SEED SYSTEM SECURITY ASSESSMENT

BURUNDI

MUYINGA PROVINCE

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CORE RESEARCH TEAM

Catholic Relief Services	Salvator Nkurunziza Simon Nakaganda Yves Haringanji Rose Paula Kanyange
ODEDIM	Sebastien Havyarimana
Bioversity	Faustin Ngendahayo
DPAE Muyinga	Jean Claude Mbarushimana Jean Bosco Ndayizeye
DPSP	Evariste Nsabiyumva
ISABU	Michel Ntimprangeza
RBU2000Plus	Longin Nzeyimana Jean Paul Twizerimana David Nsanzimpundu Jean Nkurunziza Isabelle Nibogora Reginald Sabushimike Godefroid Nzigamasabo Simplice Nkurunziza Roch Jean Pierre Shemezimana Dieudonné Ahishakiye Deo Bigirimana Richard Mbonyumwibutsa Aaron Nzobonimpa Ernest Nsengiyumva Damien Karibwami Claver P. Minani
Consultants	Christian Man (Independent)

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Acronyms

CBSP	Community-based seed production
CRS	Catholic Relief Services
DFAP	Development Food Aid Program (an initiative of USAID)
DPAE	Muyinga Provincial Directorate of Agriculture and Livestock
DPSP	Department of Seed and Plant Promotion
FAO	Food and Agriculture Organization **FFP**

Food for Peace (an office of USAID) **ISABU**

Burundi Institute of Agronomic Sciences **NGO**

Non-Governmental Organization

ONCCS	National Office for Seed Inspection and Certification
SSSA	Seed System Security Assessment
USAID	United States Agency for International Development

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This SSSA report presents original analyses of the fieldwork conducted during the August-September SSSA in Muyinga, Burundi. Where findings reflect those from other SSSAs, it uses language from previous reports. To learn more about the SSSA community of practice, visit www.seedsystem.org.

Citation

Catholic Relief Services, 2017. Seed System Security Assessment, Muyinga, Burundi. August/September 2017. Muyinga: Catholic Relief Services.

Feedback

Comments and updates are welcomed. Please contact the assessment coordinator, Salvator Nkurunziza, at salvator.nkurunziza@crs.org.

I. EXECUTIVE SUMMARY: KEY SSSA FINDINGS

Acute Seed Security Findings

Diverse indicators suggest the seed security of Muyinga farmers in the short-term is stable.

From the farmer point of view (2017B and 2018A)

1. For the 2017B season, farmers sowed +4% more than normal. In 81% of cases, crop yields were reported to be either good or average.

2. Farmers relied on local channels—own/saved stocks, local markets, and social networks—to access 95.3% of their seed for the 2017B season. Own/saved stocks were the single most important source for farmers, supplying 55.2% of all seed farmers sowed. For vegetatively-propogated crops such as cassava, sweet potato, own stocks supplied farmers with three times as much planting material as that of local markets.

3. For the 2017B season, seed from formal seed sources, such as agro-dealers, government/NGO aid, or even seed from community-based groups was extremely marginal, together accounting for less than 5% of seed sourced. NGO seed distributions account for the majority of this figure, and they are a relatively recent development in Muyinga.

4. Farmers anticipate sowing +22% more in 2018A than normal. This is indicative of a stable farming situation.

5. Nonetheless, this should not obscure vulnerable populations in Muyinga—and within the SSSA sample—who did and plan to sow less than normal. In 2017B, in fact, 40% of all crop cases within the SSSA sample were sown at lower rates than usual. For 2018A, this figure was anticipated to be 28%.

6. By far the most important factor driving farmers to sow less was a lack of money to buy seed. This reason accounted for 32% of all reasons given for sowing less. The second most important reason given was poor land or lack of land (13.9%), followed by health problems likely stemming from malnutrition (10.4%). *Only 1.5% of farmers (n=3) indicated lack of seed availability as a reason for sowing less in 2017B.* This means that giving free seed would not have addressed the challenges they face.

7. Understanding farmers' rationale for expanding seed use—which is a general proxy for expanding land area cultivated—is central for planning how to spur production. Households did or will plant more mainly because of favourable soil fertility and/or land availability. (These are also reasons farmers sowed less, as noted in #6 above, underscoring the diversity of farming systems and their challenges in Muyinga.) Other significant reasons include the availability of more seed (14.3%) and the decision to give more priority to agriculture (11.9%).

In sum, there does not seem to be acute stress in Muyinga, but rather chronic issues of land availability, soil health, poverty, and illness.

On the supply side (2017B and 2018A)

8. Seed availability.

- Farmers assessed that 2017B had been an average or good season in 81% of cases (across crops). These production gains translate to more seed being available for the upcoming season.
- Large traders in Muyinga anticipated an overall increase of +26% in seed quantities for 2018A.

9. Seed quality. Will seed on offer be of acceptable quality to farmers? From the farmer point of view, overall seed sown for 2017B was generally good (83% of cases) or average (15% of cases), with seed specifically sourced from the market assessed as 'good' and 'average' in 78% and 21% of cases, respectively. Hence, there was no real difference in seed quality from all sources versus seed specifically sourced from the local markets. Seed used by farmers is of acceptable quality and is therefore not a salient issue at this point in time.

10. Seed access. Large traders anticipate seed prices for 2018A will remain near 2017B prices. Across all crops sold by traders, the average weighted price change for 2018A is anticipated to be 5%, which falls within a normal range of variation. As for farmer expenses for seed, the average outlay is anticipated to increase from $10.59 to $11.06, a +4% increase. This, too, falls within a normal range of variation, and in absolute terms is a reasonable, affordable sum, as indicated by the SSSA team.

Community summary

Maize farmers in Mugano commune have a high level of seed security, since they source most of their maize seed from Tanzania, which is closer to Mugano than to Gasenyi, where the level of seed security for maize farmers is only 20%. As for common bean, differences are attributable to commune-level harvests from 2017 B, which were stronger in Mugano (where the community estimated seed security to be 50%) and weaker in Gasenyi (where the community estimated seed security to be 30%). Good harvests mean common bean seed is relatively more widely available in home/saved stocks and in local markets.

Chronic Seed Security Findings

1. Crop profiles for three different sites within the Muyinga province—Mugano, Ntamba, and Gasenyi—reveal little crop specialization, with principal crops like cassava and common bean being used for food and income. And while maize is important in two of the three sites, it is not considered a critical crop of "highest" importance for either food or income. Finally, there is very little value-addition to crops. Transformations are limited mainly to flour and alcohol.

2. Seed system channels have remained very static over the last five years. Virtually the only change across the province's principal crops (common bean, maize, cassava/sweet potato) is the emergence of seed distribution programs implemented by NGOs.

3. 43.5% of farmers in the sample reported having received, on average, 1.7 new varieties in the last five years. These modest figures suggest the need for more robust, creative exploitation of variety delivery channels.

4. Decentralized seed multiplication in Muyinga is scaling, with the 14 groups interviewed increasing production to 40,000 kgs in 2018A (a +400% increase from 2017B). If producer groups are going to sustain this growth, they need to diversify their client base beyond NGOs.

5. Input use in Muyinga is common. 80% of households use compost, while around half (47.3%) use mineral fertilizers. Those that do not cannot afford it. Seed storage losses between seasons are only marginal (14.4%).

6. Seed aid—seed that is distributed freely as part of emergency responses and/or development initiatives—was received by one-quarter (25%) of farmers, and almost always only once. The majority (65%) of this seed aid was received in 2017, with another quarter (23%) received in 2016. Unlike many other areas of Africa, seed aid here is not endemic.

In sum, decentralized seed multiplication represents the most (and perhaps the only) dynamic aspect of Muyinga's seed system. Investments need to be made in these groups if they are to sustain their growth beyond the short-term. Chapter VII discusses these investments.

Recommendations

The opportunity for the SSSA team to conduct an assessment in Muyinga province provides the Amashiga staff with useful, concrete perspectives on seed security in this region.

Overall, the SSSA did not find problems in Muyinga that warrant 'emergency' interventions. The issues are not acute but chronic. The following recommendations, therefore, are developmental in nature.

A. NEW VARIETIES

1. Organize local stakeholders to identify and test new varieties

Amashiga should consider establishing a network of institutions—beyond agricultural research institutions—that facilitates varietal identification and testing. Key is that members a) agree to use the same protocol, b) test varieties under real farmer conditions, and c) ensure systematic farmer feedback. In terms of c), widespread training in participatory varietal selection (PVS) methods could be implemented.

2. Expand varietal diversity by investing in seed producer groups

The 14 seed producer groups interviewed in Muyinga anticipate producing some 40,000 kgs of seed in 2018 Season A, a meaningful sum. However, the crops and varieties they multiply are extremely limited and their principal client is NGOs. As such, three investments are worth considering.

> **2a. Stipulate and help seed producer groups write a business plan** that takes a hard look at the cost-effectiveness, challenges, and opportunities for their operation. This is a capacity-building exercise that is as important for developing cohesion and 'sweat equity' as it is for producing a strategic business plan.
>
> **2b. Establish durable relationships with reliable sources of germplasm.** Seed producer groups will have trouble selling directly to farmers if the products they offer are commonplace. Finding suppliers with new varieties that are adapted to the agroecologies of Muyinga is a critical task.
>
> **2c. Diversify seed producer groups' client bases.** A business that relies on one client alone is destined to fail. This is especially true when the client, for their part, has needs that are

constrained by 3-5 year project cycles. Seed producer groups should sell directly to smallholders or to smallholder cooperatives. This is the opposite type of customer: NGOs require high volumes and few transactions, whereas the reverse is true for a retail market. A diversified customer base requires diverse marketing and operations strategies, which should be anticipated in the business plan.

3. Package new varieties in small quantities…

Seed packets of 250g, 500g, and 1kg sachets are far less risky and costly than larger sizes, especially when the variety on offer is new. Small packets are geared towards giving a large number of farmer-customers access to new, high-quality products. They are conducive to experimentation *in situ*. A farmer may be willing to purchase a small packet of a new haricot variety and try it out in a corner of her field, whereas she may well pass by a large sachet of that variety for sale in a market.

4. …and make them available for sale at existing places

While roughly 40% of households reported receiving new varieties, the average number of new varieties received—1.7—was low. Moreover, variety delivery channels in Muyinga are constrained to local markets and NGO seed distributions. *Agro-dealers, 'Mom and Pop' general shops,* and *traders* represent two under-exploited channels that could help provide more varieties desired by farmers. These sale points would provide seed at locations where farmers already go. This is especially important in rural areas, where retail infrastructure is usually limited to small general shops.

Agro-dealers. *Agro-dealers are 'low-hanging fruit' because they already sell seed and have a customer base of farmers. New varieties not currently available in the area may be of special interest to agro-dealers, who want to quickly capture the market for a new product.*

'Mom and Pop' general shops. *Shop owners would need training in managing seed quality and marketing seed packets. Offering small packets to shop owners on consignment and offering them a portion of the revenues reduces the disincentives of risk and capital outlays, which are*
'front and center' issues for small business owners.

