



Analysis of the seed system in Ghana

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ABSTRACT

The importance of seed to any crop-based production system cannot be overemphasized. It is the fundamental unit of any production system since it is the source of life. Two parallel seed systems exist in Ghana: A formal system established by the State and its technical partners and a traditional or informal system. The objective of the study was to provide an overview of the existing seed systems in Ghana. Stakeholders in the seed industry were interviewed with the aid of a questionnaire. Assessment of the two systems seems to suggest that the formal and informal systems have historically overlapped and there is potential for a hybrid system combining aspects of the two systems to emerge, with more relevance to the realities of smallholder farmers.

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INTRODUCTION

The importance of seed to any crop-based production system cannot be overemphasized. It is the fundamental unit of any production system since it is the source of life. Improving the quality of seed of any preferred variety is the basis for agricultural productivity improvements (Louwaars and De Boef, 2012). In Ghana and perhaps sub-Saharan Africa, seed is arguably the most important production factor and perhaps the cheapest input for crop production. Two parallel seed systems exist in Ghana: A formal system established by the State and its technical partners and a traditional or informal system based on a tradition of exchanges and mutual support among producers within any one zone (Niangado, 2010).

Community based seed production systems are also gaining popularity in the country.

Majority (over 80%) of smallholder farmers in Africa mainly get their seeds from the informal channels which include farmers' own saved seeds, seed exchanges among farmers and finally purchases from the local grain or seed markets (Crissman et al., 1993; Maredia et al.,

1999; Louwaars and De Boef, 2012). The formal seed sector is receiving a stimulus as a result of the development of hybrid varieties and implementation of development projects by both Governmental and Non-Governmental Organizations (NGOs). These organizations are strengthening the formal seed sector by demonstrating the importance of certified seed on farmers' field, providing farmers with free samples of certified seeds and even giving out certified seed as relief.

Varietal development in Ghana has in recent times witnessed increased investments culminating in the release of several varieties of crops such as maize, sorghum, millet, groundnut and cowpea. In spite of the availability of these new varieties coupled with the promotional efforts of government and its development partners, the awareness and adoption of these new varieties seems to be low as a result of the weak seed delivery systems in place. The West and Central African Council for Agricultural Research and Development (CORAF/WECARD) is however coordinating a project that is aimed at building a strong and sustainable seed system for staple crops in West and Central Africa. The main objective of this present study is to provide an overview of the existing seed systems in Ghana. Available literature on the current state of Ghana's seed

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system is scanty; this study therefore seeks to make an empirical contribution to the existing body of knowledge. The study is organized into 5 sections. The next section discusses the methodology adopted by the study. The structure of the seed system in Ghana is discussed in the subsequent section. Analysis of the various stakeholders in the seed system is presented in the 4th section. The paper ends with recommendations to help build a sustainable seed system.

METHODOLOGY

The study was undertaken in Ghana and relied mainly on primary data collected through field survey. All the Seed Inspection Units of the Ministry of Food and Agriculture (MoFA) were interviewed. A total of 60 seed producers, 10 seed companies and 20 agro input dealers were surveyed with the aid of a questionnaire. The agro input dealers were identified through snowball sampling and the seed producers and companies were identified through simple random sampling technique. The interviews were conducted face-to-face. The questionnaire covered key areas such as characterization of varieties, production and marketing of certified seeds among others. The study used mainly qualitative analytical tools to generate descriptive statistics such as frequencies and central tendencies.

RESULTS AND DISCUSSION

Structure of the Seed System in Ghana

Prior to the establishment of the formal seed system, farmers relied on informal sources for their seed. The hybrid Maize Production Unit established in 1958 is the first commercial seed sector in Ghana but was renamed the Seed Multiplication Unit when it shifted to the production of open-pollinated varieties in 1961. In 1969, while continuing to produce basic seed on its own farm, the unit started a contract grower's scheme (Delimini and Wobil, 1998 cited in Lyon and Afikorah-Danquah, 1998). Ghana Seed Company, a state owned company, was tasked with seed multiplication in 1979 but was privatized in 1989 as part of the structural adjustment program of the Government of Ghana (Delimini and Wobil, 1998 cited in Lyon and Afikorah-Danquah, 1998). Seed production is now undertaken by the private sector with public institutions playing oversight roles.

