SEED SYSTEM SECURITY ASSESSMENT

NORTHERN KATANGA (KALEMIE AND NYUNZU TERRITORIES):

DEMOCRATIC REPUBLIC OF CONGO

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Finally, we do aim for this assessment to lead to practical action in the short and medium-term. The positive opportunities for seed system, marketing and livelihood support in northern Katanga need to be seized upon soon and with vigor.

Acronymns

ADECOP	Association pour Développement Communautaire et des Paysans
AMT	Association de Mamans de Tabac
BEDERCA	Bureau d'Encadrement pour le Développement Rural, Communautaire et Agricole
CBSP	Community-based seed production
CEFA	Champ école formation agriculteur
CIAT	International Center for Tropical Agriculture
CD	Catholic Diocese
CMV	Cassava Mosaic Virus
CRS	Catholic Relief Services
DRC	Democratic Republic of Congo
DSD	Direct Seed Distribution
FC	Congolese Franc (currency unit) *
FHI	Food for the Hungry International
HH	Household
KAMA	kasi na maendeleo
IDP	Internally Displaced Persons
IPAPEL	Inspection Provinciale de l'Agriculture, Pêche et Élevage
INERA	Institut National pour l'Étude de la Recherche Agronomique National Institute for Agronomic Study and Research
FAO	Food and Agriculture Organization (also UN-FAO)
g	grams
GLCI	Great Lakes Cassava Initiative (project led by CRS)
Kg	Kilos
LM	Linear meter (ML metre linéaire) (unit for cassava planting material)
MT	Metric Tonnes
OPV	Open Pollinated Variety
NGO	Non-governmental organization
PETAMU	Paysans et Éleveurs de Tabac et de Musoshi
PETARU	Paysans et Éleveurs de Rugumba
PRONANUT	Programme Nationale de Nutrition
RAF	Réseau agricoles des femmes (women's agricultural network)
REFOS	Réseaux des Femmes pour les ONG à la Santé
SENASEM	Le Service Nationale des Semences: National Seed Service
SSSA	Seed System Security Assessment
SVF	Seed Vouchers and Fairs
UEA	University of East Anglia
UPETA	Union de Pêcheurs et Éleveurs de Tan

* $US 1 equaled about 900 FC at time of assessment.

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EXECUTIVE SUMMARY

A Seed System Security Assessment (SSSA) was carried out in the northern part of Katanga (Tanganyika District), eastern Congo during August and September 2012. It reviewed the functioning of the seed systems farmers use, both formal and informal, and assessed whether farmers could access seed of adequate quantity and quality in the short and medium term. Work was conducted across two *territories* (territories), Kalemie and Nyunzu), with specific sites clustering around Tabac/with Kalemie town, and Muhuya/with Nyunzu town. Needs of both resident farmers and Internally-Displaced Persons (the latter in Tabac) were considered in the analysis.

The SSSA was conducted in northern Katanga at this time for five main reasons:

The region recently emerged from a period of civil strife (ending about 2006), but still has pockets of insecurity. There is a pressing need to rebuild and establish anew structures and processes that can strengthen smallholder farmers' seed security.

Select seed aid has been initiated in the region in the last five years, albeit on a limited scale. Within an 'emergency framework', direct seed distribution has taken place, particularly with horticultural crops, and seed vouchers and fairs have been implemented for several seasons. Within a 'developmental perspective', seed multiplication has been effected by select non-governmental organizations (NGOs) and the UN Food and Agriculture Organization (FAO). The seed multiplication efforts with cassava and banana have been particularly important due the disease pressures both are facing. As these efforts have been piecemeal (and are generally not sustainable), it is due time to get a holistic view on seed security needs and opportunities.

The northern Katanga region and, especially the farmlands around Nyunzu, were formerly (pre-war) recognized as an important breadbasket of DRC. With well-planned initiatives, the region can regain this much-need stature and expand production and agro-enterprise efforts.

Catholic Relief Services (CRS) eastern Africa programs and its partners have long been interested in seed systems more generally and have been involved in a range of programs supporting processes of seed selection and varietal development, multiplication, and improved storage methods. CRS firmly believes that empowering local communities to create and sustain functional seed systems will directly lead to improved household food security.

Finally, the work took place to build assessment capacity. Seed security assessment tools are linked to food security assessments, but are also quite distinct. For example, an assessment of a production shortfall, which often leads to food gaps, in most cases does not lead to a seed shortfall. The SSSA in northern Katanga was designed to give honed technical insight and to train professionals in fast-evolving seed security assessment methods http://webapp.ciat.cgiar.org/africa/pdf/sssa_manual_ciat.pdf.

This report presents findings across sites. Site-specific reports, in French, are available through CRS (Willy.Mulimbi@crs.org).

Select SSSA results are reported below in two sections: a) Acute seed security findings, and b) Chronic seed security findings and emerging opportunities. Recommendations then follow.

Acute Seed Security Findings

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

From the farmer point of view, 2011-13

Residents/non-IDPS

1. For the 2011-12 main growing season, farmers (residents/non-IDPs) sowed only slightly less than normal (-5.08%) in terms of overall quantities planted. Crop yields were rated to be generally good in 71% of cases.

2. Farmers relied on local channels to access 96%+ of their seed during the 2011-12 season. Local markets were a crucial core for ensuring seed security, supplying 44% of total seed sown. 'Friends and kin' as a source were important especially for the vegetatively-propagated crops (cassava and sweet potato), which has key implications for how these cuttings might move more widely and quickly.
3. For the 2011-12 season, seed from agro-dealers was negligible (< 0.5% and only for rice). Seed obtained from FAO/NGOs was also minimal: 3.2% of all seed sown and focusing on maize and cassava planting material.
4. Farmer projections for the 2012-13 main season show much of the same, with somewhat more of a positive trend. Almost 75% of farmers plan to maintain or increase the amounts sown across crops, with a modest overall aggregate seed increase of + 5.18%. (Hence from -5.08 in 2011-12 to +5.18 for the upcoming season).

In brief, for resident farmers, the seed security situation 2011-2013 revolves around the norm and is not particularly dynamic.

IDPs

5. For the 2011-12 main growing season, IDPs sowed almost 20% less than 'usual' in terms of overall quantities sown (comparing amounts sown in the camps versus what they would do on their home plots). Crop by crop, 54% of farmers stated that they sowed the same amount or more than is their norm.

6. IDPs relied on local channels in much the same way as the resident population—only to a greater degree. For the 2011-12 season, IDPs relied on local channels, for nearly 100% of their seed. Humanitarian provided only 0.5% of their seed. Local markets were the crucial core for ensuring seed security, providing 70% of total . Note that IDPs are purchasing seed, and in large quantities.
7. The reported plans of IDPs for the 2012-13 main season show planting trends on an upward path. Over 70% of farmers plan to maintain or increase the amounts sown across crops. The aggregate amount also moves from -20% in 2011-12 (# 5 above) to a – 6%, for 2012-2013.

In brief, for the IDPs, the seed security situation is somewhat stressed for 2011-2012, but projected to improve markedly in 2012-2013.

8. The relatively progressive picture should not obscure the fact that there are still vulnerable populations and regions where farmers are stressed: resident farmers indicated they were planting less of a crop in 37.8 and 26.4% of cases for 2011-12 and 2012-13, respectively. In parallel, IDPs indicated they were planting less of a crop in 44.1 and 30.9% of cases, respectively.

9. The rationale for using less seed (a general proxy for decreasing land area) is key. During 2011 and 2012, resident farmers gave four main reasons for sowing less: the weather, as the start of the A season in 2011-12 was erratic; money constraints (which accounted for 45-63% of the cases among those 'sowing less'); health problems; and labor shortages. Seed availability was mentioned as a constraint by fewer than 5% of the residents, but proved to be a more important factor for the IDPS. Due to the small local market in Tabac, farmers often travel to Kalemie for seed and IDPs have challenges meeting such travel costs. (Note that lack of land among IDPs was not cited as a major constraint.)

