

ISSD Africa



ISSD Briefing Note – April 2013 Ghana Seed Entrepreneurship Assessment

How does ISSD approach seed entrepreneurship?

In September of 2012, the Integrated Seed Sector Development (ISSD) programme in Africa published briefing notes assessing the seed sectors in eight countries¹, aimed at informing policy-makers and practitioners on the realities of farmers, with the intention of influencing seed policies and programmes in becoming more coherent with the practices of farmers, and thereby more effective in addressing the diverse range of demands among seed consumers.

ISSD recognizes the relevance of informal seed systems. It aims to better link informal and formal seed systems, and balance public and private sector involvement. ISSD endorses and supports a pluralistic approach to seed sector development, by identifying and characterizing a range of seed systems and work within these systems according to the structure of the seed value chain. The aim is to promote market orientation and entrepreneurship, and foster an enabling environment for the emergence of a diversity of international, national, and local seed businesses to contribute their strengths and operate in their specific niches. The driving forces are food security, biodiversity management, economic development, and the promotion of agricultural entrepreneurship.

Entrepreneurship is a strong incentive for investment and development in the seed sector, and can be a catalyst to improve the functioning and performance of seed value chains. Strengthening entrepreneurship in the seed sector requires an enabling environment for different types of seed systems, differing in operators and service providers. In order to support the design of seed programmes and policies that promote and/or strengthen entrepreneurship in a range of seed systems, decision-makers need to be able to recognize entrepreneurship in all its existing and potential forms.

¹ Briefing notes on Burundi, Ethiopia, Ghana, Malawi, Mali, Mozambique, Uganda and Zambia are available at: <http://www.wageningenur.nl/en/show/Integrated-seed-sector-development-in-Africa.htm>.

Assessing seed entrepreneurship in Africa

Guided by the assessments of national seed sectors, experts from across all ISSD Africa countries were involved in the design of an approach to assess seed entrepreneurship in different clusters of seed systems, namely: the informal, intermediary and formal systems. In Ghana, the informal cluster involves the farmer-saved seed system, with farmers producing, saving and exchanging seed amongst themselves. The intermediary cluster consists of the NGO programmes, which largely operate as community-based seed system, in which farmers' groups produce seed for their own and the community's use, and sell seed to NGOs and other entities. The formal cluster involves registered seed producers; emerging national private seed companies; and international companies, which produce mainly certified seed that is marketed through the government seed unit, or through agro-dealers or input schemes. In addition, cash crop value chains and closed value chains belong to the formal seed system cluster. See the previous Ghana seed sector assessment briefing note for more details.

In each cluster, two indicator crops were selected for identifying value chains through which opportunities for entrepreneurship emerge. An assessment of the strengths, weaknesses, opportunities and threats relevant to the different forms of entrepreneurship is then carried out; and finally, projects and programmes aimed at promoting and/or strengthening seed entrepreneurship are evaluated according to the specific requirements of those entrepreneurs identified.²

A. Defining seed entrepreneurship

Seed entrepreneurship in Ghana is perceived in different ways, reflecting the fact that although many characteristics are common for all actors in the sector, a

² For further details on the assessment and the methodologies applied, reports are available upon request. See also ISSD Africa Newsletter 3, December 2012, available at: <http://www.wageningenur.nl/en/show/Integrated-seed-sector-development-in-Africa.htm>.



few distinctive characteristics differentiate the type of entrepreneurship of the various stakeholders who are operating in informal, intermediary and formal seed system clusters.

In the informal cluster, entrepreneurs can be identified as individual small-holder farmers (both men and women) who are equipped with better social networking skills to acquire new varieties from possible sources. Entrepreneurship is largely expressed in the form of risk taking; experimentation; enhanced technical skills; resource planning for large production; and seed marketing, motivated mainly by profit, for improved livelihoods.

In the intermediary seed system cluster, entrepreneurs are small- to medium-scale seed producers, who operate in groups. They work collectively in a group to conduct business for profit, which seems to strongly motivate group cohesion. Entrepreneurship is largely expressed in the form of a business mind-set; resource planning for large-scale production; and a passion to be involved in the commercialization and marketing of their own seed.