The informal seed system continues to play a vital role

even though there have been conscious efforts by government and its development partners to strengthen the formal seed sector. Assessment of the two systems seems to suggest that the formal and informal systems have historically overlapped and there is potential for a hybrid system to emerge based on the best of both systems which would be more relevant to the realities of smallholder farmers. The two seed systems as currently prevailing are examined below:

Formal Seed System

The formal seed system is headed by the Ministry of Food and Agriculture which is hosting the National Seed Committee and the National Seed Services. Research and development of seeds or varieties is however the mandate of research institutions such as those within the Council for Scientific and Industrial Research (CSIR) and the Universities. Once all conditions are accepted by the National Variety Release Committee, the variety is released and the research institute is mandated to produce the breeder seed.

The Grains and Legumes Development Board (GLDB) then acquires the breeder seed to produce foundation seed. Hitherto, GLDB was the only organization mandated to produce foundation seed, but as a result of increasing demand for foundation seed, research institutions are now also allowed to produce foundation seed.

Foundation seeds are then acquired by seed companies and seed growers to produce seeds that are certified for sale to agro-dealers, NGOs and in some cases directly to farmers or grain producers. The Ghana Seed Inspection Division of MoFA is mandated to inspect and certify the production and distribution of foundation and certified seeds. A flow chart of the formal seed system in Ghana is shown in Figure 1.

Results of the survey indicates that there are presently only 11 seed companies in Ghana with as many as 4 of the companies operating from the Northern Region only. There is however no seed company in the Western and Central regions. There are currently 192 registered seed growers (with 6 females) in Ghana.

Informal Seed System

The informal seed system is unstructured and unregulated hence its activities are not monitored or supervised by any public or private institution. Variety selection, multiplication and distribution are all done within a local context or specific geographical area. Whereas variety selection and multiplication may take a

