasons; it is our view that had these meetings taken place there is the high probability that the inputs could have enriched the final report.

The specific problem the consultant encountered was with Alpha Seed Enterprise. In the initial stages of the evaluation the CEO of the company cooperated with the evaluation team, however, as the evaluation progressed, she stopped cooperating with the consultant. As a result, for most aspects of the evaluation of Alpha Seed Enterprises, the consultant had to depend on secondary sources of information to complete the assignment.

### **5.3. CONCLUSIONS**

From the three projects evaluated, the following general conclusions are made. For the EACI project at the KNUST, there is ample evidence to suggest that the MSc Plant Breeding and Seed Science programme was well planned and implemented by all stakeholders involved- university authorities, project coordinators, lecturers, field supervisors and 1<sup>st</sup> cohort students. Except for issue of the programme not being sustainable without AGRA funding and the need for it to be more integrated with other AGRA and national agriculture and educational interventions, its relevance, effectiveness, efficiency and the burgeoning impact is worth commending for replication in similar programmes in Africa.

For the two SEPA projects that were evaluated, the concept of promoting small private seed companies to grow is highly commendable. However, inadequate monitoring and evaluation as well as the lack of operational and financial audits of the seed companies resulted in fairly satisfactory outcomes of the projects relevance, effectiveness, efficiency, sustainability and impact within the immediate environs of each seed company and the nation at large. Very little effort was directed towards monitoring efficiency in the production of outputs, collecting information for measuring outcomes or preventing and/or mitigating risks. Self-evaluations if they exist did not contain relevant information. Also, there was little complementarity internally or externally between the seed companies and the MSc programme at KNUST.

Resolving these issues will pose important challenges that may require substantive changes in the manner AGRA projects and programs are implemented in future.

#### **5.3.1. Evaluability of Projects**

The team has observed fundamental weaknesses in the evaluability of the 2 SEPA and its components for their effectiveness to address development problems. In this respect the problems detected can be summarized as follows:

- Definition of the objectives of projects in broad terms make it difficult to ascertain or measure their attainment;

- Absence of efficiency and outcome indicators and ;
- Absence of systematic monitoring and self-evaluation.

The proposal documents of both seed companies did not develop measurable indicators to assess the extent of seed dissemination outreach for instance.

### **5.3.2. Relevance of Projects**

The relevance criterion addresses two issues: the extent to which the intended outcomes of the projects are consistent with country development priorities and the extent to which project formulation/design adopted the correct solution to the identified problem.

All three projects to a large extent were consistent with Ghana's current development priorities. The masters programme at the KNUST is already yielding good dividends in helping the country produce scientists with specialized knowledge in plant breeding and seed science – an essential ingredient for the country's medium terms plans. All the six Ghanaians who graduated from the programme are working in the public institutions of the seed industry and the universities.

The two seed companies have also been very relevant in terms of producing more seeds to augment the country's stock. For instance, in 2009, Savanna Seeds produced 5.60 metric tonnes of sorghum which exceeded the national yield of 5.04 metric tonnes obtained in the entire country.

The two seed companies have also been very relevant in helping change the attitude of farmers in their areas of operation through the demonstration plots and training of out-growers to produce seeds. The newly trained out-growers of SASSEC have the potential to produce more soybean, cowpea and groundnut seeds which less popular with seed grower in Ghana.

### **5.3.3. Efficiency of Projects**

Efficiency is a measure of how well the project used resources in achieving outcomes. It is measured by the extent to which resources have been optimally utilized. Due to monitoring challenges and the unavailability of evaluation data on the project activities the team was not able to review program costs with associated benefits. However interviews with students and project co-ordinators indicate satisfaction in the performance of the EACI project at KNUST.

For the two SEPA projects, in spite of difficulties enumerated above with regards to measuring efficiency, interviews and field observations indicate a mixed result. While some aspects of the activities such as demonstrations, demonstration plots and field days may be assessed to be satisfactory, the seed production by the two companies was not very efficient. For Alpha Seeds which has maize production as its major seed, it produced 16.2 metric tonnes of seeds on a 30 acre plot. Conservative estimates provided by PPRSD states that Alpha Seeds could have harvested 60 metric tonnes from the same plot size. Similarly, Savanna Seeds in 2010 produced 14.85 metric tonnes of maize seeds (Obantampa) on a 44 acre plot.

In terms of timeliness of the delivery of seeds to farmers, farmers were very satisfied with the efficient manner both Alpha Seeds and Savanna Seeds got seeds and agro-inputs to farmers.

#### **5.3.4. Effectiveness of Projects**

Effectiveness refers to how successful the strategy and program activities have been contributing to the achievement of outputs and outcomes. Here again the assessment of effectiveness was hampered by the absence of an adequate logical framework of objectives and indicators, and by the poor management information base especially by the two seed companies. The log frame is not complete and no attention was given to the identification of outcome indicators at component and program levels.