In the formal seed system cluster, entrepreneurs are individuals from medium- to large-scale commercial enterprises (mostly men), who often consider seed as a business for profit motives. Entrepreneurship is largely expressed in the form of a business mind-set; risk taking; an interest in using innovations for quality seed production; the sourcing of new commercial varieties; large-scale production; and the desire to establish their own seed company.

The formal seed system also comprises a second type of entrepreneurs (mostly men), who own seed companies. These entrepreneurs are associated with large-scale enterprises; they are not necessarily actual farmers, and may come from a different business background. Entrepreneurship is expressed in the form of approaching seed as a new business opportunity; risk taking and innovations to demonstrate successful new technologies (new seed and machinery). In this way, they differ from their peers, by creating employment and excelling in performance to become well-respected and profitable business firms.

Various seed programmes consider entrepreneurship as the ability to share knowledge and technologies; develop a commercial business attitude concerning their partners, and to efficiently fulfil the goals of the programme.

B. Seed value chains in the different clusters

The seed value chains for the informal, intermediary and formal seed system clusters of Ghana are summarized in Tables 1, 2, and 3, respectively. In the informal cluster, the operators are mostly small-holder farmers (men and women), who lack specialized seed production techniques. Varieties are sourced from farmer-saved seed or through exchange with neighbours. There is an absence of a structured marketing system for seed, which is mainly exchanged locally or sold in the local grain market. NGO seed distribution programmes; government block farm programmes; and on-farm trials of public research entities comprise the limited opportunities that exist for obtaining improved varieties of mainly maize, rice, cowpea and cassava.

Table 1: The value chain of the informal cluster

Seed value chain	Variety source	(Basic) seed source	Seed production and multiplication	Seed dissemination and marketing
Operators	Farmer -saved seed, seed from relatives or neighbours, local markets, exchange	Farmer-saved, relatives or neighbours, local markets, exchange	Farmers' own fields, on-farm multiplication	Own distribution, dissemination through relatives or neighbours, local markets and exchange
Services	Access through extension services, NGO programmes for some new materials, on-farm trials (participatory varietal selection) by public research	Advice from fellow farmers	Government extension services, on-farm trials of participatory research	No special seed dissemination mechanism, local government extension services
Enabling environment	<ul style="list-style-type: none"> Seed law (under the Plants and Fertilizer Act, 2010) provides for the participation of farmers in decision-making at national level (e.g. National Seed Council and the National Variety Release Committee) Draft national seed policy of 2013 includes provisions for strengthening the informal seed system, by for example, promoting participatory plant breeding strategies National Genebank at the Plant Genetic Resource Research Institute (PGRRI), which serves as a source of germplasm for new variety development The revised Food and Agriculture Sector Development Policy (FASDEP II) provides support for the production of certified seed/planting materials Draft bill on plant breeders' rights of 2012 is disallowing farmers informal seed system Farmers' Rights legislation has not yet been developed Access and benefit-sharing law of the Convention on Biological Diversity (CBD) of 1992 has not yet been developed Member of the Economic Community of West African States (ECOWAS) in seed policy harmonization 			

Indicator crops: sorghum and grain legumes; Type of seed quality: farmer-saved, informal

The intermediary seed system cluster mainly involves seed or produce value chain programmes, which are being implemented by various NGOs under the community-based seed production scheme. This system is mainly concentrated in northern Ghana, for crops such as maize, rice and cowpea. Value chain programmes on root and tuber crops are currently being implemented across the country. The major operators are organized seed producing farmers, who multiply and produce quality seed; public research programmes, such as Savannah Agricultural Research Centre (SARI), the Crop Research Institute (CRI) in collaboration with the

International Institute of Tropical Agriculture (IITA), and other CGIAR programmes that have introduced released or pipeline varieties. The Grains and Legumes Development Board (GLDB) is the sole source of foundation seed. However, rice seed production and root and tuber crop programmes have their own foundation seed production activities. Regional seed units, under the Plant Protection and Regulatory Service Directorate (PPRSD), provide services for seed quality assurance. A large number of agro-dealers act as input suppliers, and are also involved in seed marketing.

