

SEED SYSTEM DEVELOPMENT: FERTILE GROUNDS IN SUB-SAHARAN AFRICA

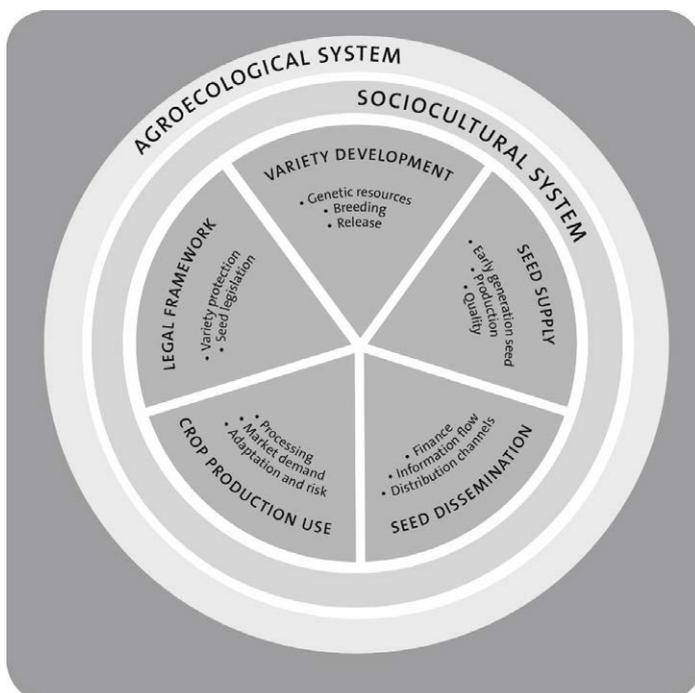
Identifying Options for Sustainable Development

Seed is a fundamental resource required for arable agriculture. Seed as an input is critical for enhancing value, productivity and resilience in African agriculture. Sustainable seed systems enable availability, access and quality of seed and thus of new and continuously improving varieties for farmers and users of the crops. Improvements to seed systems are expected to produce wide-ranging and growing benefits along the entire value chain. Enhancing the sustainability of seed systems may involve a broad range of actors including plant breeders, certification agencies, seed companies, grain processors as well as farmers. Seed system investments in Sub-Saharan Africa are diverse and tend to focus on specific groups of actors and actions. The latter include, among others, emergency seed distribution, harmonizing regional seed policies, encouraging private sector investments in the seed sector, building community seed banks,

strengthening farmer-researcher collaboration for efficient variety development or conserving agricultural biodiversity. Despite the investment from the international community, The African Centre for Biodiversity estimates that as much as 70-80% of seed planted in Africa is farm-saved seed. Only maize has reached relatively high adoption rates; in Southern and Eastern Africa around 25% of seeds sown are estimated to be certified. What can be learned from the experiences and expectations of the full range of seed system actors?

Teams of national and international scientists facilitated and documented such steps towards collaborative learning in Kenya and Mali, focusing on seed systems for the national staple crops, maize and sorghum in Kenya, and rice, pearl millet, sorghum and maize in Mali. The discussions focused on identifying priority actions to improve seed system sustainability to which all the actors could agree. This policy brief summarizes these high-priority options identified by seed system actors from both countries for consideration by donor agencies, implementers of seed system projects and others interested in improving the sustainability of their efforts for seed system development. The methodology used for arriving at these prioritized seed system development options is described in detail in the ZEF working paper 165.

Figure 1: Five basic seed system functions (centre), embedded in larger socio-cultural and agro-ecological contexts



Seed Systems in Sub-Saharan Africa

Seed systems across Africa vary in terms of structure, organization and reach. Table 1 highlights some of the differences in the main characteristics of the seed systems for major cereal crops in Kenya and Mali. In both countries, extension systems are weak and farmers and other actors have difficulty to access information about the performance of new varieties in specific production conditions or about their grain qualities. In both countries, the release of new varieties is slowed down by the high costs for national performance testing, while the costs of seed certification are high and do not prevent fraud effectively.