#### **5.3.5. Sustainability and Ownership of Projects**

Sustainability and ownership are two mutually reinforcing ingredients to successful development assistance. The extent to which the benefits generated through project interventions will continue

after the project assistance very much depends on the capacity and readiness of targeted groups to take up ownership. On this, the team has observed weaknesses. All three projects evaluated cannot sustain themselves after the expiry of the AGRA grant.

#### **5.4. Recommendations**

Generally, the team recommends the following for the seed companies;

- Criteria process for the selection of grantee seed companies need to be thoroughly reviewed. There is the need to involve MoFA and PPRSD in the selection process.
- Monitoring and evaluation needs to be more rigorous and frequent to impact on the projects.
- Regular auditing of projects is very necessary to ensure strict adherence to contract.
- AGRA may engage the services of a private consultancy firm specialized in communication to undertake the seed dissemination activities for the seed companies which may concentrate solely on seed production.
- AGRA should support the development of seed policy and regulation in Ghana. Current importation of seed may have serious detrimental effect on local private seed companies.
- AGRA policy to subsidize seed production needs to be reviewed. Support for seed companies to acquire own equipment has great potential to increase seed production in the long-run on sustainable basis.

Following the assessment of the EACI component of the AGRA intervention we recommend the following:

- In the future the procurement of equipment should be done on a sole sourcing basis, however a “no objection” should be obtained from AGRA in order to expedite the procurement of equipment for the M.Sc programme in the future;
- Given the challenges inherent in the food crop production sector and the importance of the graduates of the programme, we recommend that the number of students for each cohort should be increased. The extra number could be financed through contributions of the Governments of non Ghanaian students on the programme;

- Public awareness on the M.Sc programme by the KNUST should be enhanced to ensure that they attract the best calibre of candidates and an increase in the number of women who apply for the M.Sc programme;
- The process of dissemination of information on the improved seeds and new breeding techniques resulting from the programme to stakeholders should be expedited;
- The coordinating unit of the M.Sc programme should on a regular basis conduct a comprehensive evaluation of the course, thus addressing students concerns on course some of the subjects;
- The university should immediately commence the process of identifying other sources of funding to complement AGRA’s funding for the M.Sc programme. If at any point AGRA’s funds “dry up”, it will affect the smooth running of the programme;
- The PM recommended that approval for future cohorts should be given early to enable the Department to undertake a comprehensive assessment of qualified candidates. This was particularly relevant for students from Francophone countries since they have a different academic grading system. The PM also emphasized that they would like the students from the Francophone countries to attend refresher English language courses prior to the commencement of the M.Sc programme.

The consultants in their study realized that there did not seem to be any formal working relationship between WACCI and KNUST. We recommend that the relationship between the two institutions should be formalized and strengthened, this is very relevant given the fact that most of the students on the M.Sc programme aspire to pursue a Ph.D in plant breeding and seed science. It will also give them the opportunity to share experiences and lessons that will be relevant for improving their respective programmes and the output of the students.

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## APPENDIX

### Appendix I: List of key informants interviewed

1. Professor R. Akromah, Programme Manager M.Sc Programme for Seed Science and Plant Breeding, KNUST
2. Dr (Mrs) N. Olympio, Department of Horticulture, KNUST
3. Mrs. Ewool, CEO, Alpha Seed Enterprises
4. Mr. Ewool, Plant Breeder, Crop Research Institute
5. Mr. P. Apullah, CEO, Savannah Seed Enterprises Company
6. Mr. Wumpuni, Agro Input Dealer, Tamale
7. Mr. Prince Yao, Agro Input Dealer, Navorongo
8. Mr. Yaw Berko, Agro Input Dealer, Kumasi
9. Mr. J. Abonya, Agro Input Dealer, Navorongo
10. Mr. K. Dankwa, Member, Seed Producers Association of Ghana
11. Mr. Seth Baah, Alpha Seed Enterprises Stockist
12. Mr. Solomon Adu, Alpha Seed Enterprises Stockist
13. Dr. K. Nutsugah, Director SARI
14. Dr. Nicholas Denwar, SARI, Plant Breeder
15. Dr. Marshak Abdullai, SARI, Plant Breeder
16. Mr. Ahmed Awuni, SARI, Technical Officer
17. Mr. Achaab, Head, Seed Inspectorate Division, PPRSD
18. Mr. William Kukah, Seed Inspector, PPRSD
19. Mr. Haruna Mohammed, SARI, Self financing M.Sc Graduate (Plant Breeding)
20. Mr. Tengan Martin Luther, Crop Research Institute, CORAF funded M.Sc Graduate (Plant Breeding)
21. Mrs. Sanatu Mustapha, AGRA funded M.Sc Graduate (Plant Breeding)
22. Mrs Priscilla Adofo Boateng, AGRA funded M.Sc. Graduate (Plant Breeding)
23. Mr. Ebenezer Obeng Bio, AGRA funded M.Sc Graduate (Plant Breeding)
24. Mr. Hillary Bortey, AGRA funded M.Sc Graduate (Seed Science)
25. Mr. David Teye Sackey, AGRA funded M.Sc Graduate (Seed Science)