Table 2: The value chain of the intermediary cluster

Seed chain	value	Variety source	(Basic) seed source	Seed production and multiplication	Seed dissemination and marketing
Operators		Root and Tuber Improvement and Marketing Programme (RTIMP), the Ministry of Food and Agriculture (MoFA), CRI, SARI, IITA, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); National genebanks that provide access to germplasm for breeding; individual farmers and organized groups of farmers	Facilitated through RTIMP (primary and secondary planting material producers, or specialized local farmers), GLDB	Selected farmers, groups of farmers, individual farmers, or entrepreneurs who are to some degree specialized in seed production	Directly by RTIMP through groups of farmers, individual farmers or entrepreneurs Agro-input dealers supply seeds directly from farmers, groups or local entrepreneurs
Service providers		National and international public research and genebanks provide access to varieties and information to intermediaries that provide varieties to farmers	Public research institutes, quality assurance by extension and seed quality inspectors under PPRSD (no control; quality declared)	Input often supplied by NGOs and development agents, and/or agro-dealers Quality management by extension and seed quality inspectors (no control; quality declared)	Dissemination through selected farmers or groups of farmers Marketing information by agricultural extension agents (AEAs)
Enabling environment		<ul style="list-style-type: none"> • FASDEP II provides support for the production of certified seeds/planting materials • Plants and Fertilizer Act of 2010 (seed law) has been approved and enacted • Draft seed regulations need approval; provide standards for variety release and quality assurance • National Seed Council has not yet been fully formalized • Variety release committee is in place • Draft national seed policy of 2013 needs approval • Draft bill on plant breeders' rights of 2012 needs approval • Farmers' Rights legislation has not yet been developed • Credit and trade laws • Member of ECOWAS in seed policy harmonization • Not yet accredited with International Seed Testing Association (ISTA) standards 			

Indicator crops: Rice and cassava; Type of seed quality: certified

The formal system cluster is very similar to the intermediary cluster in terms of crop focus, seed programmes, and the way in which the roles and responsibilities of the various actors involved in providing services along the seed value chain are defined and organized. The main characteristic of this system is the presence of a large number of scattered registered seed producers operating within the Seed Producers Association of Ghana (SEEDPAG); and emerging national private seed companies. SEEDPAG

members and seed companies both vary in terms of seed production capacity, and the volume of quality seed produced. However, they are very similar in terms of crop and variety portfolio. The main bulk of certified seed produced open-pollinated maize (one single variety, Obatanpa, which was released in early 1990s); rice (two improved varieties and one newly released Jasmine 85); soybean and cowpea (mainly the black eye variety). Sorghum and groundnut constitute a small portion of certified seed production. They market the

seed through regional seed units, seed distributors or agro-dealer networks. However, rice seed is largely marketed through projects rather than agro-dealers.

The packaging materials are sourced from Ghana Seed Inspection Division.

Table 3: The value chain of the formal cluster

Seed chain value	Variety source	(Basic) Seed source	Seed production and multiplication	Seed dissemination and marketing
Operators	IITA, CRI, SARI	IITA, CRI, SARI, GLDB, private seed companies	Research Institutes, private seed producers (SEEDPAG)	Agro-dealers sourcing seed from private seed companies
Service providers	Public research entities provide access to varieties and information	Public research entities, quality assurance and certification by MoFA (Ghana Seed Inspection Division)	<ul style="list-style-type: none"> • Input supply by agro-input dealers • Extension services provided by MoFA • Seed quality assurance and certification by MoFA • Financial services (credit) provided by commercial and rural banks, micro-finance institutions, etc. 	Agro-input dealers (Ghana Agricultural Input Dealers Association - GAIDA), private seed companies, NGOs (ACDI/VOCA, CropLife)
Enabling environment	<ul style="list-style-type: none"> • FASDEP II provides support for the production of certified seed/planting materials • Plants and Fertilizer Act of 2010 (seed law) has been approved and enacted • Draft seed regulations need approval; provide standards for variety release and quality assurance • National Seed Council has not yet been fully formalized • Variety Release Committee is in place • Draft national seed policy of 2013 needs approval • Draft bill on plant breeders' rights of 2012 needs approval • Farmers' Rights legislation has not yet been developed • Credit, trade laws • Member of ECOWAS in seed policy harmonization • Not yet accredited with ISTA standards 			

Indicator crops: maize and tomato; Type of seed quality: certified

C. Seed entrepreneurship incentives

The key incentives for promoting seed entrepreneurship in Ghana have been identified as being: (i) access to new varieties of seed and wide-scale field demonstration activities; (ii) capacity-building of seed chain actors; (iii) a revolving fund for breeders and seed inspectors; (iv) access to physical assets and infrastructures; and (v) access to a financial support 'starter pack'.