10. Understanding farmers' rationale for expanding seed use (a general proxy for expanding land area) is also central for laying a base to spur production. Households will plant more in 2012-13 as a good harvest means more seed available at no cost (36% responses) . Getting access to more land, and seizing on new marketing opportunities also directly expanded seed use (13% of responses). Finally, receiving seed free, did make a difference, especially for crops such as cassava, where access to cuttings can be a problem (17% of responses).

<u>On the supply side, 2011-2013</u>

Given farmers' dependence on the local markets for large proportions of their stock, the central questions for seed security in the 2012-13 season revolves around markets. Can they supply enough seed and acceptable seed? Subsequently, can farmers afford the seed on offer?

Can the markets deliver enough seed?

11. Several sources of information show that seed availability will not a problem in the zones of assessment for the 2012-13 season.

    - Seed flow mapping demonstrates that there are multiple sources of seed/grain for all the major crops. All normal supply routes remained open at the time of the SSSA.

    - Farmers assessed that 2011-12 had been an average or good season in 84% of cases (across crops). For the upcoming season, 2012-13, they are able to rely slightly more on their own stocks for seed, and slightly less, overall, on the market.

    - The very large traders in Kalemie and Nyunzu (the few key individuals who control seed supply) assessed that seed stocks were overall would be adequate. Bean supplies already available at the time of the SSSA were deemed 'normal'. Supplies of maize and groundnut production overall were deemed somewhat lower than normal for food (following the erratic rainfall of season B) but sufficient for seed. Large traders could procure all the supplies they wanted: the issue would be price. (To understand the scale of their operation, some move 100-300 sacks a season per crop, or 12-36 MT per crop).

Can the markets deliver acceptable seed?

Will the quality on offer be acceptable? While the SSSA team did not conduct objective seed quality assessments, the team did gather farmer and trader insights, and effected visual inspections.

12. The quality overall was assessed as acceptable, but with select concerns.

- From the farmer point of view, seed obtained from the market 2011-12 was generally good. In 86% of cases (n=190) farmers said they would re-sow the market-purchased seed in 2012-13 (versus only 71% of cases for resowing of seed received from the NGOs).
- Visually, the SSSA team visited three market centers (interviewing in detail some 49 traders). The bean, groundnut and maize seed in the market looked well-sorted, by variety, and free of any inert material (stones, sand, sticks, debris).
- Select farmer comments did suggest that, in general, groundnut seed quality should be improved, although no unusual complaints were linked to the current seasons. The main and ongoing compelling quality issue was linked to cassava planting material (due to various cassava diseases), although, even here, farmer assessments suggested that the diseased materials were tastier (especially for the local sombé).

In sum, there was no evidence that the current quality of planting material, across crops, was different from the norm or was particularly 'poor'. Ongoing stresses were noted with cassava disease.

Can farmers afford to buy the seed on offer?

The major constraint surrounding seed security, for both the resident population and the IDPs centers on money. The degree of potential financial stress becomes more visible as one tallies the amounts money concretely needed to buy seed.

13 Cash needs for seed purchase among resident farmers was about 22,000 FC for the 2011-12 season and is projected to rise to 25,000 FC for 2012-13. For IDPs, such expenses are comparable and rising even more quickly: about 19,000 FC for 2011-12 and 28,500 FC projected for 2012-13.

The good news for both residents and IDPS is that farmers are expanding land areas cultivated. However, because of reliance on market seed, expansion is ever so costly.

<u>Community summary</u>

How did communities themselves assess the potential of their members to achieve seed security (that is, having seed in stock or being able to access it elsewhere?) For Tabac, the community itself suggested that 100% were seed secure across their major crops. In contrast, for Muhuya, the community raised key issues for two crops where seed has to be purchased in large quantity: groundnuts and maize. Community focus groups suggested that only 40-50% could plant their desired amounts. Note that this figure was much higher than the individual quantitative interviews revealed in practice: for 2012-13, in only 12% of crop cases were farmers planning to plant less due to financial constraints. This latter percentage falls well within the range of 'normal' for communities with significant levels of poverty.
A part of the community is stressed on a routine basis (not only this season).

Chronic Seed Security Findings and Emerging Opportunities

The review of medium-term trends in seed security in northern Katanga showed a few (!) qualified moves forward as well as many important and key bottlenecks.

Mixed (qualified) factors: positive and negative

14. New variety access within the survey area has been modest with 23% of farmers having had access to at least one new variety in the last five years. New varieties have been largely accessed through NGO/FAO channels, that is, through non-sustainable conduits. The need is pressing for ongoing and innovative variety delivery channels.

15. There have been several notable efforts for multiplying clean cassava planting material to respond to the disease pressures of Cassava Mosaic Disease. In fact, 41% of the new varieties reaching farmers were of cassava materials (linked to #14). However, two of the bigger multiplication initiatives in northern Katanga were drawing to a close at the time of the SSSA: those spearheaded, by the UN-FAO and by the GLCI. Such a winding down occurs at a time when farmers still face a pressing need for clean planting supplies but also when several large traders (especially in Nyunzu) are drawing up plans to expand their cassava flour processing (and product) business.

Negative and ongoing stresses

16. A fairly diverse range of crops is grown at each of the SSSA sites and, farmers put special emphasis on crops geared toward income generation. However, transformation levels overall are low, mainly resulting in the fabrication of different types of flour, alcohol and street food (e.g. doughnuts and chikwangue). This means that farmers in northern Katanga have been unable to reap the benefits of value addition to raw agricultural products.

17. Seed system channels have generally remained static over the least five years, with the exception of important gains in introducing new cassava varieties and in expanding use of horticultural seed (cabbage, eggplant, onions).

18. Special problems were identified by communities linked to specific crop supply chains. Select maize varieties were assessed as 'degenerated' and groundnut seed overall is purported to be declining in quality. (Note that groundnut seed, in particular, is bought from local markets season after season.) The constraint identified around horticultural seed center on its relative 'unavailability'. The three concerns are distinct and merit separate targeted actions.

19. Input use for fertilizers or storage protection in northern Katanga is near non-existent. During the 2011-2012 main season, no household within the SSSA sample (N=198) used mineral fertilizer, only 4% used some manure and only 4% used chemicals to protect seed in storage. This latter lack is particularly worrisome as farmers and traders (even the largest traders) report storage losses of 20 -50% for maize alone.

20. Seed aid, that is free distribution of seed as part of emergency response and development initiatives, has been relatively limited in the northern Katanga region. About 1/5 of households have received such aid within the last five years (2007-2012) with a mean of 1.3 times. Delivery of aid has largely been through direct distribution although vouchers (combined with fairs) have been implemented by select organizations, including CRS and it Catholic Diocese partners.

Differentiation among households

21. When comparing results from male-headed versus female –headed households (HH), three trends were found to be statistically significant. Female-headed HH generally have smaller cultivated areas and have less use of new varieties (so they are distinctly disadvantaged). In contrast, such female-headed HH are expanding their sowing rates (and presumed land areas) at a faster rate than male-headed households.

22. When comparing trends of HH cultivating different size fields, one statistical trend was noted: those with 0.5-1 ha of cultivated land (near the bottom stratum but not the very bottom) are expanding land use at faster rates than others. (Hence, there is some positive dynamism even among quite small landholders.)

In sum, overall there seems to be very little agricultural innovation in northern Katanga. Some groups of farmers are sowing expanded land areas—but largely in the absence of new varieties, fertilizer and storage inputs, and agro-processing possibilities. For select crops, the seed situation is not static but potentially declining: cassava, groundnut and maize.

RECOMMENDATIONS

Below, find a set of recommendations which are applicable across sites. These are loosely clustered into five themes.

Important to signal is that the recommendations center on actions to alleviate chronic stress and to seize upon developmental opportunities. The SSSA did not find constraints that warranted an 'emergency response'.

I. Variety development and introduction

There is a generalized need in northern Katanga to develop and identify varieties that are adapted, meet farmer preferences and respond to dynamic market needs.

Various steps might be considered to identify productive and accepted varieties.

1. Concerted efforts should be made to scale up the multiplication and distribution of 'proven varieties'. INERA has released some 16 varieties for eastern Congo, Including Katanga (of maize, beans, cassava, groundnut, soybean) (Table 3.2), yet these are not generally found on farmers' fields.