Table 1: Main characteristics of the cereal seed systems in Kenya and Mali

SEED SYSTEM FUNCTION	KENYA	MALI
Legal Framework	Long history of regulations for variety release and seed certification with high costs	Process of regional harmonization in progress, with adaptation to national realities
Variety development	Mostly public sector breeding by national research and university, some emerging private investments for maize hybrids	<ul style="list-style-type: none"> Only public sector breeding by single national research institute Collaboration between breeders and farmers is extensive
Seed supply	<ul style="list-style-type: none"> Certified seed production is contractual between large scale farmers and seed companies Certified seed imports make up about 16% of the available certified maize seed (in 2015/16) Sorghum seed is produced by small-scale farmers on their own 	<ul style="list-style-type: none"> Certified seed production by farmer seed cooperatives, rarely with contracts Certified seed is sparsely available and mainly domestically produced Most farmers produce their own cereal seed
<ul style="list-style-type: none"> Seed Dissemination of certified seed Dissemination of farmers' own seed 	<ul style="list-style-type: none"> Managed by seed companies via multi-level agro-input supply networks Emergency seed distributions are common via local grain traders and family networks 	<ul style="list-style-type: none"> Managed by seed producer cooperatives in geographical proximity Free seed distributions are becoming more common via village level networks and family relations
Crop Production and use	<ul style="list-style-type: none"> Approximately 70% of maize seed sown is certified, for sorghum, it is approximately 30% Small-scale farmers prefer varieties with qualities for local consumption and good grain storability 	<ul style="list-style-type: none"> Certified seeds are sown on approx. 5% of sorghum and pearl millet areas and 10-15% of maize and irrigated rice areas, although shares differ widely between regions. Farmers choose varieties for their adaptation to local growing conditions and grain qualities for home consumption

What is a seed system?

A **sustainable seed system** will ensure that high-quality seed of a wide range of varieties and crops are produced and fully available to farmers and other related actors in a timely and affordable manner. A seed system can be described by its major functions: provision of a legal framework, varietal development, seed supply, seed dissemination, as well as crop production and use. Each function tends to engage a specific set of actors, such as seed policymakers, genebank managers, plant breeders, seed producers and sellers, extension agents, farmers, consumers (including processing industries) and their professional organizations, where appropriate.

Towards sustainable seed systems

Farmers, grain traders and processors, seed producers, seed sellers, plant breeders, certification agents and extension workers can engage in a wide diversity of actions to improve the sustainability of their seed systems. These actions can improve the functioning

of the seed system with effective interactions among the diverse and often geographically distant actors encouraging learning from each other. The potential outcomes from actions targeting improved quality of seed, its availability to local users, and its accessibility, especially for small-scale farmers, are summarized below with specific recommendations.

POLICY RECOMMENDATIONS

- **Actions that place farmers' demands for specific varietal and seed quality improvements in a central role for seed system development** will aid sustainability and gender-responsiveness.
- **The continuous development of new varieties is required for sustainability of any seed system effort;** thus increased attention to long-term funding for plant breeding programs and their integration in seed system development initiatives is needed.



Seed Quality

Smallholder farmers' choice of variety and source of seed are driven by specific local growing conditions, diverse production and use objectives, and experiences with various sources of seed. Since most farmers grow cereal crops for household consumption, they are interested in varieties with grain quality traits linked to local uses, and with adaptability to low soil fertility, drought or diseases, not just general yield improvements. Farmers require a diversity of varieties to enhance their ability to respond to new opportunities and changing climatic conditions.

Assurance of biological and technical seed quality is a prerequisite for seed systems to function. The inability to eliminate 'fake seeds' or those with low germination characteristics undermines trust between actors. This problem is not necessarily achieved through legal measures since it also persists in countries with elaborate regulatory systems. Rather, the nature of the relationship between actors in the seed supply chain plays an important role in ensuring quality and limiting fraud.

POLICY RECOMMENDATIONS

- **Explore alternative legal pathways within regulatory systems as well as options for a decentralized certification process** to accelerate the availability of new varieties and to ensure commercial availability of local varieties.
- **Strengthen and tap potentials of farmer cooperatives and their networks** for shorter distribution pathways and responsiveness to smallholder farmer needs based on their proximity to those farmers.
- **Enhance relationships and regular exchanges between seed system actors** to identify concrete actions with a high potential for improving seed availability and other outcomes.