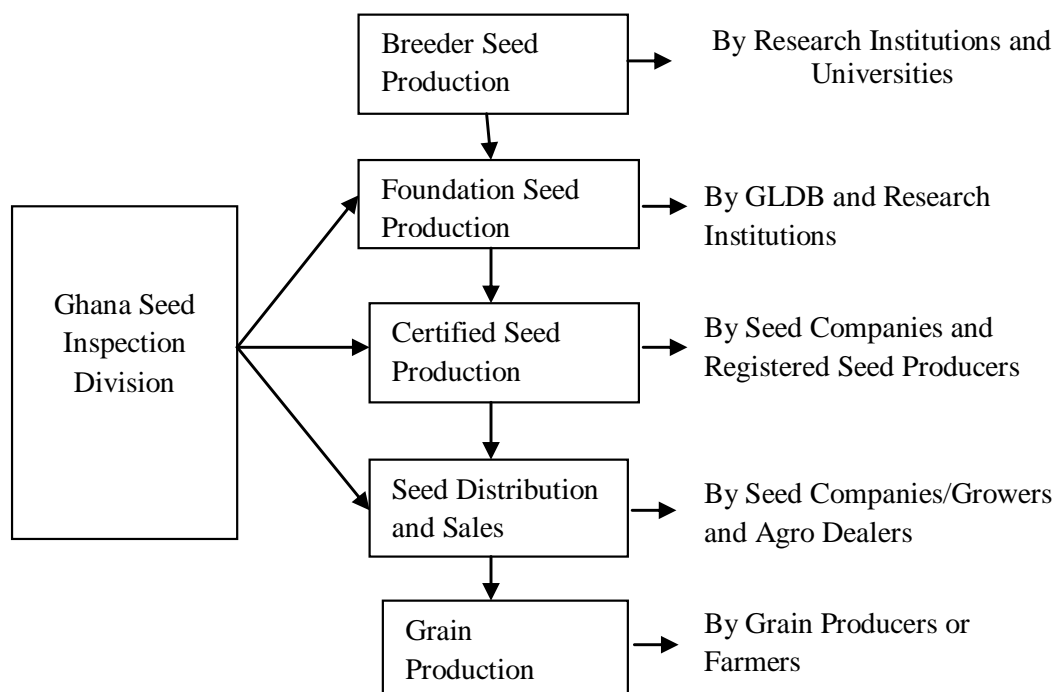


Figure 1. Flow chart of the formal seed sector in Ghana.

relatively longer time under the informal system, dissemination usually takes place at a relatively faster pace when compared with the formal seed system. The informal system thrives on traditional knowledge and distribution systems. The sector supplies about 80% of the seed needs of smallholder farmers (Crissman et al., 1993; Louwaars and De Boef, 2012) and is the main source of seed for staple crops.

The most important initial source of spread of crop varieties is from one farmer to another through participatory varietal development and gifts. Farmers-to-farmer spread is usually informed by farmers observing new varieties growing in other farmers' fields or by learning about them from friends or relatives. Most farmers upon getting access to openly pollinated varieties keep on recycling from their own stock. Most farmers would usually purchase hybrid varieties only after they have experienced a loss in vigour.

The informal seed system faces a number of constraints. The system relies mainly on nature and is therefore likely to experience seed shortages in the event of extreme weather conditions such as drought and flood. Seeds of any variety are usually selected after grain harvest hence the availability of seed is directly linked to the performance of the crop in the previous season. The system tends to concentrate on the production of seed for major staples, mostly cereals and roots and tubers, to the

detriment of other crops such as vegetables. The informal seed system is also mostly not adequately prepared for pests and diseases and usually suffers from agrobiodiversity losses (Louwaars and De Boef, 2012).

The informal seed system is however receiving a boost through the embracing of the concept of community seed production by several developmental projects. These projects usually acquire foundation seeds for farmer groups in various communities. The farmer groups are also provided with other inputs such as fertilizers and herbicides as well as technical backstopping with the aim of increasing farmers' access to seed.

Constraints of the Formal Seed System

The formal seed system in Ghana faces a number of constraints. The seed industry is too formal, with MoFA controlling about 80% of the activities of the sector (registration of seed growers, cleaning and grading of seeds, seed inspection and certification, and packaging for sales only at the regional capitals). This mostly results in delays in service provision to the seed companies and consequent loss of productivity. The distribution system from the certified seed production stage to the farmers is normally poor, the total amount of seeds produced annually are said to be a third of what is purchased by farmers. Statistics on the demand for all categories of

seeds is not readily available thereby affecting production planning. Majority (78%) of the agro inputs shops sampled reported not dealing in certified seed sale. The few that sell certified seeds mostly concentrate on maize seeds. There appears to be very low publicity of the availability of improved seeds in rural areas since most agro-input shops have no outlets in rural areas and most on-farm varietal evaluations are normally limited in scope across different agro ecologies.

Lack of storage facilities (cold rooms) is the commonest constraint facing seed distribution and sale in Ghana since seeds not sold lose their viability over time thereby compelling seed growers to either sell their seeds cheaply as grains or transport their seeds at an additional cost to centers that have cold storage facilities.

The influx of imported and fake products in the seed market is negatively affecting the sector. Variability in the on-set and distribution of rainfall is also hampering the purchase of certified seeds since farmers are afraid of incurring huge debts in case of total crop failure as a result of inclement weather.