2. Cleaning of the highly-appreciated formerly-released varieties might be explored. Farmers particularly expressed need to upgrade their 'degenerated maize' varieties.

3. Multi-locational sites might be quickly established for screening 'best bets' from elsewhere. In the current absence of a functioning government decentralized testing system, a temporary network of agricultural NGOs and universities, coordinated by the INERA, might be established across the region in key agro-ecological zones.

4. Screening sites for more exploratory germplasm trials should also be established (across key agro-ecological zones), using models which allow for end-user evaluation. Participatory Variety Selection (PVS), mother-baby trials, or Farmer Field Schools (FFS) are among the well-established variety screening formats which allow for intensive farmer and trader evaluations.

5. Decentralized screening might best be tied to decentralized seed producer groups. These can spur wider multiplication, once acceptable varieties have been identified.

Key is that: a) local adaptation be confirmed; b) farming communities be engaged to ensure performance and cooking/taste acceptability; and c) traders/dealers be involved to anticipate market acceptance.

II. Seed production and storage

Decentralized seed production needs to become a more strategic and effective force in serving farmers as the formal seed sector will never be able to handle a) the range of crops needed, nor b) the range of varieties. At this point, the decentralized seed multiplication initiatives seems to be having very modest impact (aside from anecdotal accounts of receiving new cassava planting material). Decentralized multiplication is also being propped up by institutional buyers (NGOs, faith-based groups), rather than from demand by smallholder farmer clients.

Sustainable decentralized seed production models need to be identified.

6. Decentralized seed multiplication groups need to develop an assessment of the cost-effectiveness of their organization and to develop a delivery strategy. They should be encouraged to produce only if a) viable markets are identified and b) their own agro-enterprise and marketing skills have been enhanced.

7. Links need to be specifically catalyzed to tie decentralized seed producers with continuing and new sources of germplasm (from INERA and elsewhere).

8. Storage losses on-farm need to be combatted in multiple ways, particularly to deal with storage constraints of crops such as maize and groundnut. Triple bagging or small seed silos are options to be tested for technical and social suitability.

9. Given that local markets (and their traders) are important for farmers' seed supply, more attention should be given to encouraging these open seed/grain markets to supply the kinds of potential seed farmers need. As one point of departure, seed/grain traders could be powerful partners in helping to *move new modern varieties* widely, within and among farming communities. Traders might also be linked to options for *safeguarding and improving the quality of seed they put on offer*. This could involve: linking traders to credible sources of good quality seed; working

with them on techniques of seed bulking; recommending options for separate and improved seed storage.

10. Priority crop seed quality: cassava. Major initiatives to supply farmers with clean cassava planting material were drawing to an end at the time of the SSSA. New initiatives, which are locally–driven (possibly by farmers organizations) and which *sell clean planting material* need to be catalyzed immediately.

III. Delivery outlets and approaches

Farmers need regular access to outlets that can provide them with the varieties and quality seed they desire.

Formal sector delivery expansion

11. Current formal sector outlets (aside from horticultural crops) are very few (i.e. near non-existent) and located only in larger town centers. Those that have opened should be strengthened to provide particularly: a) a greater range of horticultural seed; b) seed storage chemicals; and c) agricultural tools adapted to the milieu. (Note for tools, local blacksmiths may need to be engaged to fabricate axes, hoes, and machettes to meet local specifications.)

Informal channel expansion

The situation remains that most farmers access the large majority of their seed in various types of local markets. Small farmers do *buy* the planting material. As an overall strategy, we suggest that:

Creative initiatives need to be developed to tie supply of new varieties and quality seed to the multiple venues where farmers routinely make purchases.

More specifically, the following might be tested:

12. Trials might be initiated for selling new varieties and high quality seed in more 'integrated' rural shops, that is, the stores where farmers buy sugar and matches and oil. Venders would have to be trained to provide farmers with the technical advice needed to guide informed seed choice and management.

13. Seed loan systems, which allow farmers to access seed of new varieties on credit, might also usefully be tested, with special monitoring devoted to analyze the quality of seed returned, and real repayment rates.

14. Seed fairs, of various types (whether emergency and development-related) might be regularly linked to sources of new varieties and quality seed;

15. Agro-enterprise groups might be spurred to focus on production and marketing of good quality seed.

All of the above 'informal outlet sales' can be facilitated if high quality seed is sealed and sold packed in small seed through plastic packs. Experience elsewhere suggests this should be done in small farmer-acceptable sizes (100 g? 200 g?) and with labels reporting basic varietal characteristics. http://www.youtube.com/watch?v=FQK8KjwmPsA. The last linked recommendation is as follows:

16. Farmer-focused, small pack sale models might be tested in the range of venues where farmers routinely buy seed and other goods (12-15).

If done smartly, the above suggested broadening of seed sale venues and seed sale formats should stimulate the creation of a broad customer base, focusing demand toward direct producers (small farmers) and away from reliance on large institutional buyers. The above also builds on the varied local market channels that all farmers use on a regular basis: transaction costs for farmers will subsequently be minimized.

IV. Information innovations: raising awareness and demand

Northern Katanga 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 use of compost and manure. There is an urgent need to stimulate a) a learning and experimentation environment; b) an environment that provides a wealth of technical information; and c) information channels that foster feedback mechanisms.

Several recommendations appear below related to information innovation follow. The focus here is on enabling the small farmer to draw in much needed innovations and to make more informed choices among multiple agricultural options.

17. 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 (particularly those returning from the mines) be included in these interactive learning processes.

18. Agricultural-linked 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.

V. Agro-enterprise development; and savings and loans

Ultimately, non-seed issues will drive the seed security sector. Food and livelihood security generally are linked to the financial capacity of farmers. The last two recommendations focus on needs for: a) generating cash, through Village Savings and Loans (VSL) Programs and b) developing agro-enterprise market chains.

19. **Village Saving and Loan Programs (VSL)**: VSL can help address some of farmers' key access constraints (see '*Recommendations, Related Technical Issues*). In a relatively short time (12 – 24 months), VSL funds are often large enough to allow members to borrow enough money to access key agricultural inputs like seed and sometimes fertilizer or pesticides. Initial tests in nearby Moba (and elsewhere) have had very positive results.

20. **Rural agro-enterprises** are mechanisms of potential impact that are currently severely underdeveloped. Farmers are selling their agricultural produce in raw form, or only slightly modified as in the case of maize and cassava, sold as flour. As a start in promoting agro-enterprise development, profitable business models that work for smallholder farmers need to be tested and then scaled-up (see '*Recommendations, Related Technical Issues* for suggestions on methodology). Ultimately, linking smallholder farmers effectively to markets is the best solution to increase incomes and both seed and food security, and also to create the demand that will support crop breeding and private sector production of good seed and/or planting materials of improved crop varieties.

Overall, this SSSA recommends a move away from short-term, gap-filling interventions and towards strategic investment in smallholder–driven variety, seed, and agricultural marketing.

I. INTRODUCTION

Rationale for Seed System Security Assessment (SSSA)

This report presents the results of a Seed System Security Assessment (SSSA) in the northern part of Katanga, Tanganyika District (Kalemie and Nyunzu territories) of eastern Congo. The assessment took place in August and September 2012 and was implemented for five main reasons.

The region recently emerged from a period of civil strife (ending about 2006), but still has pockets of insecurity. There is a pressing need to rebuild and establish anew structures and processes that can strengthen smallholder farmers' seed security.

Select seed aid has been initiated in the region in the last five years, albeit on a limited scale. Within an 'emergency framework', direct seed distribution has taken place, particularly with horticultural crops, and seed vouchers and fairs have been implemented for several seasons. Within a 'developmental perspective', seed multiplication has been effected by select non-governmental organizations (NGOs) and the UN Food and Agriculture Organization (FAO) and has encompassed a good range of crops: maize, rice, groundnuts. The seed multiplication efforts with cassava and banana have been particularly important due the disease pressures faced by both crops. As these efforts have been piecemeal (and are generally not sustainable), it is due time to get a holistic view on seed security needs and opportunities, to fill critical gaps and to coordinate better these laudable partner efforts.