Traders. *Given that local markets (and their traders) are important for farmers' seed supply, more attention should be given to engaging these open seed/grain markets to supply the kinds of varieties farmers need. Seed/grain traders could be powerful partners in helping to* move new modern varieties *widely, within and among farming communities. Such traders would need to learn about new variety identification, attributes and management.*

B. SEED ACCESS

5. Host Diversity and Nutrition Fairs (DiNERs)

Farmers cited seed access—not having enough money—as a key reason for sowing lower quantities of seed than normal in 2017B. We also know malnutrition is a significant, chronic issue in Muyinga. Seed access and malnutrition are causally linked. Poverty constrains seed access, which in turn can diminish food security and household income—thereby exacerbating malnutrition. In turn, malnutrition weakens health, which can decrease farm productivity, as suggested by Table 6.7.

Short-term seed fairs address issues of both seed access and malnutrition. However, as the box on p. 38 suggests, biofortified varieties that may be seen as partial solutions to malnutrition are increasingly also seen as less productive (in terms of yield). This underscores the "D" in DinER fairs: seed offerings should be *diverse*, offering a range of varieties from which farmers can choose according to their needs.

6. Promote Village Saving and Loan Programs (VSL)

VSL programs are 'accumulating savings and credit' programs. In a relatively short time (12-24 months), the VSL funds are often large enough to allow members to borrow enough money to access key agricultural inputs, such as seed. In order to help farmers access the capital they need to meet their input needs, VSLs should be systematically promoted.

C. SOIL FERTILITY

While soil fertility issues *per se* were not an initial focus of this SSSA, their direct influence on how farmers choose crops/varieties and how farmer adjust sowing densities to combat low fertility means that a first set of ameliorating actions seems important to include—even in a seed system security assessment. Obviously, a comprehensive soil fertility management program is warranted (to be led by specialists).

7. Improve fallows and legume rotations.

The efficacy of rotations with a range of legumes is already well known (and INERA particularly suggested the sequence of cassava, cowpea and maize for food crops). Also, the possibilities of fallows with varied agro-forestry such as Mucuna, might be tested. Key, of course, is farmer acceptance of the agronomic technique as well as its technical effectiveness.

8. Promote nitrogen-fixing trees.

Preparing for longer-term horizons (beyond the 4-year project), diagnostic trials with 'best bet' nitrogen-fixing trees, might be piloted now as added as an explicit work stream. Soil fertility improvement and management (including adding of biomass) demands that interventions think long from the start.

D. Farmer-centered information systems: Raising awareness and demand

Finally, as a last set of recommendations, we focus on information systems. Muyinga farmers currently receive little information about improved techniques for sustainable and profitable agricultural production. The SSSA teams noted a lack of familiarity not just with new varieties but with even basic 'good practice' agricultural techniques, e.g. crop rotation and manure use, improved storage possibilities. There is an urgent need to stimulate a) a learning and experimentation environment, especially in rural areas; b) an environment that provides a wealth of technical information; and c) information channels that foster feedback mechanisms- quickly and directly.

Several recommendations appear below related to information innovation follow. The focus here is on enabling the small farmer to draw in much needed innovations, to make more informed choices among multiple agricultural options—and to feedback to those helping to generate research and supply side advances.

9. Facilitate community experiential learning. Face-to-face on-farm experimentation models need to be catalyzed within communities; experimental community fields or farmer field schools are but two models. Important is that women and youth (and particularly those returning from the mines) be included in these interactive learning processes.

10. Strengthen the communication channels of technical agricultural information. Agricultural-linked technical information also has to be passed through a range of media. Some farmers (and traders) do have access to mobile phones (and concrete SMS messages could be key in passing concrete variety and seed–linked information). The effectiveness of existing grassroots communication mechanisms, through

schools and faith-based organizations might also be explored to share information on good practice and available innovations. Even more classic information methods, like development of ‘new variety posters and illustrations’ would be an important addition.

II. INTRODUCTION

Rationale for Seed System Security Assessment (SSSA)

This report presents the results of a Seed System Security Assessment (SSSA) in the province of Muyinga within Burundi, which took place in August/September 2017.

The SSSA was conducted for three main reasons:

1. CRS/Burundi is in the midst of a 5-year USAID/FFP DFAP. The project is called AMASHIGA. AMASHIGA aims to improve outcomes related to a) nutrition, b) economic well-being, and c) good governance in food security and nutrition strategies. Economic well-being is a broad objective with three sub-objectives: i) sustainable increase of agricultural production at the household level, ii) reduction of pre- and post-harvest losses, and iii) increase in household incomes.

As such, in order to sustainably increase agricultural production, one of the main strategies of the AMASHIGA program is to improve access to good quality seeds for the crops targeted by the program, especially among vulnerable agricultural households. In order to do so, AMASHIGA decided to evaluate the current state of Muyinga's seed system by implementing an SSSA.

2. Seed systems have been seen as a critical entry point for increasing agricultural productivity. CRS' central and eastern Africa programs and its partners have long been interested in seed systems and have been involved in a range of programs supporting: processes of seed selection and varietal development, seed multiplication and delivery, and improved storage methods. CRS firmly believes that empowering businesses and local communities to create and sustain functional seed systems can directly lead to varied goals, increasing food security and household income; and strengthening household nutrition and farming system resilience.

3. The work took place to build assessment capacity by learning the tools and methods of the SSSA. And because the SSSA team was comprised almost entirely of AMASHIGA field staff, the findings they helped produce are the basis of recommendations they will have the opportunity to implement. This combination of learning and action has the potential to strengthen the quality of AMASHIGA's programming.

See SeedSystem.Org *for resources and tools on SSSAs.*

Aims and Structure of Report

This report summarizes the findings from the 2017 Burundi/Muyinga SSSA, drawing on desk and fieldwork that was completed in August and September. It also issues a series of practical, actionable recommendations that stem from the findings.

Chapter I provides a high-level Executive Summary of the report. Chapter II is the Introduction. Chapter III provides a background to Seed System Security Assessments (SSSA), while chapter IV describes the methodological approach for this particular SSSA. Chapter V provides detailed findings from the SSSA, while chapter VI issues recommendations based on these findings. Chapter VII provides reference citations. Chapter VIII, the Appendix, posts the action plan developed by the SSSA team immediately following the fieldwork.

This is not an academic report. The fieldwork has been effected in a relatively short time to allow for planning of the upcoming agricultural season, starting with sowing in October 2017. Having said this, the assessment has aimed for considerable rigor: including use of multiple methods, triangulation of results (with quantitative and qualitative data), and fieldwork encompassing important sample sizes.

III. BACKGROUND TO SEED SYSTEM SECURITY ASSESSMENT

This chapter presents the necessary background to interpret this SSSA. It introduces the concept of seed security and the different types of seed aid approaches that might be matched to diverse seed security problems (and opportunities) encountered on the ground.[1] Methods used in the May 2017 assessment are then presented.

The Concept of Seed Security

Farm families are seed secure when they have access to seed (and other planting material) of adequate quantity, acceptable quality, and in time for planting. Seed security is best framed within the broader context of food and livelihood security. Helping farmers to obtain the planting materials they need enables them to produce for their own consumption and sale.

Achieving seed security is quite different from attaining food security, despite their obvious links. One can have enough seed to sow a plot but lack sufficient food to eat, for example during the 'hungry season' prior to harvest. Conversely, a household can have adequate food but lack access to appropriate seed for planting. Despite these important differences between food security and seed security, determinations of seed security are normally based, implicitly or explicitly, on food security assessments. This results from a lack of appreciation and understanding of seed security issues.

The Dimensions of Seed Security: A Framework

The concept of seed security embodies several fundamental aspects. Differentiating among these is crucial for promoting those features that foster seed security as well as for anticipating the ways in which such security might be threatened. Table 3.1 outlines the fundamental elements of seed security: seed has to be available, farmers need to have the means to access it, and the seed quality must be sufficient to promote good production.

Table 3.1: Seed security framework, basic elements

Parameter	Seed Security
Availability	Sufficient quantity of seed of adapted crops is within reasonable proximity and in time for critical sowing periods.
Access	People have adequate income or other resources to purchase or barter for appropriate seeds.
Quality	Seed is of acceptable quality: • 'healthy' (physical, physiological and sanitary quality) • adapted and farmer-acceptable varieties

Source: Remington *et al.* 2002.

[1] This section draws on Sperling *et al.*, 2008.

Availability is defined narrowly as whether a sufficient quantity of seed of target crops is present within reasonable proximity (spatial availability) and in time for critical sowing periods (temporal availability). It is essentially a geographically based parameter, and so is independent of the socioeconomic status of farmers.

Seed **access** is a parameter specific to farmers or communities. It largely depends upon the assets of the farmer or household in question: whether they have the cash (financial capital) or social networks (social capital) to purchase or barter for seed.

Seed **quality** includes two broad aspects: seed quality *per se*, and variety quality. Seed quality consists of physical, physiological and sanitary attributes (such as germination rate and the absence or presence of disease, stones, sand, broken seed or weeds). *Variety quality* consists of genetic attributes, such as plant type, duration of growth cycle, seed color and shape, and palatability.

In situations of stress, it is rare to have constraints in all three seed security features at the same time. The challenge is to identify the real problem and then to target actions that alleviate well-defined problem.

Acute and Chronic Seed Insecurity

Analysis of seed security requires consideration of the duration of the stress: whether it is 'acute' or 'chronic' (recognizing that the divisions are not absolute).

Acute seed insecurity is brought on by distinct, short-lived events that often affect a broad range of the population. It may be spurred by failure to plant, loss of a harvest, or high pest infestation of seed in storage. While in normal times households may have various degrees of seed security, all may be affected by an acute event, such as a flood.

Chronic seed insecurity is independent of an acute stress or disaster, although it may be exacerbated by it. It may be found among groups who have been marginalized in different ways: economically (for example, due to poor, inadequate land or insufficient labor); ecologically (for example, in areas of repeated drought and degraded land); or politically (in insecure areas, or on land with uncertain tenure arrangements). Chronically seed insecure populations may have ongoing difficulties in acquiring off-farm seed due to lack of funds; or they may routinely use low-quality seed and unwanted varieties. The result is households with built-in vulnerabilities.

Acute and chronic seed insecurity often exist together in stressed contexts. Indeed, in cases where short-term emergencies recur − in drought-prone areas, for example − acute problems are nearly always superimposed on chronic problems rooted in poverty.

More Refined Analyses Leading to More Targeted Responses

Table 3.2 gives examples of how identification of a specific seed security constraint should lead to a targeted response, as we are aiming for in this Muyinga assessment. So, for example, if 'seed availability' is assessed as the problem in the short term, seed-based interventions, such as seed importation (for acute shocks) may be appropriate. (Seed availability problems rarely persist over the long term.) In contrast, a diagnosis of a problem of 'seed access' might wisely trigger a holistic analysis of livelihood strategies. In the acute phase, providing farmers with cash or vouchers to get their desired seed might be effective. However, an identification of access problems on a chronic basis should lead practitioners to

look well beyond seed and seed security constraints. The inability to access certain necessary goods on a repeated basis is usually equated with problems of basic poverty. Initiatives to help farmers generate income and strengthen their livelihoods would be essential. Seed quality problems, whether they relate to concerns with the varieties or with seed health *per se,* are rarely short-term. Responses usually require significant development programs, linked to plant breeding or seed quality initiatives, depending on the specific constraint identified.