Another challenge affecting distribution of inputs in general and seed in particular, is the deplorable conditions of many feeder roads in the country. This is a major disincentive for seed growers and agro-dealers to open up market links in rural areas due to high cost of transportation. Another infrastructural challenge is the lack of constant electricity supply which negatively affects the cold room thereby catalyzing the deterioration of seeds leading subsequently to loss of viability.

The Grains and Legumes Development Board (GLDB) not only has limited capacity to absorb all breeder seeds produced by the research institutes, but are also unable to produce adequate quantities of foundation seed to meet the demands of seed companies and seed growers. They are under-staffed and also use obsolete seed equipment. Research institutes that are not able to sell all their breeder seeds produced in a particular year have difficulties in producing in the subsequent year.

Stakeholder analyses of the Seed System in Ghana

Varietal development

The seed value chain begins with the development of a new variety with superior qualities to existing varieties. Several varieties of maize, millet, sorghum, rice, groundnut, cowpea, soybean among others have been developed over the years. These varieties have been developed mostly by CSIR and the Universities usually in collaboration with international research institutions and funding agencies. In fact, most varieties are developed with donor funds since government research fund allocation is mostly not forthcoming.

Seed certification

The Ghana Seed Inspection Division of MoFA plays an over sight role from foundation seed production through to the sale of certified seeds to grain producers or farmers. Seed certification officers are responsible for registration of seed growers and seed dealers. They are also tasked to inspect fields of seed growers to ensure that they conform to all seed regulations and guidelines. The core function of the Ghana Seed Inspection Division is laboratory testing of seeds to ensure that it meets the minimum standards in terms of purity and germination. Cleaning and marketing of seeds are additional roles performed by the division. There is no seed processing or cleaning plant in the Brong Ahafo Region, seed growers in the region therefore cart their produce to the Ashanti Region for cleaning and processing.

Seed distribution and sale

Results of the survey indicate that on the average, seed growers have been producing seed for sale for about 3 years. After harvesting, cleaning and packaging, the seeds are ready for distribution. Seed is mostly sold through agro-dealers (88.2%) and sometimes directly to farmers (5.1%). It is not uncommon for some NGOs (6.7%) to purchase certified seeds and give it to farmers benefiting from their interventions. Seed is not usually sold on credit by seed growers to farmers (12.7%), it is however common (87.3%) for agro-dealers to access seeds on credit since it would take them a relatively shorter time to pay back.

Seed producers

Certified seed production is in the hands of seed producers and companies. Seed production in Ghana is mostly rain-fed and male dominated (97%) with an average age of 50 years. Women however play very important roles in the seed system which is particularly evident at the processing centres of the Ghana Seed Inspection Divisions. Women are hired to sort the seeds and they help in manual seed cleaning through physical removal of debris.

Seed growers in Ghana are organized. An overwhelming majority of the seed growers belong to Seed Producers Association of Ghana (SEEDPAG). The association offers a platform for addressing issues of concern and also offers capacity building services to

seed producers.

Crop varieties

Interaction with the seed growers revealed that they prefer to cultivate sorghum varieties such as Kapaala, Dorado and Kadaga because of the popularity of such varieties among farmers. Among the maize varieties, Obatanpa was found to be the most preferred by seed growers as a result of its high demand by farmers. However, seed growers in Northern Region still grow maize varieties such as Dorke, Okomasa, Dodzi and Aporsoe. Open pollinated varieties (OPV) of maize are generally preferred to traditional and hybrid varieties. Traditional varieties are in low demand because most farmers already have access to it. The demand for hybrid varieties is also low because it usually requires a lot of fertilizer and seed cannot be recycled. Chinese, Nkatia SARI, Manipinta, Adepa and Nkosuo are the groundnut varieties which were found to be cultivated by seed growers. Apaabala, Padi tuya and Asitenapa are some of the cowpea varieties grown by seed producers in Ghana. It was also observed that maize varieties such as Dobidi, and Golden Crystal were no longer been produced by the sampled seed producers as a result of low patronage and low yield. Anidaso, a soybean variety has also been abandoned because of its high shattering nature. An inventory of some crop varieties grown during the 2011 cropping season is presented in Table 1.