Seed Availability

The regulatory context, as well as legal and socio-cultural norms, influence the availability of seed and specific varieties. Farmers, plant breeders, seed producers and others expressed strong interests in simplifying the regulations for variety release. Reducing the costs for the release process could lead

to the release of more new varieties with adaptation to specific growing conditions or quality traits. Furthermore, local varieties of preferred quality could also be released to allow their marketing as certified seed. These actions to enhance seed availability would be especially important for minor crops or specific varieties that farmers do not regularly maintain their own seed.

There was widespread interest to decentralize seed certification and to develop options for self-certification, or marketing quality-declared seed. In this way costs for certification can be reduced and processes become more transparent. Decentralized seed production and certification would allow greater access to specialized varieties that are important for smallholders and further stimulate local seed industries.

Different models of seed dissemination are suitable for different contexts. Farmer-managed seed cooperatives, for instance, can effectively reach customers at minimal cost, including those who are distant from major markets or demand diverse varieties. Furthermore, such farmer cooperatives provide opportunities for coordination and driving innovation jointly with breeders and the larger research community. The distribution networks of private companies, on the other hand, can be most effective for large-scale distribution of a few, well-known varieties to areas where they are widely used.

Seed Access

Access to seed is the final determinant of whether improved seed is sown and can thus provide benefits to its users. Cash constraints decrease accessible options to actors across the seed system. This may limit the availability of popular hybrids on the supply side or diminish access to certified seed on the farmers' side, leaving farmers to rely on their own farm-saved seed or local networks.

Free seed distribution has oftentimes been an initial answer, but it tends to create dependencies, often without providing farmers with choices or possibilities to assess the quality of distributed seeds. Not only is information about varietal qualities often poor or missing in such seed distributions, but local seed businesses also tend to suffer and fraud is encouraged.

Input credit schemes can assist farmers in accessing quality seed. Farmers' experiences relating to such approaches are mixed, especially when they leave



little flexibility regarding the use of their future income since the non-repayment of a loan due to a family emergency may have serious consequences. A savings-based scheme for accessing inputs in Mali, where farmers can also request that their savings be returned, seems to overcome many of these problems.

A gender-inclusive approach to improving access to preferred quality seeds and varieties should not only consider the needs of women and men but also their potential contributions to all seed system functions.

Detailed ex-ante evaluations that take into account a host of influencing factors - institutional, agronomic, human, and environmental are essential to fully understand the potential of small scale irrigation projects. **Strategies to expand irrigation need to consider factors that can undermine farmers' willingness and ability to make long-term investments in irrigation technologies.** Well-established **land tenure**, water rights and their enforcement, for instance, are expected to collectively encourage farmers to invest in small-scale irrigation while facilitating access to credit that can cover the costs of operations, maintenance and further expansion of the irrigation scheme. Land rights could also empower farmers to flexibly make farm decision on their own and to choose to grow high-value cash crops with irrigation during off-seasons.

Incentives, regulations, and monitoring systems that minimize any unintended consequence of small-scale irrigation expansion must be established in areas that suffer from seasonal scarcity of physical scarcity. Empowered Water Users' Associations can

perform critical functions in community-based small-scale irrigation schemes. Women's participation and leadership in WUAs could also play an important role in promoting gender-balanced impacts.

POLICY RECOMMENDATION

- **Enable more responsive information sharing among seed system actors** to aid their decision-making. Activities to collect and share varietal information, especially for specific agro-ecologies, using mobile devices, ICT platforms, and local languages will aid access to and feedback of information critical to different actors, including women.
- **More rigorously assess the benefits and costs of seed system interventions** such as new technologies, policies or free seed distributions prior to, during and after engagement. Such assessments should be differentiated by actors and beneficiary groups to enhance learning and inform future actions.
- **Consider how to tap the potential of rural actors to contribute to seed trade** by promoting locally-based and decentralized seed marketing activities rather than or in addition to urban-based actors.

This Policy Brief is based on the study: Christinck, A., Rattunde, F., Kergna, A., Mulinge, W., and E. Weltzien (2018): Identifying Options for the Development of Sustainable Seed Systems – Insights from Kenya and Mali. ZEF Working Paper No. 165. Bonn: Center for Development Research.

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PARI is funded by the German Federal Ministry for Economic Cooperation and Development (BMZ).

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