Table 3.2: Types of seed security problems and broadly appropriate responses

Parameter	**Acute**	**Chronic**
Unavailability of seed	Direct distribution of seed	(Happens rarely or never)
Farmers lack access to available seed	Vouchers and cash (sometimes with seed fairs)	Income generation activity Agro-enterprise development
Poor seed quality ▪ poor varieties *(variety quality)*	Limited introductions of new varieties (already tested in site)	Introduce new varieties/with technical support Variety selection / plant breeding Participatory variety selection
Poor seed quality • diseased/damaged seed (*seed quality per se)*	Seed fairs with quality controls	Programs to improve seed quality in: - seed companies - on farm (CBSP) -local markets

Seed System Security Assessment

A SSSA reviews the functioning of the seed systems farmers use, both formal and informal. It asks whether seed of adequate quality is available and whether farmers can access it. The SSSA also promotes strategic thinking about the relief, recovery or development vision needed. For instance, during a period of stress, should efforts aim to restore the seed system to its former state, or should they aim to strengthen it? Should efforts focus on crops for food, income or both? Should interventions be linked to crops tied with the most vulnerable (e.g., women)? Sperling 2008 gives a description of the SSSA method. Precise tools and reports of many and diverse SSSAs can be found at SeedSystem.org.

IV. METHODS

The themes and methods used in the Muyinga SSSA are sketched out in Table 4.1. They include a range of qualitative and quantitative methods and draw on multiple stakeholder insights.

Table 4.1: Investigative methods used in the SSSA Burundi – Muyinga, August/September 2017

Type of Investigation	**Commentary**
Background information collection	Variety of reports on the seed sector and on food security in Burundi
Database utilization	National Office for Seed Inspection and Certification (ONCCS)
Key informant interviews	Muyinga Provincial Directorate of Agriculture and Livestock (DPAE), ISABU, ONCCS, DPSP
Community-based (N=3) Women's groups (N=4)	agricultural and variety use and trends seed source strategies, by crop community seed security assessment women's crop/seed constraints/opportunities
Farmer interviews (**N=239)**	seed source patterns/input use access to new varieties/ seed aid
Agro-input dealers (N=6)	market constraints + opportunities
Seed/grain market traders (N=12)	crops and varieties supplies on market pricing patterns/ sourcing areas seed quality management procedures
Seed producer groups (N=14)	seed multiplication
Large traders (N=12)	Seed prices and quantities

Household Sample

Part of the methodology used in the SSSA did involve conducting quantitative interviews at the household level. Households were chosen without bias by fanning out in diverse directions from a central location point. Every 3rd or 4th household was chosen (depending on population density).

Of the 239 HHs interviewed, almost all were residents (i.e. very few internally displaced) and 82% were nominally headed by males. Areas cultivated were of different sizes, with 0.5-1.0 ha under cultivation being the predominant size (by a small margin). Table 4.2 summarizes household sample characteristics.

Table 4.2: SSSA Burundi – Muyinga, Household (HH) sample characteristics (N =239)

Feature	Description		% Sample	
Type of HH	Adult-headed Grandparent-headed Child-headed		97.9 1.3 0.8	
Resident status	Resident IDPs		97.5 2.5	
Gender of HH head*	Male Female		82.4 17.6	
Area cultivated (ha)	< 0.5 0.5-1.0 >1.0- 2.0 >2.0		30.5 33.1 22.9 13.6	
	Avg.	Std. dev.	min	max
Household size	5.6	2.2	1	13
Age of HH Head	45.2	14.6	19	90

Site Choice

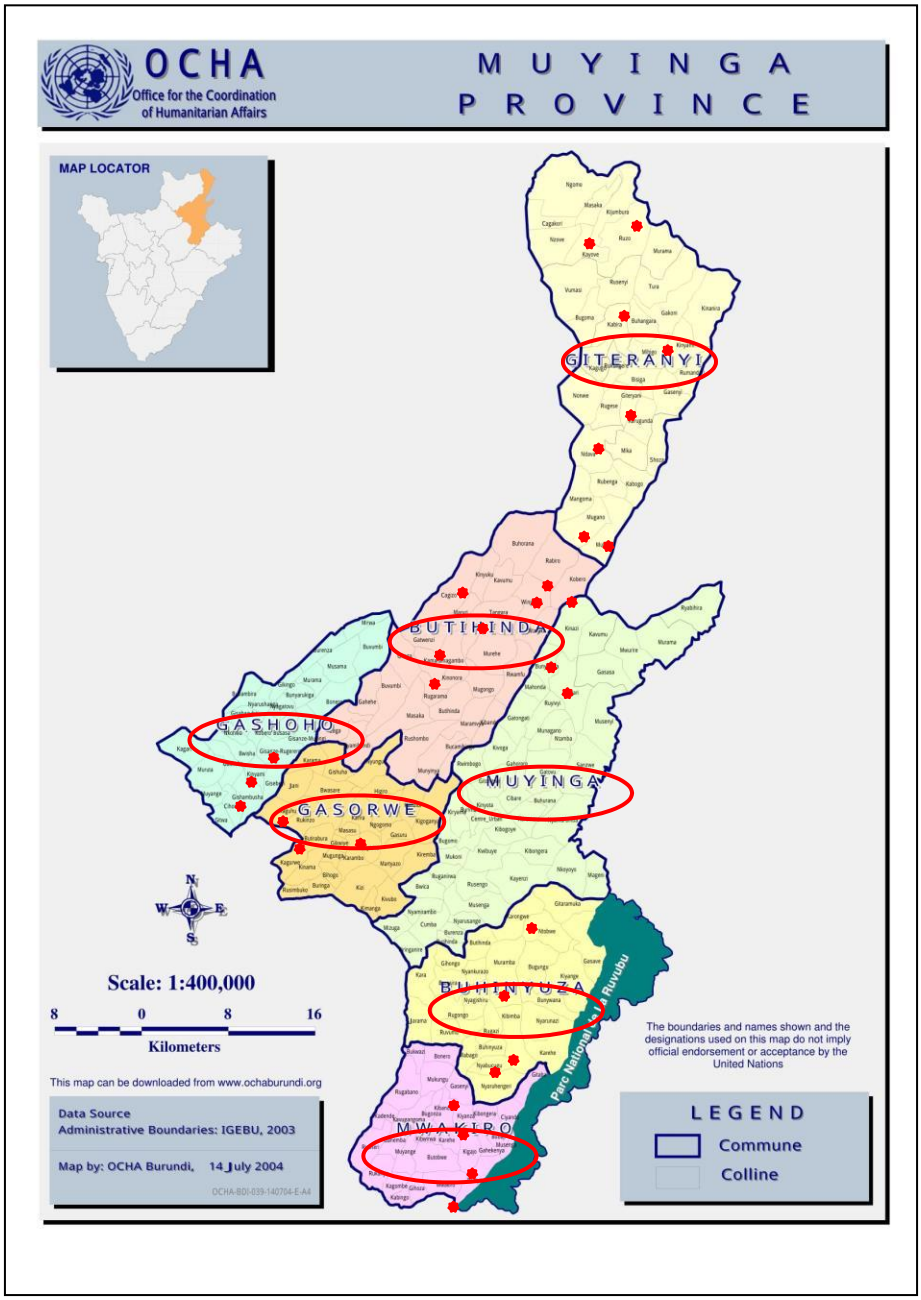
Figure 4.1 depicts the communes and collines (villages within communes) that were selected for study in the Muyinga SSSA. All seven communes were sampled, in order to representatively capture agroecological diversity, varying types and quality of infrastructure (e.g., roads), and proximity from the provincial capital.

The province of Muyinga has two agroecological zones, which are composed by two natural regions, Bugesera (15% of the land area) and Bweru (85% of the land area). The *Bugesera* region includes part of Giteranyi commune and Butihinda commune. This region's altitude is, on average, 1350m, with temperatures varying between 14.8 and 27.1 degrees C. The average annual rainfall is between 1,200mm and 1,300mm. For the past decade, the region has experienced chronic water deficits. The

Bweru region's average altitude is 1,600m. It encompasses Buhinyuza, Gashoho, Gasorwe, Muyinga and Mwakiro communes, as well as part of Giteranyi and Butihinda communes.

Muyinga is a province with strong agricultural potential despite recent cyclical droughts. Agriculture occupies more than 95% of the population who mainly produce food crops: bananas, maize, beans, sweet potatoes, cassava, rice, etc. Market gardening mainly consists of cabbages, tomatoes, white and red onions, aubergines, spinach, carrots, zucchini, etc. The main fruit crops are avocado, guava, maracouja, papaya, pineapple, mango and citrus fruits. Cash crops are mainly coffee and fruits, especially pineapple.

Figure 4.1: Communes and collines sampled in Muyinga SSSA



Seasonal Overview

Muyinga province has three cropping seasons. **Season A** begins in September of each year and lasts through February. **Season B** begins in February and lasts through July. **Season C** begins in May and lasts through December.

Communities assessed their harvest of key crops for the 'current season' (2017B), the previous season (2017A), and the season prior to that (2016B), as depicted in Figure 4.2. Crop performance has varied considerably across these three Muyinga communes. Common bean, Muyinga's principal crop, has been relatively stable, with the exception of Season 2017A in Gsenyi. The other three crops shown here—maize, cassava, and rice—have been much more erratic, with no discernable pattern, highlighting the agroecological diversity across Muyinga's communes.

Figure 4.2: Community assessments of crop performance over past three seasons

Main Crops	*Current season:* May-June 2017 (2017B)	*Season before:* Oct. 2016-Dec. 17 (2017A)	*Season before*: May -June 2016 (2016B)
Mugano			
Common bean			
Maize			
Cassava			
Rice			
Ntamba			
Common bean			
Maize			
Cassava			
Rice			
Gsenyi			
Common bean			
Maize			
Cassava			
Rice			

Good	Average	Poor	N/A

V. FIELD FINDINGS: ACROSS SITES

Acute Seed Security Findings: Season B (Feb. – July 2017) and Season A (Sept.2017 – Feb. 2018)

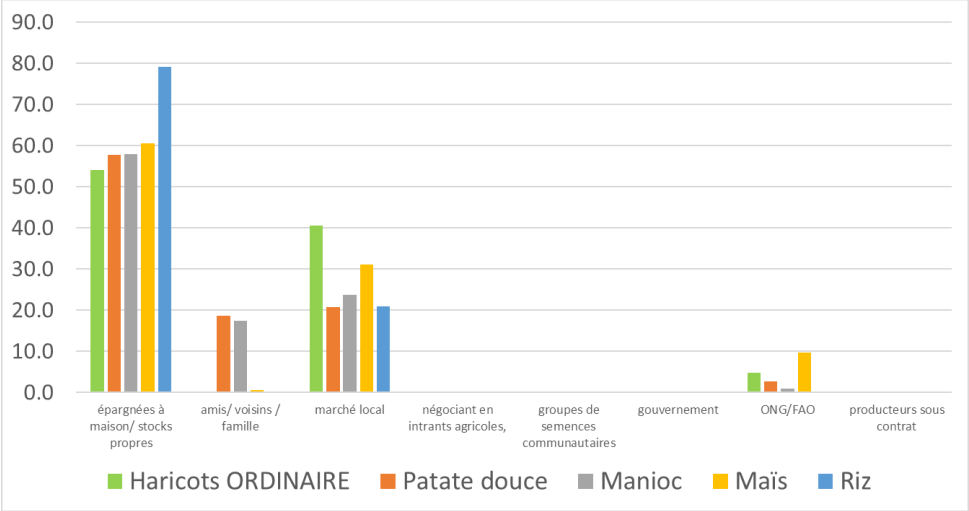
To assess near-term seed availability and the general functioning of different seed channels, farmers were asked to recall their seed sources for 2017 Season B (Table 5.1 and Figure 5.1). ***Overall, farmers sourced upwards of 95% of their seed from informal local channels (own stocks, family/friends/neighbors, and local markets).*** Seed distributions from NGOs/FAO accounted for the remainder of total seed sourced – 4.5%. This seed sourcing strategy almost all but completely excludes other channels—community seed groups, government, agro-dealers—suggesting farmers are limited to their own stocks and local markets.