Reasons for seed grower's varietal preferences

Results of the survey indicate that farmer preference (58.6%) is an important factor in determining the type of variety that is produced by the seed growers as presented in Figure 2. Earliness is also an important characteristic (30.7%) in selecting varieties to grow. Long duration varieties cannot be processed and sold to grain producers in the same cropping season even under irrigation, so early maturing varieties are preferred in order not to miss the season. High yielding varieties are obviously high rewarding and are therefore an important trait. Varieties that are able to withstand harsh weather conditions (2.4%) are also preferred.

Indicators of certified seed production

Key indicators of certified seed production in 2011 for rice, soybean, cowpea and sorghum are presented in Table 2. Less than 1% of the total area cropped for cowpea and sorghum were under certified seed. A large proportion of farmers depend on informal sources for

seeds of staple crops such as cowpea and sorghum. About 14% of the total area cropped for soybean was under certified seed. Soybean production is gaining popularity among farmers probably as a result of the several developmental interventions that are promoting the crop. It is not uncommon for farmers to receive certified seeds of soybean as a gift or credit for both governmental and non-governmental organizations in Ghana. Numerous rice interventions have also taken place in Ghana. About 23% of the total area cropped for rice was under certified seed.

Policy environment

The Plants and Fertilizer Act (Act 803) of the Republic of Ghana was passed by the parliament of Ghana on June 4, 2010 and received presidential assent on September 6, 2010. It repealed the old Seed Act of 1972. The Act was passed to provide protection for plants and control for the handling of seeds and fertilizers and related matters for the purpose of safeguarding public health, agriculture and the environment in the country. The Act consists of five parts namely Plant Protection, Seeds, Fertilizer Control, Plant and Fertilizer Fund and Miscellaneous Matters.

Under the new Act are three Councils namely, the Plant Protection Advisory Council, the National Seed Council and the National Fertilizer Council. There is at least one committee under each council. In order to meet the financial requirements of the councils the Seed Fund, the Inspection Fund and the Plants and Fertilizer Fund were also established.

Part two of the Act provides the legislative and regulatory framework for the seed industry. Guidelines are spelt out for prospective seed importers, exporters, growers and cleaners. Any imported seed must be of a registered variety, multiplied in a seed multiplication farm, conditioned in a seed conditioning plant or tested in a registered laboratory and then packaged and labeled appropriately. Imports and Exports of seed are also subject to the Exports and Imports Act 1995 (Act 503).

RECOMMENDATIONS

In order to help strengthen the seed system in Ghana, the following recommendations are made. The Ministry of Food and Agricultural should play a supervisory role with minimal direct involvement in the seed sector. Marketing of seed should solely be in the hands of the private sector. Each region could however be given a quota of

Table 1. Inventory of crop varieties grown during 2011 cropping season.

Crop species	Variety planted	Type of variety	Source of supply	Years used
Maize	Obatampa	Improved OPV	GLDB, NARS	10
	Abrohema	Improved OPV	GLDB, NARS	5
	Aporsoe	Improved OPV	GLDB, NARS	5
	Abontem	Improved OPV	GLDB, NARS	5
	Mamaba	Hybrid	GLDB, NARS	5
	Etubi	Hybrid	GLDB, NARS	2
	Okomasa	Improved OPV	GLDB, NARS	15
Groundnut	Chinese		GLDB, NARS	20
	Nkatia SARI		GLDB, NARS	5
Cowpea	Songotra		GLDB, NARS	5
	Apaabala		GLDB, NARS	6
	Padi tuya		GLDB, NARS	7
Sorghum	Kapaala		NARS	10
	El dorado		NARS	10
	Kadaga		NARS	10
Millet	Tongo yellow		GLDB, NARS	6
	Bongo short head		GLDB, NARS	6
	Manga Naara		GLDB, NARS	6
	Bristle Naara		GLDB, NARS	6