Seed producers, companies and seed programmes require easy access to newly released varieties in Ghana. This includes accessing both the necessary information and early generation seed of new varieties. To increase the demand for new varieties, field demonstrations and promotional activities, such as seed fairs, demonstration activities, production leaflets, media coverage (TV/Radio) are needed on a massive scale.

Tailor-made capacity building programmes are needed for seed chain actors, including seed producers, companies, seed inspectors, MoFA staff members and seed processors in Ghana. For the informal seed system, the areas that need particular attention are participatory varietal selection (PVS); quality seed production; and improved seed processing and storage facilities. The intermediary and formal seed systems require skills in the production of foundation and hybrid

seed; internal quality assurance; and market orientation in their seed business.

One of the constraints of the public breeding programmes, such as those of CRI and SARI, is the lack of incentives for breeders. The establishment of a revolving fund could provide an incentive for breeders and supplement the operational costs of breeding programmes. Similar revolving fund mechanisms could be established to motivate the seed inspectors and inspection unit.

The provision of seed processing equipment (shellers, dryers, cleaners, etc.), to ensure timely processing and minimize processing/post-harvest losses, will secure efficiency in seed marketing. The provision of a 'starter pack' of initial seed capital to very committed seed producers and multipliers, acts as an additional incentive. These starter packs are offered through a granting to facility, in order to facilitate an expansion in acreage; the adoption of improved production methods; and a reduction in average production costs.

D. Improving seed production through entrepreneurship

In Ghana, the following opportunities have been identified to improve seed production through entrepreneurship: (i) access to diverse crop and varietal portfolios; ii) foundation seed production; iii) market orientation for seed producers and companies; and iv) linkage of seed production chains to output markets

Seed production practices within the informal seed system are still traditional and largely ignored by the formal system. Incorporating participatory varietal selection by public research organizations, as a strategy to select the superior local populations for seed production; and providing extension support for simple techniques, such as isolation distance, rouging, and seed storage, could greatly help to professionalize the system. Practices such as the use of a community seed bank as a repository for seed storage and dissemination, and also as a social safety net during the emergency period, could further contribute to developing entrepreneurship in the system.

The intermediary and formal seed systems, which are largely controlled by government or NGO programmes, and by the private sector, in which the seed production capacity is still mainly focused on certified seed (mostly self-pollinated or open-pollinated varieties). The development of hybrid seed production is very limited. The availability of newly released varieties and early generation seed is one factor that hinders meeting the demands of certified seed production. On other hand, encouraging initiatives for producing foundation seed of newly released varieties of maize, rice and soya in northern Ghana, have been started by a small number of seed companies, such as Savannah Seed Services, Heritage Seed, and Lexbok. Several seed producers are actively collaborating with SARI to obtain the most newly released products.

Tapping into the opportunities of output markets has created a demand for quality seed production. Most commercial seed imports in Ghana depend on linked contract schemes, where seed and other inputs are provided to farmers and their produce is purchased for sale in well-defined markets. Wienco has been promoting two PANNAR hybrid maize varieties mainly for the poultry feed industry. The Root and Tuber Improvement and Marketing Programme (RTIMP) is promoting quality planting materials of cassava, yam, sweet potato to fulfil the demand of output markets, through, for example processing centres for the *Gari* flour market. Similar examples exist concerning the demand for sorghum by breweries, and for packaged rice by middle class consumers. Developing robust and efficient agricultural output markets in Ghana could be a

success factor that will determine seed demand, and contribute significantly to the growth of sector.

E. Improving service provision to seed value chains through entrepreneurship

In Ghana, the following opportunities have been identified to improve the provision of services along the seed value chain, in promoting entrepreneurship: (i) a differentiated quality assurance system; ii) efficient seed processing and storage facilities; iii) an agribusiness approach in extension services; and iv) the provision of business development services to public and private seed stakeholders.