Several other key observations are of note here. Overall, farmers' own stocks of seed were moderately more important than local markets for meeting seed needs. However, this difference is variable across individual crops. For maize, the proportion of seed from farmers' own stocks accounted for twice that of local markets. For vegetatively-propagated crops (VPCs) such as sweet potato and cassava, own stocks provided three times that of local markets. But social networks were also important, as it is common for VPCs to be exchanged/gifted within social networks. Common beans, the principal crop in the region, reflected the overall proportions of seed derived from own stocks and local markets, respectively.

Table 5.1: Seed (kgs) planted and sources, all sites, Season B (March – June 2017)

Culture	kg total plantée	% de total										
		épargnées à maison/ stocks propres	report-hybrides de maïs,	amis/ voisins / famille	marché local	négociant en intrants agricoles,	groupes de semences communautaires	gouverne-ment	ONG/FAO	producteurs sous contrat	Autres	TOTAL %
Maïs	339.0	60.5	0.0	0.6	31.0	0.0	0.0	0.0	9.7	0.0	0.0	101.8
Sorgho	65.5	33.6	0.0	0.0	66.4	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Riz	302.0	79.1	0.0	0.0	20.9	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Manioc	364.9	57.9	0.0	17.4	23.7	0.0	0.0	0.0	1.0	0.0	0.0	100.0
Patate douce	653.0	57.7	0.0	18.7	20.8	0.0	0.0	0.0	2.8	0.0	0.0	100.0
Pomme de terre irlandaise	0.9	46.4	0.0	0.6	53.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Arachide / arachide	62.0	41.9	0.0	0.0	58.1	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Haricots ORDINAIRE	10441.8	54.1	0.0	0.1	40.6	0.0	0.3	0.0	4.8	0.0	0.0	100.0
banane	10.1	12.4	0.0	60.9	26.6	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Graine de soja	33.0	42.4	0.0	18.2	39.4	0.0	0.0	0.0	0.0	0.0	0.0	100.0
tomates	40.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
taro	0.1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
pois	86.0	65.1	0.0	0.0	34.9	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Haricots Mung	10.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
TOTAL-all crops	12408.2	55.2	0.0	1.7	38.4	0.0	0.2	0.0	4.5	0.0	0.0	100.0

Figure 5.1: Sources for principal crops, all sites, Season B (March – June 2017)



Are farmers unusually seed-stressed, 2017 Season B?

To understand better any possible vulnerability, the SSSA team asked farmers to compare the 2017 Season B quantities of seed sowed, by crop, with what they would normally sow at the same time each year. Basically, the question was this: Were the 2017B patterns 'normal' or 'different' (sowing more or less) from what you usually do?

For all major crops, farmers reported that they had increased quantities sown, with an overall increase of 4.04% (Table 5.2). While sowing rates varied widely between -18% and +47%, rates for principal crops like maize and common beans appear stable, falling as they do within a normal range of variation. The VPCs exhibit more dynamism. For instance, sweet potato and Irish potato are expanding (+34% and +18%, respectively), while cassava, another VPC, is trending downward slightly.

Table 5.2: Sowing amounts: More, Same, or Less? – all sites, Season B (March – June 2017)

Culture	Nb de ménages	% de ménages PLUS	AUTANT	MOINS	Changement pour tous qui sèment cette culture moyenne %
Maïs	50	22.0	50.0	26.0	*-3.53*
Sorgho	14	7.1	57.1	28.6	*-18.47*
Riz	19	10.5	73.7	15.8	**7.18**
Manioc	75	14.7	38.7	46.7	*-10.06*
Patate douce	53	34.0	26.4	39.6	**33.95**
Pomme de terre irlandaise	33	33.3	33.3	33.3	**17.76**
Arachide / arachide	7	0.0	14.3	71.4	*-34.17*
Haricots ORDINAIRE	237	24.5	30.0	44.7	**2.19**
banane	7	71.4	0.0	28.6	**19.03**
Graine de soja	6	83.3	0.0	0.0	**46.67**
tomates	1	0.0	100.0	0.0	
taro	2	50.0	50.0	0.0	
pois	11	27.3	54.5	18.2	**10.60**
Haricots Mung	1	0.0	100.0	0.0	
TOTAL-all crops	**516**	**24.4**	**35.3**	**39.1**	**4.04**

Table 5.3: Farmers' assessment of yield, by crop, all sites, Season B (March – June 2017)

Culture	N total	Comment a été la production? %		
		bonne	moy-enne	faible
Haricots ORDINAIRE	315	51.1%	33.3%	15.6%
Manioc	88	65.9%	23.9%	10.2%
Patate douce	76	67.1%	26.3%	6.6%
Maïs	50	66.0%	16.0%	18.0%
Pomme de terre irlandaise	32	53.1%	28.1%	18.8%

Farmer appraisals of yield for principal crops (Table 5.3) likewise suggests 2017 Season B was fairly normal. Overall, 81% of crops grown (common beans, maize, cassava, sweet potato, and Irish potato) were reported to have either good or average yields.

In sum, sowing quantities and crop yields for 2017 Season B were stable, suggesting a fairly normal cropping season. However, an absence of acute stresses does not imply an absence of chronic stresses, which we look at in greater detail in the following section.

Farmers' seed sources to be planted, 2018, Season A: are there changes in sources? Are farmers seed stressed?

Farmers were asked the same questions of seed sources and sowing quantities for 2017/18 Season A (Table 5.4). While these questions do not capture 'hard' data, they are good indicators as they reflect farmers' educated guesses about the oncoming cropping season. What we find is a slightly intensified reliance on local markets and a stable reliance on own stocks. The share of seed stocks sourced from local markets rose from 38.4% in 2017 Season B to an anticipated 47.8% in 2017/18 Season A. Own stocks dipped marginally from 55.2% to 48.2%.

Table 5.4: Seed (kg) planted and sources, all sites, Season A (October 2017 – January 2018)

Culture	kg total plantée	épargnées à maison/ stocks propres	amis/ voisins / famille	marché local	total
Maïs	1952.1	**41.3**	18.3	**39.6**	**100.0**
Sorgho	61.3	**65.7**	0.0	**34.3**	**100.0**
Riz	133.0	**59.4**	0.0	**40.6**	**100.0**
Manioc	549.2	**46.5**	11.2	**42.3**	**100.0**
Patate douce	295.1	**77.0**	8.1	14.9	**100.0**
Pomme de terre irlandaise	1.6	**45.7**	0.0	**54.3**	**100.0**
Arachide / arachide	226.0	21.7	0.0	**76.1**	**97.8**
Haricots ORDINAIRE	9946.0	**48.9**	0.4	**50.4**	**100.0**
banane	7.8	**36.1**	9.6	**54.3**	**100.0**
Graine de soja	33.0	**60.6**	0.0	**39.4**	**100.0**
tomates	30.0	**100.0**	0.0	0.0	**100.0**
taro	0.1	**100.0**	0.0	0.0	**100.0**
pois	33.0	**54.5**	0.0	**45.5**	**100.0**
Eulesine	8.0	**75.0**	0.0	25.0	**100.0**
TOTAL-all crops	13276.2	**48.2**	3.6	**47.8**	**100.0**

Table 5.5: Sowing amounts: More, Same, or Less? – all sites, Season A (October 2017 – January 2018)

Culture	Nb de ménages	Changement pour tous qui sèment cette culture moyenne %
Maïs	191	**33.01**
Sorgho	9	**4.01**
Riz	10	**22.22**
Manioc	89	**30.73**
Patate douce	25	**23.36**
Pomme de terre irlandaise	46	**24.17**
Arachide / arachide	24	**13.90**
Haricots ORDINAIRE	235	**8.23**
banane	6	**112.78**
TOTAL-all crops	**640**	**22.06**

Farmers also indicated whether they intend to sow more, the same, or less for 2017/18 Season A (Table 5.5). Overall, a 22% increase in sowing quantities is anticipated. At an anticipated 8.23% increase, sowing quantities for common beans appear stable. Sowing quantities for other significant crops, such as maize and cassava, are anticipated to increase by one-third. This could be a positive sign of farmers aiming to increase production. It is indicative of a stable farming situation. In the next section, we look at the reasons for changes in sowing quantities in detail.

Focusing on potential problems areas and spurring production

To better understand the challenges and opportunities facing farmers, the SSSA team asked about reasons farmers planted more or less, both for 2017 Season B (actual) and for 2017/18 Season A (anticipated; Table 5.6). Overall, of the 510 responses farmers provided for 2017 Season B, 202 (40%) were reasons for sowing less, 182 (36%) were reasons for sowing the same, and 126 (25%) were reasons for sowing more. For 2017/18 Season A, farmers provided a total of 646 responses. 178 (28%) were anticipated reasons for sowing less, 232 (36%) were anticipated reasons for sowing the same, and 236 (37%) were anticipated reasons for sowing more. *(Note: Farmers were asked to provide a response for each of their three most important crops for a given season. Not all farmers cultivate three crops.)*

In other words, more than half of responses across both seasons indicated either stable or increased sowing quantities. Again, this suggests a fairly stable situation for farmers – especially given that, for Season A (by far the most important cropping season), reasons for sowing more or the same accounted for fully 73% of responses.

Table 5.6 suggests some of the drivers of this stability. By far the most important single reason (29.4% of all reasons given for sowing more than usual) is farmers' access to either more land or to more fertile land. This is related to the purchase or rental of additional land. It also stems from increased access to fertilizer. Another driving factor was the increase in the availability of seed (14.3%), stemming from the increase in NGO seed distributions in recent years, and from good harvests in the previous season. A third factor driving increases in sowing was the decision to give more priority to agriculture (11.9%). Related to this, and of near equal importance, were decisions to give priority to different crops (11.1%), which reflects coping strategies for stresses like climate change (e.g., drought) and/or plant disease.