The northern Katanga region and, especially the farmlands around Nyunzu, was formerly (pre-war) recognized as an important breadbasket of DRC. With well- planned strategies and initiatives, the region can regain this much-need stature and even expand both production and agro-enterprise efforts. There is a need for tools such as the SSSA, which can also be forward-looking.

CRS eastern Africa programs and its partners have been long interested in seed systems more generally and have been involved in a range of programs supporting processes of seed selection and varietal development, multiplication, and improved storage methods. CRS firmly believes that empowering local communities to create and sustain functional seed systems will directly lead to improved household food security.

Finally, the work took place to build assessment capacity. Seed security assessment tools are linked to food security assessments, but are also quite distinct. For example, an assessment of a production shortfall, which often leads to food gaps, in most cases does not lead to a seed shortfall. The *Seed System Security Assessment* (SSSA) in northern Katanga was designed to give honed technical insight and to train professionals in fast-evolving seed security assessment and intervention design methods. The training/assessment lasted three weeks and strengthened capacity in six organizations.

Aims and Structure of Report:

The report presents the results of the SSSA in the northern part of Katanga (Tanganyika District), eastern Congo during August and September 2012. It presents the findings on seed security across two *territories* (territories), with specific sites clustering around Tabac/with Kalemie town, and Muhuya/with Nyunzu town. Both sites focus on resident farmers, with the Tabac area including additional information from a town-based camp of internally displaced persons (IDPs). The seed security issues of resident farmers ('all farmers') are separated from the IDPs as the latter may have special needs, particularly due to asset depletion and land insecurity.

In terms of report structure, Chapter II introduces the SSSA methodology and reviews the actual methods used in the August-September assessment, including the rationale for the choice of sites. Chapter III provides a brief background to eastern Congo's formal and especially informal seed sector, and has a special focus on how local seed markets function.

Chapter IV presents the main field findings, divided into specific sections on seed security issues in the near term (2011-2013), and on chronic stresses and emerging opportunities over the medium to longer-term. The 'near term' analyses concentrate on the main season for both years, technically known as 'Season A', which generally unfolds from October to January.

Chapter V presents the recommendations across sites, followed by references.

Appendices post site-by site action plans and give a glimpse into the type of tailored strategies needed to address smallholder farmers' constraints and opportunities.

Note that while this report presents a synthesis of findings across the two sites, site-specific reports are available from CRS Congo (Willy.Mulimbi@crs.org).

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 and November 2012. 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.

II. BACKGROUND TO SEED SYSTEM SECURITY ASSESSMENT (SSSA)

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 August -September 2012 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 2.1 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 2.1: 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 target actions to alleviate that 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 emergency contexts. Indeed, in cases where 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 2.2 gives examples of how identification of a specific seed security constraint should lead to a targeted response, as we are aiming for in this Southern Sudan 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 2.2: 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 Agroenterprise development
Poor seed quality ▪ poor varieties ▪ unhealthy seed	Limited introductions of new varieties	Introduce new varieties and give technical support Variety selection / breeding Development of seed enterprises linked to new varieties and other quality enhancements

Source: Sperling et al. 2008

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 effort 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 http://webapp.ciat.cgiar.org/africa/pdf/sssa_manual_ciat.pdf) .

Methods Used

The themes and methods used in the northern Katanga SSSA are sketched out in Table 2.3. They include a range of qualitative and quantitative methods and draw on multiple stakeholder insights. Mapping tools were also used to trace seed availability and seed flows within and among regions. Of special note is that the sample sizes were relatively big for a rapid assessment: 198 individual farmer interviews, 49 trader interviews, visits to 10 input dealers and agro-processors, and multiple focus group discussions and key informant interviews.

Table 2.3: Investigative methods used in the SSSA northern Katanga, Aug. –Sept. 2012

Type of Investigation	Commentary
Background information collection	Project reports, regional literature
Database utilization	agricultural production figures vulnerability data
Key informant interviews	government /project personnel seed producers/multipliers
Focus group discussions Community-based Women's groups	Separate community and women- only FGD agricultural and variety use and trends seed source strategies, by crop community seed security assessment women's crop/seed constraints/opportunities
Farmer interview s (N=198)	seed source patterns/input use access to new varieties/ seed aid
Agro-input dealers, Agro-processors (c. 10)	processing trends market constraints + opportunities
Seed/grain market analysis (N=49 traders)	crops and varieties supplies on market pricing patterns/ sourcing areas seed quality management procedures

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 note is that almost 1/3 of the households designated themselves as 'female-headed'. The SSSA team, later, found this category not very useful as many households legally headed by men were in practice run by women -- as men were working off-farm (e.g. in the mines), or not engaged in daily decisions.

Of the 198 HH interviewed, about 85% were among the settled population and 15% among a group of internally displaced persons. The IDPS were found only in the Tabac area and had been displaced mainly due to conflict/insecurity in the northern Katanga area in the last 2-5 years. Table 2.4 summarizes household sample characteristics.

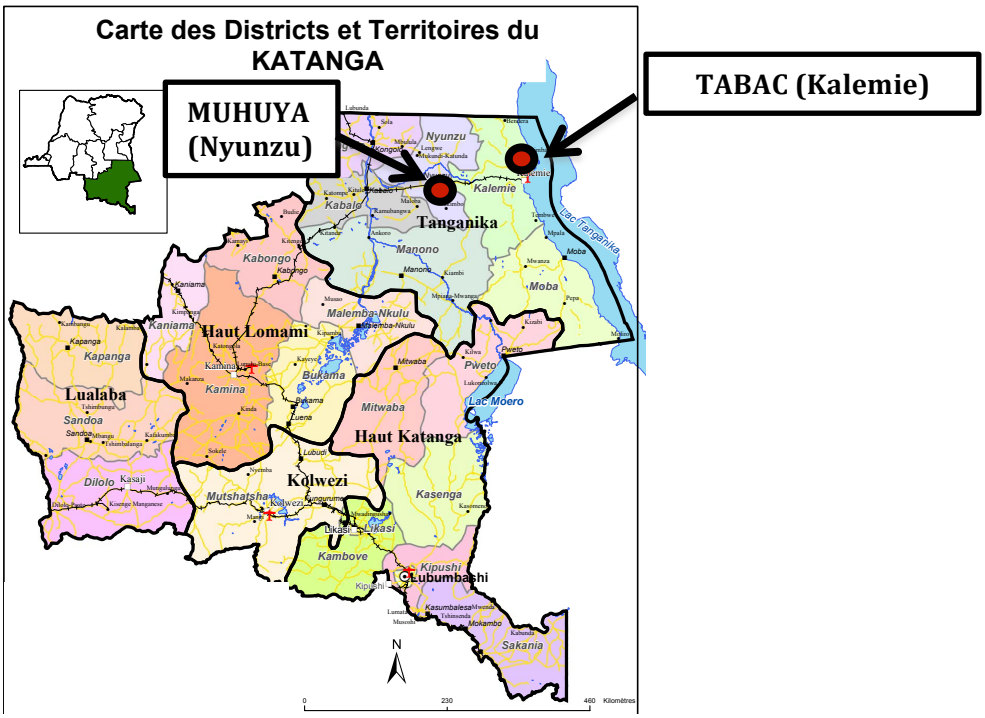
Table 2.4: SSSA northern Katanga region, household (HH) sample characteristics (N =198)

Feature	Description	% Sample
Type of HH	Adult-headed Grandparent-headed Child-headed	**96.9** **2.6** **0.5**
Resident status	Resident IDPs	**84.8** **15.2**
Gender of HH head*	Male Female	**60.4** **30.6**
Area cultivated (ha)	< 0.5 0.5-1.0 >1.0- 2.0 >2.0	**37.9** **45.1** **12.8** **4.1**

Site Choice

Sites were chosen mainly to link the assessment to practical action, and hence followed partner priorities. Figure 2.1 indicates the general location of the two sites: Tabac/Kalemie, Muhuya/Nyunzu.