Source: Field survey, 2012

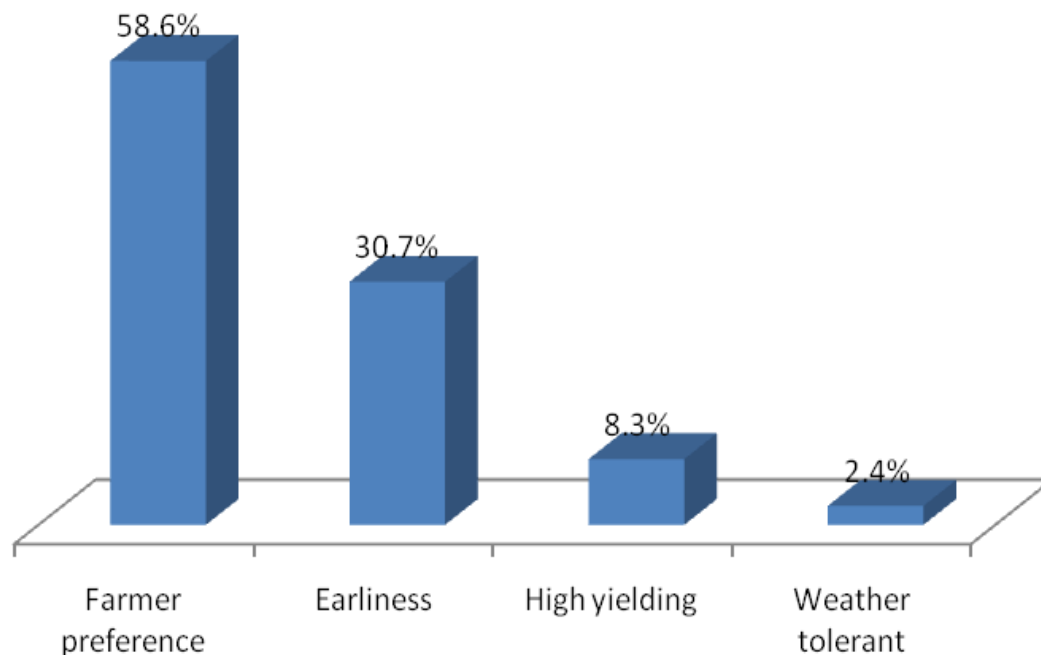


Figure 2. Reasons for adoption of improved seed varieties. **Source:** Field survey, 2012.

Table 2. Certified Seed Sufficiency in 2011.

Crop	Area (ha)	Output (MT)	Seeding rate (Kg/ha)	Estimated area that can be cropped with certified seed (ha)	Area cropped	Proportion of area under the various crops that can be planted by certified seeds (%)
Rice	752.61	2,257.83	50	45,156.00	197,480	22.87
Soybean	472.80	472.80	40	11,820.00	85,938	13.75
Cowpea	37.80	37.80	25	1,512.00	184,192	0.82
Sorghum	2.00	2.00	5	400.00	243,482	0.16

Source: Plant Protection and Regulatory Services Directorate of MoFA (2011).

seed to produce.

There is the need for farmer education in local languages about the importance of using certified seed in general and hybrid seed to be specific through field days, demonstrations, radio and television programs among others. The capacity of seed producers should be enhanced, especially for production of hybrid seeds, to minimize importation of seeds.

There is the need to build more cold rooms, ware houses, and install processing and packaging equipment in the regional and district capitals to help in the processing of seeds. Government could provide these services at a fee or provide seed companies with grants to acquire such facilities.

Agro-input dealers should be assisted to open more outlets in rural communities and also be encouraged to package seeds in different weights ranging from 1 Kg to 50 Kg in order to meet the needs of all categories of farmers.

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