Table 5.6: Reasons (% of responses) farmers gave for planting MORE of a given crop, all sites, 2017 Season B and 2017/18 Season A

Raisons données pour semer PLUS que normale	Saison B (n=126)	Saison A (n=236)
LIÉE AUX SEMENCES		
Disponibilité des semences		
Plus de semences disponibles du fait d'une bonne récolte	**14.3%**	10.6%
Plus de semences disponibles grâce à des semences gratuites/ données	**6.3%**	1.7%
Accès aux semences		
Plus d'argent pour acheter des semences ou le prix des semences est bas	**4.0%**	2.5%
Ont un crédit	0.0%	0.4%
Coupons (argent octroyé par les ONG)		
Qualité des semences		
Ont des semences particulièrement bonnes ou une bonne variété	**0.8%**	2.5%
Sous-total: liée aux semences	**29.4%**	**17.8%**
FACTEURS DE PRODUCTION NON LIÉS AUX SEMENCES (possibilités)		
Bonne main d'œuvre/ plus de main d'œuvre	**1.6%**	0.8%
Se sentent forts/ en bonne santé	0.0%	0.8%
Ont plus de terre/ une terre plus fertile	**29.4%**	**34.7%**
Ont des outils/ un tracteur, d'autres machines pour aider à la culture	0.0%	0.0%
Ont accès à l'irrigation, à des engrais ou autres intrants (par ex. des piquets)	**0.8%**	1.3%
Temps/ précipitations favorables	**2.4%**	1.3%
Bonne sécurité (par ex. pas de vol)	0.0%	0.0%
Sous-total: facteurs de production	**34.1%**	**39.0%**
AUTRES PRIORITÉS/ STRATÉGIES		
Marchés bien développés/ nouveaux marchés pour les cultures ou les produits des cultures	**4.0%**	3.0%
Ont décidé de donner une plus forte priorité à l'agriculture	**11.9%**	14.4%
Autre	**5.6%**	8.1%
Changement de profils de cultures ou de priorités	**11.1%**	15.3%
TOTAL	**96.0%**	**97.5%**

Nonetheless, smallholder farmers in Muyinga are still up against real challenges (Table 5.7). Among them, a shortage of money—poverty—is a significant constraint. For both seasons, a lack of money accounted for a third of reasons for planting less. There are also nominal challenges related to health and sufficient quantity and health of landholdings.

It is worth nothing that almost no responses for planting less (1.5% for Season B, 1.7% for Season A) were related to the unavailability of seed or cuttings. This means that giving free seed—when farmers are planting less—would not have addressed their problems at all.

Table 5.7: Reasons (% of responses) farmers gave for planting LESS of a given crop, all sites, Season B (March – June 2017) and Season A (October 2017 – January 2018)

Raisons données pour semer MOINS que normale	Saison B (n=202)	Saison A (n=178)
LIÉE (ou indirectement liée) AUX SEMENCES		
Pas de semences disponibles sur le marché	1.5%	1.7%
Pas de semences/ boutures disponibles auprès des voisins	5.4%	6.2%
Accès aux semences		
Pas d'argent pour acheter/ difficultés financières ou prix des semences trop élevé	32.2%	33.1%
Qualité des semences		
Les semences disponibles ne sont pas de bonne qualité ou la variété n'est pas appréciée	1.0%	1.1%
Sous-total: liée aux semences	40.1%	42.1%
Facteurs de production non liés aux semences (limites)		
Pas/ trop peu de main d'œuvre	8.9%	6.2%
Maladie/ problèmes de santé	10.4%	8.4%
Pas/ trop peu de terre ou la terre n'est pas appropriée/ suffisamment fertile	13.9%	10.7%
Manque d'outils/ tracteur/ autres machines pour cultiver	0.0%	0.0%
Des nuisibles/ maladies des plantes rendent la production impossible	3.0%	2.2%
Des animaux/ prédateurs rendent la production impossible	0.0%	0.6%
Manque d'autres intrants : approvisionnement contrôlé en eau/ irrigation ou engrais ou pesticides	2.5%	0.6%
Temps/ précipitations défavorables	4.0%	6.2%
Insécurité (par ex. vol)	0.0%	0.0%
Intrants agricoles de mauvaise qualité : ex. engrais, herbicides, pesticides (insecticides) etc	0.0%	0.0%
Coût trop élevé es intrants agricoles	2.0%	1.7%
Sous-total: facteurs de production	44.6%	36.5%
AUTRES PRIORITÉS/ STRATÉGIES		
Les marchés pour les cultures ou les produits des cultures ne sont pas bien développés	0.0%	0.0%
D'autres priorités que l'agriculture (par ex. ont une boutique)	0.5%	0.0%
Autre	5.4%	7.9%
Changement de profils de cultures ou de priorités	7.9%	11.2%
TOTAL	98.5%	97.8%

Is money an issue shaping seed security?: Seed expenditures

In reviewing seed security constraints for 2017B and 2017/8A, the issue of money constraints is raised in a good number of cases (~32% of cases per season for those sowing less). Farmers say they are planting less of a given crop because they don't have the resources to buy or get additional seed.

Table 5.8 looks at this more closely. It presents calculations of money needed for the three major crops, according to actual average amounts planted. Average expenses seem modest: $10.59 (2017B) and $11.06 (2017/18A) for the three major crops (2017B: common bean, cassava, sweet potato; 2017/18A: common bean, maize, cassava). The SSSA team confirmed these outlays are reasonable sums for farmers. In fact, recent voucher programming in Muyinga (October 2017, implemented prior to the publication of this report) provided $10 vouchers for seed and $10 vouchers for tools.

Table 5.8: Farmers' average spending for seed, 3 main crops

2017 Season B (actual)

most important crops	N growing this crop	Average Spending* local market	input shops
Haricots ORDINAIRE	237	16082.28	0.00
Manioc	75	2036.37	0.00
Patate douce	53	404.15	0.00
total (of 3)		**18522.80**	**0.00**
* local currency			

$10.59

2017/18 Season A (anticipated)

most important crops	N growing this crop	Average Spending* local market	input shops
Haricots ORDINAIRE	235	19203.51	0.00
Maïs	191	137.43	0.00
Manioc	89	10.97	0.00
total (of 3)		**19351.91**	**0.00**
* local currency			

$11.06

Price data: Direction des Statistiques et Information Agricoles (DSIA) System Information Prix (Monthly Average for July 17 – August 13, 2017)

Can the markets deliver seed 2017-8?

Market seed availability

As has been shown in these field findings, formal sector seed is insignificant in supplying Muyinga farmers with planting material. Rather, farmers get large amounts of their seed from local markets: they carefully seek out 'potential seed' from the grain supplies, by looking for specific varieties and seed batches which are clean and well-stored. Further, as shown in Table 6.5, farmers in the assessment zones intend to increase the quantities of seed planted for the upcoming 2017/18 principal Season A. The issue is whether supplies of local market seed can meet this demand.

Farmers anticipate sourcing nearly 50% of their seed needs from local markets for 2017/18 Season A, which underscores confidence in this important seed channel. To assess seed availability from a supply-side perspective, however, the SSSA team also interviewed 12 large/commercial traders (Table 5.9). Overall, these traders anticipate their seed quantities to rise by a (weighted) average of +26% for 2017/18 Season A. Common beans, this group's most important product, reflects that overall trend, with an average increase of +20%. In sum, seed availability for the short-term (2017/18 Season A) does not appear to be an issue.

Table 5.9: Larger traders (n=12) on average seed quantities (MTs) for 2017 Season B (actual) and 2017/18 Season A (anticipated)

	N	cette saison (moyenne)	prochaine saison (moyenne)	% Changement
Haricot	12	17.25	20.75	20%
Sorgho	4	9.125	20.5	125%
Eleusine	1	2	1	-50%
TOTAL		14.4	19.53	26%

Local market traders (n=12) engage in a number of practices that are conducive to 'potential seed'…

Market seed access/price

Table 5.8 suggests average farmer outlays for seed purchased in local markets is both modest and stable between 2017 Season B and 2017/18 Season A. Again, however, the SSSA team sought the input of larger/commercial traders (n=12) on average seed prices for 2017 Season B and 2017/18 Season A (Table 5.10). Generally, the outlook seems favourable for farmers: prices are anticipated to remain similar to their 2017B levels. (An overall weighted average decrease of 5% falls within a normal range of variation.) And for common bean—the most important crop for farmers in Muyinga and the most important product for these traders—the average price is anticipated to drop by 16%, likely driven by anticipated increases in supply (Table X.X).

Table 5.10: Larger traders (n=12) on average seed prices (BIF/kg) for 2017 Season B (actual) and 2017/18 Season A (anticipated)

	N	Cette saison (moyenne)	Prochaine saison (moyenne)	% Changement
Haricot	12	1,310	1,107	-16%
Sorgho	4	1,000	1,013	1%
Mäis	3	1,167	1,367	17%
Arachide	1	3,000	3,300	10%
Eleusine	1	1,200	1,500	25%
TOTAL		1,306	1,249	-5%

Market seed quality

Finally, the SSSA team asked whether the quality of seed on offer was acceptable (Table 5.11). From the farmer point of view, overall seed sown for 2017B was generally good (83% of cases) or average (15% of cases), with seed specifically sourced from the market assessed as 'good' and 'average' in 78% and 21% of cases, respectively. Hence, there was no real difference in seed quality from all sources versus seed specifically sourced from the local markets. Seed used by farmers is of acceptable quality and is therefore not a salient issue at this point in time.

Table 5.11: Quality of seed sown, 2017 Season B

Crop	N total	Quality of seed used? N			%		
		Good	Average	Poor	Good	Average	Poor
Maïs	51	46	2	3	90.2%	3.9%	5.9%
Sorgho	15	15	0	0	100.0%	0.0%	0.0%
Riz	19	17	2	0	89.5%	10.5%	0.0%
Manioc	88	76	8	4	86.4%	9.1%	4.5%
Patate douce	76	66	8	2	86.8%	10.5%	2.6%
Pomme de terre irlandaise	33	22	10	1	66.7%	30.3%	3.0%
Arachide / arachide	6	6	0	0	100.0%	0.0%	0.0%
Haricots ORDINAIRE	315	251	61	3	79.7%	19.4%	1.0%
banane	11	11	0	0	100.0%	0.0%	0.0%
Graine de soja	6	6	0	0	100.0%	0.0%	0.0%
tomates	1	1	0	0	100.0%	0.0%	0.0%
taro	2	2	0	0	100.0%	0.0%	0.0%
pois	12	9	3	0	75.0%	25.0%	0.0%
Haricots Mung	1	1	0	0	100.0%	0.0%	0.0%
TOTAL-all crops	**636**	**529**	**94**	**13**	**83.2%**	**14.8%**	2.0%

Agro-dealers

The SSSA team also interviewed 6 agro-dealers, which farmers seem to rely on principally for horticultural crops like cabbage, red onion, tomato, carrot, and eggplant (Table 5.12). While the sample is small, and while horticultural crops are not of principal significance for farmers in Muyinga, sales and prices appear stable. In addition to selling packets of horticultural seed, agro-dealers specialize in some pesticides, especially those used for tomato and cabbage.

Table 5.12: Seed sold by agro-dealers

Crop	N		Quantities sold		Average price	
	2017B	2017A	2017B	2017A	2017B	2017A
Common bean	2	1	7000 kgs	2000 kgs	1500/kg	1200/kg
Cabbage	4	4	41	66	1562	1612
Red onion	4	4	28.5	39.5	192	187
Carrot	2	2	12	12	100	100
Tomato	1	1	8	11	300	300
Eggplant	1	1	0.2	0.5	350	350
Quantities are listed in grams and prices are per gram, with the exception of common bean (as noted)						

Community assessment of seed security

As a final cross-check to the above multi-source data, the communities themselves were asked to assess the seed security of their members. Seed Security was defined as either having the seed already in hand, or being able to access the seed with some certainty (through purchase, barter, gift, or other means). Community meetings at all sites involved upwards of 20 people, with an average male-female ratio of 65% and 35%, respectively.