Figure 2.1. Geographic location of SSSA zones, September 2012



Tabac

Tabac village is situated 18 km from Kalemie town, with good road links between the two that facilitate relatively easy access to goods (including seed) and growing business opportunities. For years (especially 1960-1990), the village was known as an area providing labor for well-developed enterprises: the tobacco industry (hence the village name), the railroad (SNCC, Societe Nationale de Chemin de fer du Congo), the textile industry (FILTISAF-Filature-Tissage-Africaine) and commercial fish processing. Partially because of this legacy, even today, the village is marked by extremely high use of contract labor within agriculture (see Box 1).

The village itself presently has 8700 inhabitants, however, only about 25% of these are considered original or local, with 65% being new migrants (in the last 5-10 years) and 10% being internally-Displaced Persons, who have been camped within town boundaries for the last two years or so. (IDPS are generally from Wimbi, Fizi, and other areas on the route toward Bendera). Many here are relatively new to the practice of agriculture.

The village of Tabac has two distinct agricultural areas, a plateau, where most the population has some land, and the valley, which is parceled out for seasonal crops by the customary Chief. (One of the main complaints of the IDPS, is that few have been given access to their rich valley land and that their plots, on the plateau are often 5-10 km distant.) Land scarcity is the defining issue here with holdings generally less than 1 ha, and plots in the valley particularly small and in demand.

Muhuya

The village of Muhuya is quite distinct from the Tabac site. Muhuya, and the Nyunzu region more generally, used to be a breadbasket of agricultural production in Katanga (and during the colonial period was known for cotton production). Land is expansive, and until very recently, forest was routinely cleared through using traditional methods of slash and burn to plant the important maize crop. The practice is still ongoing, but at a reduced scale.

Transport routes greatly deteriorated during the Mayi Mayi[2] period of insecurity (roughly between 1997-2005), directly affecting commercial opportunities (note, there is still NO local market at Muhuya itself). In the last year, the road between Nyunzu and Kalemie (194 km) has been greatly improved and has spurred economic enterprise in the region (so a trip that formerly took up to 2 weeks, now takes but 4 hours). However, the road linking Muhuya to Nyunzu- some 15 km, remains deteriorated, and requires 3 hours by foot or loaded bicycle (with the latter being the main way goods, especially groundnuts, are transported).

A key livelihood influence in this area is mining. Agricultural workers, especially young men, leave the farm to work in nearby quarries (at 40 km, “100 kilos’ and 62 km ‘temps present). While the work itself may not bring the cash expected (see Box 2), the mining population does need to be fed – with beans, maize, manioc flour.

For summary of site parameters see Table 2.5 below

[2] Mayi Mayi groups are essentially localized village militias that may spread out over a large area. Different factions block and destroy roads to prevent access.

Table 2. 5: Select descriptive parameters of sites chosen for assessment.

Site	**Tabac (with Kalemie town)**	**Muhuya (with Nyunzu town)**
Agro-ecology	Valley - 750-780 m altitude Plateau	Savannah-forest -650-680 altitude
Irrigated /rainfed	Rainfed	Rainfed
Principal Crops	Cassava, maize, groundnuts, irrigated: paddy , sweet potato, Oil palm	Cassava, maize, groundnuts
Emerging crops	Taro, soybean, horticultural crops, sugar cane	Rice, tomatoes, peas
Infrastructure -roads -market - telephone	Good road Permanent market Well-developed commerce center Good mobile coverage	Road recently improved from Nyunzu to Kalemie (194 km, packed dirt) Road Muhuya to Nyunzu still poor shape (15 km) No local markets Poor mobile coverage
Security risks	None	Weak (but ongoing)
Environmental risks	Flood Bush fires Deforestation	Bush fires Extractive mining Heavy deforestation
Internally-Displaced Persons	Yes	No
Other salient characteristics	Small farm sizes Extensive contract labor Large 'new' population	Expansive land available (practice slash + burn) Need to reintegrate mining youth into local economy

Box 1: Contact labor in Tabac – a sign of stress, or an opportunity?

Contract labor is central to farming in Tabac, in part due to the deep and heavy soils in the valley (see Box 11 on *women and agriculture*). In the past, this work was done by groups working on each other's farm, or workers were paid in-kind with food or other goods. However, contract labor is now largely paid with cash, under a system called *Bikingo.* This practice apparently started around 1984 when a church-linked NGO paid cash for their missionary farm work and the people of Tabac got used to the payments. At the same time, displaced people from Moba, fleeing unrest, provided a ready pool of labor. The *Bikingo* system has standardized pay rates for key agricultural tasks, as shown in the following table.

Bikingo rates for key farming tasks in Tabac

TASK	Area	Pay rate
Brush clearing	10 x 10 m	1000 FC
Land preparation	10 x 5 m	1000 FC
Weeding (normal)	10 x 10 m	1000 FC
Weeding (heavy)	10 x 5 m	1000 FC

These rates mean that a typical 50 x 50 m plot would need to pay as much as 25 000 FC for labor a season – even more, if trees need clearing, or weeding happens more than once. So a household's labor costs may be in the same range as seed costs, a significant burden (see tables, 4.12, 4.13: seed costs).

It is noteworthy that 40-50% of Tabac's resident population does contract labor, as does 80% of IDP households (700 out of 900 in the camps). Working for cash on others' farms is driven by a need for cash to buy seed, to rent farmland, and to off-set school fees. With monthly school fees of 1200-1800 FC for primary, 3000 FC for secondary school, and additional contributions of 15 000 FC a term, school costs add up for a family!

The impacts of a contract labor market are mixed. On the plus side, *Bikingo* provides opportunities for earning cash. It also may help integrate newcomers; for instance, Tabac residents say they prefer hiring IDPs. ("They work better than locals, and we get fewer problems of theft in our town when they have money."). However, *Bikingo* has also drawn many to Tabac to work, and eventually to settle, leading to scarcity of the best land. More critically, poorer households' work off-farm comes at the cost of attention to their own farms. They end up working less land, delaying key tasks, or neglecting them altogether. Thus an arrangement to fill an immediate need for cash may weaken production and affect the poor's longer-term prospects.

Box 2: Why one day in the mines could be a day lost (for an agricultural –based family)

In recent years, quarries have opened in the northern Katanga region for valuable minerals such as gold and coltan. Thousands of people have gone to work in these quarries, drawn by a desire to gain quick (and hopefully substantial) money, and for the freedom to work for themselves. Many left Muhuya for the mines, most of them men between 12 and 40 years old. They generally went on their own, leaving behind parents or (if they were older) wives and children, and tended to stay for several months. The hope was that their earnings would contribute to the household back home. For those left behind on the farm, losing an able-bodied worker is a big cost, limiting agricultural productivity. Was it worth it?

The vast majority say 'No'! Mine-workers are not regular employees, but paid for what minerals they unearth, by a single buyer (MMR mining) who operates throughout the area. The sheer number of mine-workers at a quarry, and monopoly buyer, would tend to drive down returns to individual mine-workers. Miners' contributions to their families were insignificant. Even worse, illness and divorce have affected some workers. Most who have travelled from Muhuya to work in mines have since returned, discouraged, and no better-off. For most, their time in the mines was time lost to farming. Many young returnees lack assets or land, and are searching for ways to re-establish themselves in the community, and to get a secure livelihood.

Reintegrating particularly the younger population, and stimulating for them lucrative job possibilities remains a central concern of the Muhuya community. Some have suggested brickmaking, agro-processing and specialized seed production as commercial possibilities.

Seasonal Overview

Of specific note were the seasonal patterns of crop performance around the period of the seed system security assessment (August-September 2012). In both sites, community focus groups assessed crop performance across the last three seasons. In Tabac, communities stated that the most recent season, February to June 2012 had not been a particularly good one and, also, that seemingly longer-term changes were taking place, due to seasonal variability which was affecting crop production strategies. For instance, due to perceived changing rainfall patterns (i.e. too variable) farmers stated that growing rainfed rice on the Plateau was no longer possible and that rice production has shifted exclusively to the better-watered valley areas. Similarly, maize and bean production was being severely curtailed during this 'season B' (February-June).

The community in Muhuya cited some of the similar stresses: groundnut production is stressed due to variable weather patterns (drought and heavy rains) and bean production seems to be declining due to a rise in insect attack, which farmers ascribe to 'no real dry period between the two seasons'. Additionally, Muhuya farmers raised issues of heightened Cassava Mosaic Virus (CMV) attack, and labor problems with maize production spurred by farm youth leaving to work in the mines.