The Ghana Seed Inspection Division (GSID), which is the sole government body responsible for seed quality assurance in Ghana, is currently following minimum standards of certification. However, the limited resources available at GSID greatly limit its operation; in addition, seed production sites are scattered, which creates inefficiencies in the delivery of services. Internal quality assurance systems have not yet been developed within seed companies or producers, so they completely rely on the services of GSID. The new seed law and seed policy include provisions for the accreditation of an internal quality assurance system.

One of the key factors limiting the development of entrepreneurship in the Ghanaian seed sector is the lack of modern and efficient seed processing, storage and conditioning facilities. The Grains and Legumes Development Board (GLDB) inherited some of the infrastructures of Ghana Seed Company (GSC), when it collapsed in 1989. These age-old infrastructures are at present the only source of services. Only four such processing centres are currently functional, and are located in Winneba (central region), Kumasi (Ashanti region), Tamale (northern region) and Ho (Volta region). Due to the more individual nature of seed production in Ghana, these regionally located seed units are not an efficient option for all seed producers. More public-private or private-private partnership, with decentralized processing facilities, should be explored to eventually develop their own seed conditioning facilities that are better suited to their own operations.

Various seed sector stakeholders are becoming increasingly active in providing extension services to their own members and to other farmers. However, the key challenge is that there is still a large number of farmers who lack improved varieties seed, and the credit to buy the required inputs, and as such the adoption rate is still low. The agribusiness firm Wienco, which is producing two hybrid yellow maize varieties for its out growers in a contract scheme in northern Ghana, provides input packages in the form of credit facilities,

such as fertilizers and agro-chemicals; repayment by the farmers' groups is carried out after the harvesting of their crops. This type of entrepreneurship could help overcome many challenges that are prevalent in the extension services of the Ghanaian seed sector.

Business development support services are essential to professionalize seed entrepreneurs in Ghana, for both public and private organizations. AGRA, through its seed programme, provides training and coaching to national private seed companies to develop their seed business plan, and financial and marketing management. A large number of members of SEEDPAG still organize their businesses based on their previous years' experiences, or plan on an ad-hoc basis. These members would benefit greatly from the provision of such business development support services.

F. Impact of the enabling environment on seed entrepreneurship

The seed sector in Ghana is at the stage of developing several new policies, laws and regulations, many of which are in the process of being drafted and approved, which is having an impact on the development of seed entrepreneurship across the seed system clusters. The revised Food and Agriculture Sector Development Policy (FASDEP II) is the main comprehensive agricultural policy that provides scope for seed sector development by supporting the production of certified seed/planting materials, and intensifying awareness raising programmes to increase farmer usage.

The seed law (within the Plants and Fertilizer Act of 2010) has been enacted; however, it has yet to be fully implemented. The most important aspect of the new seed law is the establishment of the National Seed Council and various committees, facilitating the production of any class of seed by an approved entity, and the provision of permits in both the domestic and foreign (public and private) sectors. This provides a major incentive for private seed companies to produce early generation seed. The draft seed regulations, which outline the procedures for variety release and standards for seed certification, largely aim to facilitate the formal seed system.

Draft bill on plant breeders' rights (PBR bill) is currently waiting for approval by the parliament. The PBR bill has been developed in line with the International Convention for the Protection of New Varieties of Plants (1991 version), to provide ownership and protection for new varieties developed by any public and private entities. Upon approval and enforcement, the PBR bill could serve as a major enabling environment to provide incentives for public and private breeding programmes. This provides almost monopolistic rights to variety

owners. However, the absence of a provision for farmers' exemption in the PBR bill may impact negatively on the informal seed system, where farmers will be forbidden from exchanging and selling protected varieties.

A draft national seed policy, which includes key elements such as the recognition of the importance of the informal seed system, is in the process of being approved. This policy provides a number of strategies for strengthening the informal seed system, and for developing the private seed sector, and recommends the establishment of a differentiated seed quality assurance system in support of a pluralistic seed sector in Ghana. At the same time, the policy outlines strategies for the differentiated provision of plant variety protection and farmers' rights. For example, the entire commercial sector will be supported by strong provisions on variety protection, while traditional landraces/varieties will be protected through farmers' rights; therefore, farmers will still be able to use, re-use, exchange and sell the seed.

Seed policy harmonization and rationalization process of ECOWAS, of which Ghana is a member, covers regional variety release and registration; seed certification; plant variety protection; and phyto-sanitary measures. This provides for the free trade of varieties and seed across the border, by removing trade-related obstacles and barriers, which benefits commercial seed producers by allowing them to explore markets. At the same time, the emerging national private seed sector needs to compete with international seed companies to find their niche market.