Table 6.13 presents the communities' own assessments of those within their village who they deem seed secure for major crops for the upcoming 2017-8 A season. These assessments can be useful, but they can also be biased. For instance, if a community believes the SSSA team is there to distribute free seed, they may be inclined to indicate a relatively lower level of seed security. (SSSA teams establish neutrality at the beginning of community meetings to mitigate this kind of bias.) That said, some differences in this table make sense. For instance, maize farmers in Mugano have a high level of seed security since they source most of their maize seed from Tanzania, which is closer to Mugano than to Gasenyi, where the level of seed security for maize farmers is only 20%. As for common bean, differences are attributable to commune-level harvests from 2017 B, which were stronger in Mugano (where the community estimated seed security to be 50%) and weaker in Gasenyi (where the community estimated seed security to be 30%). Good harvests mean common bean seed is relatively more widely available in home/saved stocks and in local markets.

Table 5.13: Community self-assessment of those having seed security for 2017/8 A season

	Mugano	*Ntamba*	*Gasenyi*
Haricot	***50%***	***40%***	***30%***
Maïs	***80%***	*--*	***20%***
Manioc	***70%***	***60%***	*--*
Riz	*--*	***30%***	***60%***

Summary: Acute Seed Security Findings

Diverse indicators suggest the seed security of Muyinga farmers in the short-term is stable.

From the farmer point of view (2017B and 2018A)

1. For the 2017B season, farmers sowed +4% more than normal. In 81% of cases, crop yields were reported to be either good or average.

2. Farmers relied on local channels—own/saved stocks, local markets, and social networks—to access 95.3% of their seed for the 2017B season. Own/saved stocks were the single most important source for farmers, supplying 55.2% of all seed farmers sowed. For vegetatively-propogated crops such as cassava, sweet potato, own stocks supplied farmers with three times as much planting material as that of local markets.

3. For the 2017B season, seed from formal seed sources, such as agro-dealers, government/NGO aid, or even seed from community-based groups was extremely marginal, together accounting for less than 5% of seed sourced. NGO seed distributions account for the majority of this figure, and they are a relatively recent development in Muyinga.

4. Farmers anticipate sowing +22% more in 2018A than normal. This is indicative of a stable farming situation.

5. Nonetheless, this should not obscure vulnerable populations in Muyinga—and within the SSSA sample—who did and plan to sow less than normal. In 2017B, in fact, 40% of all crop cases within the SSSA sample were sown at lower rates than usual. For 2018A, this figure was anticipated to be 28%.

6. By far the most important factor driving farmers to sow less was a lack of money to buy seed. This reason accounted for 32% of all reasons given for sowing less. The second most important reason given was poor land or lack of land (13.9%), followed by health problems likely stemming from malnutrition (10.4%). *Only 1.5% of farmers (n=3) indicated lack of seed availability as a reason for sowing less in 2017B.* This means that giving free seed would not have addressed the challenges they face.

7. Understanding farmers' rationale for expanding seed use—which is a general proxy for expanding land area cultivated—is central for planning how to spur production. Households did or will plant more mainly because of favourable soil fertility and/or land availability. (These are also reasons farmers sowed less, as noted in #6 above, underscoring the diversity of farming systems and their challenges in Muyinga.) Other significant reasons include the availability of more seed (14.3%) and the decision to give more priority to agriculture (11.9%).

In sum, there does not seem to be acute stress in Muyinga, but rather chronic issues of land availability, soil health, poverty, and illness.

On the supply side (2017B and 2018A)

8. <u>Seed availability</u>.

- Farmers assessed that 2017B had been an average or good season in 81% of cases (across crops). These production gains translate to more seed being available for the upcoming season.

- Large traders in Muyinga anticipated an overall increase of +26% in seed quantities for 2018A.

9. Seed quality. Will seed on offer be of acceptable quality to farmers? From the farmer point of view, overall seed sown for 2017B was generally good (83% of cases) or average (15% of cases), with seed specifically sourced from the market assessed as 'good' and 'average' in 78% and 21% of cases, respectively. Hence, there was no real difference in seed quality from all sources versus seed specifically sourced from the local markets. Seed used by farmers is of acceptable quality and is therefore not a salient issue at this point in time.

10. Seed access. Large traders anticipate seed prices for 2018A will remain near 2017B prices. Across all crops sold by traders, the average weighted price change for 2018A is anticipated to be 5%, which falls within a normal range of variation. As for farmer expenses for seed, the average outlay is anticipated to increase from $10.59 to $11.06, a +4% increase. This, too, falls within a normal range of variation, and in absolute terms is a reasonable, affordable sum, as indicated by the SSSA team.

Community summary

Maize farmers in Mugano commune have a high level of seed security, since they source most of their maize seed from Tanzania, which is closer to Mugano than to Gasenyi, where the level of seed security for maize farmers is only 20%. As for common bean, differences are attributable to commune-level harvests from 2017 B, which were stronger in Mugano (where the community estimated seed security to be 50%) and weaker in Gasenyi (where the community estimated seed security to be 30%). Good harvests mean common bean seed is relatively more widely available in home/saved stocks and in local markets.

Chronic Seed Security Findings: Season B (Feb. – July 2017) and Season A (Sept.2017 – Feb. 2018)

This analysis now moves to examining more systemic trends in Muyinga agricultural and seed security. Community-level assessments were done in all sites and involved a range of methods: community meetings, special focus groups with women, key informant interviews with government leaders, business leaders, NGOs staff and others), and market analyses. The varied methods allowed for cross-verification and opened possibilities to assess medium-term trends. The following topics are highlighted below: crop diversification and processing, dynamism in use of seed sources, access to new varieties and use of select inputs: inorganic and organic fertilizers and seed storage chemicals.

Crop diversification and value-added products

Communities in Mugano, Ntamba and Gasenyi provided overviews of major crops sown in their area, and rated their respective importance for food consumption, income, and possible transformation from raw agricultural goods into value-added products geared to increasing revenue margins (Figure 5.14). The clearest message is that common beans and cassava are multi-functional staples across all sites, meeting needs for food, income, and also serving as a raw ingredient for flour (in the case of cassava). The sites vary, though: Mugano's crop profile is considerably more dynamic and diverse than that of Ntamba, given the agroecological variation between the two sites. Another observation is that, while important in 2 of the 3 community meetings, maize is not considered a critical crop of "highest"

importance for either food or income purposes. The findings also suggest little crop specialization: nearly all are used for both food and income. Finally, transformation levels overall are very low, mainly only resulting in different types of flour and local alcohol.

Table 5.14: Major crops sown, and their uses, 3 sites

	Importance for food			Importance for income			Transformation?
	Mugano	*Ntamba*	*Gasenyi*	*Mugano*	*Ntamba*	*Gasenyi*	*Across Sites*
Common bean							
Maize							Flour, beer
Cassava							Flour
Rice							
Sweet potato							
Irish potato							
Peanut							Flour
Banana							Alcohol

High importance	Medium importance	Low importance	N/A

Seed system sourcing: dynamic trends

Community mapping of seed sources traces general trends in seed source strategy. Groups mapped seed sources for a particular crop for 2017 and compared current sources with those used five years previous (2012). The exercises (Figures 5.2 – 5.4) show that there has been almost no dynamism in sources— and no real choice at any period. Virtually the only change across these principal crops in terms of seed sources is the emergence of seed distribution programs implemented by NGOs this year, both for maize and common bean (but not for sweet potato or cassava).

Figure 5.2: Common bean seed sources in Muyinga

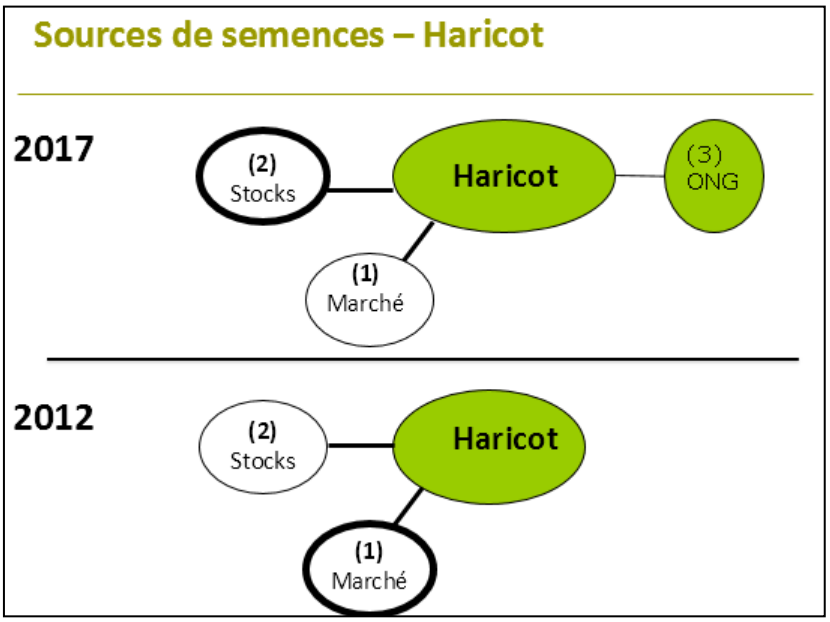


Figure 5.3: Manioc and sweet potato seed (cutting) sources in Muyinga

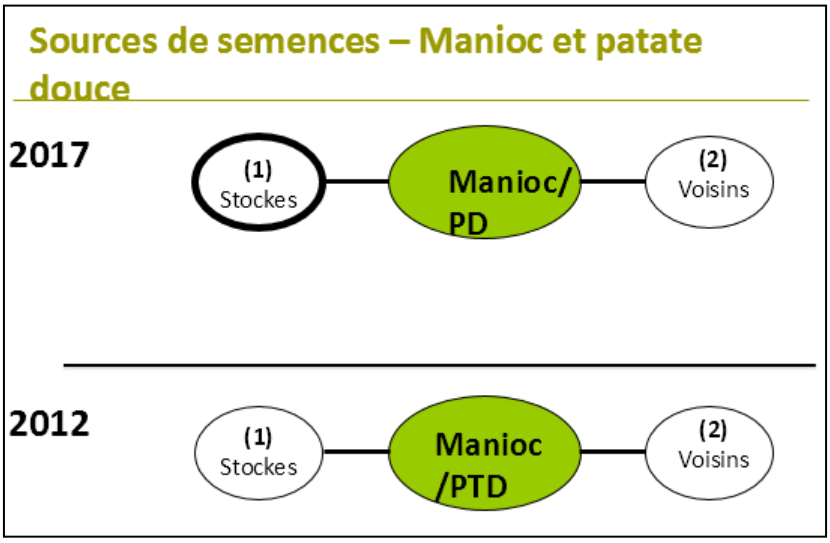
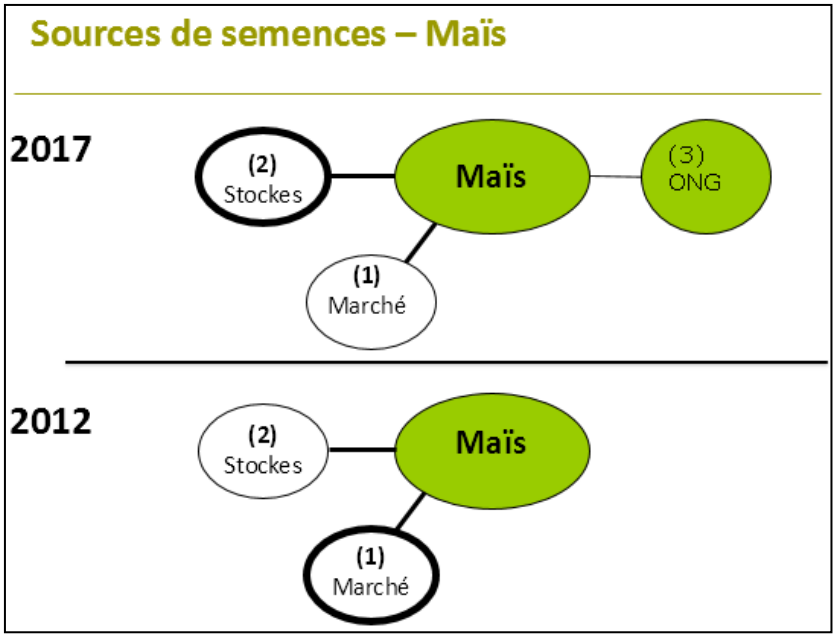


Figure 5.4: Maize seed sources in Muyinga



New varieties

Within the context of a seed security assessment, understanding the flows of new varieties into a farming system is important. New varieties can be an economical way to increase production quickly. Figure 5.5 describes the extent of introductions of new varieties in the last five years. A moderate proportion of farmers (43.5%) said they had received an average of 1.7 varieties in this period. No farmer interviewed had received more than three new varieties, however. The majority (63.9%) of these new varieties were sourced from local markets, while in more recent years, NGO seed distribution programs have also accounted about a fifth (18.9%) of new variety introductions. These findings suggest farmer innovation and experimentation could be exploited more fully through more robust and creative variety delivery channels.