So overall, the seasons of the SSSA were 'stressed ones', but with the stresses identified as ongoing and no longer unusual. In particular, seasonal variability is now recognized as a norm and Box 3 summarizes some of the strategies farmers are using to adapt to this perceived change.

Table 2.6: Community assessments of crop performance over three past seasons:

a) Tabac

CROP	2012	2011	2010
Cassava	XXX	XXX	XXX
Maize	X	XXX	XXX
Groundnuts	X	XX	XXX
Rice : irrigated	XXX	XXX	XXX
Rice : rainfed	X	X	X
Beans	X	XX	XX

- x=poor; xx= average; xxx= good. poor harvests have been shaded.

b) Muhuya

CROP	2012	2011	2010
Cassava	XXX	XX	X disease-CMV
Maize	X	X	XXX
Groundnut	X	X	X
Beans	X	XX	X

Box 3: How are farmers dealing with seasonal changes?

Climatic change is already effecting how farmers in eastern Congo manage their crop profiles. Simply, the two seasons are being more unpredictable: it is not clear when season A ends (formerly October to January) and season B begins (formerly February to June). Further, rains are sometimes unusually heavy, and droughts unusually marked. 'Real' or not, these changes are effecting crop management on the ground.

Farmers interviewed outline the following trends:

- Greatly reducing (sometimes eliminating) maize planting for season B
- Reducing planting area for season B for beans and groundnuts
- Expanding sweet potato use—to replace maize
- Moving rice to only the valley bottoms (not rainfed, higher areas)
- Concentrating horticultural crops in the valley bottoms (not rainfed higher areas)

III. SEED SYSTEMS IN NORTHERN KATANGA: OVERVIEW

Smallholder farmers use multiple channels for procuring their seed. These channels fall within formal and informal seed systems (with the latter also sometimes labeled as the local, traditional or farmer seed systems).

The formal seed system involves a chain of activities leading to certified seed of named varieties. The chain usually starts with plant breeding, and promotes materials towards formal variety release. Formal regulations aim to maintain varietal identity and purity, as well as to guarantee physical, physiological and sanitary quality. Seed marketing takes place through officially recognized seed outlets, either commercially or by way of national agricultural research systems (Louwaars, 1994). Formal sector seed is also frequently distributed by seed relief agencies.

The informal system embraces most of the ways farmers themselves produce, disseminate and procure seed: directly from their own harvest; through gifts and barter among friends, neighbors and relatives; and through local grain markets or traders. Farmers' seed is generally selected from the harvests or grain stocks, rather than produced separately and local technical knowledge, standards, and social structures guide informal seed system performance (McGuire, 2001). In developing countries, somewhere between 80% and 90% of the seed sown comes from the informal seed system (DANAGRO, 1988; FAO, 1998), although this varies by crop and region. Results of this northern Katanga SSSA show that over 96% of seed eastern Congolese farmers sow comes from local channels. There are some small exceptions , with rice and seed of horticultural crops (Chapter IV, Table 4.1, Figure 4.1).

Finally, as a parallel channel, the development of a 'relief seed system', has become of distinct importance on the supply side in many parts of Africa (Bramel and Remington, 2004). Northern Katanga has been involved only to some degree in this 'seed relief' trend. In this region, seed aid has been selectively given since 2003, especially for the horticultural crops and cassava cuttings. Within the random sample in northern Katanga SSSA, 23% of farmers had received seed aid within the last 5 years, with a mean frequency of 1.3 times each (see Chapter IV, Tables 4.24). Note that both direct seed distribution (DSD) as well as Seed Vouchers and Fairs (SVF) (CRS, 2002) are well known forms in this northern Katanga area (see Chapter IV, Figure 4.9).

Figure 3.1 shows schematically the formal and informal seed systems (and their component channels) and how they may interact. Adapted from Almekinders and Louwaars (1999), the figure additionally highlights the importance of the local seed market and seed relief channels.

Table 3.1 suggests how farmers in the communities of Tabac and Muhuya, described the general advantages of accessing seed from each of the diverse channels. They listed the potential sources in their order of importance: local market and social networks were deemed more important as seed sources than home stocks. No agro-dealers (or other certified seed sources) are mentioned by communities as sources. Such shops are located far from the community or non-existent in the region all together.

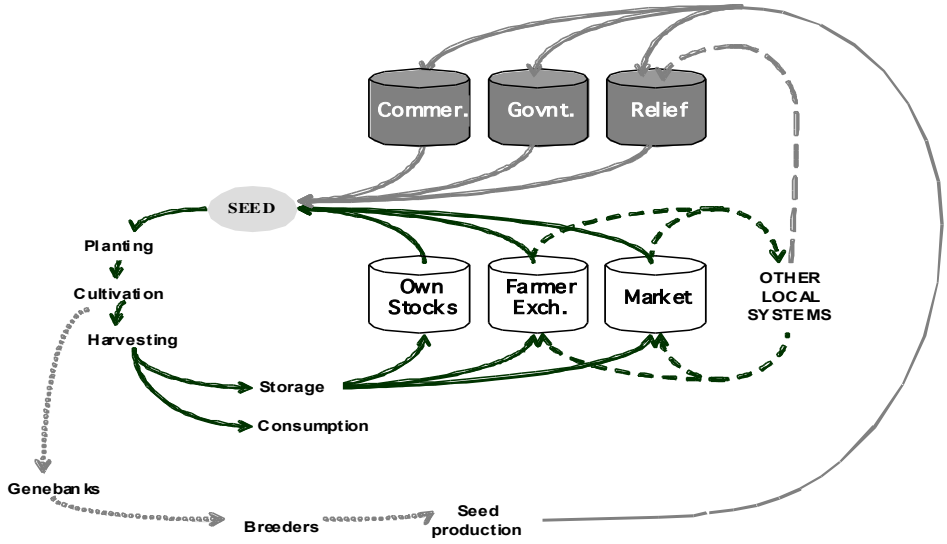


Figure 3.1.: Channels through which Farmers Procure Seed. Own seed stocks, exchange with other farmers , and purchase through local grain markets constitute 'informal' channels, while commercial seed companies, government or research outlets , relief supplies constitute formal channels. Adapted from Almekinders and Louwaars (1999).

Table 3.1: Advantages and disadvantages of using diverse seed channels : perspective from communities' perspectives: Tabac and Muhuya,, Aug-Sept 2012

Advantages	Disadvantages
Local Market • Can access these quickly • Seed is availability in great quantity • Can select good seeds • Some choice in price • (No problems with sorcery)	• Sometimes low germination • Have to sort to get best for seed • Price can be high • Need money • Quality not always clear • Weight may not be accurate
Neighbors/social networks • Can get a seed loan • Sometimes can get seed free • You know the seed	• No choice: you have to accept everything • Seed quantity is limited (i.e. not volumes wanted) • Sometimes have to pay back in quantities 2x to 3x what was given
Own stocks • Selected well • Seed adapted to your farm • Can sow at date you want (seed immediately available)	• Seed might be attached by insects/pests • Lack of storage vessels • Theft • Seed degenerated due to poor storage methods • Lack of amount needed
NGOs • Can get improved varieties • Product is high quality/good yield • Seed is free • Seed resists diseases	• Arrives late • Not everyone gets • No choice • Not enough for planting • Seed may not be viable • (Encourages disappearance of local varieties)

The next sections make a few points on varieties and seed system structures (or lack thereof) serving the northern Katanga zones. The formal breeding and seed sector are quickly reviewed and then focus shifts to informal seed systems, and particularly, the local seed/grain markets.

Formal Seed Systems in northern Katanga: variety development and seed multiplication

There are few formal breeding or seed sector programs in the northern Katanga area. Brief information is presented below on a) variety development + b) organized seed multiplication.