26. Mr. Samuel Abebrese, AGRA funded M.Sc Graduate (Seed Science)
27. Mr. K. Amponsah, Chief Development Officer, Grains and Legumes Development Board (GLDB)
28. Mrs. Juliet Biney, CEO, Ghana Agricultural Association Business Information Centre (GAABIC)
29. Dr. Issoufou Kapran, Programme Officer, AGRA, Accra
30. Mr. Asante Mensah, Adventist Development Relief Agency (ADRA)

## **Appendix II: Interview and Discussion Guide**

### **Focus Group Discussion and Interview Guide**

As noted in the methodology section of this report Focus Group Discussions and interviews were the main sources of primary data for the evaluation projects. To ensure that data collection standards were maintained at all times and all stakeholders were actively involved and participated in the interviews and discussions, the consultant developed a field guide which it adhered strictly to. The field guide provided guidelines for interacting with all stakeholders, this included beneficiaries of the EACI program, lecturers on the program, AGRA staff (Accra Office), staff of MoFA, farmer groups, seed producers and input dealers.

Members of the team were required to:

- ▶ Thoroughly explain the purpose of the evaluation;
- ▶ Assure interviewees that the information gathered will be treated as a confidential document;
- ▶ Discussions/interviews were to be interactive and participatory

### **Discussion Guidelines**

Discussions on all EACI related issues focused on the relevance, effectiveness, efficiency, sustainability and impact of the programme. Below are the subject areas the questions revolved around.

#### **Relevance**

- Is the EACI project aligned with national development policies and relevant sector policies? Has the project's training of highly skilled breeders contributed to poverty reduction and food security in the country?
- Has the project design been appropriate in achieving its main objectives?
- Is the course content (theory and application) relevant in training breeders to produce quality seeds such as hybrid seeds of local crop varieties?
- To what extent were Ministries of Education, and Agriculture and other stakeholders such as SEEDPAG, GAIDA etc. involved in the design and planning phase and how explicit are their respective roles?
- Do the implemented actions (interventions funded and specific actions) meet the objectives of the EACI project?

### **Effectiveness**

- Could the objectives have been achieved by other (more effective) ways?
- How effective have the institutional arrangements been in establishing the EACI project in a tertiary institution?
- What is the relationship between the authorities of the tertiary institution and EACI project managers and students?
- What has been the involvement of both public and private sectors in seed technology innovation and diffusion during and after training?
- How effective has the accreditation and quality control measures been maintained in training enrolled students?
- Was funding for the EACI project channelled in the most effective manner?
- How has the implementation of the EACI project improved the quality and quantity of trained breeders of targeted crops?
- How effective have student enrolment policies and procedures been in getting the most qualified students for the crop areas most relevant?

### **Efficiency**

- Were the resources allocated (human and financial) appropriate to what the project set out to achieve?
- Timely release of funds by AGRA for the implementation of the EACI project?
- Timely procurement of relevant equipment for the programme?
- What is the relative cost assessment of the different EACI projects if available?

### **Sustainability**

- An assessment of the ownership of the program by all stakeholders especially the Department of Agriculture and Horticulture and the management of the KNUST
- An examination of the structures in place for the implementation of the programme
- Consultative approach to the development of the curriculum and supervision of students
- Availability of funds for the implementation of the program
- Identification of other potential sources of funds for running and expanding the program

## **Impact**

- How many students graduated (disaggregated by sex and nationality)?
- Are graduates working with agricultural research institutions and contributing to the development of improved seed varieties?
- Has there been an increase in the quantity and quality of improved varieties following the training of the students?
- From the perspective of the all stakeholders along the seed value chain, what have been the intended and unintended effects of the student training?

## **Discussions with the representatives of the Seed Producing Companies, the farmers and the agro-input dealers revolved around the following issues:**

- Varieties of improved seeds produced,
- Yields of improved seeds,
- Accessibility and price of seeds
- Acceptability of new and improved seed varieties and the catchment area of input dealers
- Farmers' acreage of land under improved seeds
- Farming practices
- Training programmes organized (field days and demonstration plots)
- Income levels of beneficiary farmers before and after the cultivation of improved seeds
- Knowledge of markets of market opportunities, crop storage and pricing
- Labour for cultivation and availability of equipment
- Proposals for improving productivity
- Alignment of the project to National Development Policies
- Appropriateness of Project Design and the effectiveness of the institutional arrangement
- Efficiency and the companies processes
- An assessment of the sustainability of the Seed Programmes
- Impact of the Seed Programme