Figure 5.5: New Varieties Received by Farmers

Nombre de ménages*	Reçu de nouvelles variétés ? (%)			Mén. Qui ont reçu	Nb de variétés reçues les 5 Dernières années			
	Oui	Non	total		Moy-enne	Dév Std.	Min	Max
232	43.5%	56.5%	100.0%	101	**1.7**	0.88	0	3

Sources de nouvelles variétés dans les 5 dernières années		
Source	**Nb**	**%**
amis/ voisins / famille	21	13.5%
marché local	99	**63.9%**
négociant en intrants	0	0.0%
groupes de semences comm.	3	1.9%
gouvernement	1	0.6%
ONG/FAO	29	18.7%
producteurs sous contrat	0	0.0%
Autres	2	1.3%
total	155	100.0%

Seed Producer Groups

Seed multiplication is Muyinga seems to be scaling up dramatically (Table 6.15). Groups interviewed (n=14)—most of which are ten years old or less—anticipated production increases of nearly 400% in

2018 Season A (42,250 kgs, up from 10,621 kgs in 2017 Season B). This increase—principally in maize and common bean—is due in large part to demand increases from NGO clients in the area. Several groups even explained they were unable to keep up with demand. Obviously, NGO demand is driven by NGO project cycles. If they are to survive, producer groups must diversify their client base to other institutions and directly to farmers.

Table 5.15: Seed Producer Groups – Crop Profiles and Quantities (N=14)

	2017B Crops Produced (N)	2018A Crops Produced (Est.) (N)	2017B Production (kgs)	2018A Production (Est.) (kgs)	% Change in Production
Haricots	11	13	9,671	20,150	108%
Maïs	2	6	760	21,500	2729%
Soja	1	1	70	600	757%
Patate douce	0	1	-	-	n/a
Arachides	1	0	120	-	-100%
TOTAL	**15**	**21**	**10,621**	**42,250**	**298%**

Do biofortified varieties cost more than they are worth?

Among seed multipliers in Muyinga, ne popular bean variety is MAC 44, which is biofortified and thus widely popular for addressing issues of malnutrition. However, concerns are emerging about the productive viability of the variety.

“Even if it is biofortified, [it] remains less productive,” said one farmer.

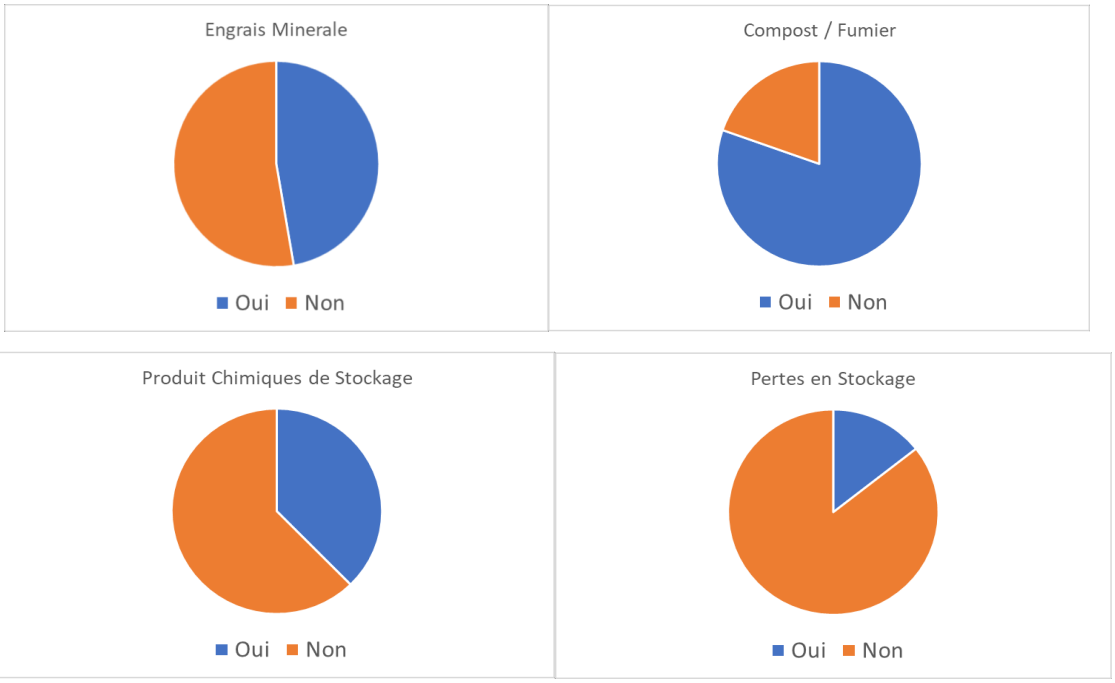
Another remarked, “Its performance decreases from day to day.”

In terms of food security, these comments raise an unpopular question. Do biofortified varieties cost farming households more than they are worth?

Input use: Fertilizer, manure/compost, and storage chemicals

Select input use was also considered during the assessment as a complement to the seed security analysis (Figure 5.6). This included attention to farmers’ use of a) inorganic fertilizer, b) manure and compost, and c) seed storage chemicals. Do farmers in the Muyinga region use non-seed inputs? Yes, especially compost (80.3%). Farmers used a mixture of kitchen residue and animal manure as compost. Around half (47.3%) of farmers used mineral fertilizer (DAP, Urea), primarily on their common bean and maize crops. Those that did not use fertilizer said it was too expensive. And while only one-third (37.7%) of farmers used storage chemicals, only 14.4% of households confirmed storage losses.

Figure 5.6: Proportion of farmers who used select inputs and had storage losses, 2017 Season A



Seed aid

Seed aid is seed that is distributed freely as part of emergency responses and/or development initiatives. In Muyinga, seed aid was received by one-quarter (25%) of farmers, and almost always only once (Table 5.16). The majority (65%) of this seed aid was received in 2017, with another quarter (23%) received in 2016.

Table 5.16: Seed aid received by farmers

Nombre de ménages*	Reçu d'aide en semences ? (%)			Mén. qui ont reçu (Nb.)	Nombre de fois aide est reçue			
	Oui	Non	total		Moy-enne	Dév Std.	Min	Max
236	25.0%	75.0%	100.0%	59	1.1	0.32	0	2

Summary: Chronic Seed Security Findings

1. Crop profiles for three different sites within the Muyinga province—Mugano, Ntamba, and Gasenyi—reveal little crop specialization, with principal crops like cassava and common bean being used for food and income. And while maize is important in two of the three sites, it is not considered a critical crop of "highest" importance for either food or income. Finally, there is very little value-addition to crops. Transformations are limited mainly to flour and alcohol.

2. Seed system channels have remained very static over the last five years. Virtually the only change across the province's principal crops (common bean, maize, cassava/sweet potato) is the emergence of seed distribution programs implemented by NGOs.

3. 43.5% of farmers in the sample reported having received, on average, 1.7 new varieties in the last five years. These modest figures suggest the need for more robust, creative exploitation of variety delivery channels.

4. Decentralized seed multiplication in Muyinga is scaling, with the 14 groups interviewed increasing production to 40,000 kgs in 2018A (a +400% increase from 2017B). If producer groups are going to sustain this growth, they need to diversify their client base beyond NGOs.

5. Input use in Muyinga is common. 80% of households use compost, while around half (47.3%) use mineral fertilizers. Those that do not cannot afford it. Seed storage losses between seasons are only marginal (14.4%).

6. Seed aid—seed that is distributed freely as part of emergency responses and/or development initiatives—was received by one-quarter (25%) of farmers, and almost always only once. The majority (65%) of this seed aid was received in 2017, with another quarter (23%) received in 2016. Unlike many other areas of Africa, seed aid here is not endemic.

In sum, decentralized seed multiplication represents the most (and perhaps the only) dynamic aspect of Muyinga's seed system. Investments need to be made in these groups if they are to sustain their growth beyond the short-term. The next chapter discusses these investments.

VI. OVERALL RECOMMENDATIONS

The opportunity for the SSSA team to conduct an assessment in Muyinga province provides the Amashiga staff with useful, concrete perspectives on seed security in this region.

Overall, the SSSA did not find problems in Muyinga that warrant 'emergency' interventions. The issues are not acute but chronic. The following recommendations, therefore, are developmental in nature.

A. NEW VARIETIES

1. Organize local stakeholders to identify and test new varieties

Amashiga should consider establishing a network of institutions—beyond agricultural research institutions—that facilitates varietal identification and testing. Key is that members a) agree to use the same protocol, b) test varieties under real farmer conditions, and c) ensure systematic farmer feedback. In terms of c), widespread training in participatory varietal selection (PVS) methods could be implemented.

2. Expand varietal diversity—*especially for beans and maize*— by investing in seed producer groups

The 14 seed producer groups interviewed in Muyinga anticipate producing some 40,000 kgs of seed in 2018 Season A, a meaningful sum. However, the crops and varieties they multiply are extremely limited and their principal client is NGOs. As such, three investments are worth considering.

> **2a. Stipulate and help seed producer groups write a business plan** that takes a hard look at the cost-effectiveness, challenges, and opportunities for their operation. This is a capacity-building exercise that is as important for developing cohesion and 'sweat equity' as it is for producing a strategic business plan.
>
> **2b. Establish durable relationships with reliable sources of germplasm.** Seed producer groups will have trouble selling directly to farmers if the products they offer are commonplace. Finding suppliers with new varieties that are adapted to the agroecologies of Muyinga is a critical task.
>
> **2c. Diversify seed producer groups' client bases.** A business that relies on one client alone is destined to fail. This is especially true when the client, for their part, has needs that are constrained by 3-5 year project cycles. Seed producer groups should sell directly to smallholders or to smallholder cooperatives. This is the opposite type of customer: NGOs require high volumes and few transactions, whereas the reverse is true for a retail market. A diversified customer base requires diverse marketing and operations strategies, which should be anticipated in the business plan.