Variety development

Variety development across Congo is spearheaded by the Institut National pour l'Étude et la Recherche Agronomique (INERA), (the National Institute for Agronomic Study and Research). While INERA headquarters in are based in Kinshasa, regional stations take the lead in more site-specific research initiatives, including plant breeding and variety testing. The only research station currently functioning in all of Katanga Province is located in the south, in Lubumbashi, with the actual testing site about 25 km away from this large city, in Kipopo. As SSSA sites are located in the northern part of the province, some research results from the South Kivu research station at Mulungu have also been of use in identifying adapted varieties. However, there is an urgent need to identify more varieties that could help boost production in northern Katanga and to ensure that they are well-adapted to that specific region. (Farmers do not need to be exposed to even more risks.)

Research resources in the national research program, INERA, are scarce for the moment, but extensive research can still unfold on farm—with partners' help and with partners' working together to form new coalitions. Many faith-based organization and NGOs regularly carry out agricultural activities in the northern Katanga zone. Their joint and coordinated efforts could result in a strong 'decentralized variety testing system'—and relatively quickly (Box 4)

Box 4: What would it take to catalyze the creation of a decentralized variety testing network?

Varieties are only useful to farmers if they are adapted to farmers' agro-ecological conditions and management practices—and if they also meet farmers' preferences and marketing needs. To confirm this more local acceptability, varieties need to be tested in the regions of actual farmer use. At present, there is only one testing station in all of Katanga province, and this is located in the south, near Lubumbashi.

What would it take to take to catalyze the creation of a decentralized variety testing network? Well -- not much. In each site of the SSSA, partners were excited and committed to working together, and most already have at least some of the basic resources.

Basic features needed for such a decentralized system include:

1. INERA would have to provide initial seed for on-farm experimental sites.
2. INERA would have to be willing to serve as a Coordinator of this loosely configured 'variety testing network.'

3. Sites with different agro-ecologies would have to be characterized.
4. Partners would have to be trained to make agronomic and pathology observations.
5. Partners would need to be trained to conduct evaluations with farmers.
6. Partners would have to be willing to share and pool results (data).

Note that many organizations on the ground already have some of these crucial skills! Some are already experimenting on their own, so costs could be absorbed into ongoing activities. The main challenge is not money but rather will to work as a unified group.

Table 3.2 lists the varieties currently released and recommended for the eastern Congo area.

Table 3.2: Varieties released diffused by INERA for select provinces of eastern Congo

Provinces	Crops	Varieties
Katanga	Bean	1. XAN 76 2. DB 196 3. D6 KENYA or D6 BEAN 4. DOR 715 5. K 132 6. CAL 143 7. RJB 1
	Maize	1. Babungo-3 2. Kasaii 3. TZM
	Cassava	1. Sawasawa 2. Butamu 3. Liyayi
	Groundnut	1. G 17 or Red Beauty 2. A 65 3. MGV 4
South-Kivu	Bean	1. COD MLB001 2. HM 21-7 3. RWK 10 4. AND 620 5. BRB 194 6. AFR 708 7. G 59/1-2 8. AND 10 9. VCB 81013 10. VCB 81012 11. Namulenga 12. M 211
	Cassava	1. Sawasawa 2. Butamu 3. Liyayi
	Soybean	1. TGX 2. PK 3. SB

North-Kivu	Bean	1. COD MLB 001 2. HM 21-7 3. BRB 194 4. G 59/1-2 5. VCB 81013 6. VB 081012
	Cassava	1. Sawasawa 2. Butamu 3. Liyayi

New variety multiplication (formal seed initiatives)

At present, the National Seed Service, SENASEM, does not operate officially to produce the critical foundation seed (although there seems to be some unofficial multiplication and sale for which figures are not presently available). However, SENASEM does seem to offer some services in evaluating the seed quality of seed produced by others and hence does have a key regulatory role. (Note that SENASEM has no visible presence in the northern Katanga area.)

INERA, for its part, starts the seed multiplication cycle and multiplies a small amount of breeders' seed, with the scale of multiplication generally linked to magnitude of external donor funding. Decentralized seed multiplication partners, mainly select farmer groups, NGOs and the UN Food and Agriculture Organization then bulk up (i.e. further multiply) this breeder seed. Within the northern Katanga areas, multiplication has encompassed a good range of crops: maize, rice, groundnuts. The seed multiplication efforts with cassava and bananas have been particularly important due the disease pressures both are facing (see Box 5 for key cassava multiplication work). Generally these efforts are relatively new and have been piecemeal. To understand the fragmented nature of these interventions an initial list for those multiplying in the region of Tabac appears directly below. This multiplication a) generally does not guarantee seed of a certain quality and b) is not tied to strong marketing or commercialization thrusts. Given that seed is usually given free, or with (un-enforced) conditions of payback, real demand for higher quality seed has yet to be established.

Groups multiplying seed in the Tabac area: as of September 2012

- Food for the Hungry International (FHI), since 2006/7, working with 8 multiplication groups : maize, groundnuts
- FAO – since 20120/11, working with Cooperative BWINO: maize, rice
- FAO – since 2006, working with an Association of Women at Tabac: cassava
- SADEF / CEFA- Sensibilisation des droits d'enfants et les femmes / Champ-école Fermes – since 2009 : rice and cassava
- Association KAMA (Kazi Na Maendeleo) – since 2006 (with FHI) : cassava and horticultural crops (and since 2009 (FAO/ CRS/ GLCI with Caritas/Kalemie)
- BEDERCA – since 2012: bananas
- RAF – since 2011 (with some FAO support): cassava, horticultural crops
- FHI – macro-propagation of bananas (also rapid multiplication)
- PETAMU / PETARU – since 2009:cassava multiplication and participatory variety selection (PVS), (with some support from Caritas and FAO)

(source : Launch meeting SSSA August 27, 2012, Kalemie : group discussion)

Box 5: Important cassava stake/cutting multiplication Initiatives: northern Katanga (two examples)

Cassava in the staple crop in northern Katanga yet is victim of multiple types of disease and pest attacks, many of which are transmitted through the planting material itself. Several initiatives within the last five years have worked to greatly scale-up the supply of clean planting material. We give but two examples below (among multiple projects).

The **GLCI** (Great Lakes Cassava Initiative) was operational from February 2009 to April 2012, in the zones of northern Katanga. In Tabac alone, it worked through 7 partners on the ground to produce tertiary planting material (partners: Ferme Ramazani, Ferme Tabac, KAMA, PETAMU, UPETA, REFOS, ADECOP and AMT). To encourage diversity, GLCI multiplied a cluster of varieties: *Sukisa, Sawasawa, Mayombe, Disanka, Nsansi* and *Liiyayi*. For the year 2009, the project reached 12,161 beneficiaries and multiplied 304,025 LM (linear meters) of cuttings; For 2010 , 15,387 beneficiaries with 368,288 of planting material and 2011, 11,880 beneficiaries with 285,120 LM of cuttings.

The **UN-FAO** implemented a special project on cassava planting material multiplication from 2006 through the beginning of 2012. Like the GLCI, it had an impressive number of partner multipliers, 14, in 2007/08 alone for the Kalemie and Nyunzu territories. Focus through the years was on at least 11 varieties: *Mapendo, Butamu, Nzizila, MM96/1751, MM 96/422, RAV Sawasawa, Sukisa, Mayombe, Mvuazi* and *Liyayi* . At its peak, the project was also managing multiplication areas of up to 25 ha.

Unfortunately, both of these important efforts had drawn to a close at the time of the SSSA. There is an *urgent* need to set up sustainable cassava planting material initiatives in the northern Katanga region and, from the beginning, to do so on a more commercial basis.

* Final note- from farmers' point of view. The flour quality of most of these new varieties seems not to compare with the local. Further, most of the 'improved' present problems for storing longer-term in the ground +18 months. They rot.

New variety delivery systems (virtually no agro-dealers!)

The results of the northern Katanga SSSA showed only 22.7% of farmers accessing some new varieties within the last 5 years (Chapter IV: section 'New Varieties'), and 41% of these accessions revolved around cassava (with groundnuts, maize and horticultural crops following in descending order).