Ghana is also a signatory of international conventions related to biodiversity and plant genetic resources for food and agriculture (PGRFA), such as the Convention on Biological Diversity (CBD) of 1992, and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) of 2004 which directly impact on the seed sector, and which urge governments to develop appropriate legislation, such as Access and Benefit-Sharing law, and Farmers' Rights legislation at national level, which are both lacking in Ghana.

G. Recommendations for making policies, programmes and practices more effective in promoting and strengthening entrepreneurship

Promoting successful initiatives and incentive mechanisms in the practices of seed entrepreneurship:

The informal seed system provides a huge entry point and opportunity for quality seed production and supply,

to meet demands for seed of food security crops, especially those that are not catered for in the formal seed systems. Furthermore, the system serves as the main source of seed for the large majority of small-scale farmers, particularly those who cannot afford to buy certified seed. However, the informal seed system has been given the lowest priority, and only insignificant activities have so far been carried out. Public research entities have adopted participatory varietal selection (PVS) methods to incorporate the views of farmers during on-farm trials of new varieties. The provision of pluralistic extension services, and use of an agribusiness approach will provide a key stimulus in the system.

The intermediary seed system involves community-based seed production schemes that largely depend on external support. Self-reliance and business orientation comprise the entrepreneurial approach. This system requires an upgrading of technical skills on, for example, pre-harvest and post-harvest production: seed pricing; seed marketing; financial record keeping; managing a bank account; and linkages with service providers. This could lead to becoming self-reliant local seed business entities, and meeting the demand for quality seed.

Formal seed systems still lack market orientation and have inadequate skills in seed business management and seed trade association development. In order to address these issues, strong management skills should be developed, focusing on the following three main areas: production management, where pre- and post-harvest skills are upgraded with the efficient use of machinery and an internal quality assurance system; financial management, with skills in annual resource planning, annual auditing and the banking culture; and marketing management, with a focus on unique product marketing through exclusive licensing, customer feedback and promotional activities, including the development of packaging and branding. Integrating an out-grower model and agribusiness approach could be a strategy for extending the production scale. Collaboration with international seed companies, functional linkages with seed chain actors and seed trade association development will provide new opportunities for learning and institutional growth.

Scaling-out and -up of successful initiatives and interventions of seed-related programmes:

Commercial seed production efforts in Ghana are concentrated in the intermediary and formal seed system clusters, mainly focusing on maize, rice, cowpea, soya, cassava, sweet potato, yam and a few other crops. The following strategies could support the development of the seed sector in Ghana: ensure robust and efficient agricultural outputs; establish a market-oriented seed value chain; adopt of an agri-business

approach in the provision of extension services; provide business development services for private firms; and promote the use of information communication technologies (ICT).

Wienco's out-grower seed production scheme for hybrid maize seed, in which growers are trained and provided with input-seed, fertilizer and agro-chemicals as credit, in one package, could be applied to many other crops. In the RTIMP programme, international research organizations collaborate with national partners in developing or testing new technologies on vegetatively propagated crops. These are linked to commodity value chains, where seed production is organized into primary and secondary producer levels to multiply and disseminate quality seed to thousands of small-holder farmers. These farmers are linked to processing centres that directly receive inputs and training to produce higher yields and market their outputs. Good Practice Centres are another successful approach to practical training. These centres demonstrate and disseminate successful technologies on a wide scale.

The 'Ghana Agro-Dealer Development (GADD) project' used information technology to digitise the distribution of over 4000 agro-dealers, and to develop a common directory in Ghana. This service is accessible through a mobile-based SMS system. This kind of approach could be easily scaled-up to develop inventories detailing seed production activities of SEEDPAG members and seed companies, for which such information is at present largely lacking or inaccessible.

Sproxil, a company which has country office in Accra, is promoting a mobile phone messaging service, based on scratch-cards, to deal with counterfeit commodities. This has achieved huge success with medicines in Nigeria, and is currently being tested for use with agro-chemicals. The Sproxil technology will work best if seed producers are allowed to use their own customized packaging and tags with the scratch cards. Producers can then be held accountable if fake seeds are found in their seed packs/bags. This will provide an opportunity to deal with fake seed in Ghana, for consumer protection.