3. Encourage private companies and/or ISABU to package new, certified legume and cereal varieties in small and medium packs…

Seed packets of 1 kg, 2 kg, and 5 kg sachets are far less risky and costly than larger sizes, especially when the variety on offer is new. Small packets are geared towards giving a large number of farmer-customers access to new, high-quality products. They are conducive to experimentation *in situ*. A farmer may be willing to purchase a small packet of a new haricot variety and try it out in a corner of her field, whereas she may well pass by a large sachet of that variety for sale in a market.

4. …and make them available for sale at existing places

While roughly 40% of households reported receiving new varieties, the average number of new varieties received—1.7—was low. Moreover, variety delivery channels in Muyinga are constrained to local markets and NGO seed distributions. *Agro-dealers, 'Mom and Pop' general shops,* and *traders* represent two under-exploited channels that could help provide more varieties desired by farmers. These sale points would provide seed at locations where farmers already go. This is especially important in rural areas, where retail infrastructure is usually limited to small general shops.

> Agro-dealers. *Agro-dealers are 'low-hanging fruit' because they already sell seed and have a customer base of farmers. New varieties not currently available in the area may be of special interest to agro-dealers, who want to quickly capture the market for a new product.*
>
> 'Mom and Pop' general shops. *Shop owners would need training in managing seed quality and marketing seed packets. Offering small packets to shop owners on consignment and offering them a portion of the revenues reduces the disincentives of risk and capital outlays, which are*
> *'front and center' issues for small business owners.*
>
> Traders. *Given that local markets (and their traders) are important for farmers' seed supply, more attention should be given to engaging these open seed/grain markets to supply the kinds of varieties farmers need. Seed/grain traders could be powerful partners in helping to* move new modern varieties *widely, within and among farming communities. Such traders would need to learn about new variety identification, attributes and management.*

B. SEED ACCESS

5. Host Diversity and Nutrition Fairs (DiNERs)

Farmers cited seed access—not having enough money—as a key reason for sowing lower quantities of seed than normal in 2017B. We also know malnutrition is a significant, chronic issue in Muyinga. Seed access and malnutrition are causally linked. Poverty constrains seed access, which in turn can diminish food security and household income—thereby exacerbating malnutrition. In turn, malnutrition weakens health, which can decrease farm productivity, as suggested by Table 6.7.

Short-term seed fairs address issues of both seed access and malnutrition. However, as the box on p. 38 suggests, biofortified varieties that may be seen as partial solutions to malnutrition are increasingly also seen as less productive (in terms of yield). This underscores the "D" in DinER fairs: seed offerings should be *diverse*, offering a range of varieties from which farmers can choose according to their needs. To learn more about DinER fairs, access SeedSystem's DinER Manual here: https://seedsystem.org/wp-content/uploads/2017/07/agricultural_fair_and_voucher_manual_a4_2may_2017.pdf.

6. Promote Village Saving and Loan Programs (VSL)

VSL programs are 'accumulating savings and credit' programs. In a relatively short time (12-24 months), the VSL funds are often large enough to allow members to borrow enough money to access key agricultural inputs, such as seed. In order to help farmers access the capital they need to meet their input needs, VSLs should be systematically promoted.

C. SOIL FERTILITY

While soil fertility issues *per se* were not an initial focus of this SSSA, their direct influence on how farmers choose crops/varieties and how farmer adjust sowing densities to combat low fertility means that a first set of ameliorating actions seems important to include—even in a seed system security assessment. Obviously, a comprehensive soil fertility management program is warranted (to be led by specialists).

7. Improve fallows and legume rotations.

The efficacy of rotations with a range of legumes is already well known (and INERA particularly suggested the sequence of cassava, cowpea and maize for food crops). Also, the possibilities of fallows with varied agro-forestry such as Mucuna, might be tested. Key, of course, is farmer acceptance of the agronomic technique as well as its technical effectiveness.

8. Promote nitrogen-fixing trees.

Preparing for longer-term horizons (beyond the 4-year project), diagnostic trials with 'best bet' nitrogen-fixing trees, might be piloted now as added as an explicit work stream. Soil fertility improvement and management (including adding of biomass) demands that interventions think long from the start.

D. Farmer-centered information systems: Raising awareness and demand

Finally, as a last set of recommendations, we focus on information systems. Muyinga farmers currently receive little information about improved techniques for sustainable and profitable agricultural production. The SSSA teams noted a lack of familiarity not just with new varieties but with even basic 'good practice' agricultural techniques, e.g. crop rotation and manure use, improved storage possibilities. There is an urgent need to stimulate a) a learning and experimentation environment, especially in rural areas; b) an environment that provides a wealth of technical information; and c) information channels that foster feedback mechanisms- quickly and directly.

Several recommendations appear below related to information innovation follow. The focus here is on enabling the small farmer to draw in much needed innovations, to make more informed choices among multiple agricultural options—and to feedback to those helping to generate research and supply side advances.

9. Facilitate community experiential learning. Face-to-face on-farm experimentation models need to be catalyzed within communities; experimental community fields or farmer field schools are but two models. Important is that women and youth (and particularly those returning from the mines) be included in these interactive learning processes.

10. Strengthen the communication channels of technical agricultural information. Agricultural-linked technical information also has to be passed through a range of media. Some farmers (and traders) do have access to mobile phones (and concrete SMS messages could be key in passing concrete variety and seed–linked information). The effectiveness of existing grassroots communication mechanisms, through schools and faith-based organizations might also be explored to share information on good practice and available innovations. Even more classic information methods, like development of 'new variety posters and illustrations' would be an important addition.

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VIII. ANNEXES

Action Plan

Problèmes	Activités	Parties prenantes	Commentaires
Few **improved** (certified) seed availability	1. Strengthen the capacity of seed multipliers in marketing 2. Create linkages between seed producers and sellers of agricultural inputs 3. Promote the marketing of seeds at the communal level by establishing sales outlets at the trading centers 4. Working with MSOs to multiply and sell potential seeds 5. Technical training of seed multipliers 6. Reinvigorate the seed centers of the DPAE	- ONG/projet - DPAE - DPSP - ONCCS - ISABU - Administration - GMS et IMS	- Ensure that seed production is sustainable - Monitor seed distribution flows to prevent any attempt at speculation - An available seed publication channel is needed - Sensitization not to consume seeds
Limited access to new varieties	1. Make quality seed available in small, labeled packages. 2. Identify points of sale near the community • Specialty retail outlet • Generalized point of sale, eg: those selling sugar, oil, etc. 3. Install the demonstration fields beside the seed outlets, make the demonstration fields with model farmers 4. Strengthen the knowledge of male / female traders in seed marketing 5. Creation of distribution chains of	- GMS et IMS - DPAE - ONG/projet - DPSP - Administration - ISABU - ONCCS	- Example for vegetables: 100gr; 250gr; 500gr - Point of sale within the community - For generalized outlets, people need to be trained in seed management. - Make the commitment with the DPAE to avail the seed centers (to the GMS and OPA) - Make technical data sheets available to merchants

	weakly marketed planting material 6. Promotion and strengthening of savings and credit associations 7. Strengthen the capacity of small shops, either specialized or generalized in seed marketing		
Few new varieties available	1. Generalize participatory varietal selection 2. Promotion of new varieties in multipliers 3. Availability of new varieties at producer level	- GMS et IMS - DPAE - ONG/projet - DPSP - Administration - ISABU - ONCCS	Research institutions must have available varieties adapted to the agro-ecological conditions of different regions,
High losses of seeds and seeds during storage	1. Promote hermetic storage (sensitize and subsidize peak bags, containers) 2. Availability of appropriate pesticides 3. Capacity building on post-harvest loss reduction techniques.	- DPAE ONG /projet DPV Administration	there is a need for synergy among farmers, managers and the administration for hermetic conservation.
Limited knowledge of improved agricultural practices including knowledge of good quality seed	1. Increase farmers' awareness of the added value of using quality seeds. 2. Capacity-building for farmers on good agricultural production techniques; 3. Set up demonstration fields at the community level	- GMS et IMS - DPAE - ONG/projet - DPSP - Administration - ISABU -	a research, extension and administration synergy to improve agricultural practices is needed
Unfamiliarity with periods and crop techniques to keep planting / preserving material for cuttings. (Poor management of planting material)	1. Capacity building on the management of planting material for vegetatively propagated crops 2. Disseminate healthy planting materials on a regular basis.	- GMS et IMS - DPAE - ONG/projet - DPSP - Administration - ISABU -	
Low soil fertility	1. Promoting green manure 2. Awareness-raising on the production of organic matter by composting	- - DPAE - ONG/projet - DPSP - Administration - ISABU - DFS	

	3. Awareness-raising on pastoralist agro-sylvo practices 4. Sensitization of farmers on the rational use of mineral fertilizers	-	
Diseases and pests of crops	1. Strengthening farmers' capacities on integrated pest and crop pest management. 2. Development and dissemination of resistant and disease-tolerant varieties 3. Promote biological control	- GMS et IMS - DPAE - ONG/projet - DPSP - Administration - ISABU - DPV -	
Climate change	1. Promote short vegetative crops / varieties 2. Promote vegetable crops. 3. Promoting irrigation systems 4. Promoting crops that tolerate climatic hazards 5. Reforestation and Arboriculture	- GMS et IMS - DPAE - ONG/projet - DPSP - Administration - ISABU - IGEBU -	
No seed packaging in small quantities	1. Promotion of packaging 2. Sensitization of seed producers on the importance of packaging	- GMS et IMS - DPAE - ONG/projet - DPSP - Administration - ISABU - ONCCS	
Very few input shops in the municipalities****	Promotion of input shops in municipalities	- DPAE - ONG - Administration	
Land problem for seed	1. Provide seed centers to producers of basic and certified seed 2. Review the area requirements for seed production	- GMS et IMS - DPAE - ONG/projet - DPSP - Administration - ISABU - ONCCS	
Problem of organizational management in groups	1. Strengthening the capacities of groupings in organizational management	- GMS/OPA - DPAE - ONG/projet - Administration - DAOPA -	
Removal of Certification Services	1. Improve the collaboration of certification services	- GMS et IMS - DPAE - ONG/projet	

	with the decentralized structures of MINAGRIE	- DPSP/CNS - ONCCS	
Unique use of DAP for chemical fertilizers and ignorance of chemical fertilizers in some localities	1. Awareness-raising on the use of mineral fertilizers 2. Conscientiate farmers to make group orders 3. Promote specific fertilizer formulas by crop and by region 4. Installation of Demonstration Fields in the Community	- DPAE - ONG/projet - Administration - ISABU -	
Lack of knowledge on the use of phytosanitary products / pesticides	1. Awareness-raising on the rational use of pesticides 2. Awareness of the toxicity of certain pesticides	- DPAE - ONG/projet - Administration - ISABU - DPV	
High Poverty	1. Promoting income-generating activities	- DPAE - ONG/projet - Administration -	
Few seed producers in selected locations	1. Promote the creation of quality seed sales outlets 2. To stimulate the evolution of takeovers in seed multiplier groups	- GMS et IMS - DPAE - ONG/projet - DPSP - Administration - ONCCS	
No / little access to storage shed	1. Promote the construction of storage hangars 2. Rehabilitate existing hangars	- DPAE - ONG/projet - Administration - ONCCS	