Addressing gaps in policies and the enabling environment:

The informal seed system clearly lacks an enabling environment to support the professionalization of farmers; enhance their capacity in varietal choice, quality seed production and storage; and develop adequate marketing skills to meet diverse demands. To address these gaps, the draft national seed policy of 2013 has provided a strategy to integrate the formal and informal seed systems by promoting participatory

approaches. In addition to these, the informal seed system in Ghana could benefit from the successful experiences of other African and Asian countries in promoting various practices, which include supporting on-farm management through participatory plant breeding; promoting the protection of traditional knowledge; organizing seed fairs; establishing community seed banks and community seed funds; and facilitating the participation of farmers in national decision-making bodies, such as national seed councils and national variety release committees.

Limited variety development and an insufficient availability of breeder' seed within public research programmes is associated with a lack of breeder incentives; and the absence of resources for multi-location trials, and irrigation facilities for breeder seed production during the off-season. In addition to this, lengthy, and not fully transparent, variety release procedures is another bottleneck. Upon its approval and enforcement, the PBR bill could offer policy solutions to breeder incentives, and market orientation of breeding programmes. At the same time, the opportunity provided by the ECOWAS common seed catalogue should be fully exploited when a variety released in one member state does not require full testing.

The seed sector in Ghana is suffering from an inadequate quality assurance system, and insufficient access to seed processing equipment. A public-private partnership business modality needs to be identified in order to develop an independent seed regulatory body that can provide services to customers. The seed policy has provided further scope for differentiated quality assurance mechanisms targeting different levels of development in different seed systems, such as 'quality declared seed' (QDS) for more community-oriented seed production programmes; and full certification, with the

provision of internal quality assurance and accreditation, for the commercial seed sector. Similarly, private-private/-public partnerships with decentralized processing facilities should be explored by seed producers in the private sector, with the ultimate aim of developing their own seed conditioning facilities, which would be most suited to their own operations, and as such could be a sustainable strategy.

Another policy consideration is that of seed subsidies, which need careful analysis. Instead of providing a seed subsidy for popular varieties that are already available in the market, the government could provide subsidies for newly released varieties, for a specific time-period, to create awareness, interest and demand in the farming communities. This in turn could strengthen the sector.

In light of the above development and policy issues, the key challenge is to ensure the availability of adequate resources in order to establish an enabling environment for fully enforcing the policies needed. Furthermore, different policies and programme interventions require greater coordination and partnership efforts with different stakeholders, including the various ministries. In light of these new emerging challenges, the MoFA has undertaken to work together with all seed sector stakeholders in Ghana, to develop a comprehensive 'national seed plan', aimed at developing a landscape overview of the seed sector, its current status and investment plans; identifying gaps and future priorities; and defining roles and responsibilities that will enable the seed sector in Ghana to move towards becoming vibrant, pluralistic and entrepreneurial, as foreseen by the Integrated Seed Sector Development Programme in Africa.

Authors:

Robert Aidoo, Charles Quansah, Richard Akromah, Kwadwo Obeng-Antwi, Kwabena Adu-Gyamfi, Juliette Lampoh and Abishkar Subedi

Picture credit: Marja Thijssen (CDI)

ISSD Africa II – Ghana task force and team:

- C. Quansah, Faculty of Agriculture, Kwame Nkrumah University of Science and Technology, ISSD consultant
- R. Aidoo, Faculty of Agriculture, Kwame Nkrumah University of Science and Technology, Assistant consultant
- K. Obeng-Antwi, Crops Research Institute, Kumasi, Ghana, representing the public sector
- K. Adu-Gyamfi, Agri Commercial Services Ltd, Accra, Ghana, representing the private sector
- J. Lampoh, Concern Universal, Accra, Ghana, representing NGOs
- R. Akromah, Faculty of Agriculture, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
- A. Subedi, Centre for Development Innovation, Wageningen University and Research centre, the Netherlands, ISSD Ghana programme coordinator

ISSD Africa editorial team:

Gareth Borman, Marja Thijssen, Elizabeth O’Keeffe and Mundi Salm
Centre for Development Innovation, Wageningen University and Research centre (CDI), Wageningen, the Netherlands

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