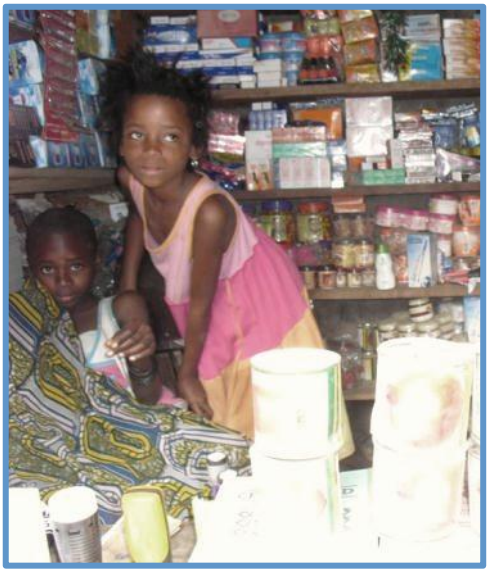
The main delivery channel for the new varieties was NGO/FAO for 77.6% of the cases. Note that this is not a sustainable channel. Social networks and the local market also provided some new varieties (9.5% of cases each).

The teams found that agro-dealer stores were virtually non-existent in the SSSA sites. None (0) were found in all of Nyunzu and Muhuya, despite its former reputation as an important breadbasket. Two-three newer ones were found in the town of Kalemie operating on a modest scale, and, in Tabac, two general goods stores (kiosks) had several tins of horticultural seed.

In contrast, many farmers interviewed seemed interested in accessing horticultural seed. Some in Tabac send for special orders in Bukavu (to save on costs, e.g. going from 5000 FC to 2500 FC for 50 g of seed for onions or eggplant). At the time of the SSSA, farmers' organizations in Nyunzu also discussed banding together in a larger conglomeration to try to get horticultural seed available in town on a regular basis.

Figure 3.2: Types of outlets that sell certified seed (few and far between)

Specialized agro-dealers, in Kalemie town



General goods stores (kiosks)

Fertilizer and other input systems

No mineral fertilizer was located in the course of the assessment. A few bottles of field pesticides were located in Kalemie town.

In contrast, both larger traders and farmers expressed a strong need for seed storage chemicals but asserted they were largely unavailable (see Chapter IV, section on 'Input Use'). Traders assessed their storage losses at 40-50%; farmer estimates varied even more, 20-80% loss, especially for maize.[3]

In brief, new varieties, high quality seed, and other key inputs (fertilizer, seed storage chemicals) are lacking all together, or severely underdeveloped across the zones of assessment.

We now move to discussion of informal seed systems.

[3] For ease of reporting, we use the figure 20-50% in this report. The exact degree of loss might best be verified by actual field measurement.

Informal Seed Systems in area of northern Katanga

Cassava, maize and groundnuts, constitute some of the crops that are important in the informal seed sector in the northern Katanga region. In fact, except for small amounts of seed of rice and horticultural crops (e.g. cabbage, onions, eggplant) the informal sector supplies all of the seed northern Katanga farmers sow (over 96% of total stocks). Note that the informal sector includes all the ways farmers themselves produce and disseminate seed: through own stocks, via barter/gifts and through local markets.

Local markets, in particular, serve as the backbone of seed provision for farmers in this region. In fact, on a routine basis, local markets are considered as the most important source of seed for all key crops, except for cassava, whereby cuttings are more likely obtained through neighbors. Simply, money needs and problems with storage (seed storage losses of estimated 20-50%, for maize) force farmers to access most of their seed from local markets, season after season. Supporting and strategically strengthening such markets would be key for promoting seed security across a range of smallholder farmer sites. Much of this next section on Informal Seed Systems focuses on how local seed/grain markets in northern Katanga work.

Seed/grain markets

'Seed/grain markets' refer to a diverse set of actors and institutions, from open-market traders to permanent village shops to long-distance truckers, who buy and sell crops for consumption and, potentially, for seed (Sperling and McGuire, 2010). To be clear, much that is sold in local markets is used for grain (for consumption, flour, brewing). However, there is a special subset of this grain which can potentially also be used for seed and which is actually sown.

Distinguishing seed from grain

Both farmers (buyers) and traders (sellers) use a range of strategies to access 'good' seed from the markets. For the buyer, he/she wants to maximize the possibility that the product bought will actually grow on his/her own farm. For the seller, he/she wants to tap into a lucrative seed market, one that may offer higher prices than for routine sales of food grain alone. There are a number of different practices that traders may use to distinguish seed from grain, in terms of how they source, manage, or present their wares. Interviews with 26 traders who sold seed/grain in permanent, daily markets (15 in Kalemie, 11 in Nyunzu) noted which management practices were done, for each of the major crops they sold.

Table 3.3 gives a sense of the frequency of each management practice traders use to distinguish seed from grain among the sample of traders interviewed for the SSSA. There are at least seven different practices which over half of the traders interviewed use to encourage a better product. For example, nearly all traders sought specific varieties of their key crops, and purchased grain from regions believed to have grain that is adapted to grow in the area they sell to.

Box 6 shows the converse. How traders know that farmers are buying seed- and not just grain. What is clear from both is that seed, the material which farmers sow is heavily sourced from local markets.

Table 3.3: Trader practices in managing potential seed, Kalemie SSSA sample, August-September 2012 (n=26 traders)

		% of answers 'yes'										
CROP	**N**	*Get grain from specific regions*	*Seek out specific varieties*	*Buy from specific growers*	*Keep varieties pure*	*Keep fresh harv. Stocks apart*	*Grade stocks*	*Do germin-ation tests*	*Have special storage condit-ions*	*Sort out waste (stones dust)*	*Sort out bad grains/ seed*	*Sell seed & grain seper-ately*
Ground nuts	22	100%	91%	59%	85%	59%	43%	18%	55%	86%	64%	55%
Beans	15	100%	100%	53%	71%	71%	21%	7%	31%	80%	53%	53%
Maize	10	90%	90%	70%	89%	56%	67%	20%	56%	80%	80%	60%
ALL CROPS	**56**	**98%**	**93%**	**61%**	**79%**	**65%**	**42%**	**13%**	**45%**	**86%**	**64%**	**57%**

Box 6: How a trader knows that a farmer is buying/wants seed (versus grain)

Customer:

- Looks for varieties that are not mixed;
- Asks for a specific variety, by name
- Asks about the provenance of a variety, whether they are locally adapted and whether they have been directly procured from farmers; sometimes asks for specific seed grower's name;
- Inquires about the storage conditions
- Specifically states: "I am buying for seed"!

Distinguishing among traders : general structure of seed/grain markets

One trader is not like another, and in trying to chart how seed markets function, it is important to understand key differences. For instance, traders who have large, reliable trucks and storage facilities define their supply territory differently from local sellers who may produce their own seed and travel to market by bicycle.

Figure 3.3 gives a general overview of key traders (market actors) in Kalemie and Nyunzu, based on the SSSA field study. This is a preliminary picture, developed after an initial exploration; it is possible that a longer study might uncover other key actors, such as intermediaries and brokers who perform specialised services. Even a preliminary market structure makes it clear that a key distinction among market actors is the scale of operation. This scale is, in part, shaped by the assets each group of trader possesses (especially transport), and in turn influences whether they buy and sell within one region, or span multiple regions.

Rural market vendors sell in village markets, like in Tabac. As actors at this scale generally do not have transport, they tend to source from their own farms or from others who live near them, and may only go to markets occasionally (i.e. commerce may not be their sole livelihood activity). Reliance on bicycle or public transport probably restricts this group to selling 100-200 kg per day. Rural vendors may come from the same local area, though there

are also some who travel from more distant areas and sell to multiple village markets. For example, vendors come from Moba at sowing time to sell groundnut seed to rural areas in Kalemie, attracted by the high demand and prices. Urban market traders tend to operate a regular stall in a permanent market, such as the Lukuga Market in Kalemie, and are more likely to be full time traders. They tend to sell several commodities, which are sourced from different regions. These traders have more assets than rural traders, such as modest off-site storage, but do not have their own vehicles for transport. The data in Table 3.6 comes from urban market traders. The largest-scale traders are those who own storage depots, who generally operate out of major centres like Kalemie and Nyunzu. Such depots can hold several tonnes of seed or grain, and such physical capital points to the higher capacity of depot owners, who can buy and sell large volumes. This group may also have their own transport, such as trucks or even boats. There are a relatively small number of traders at this scale – for instance, only five traders in Nyunzu had a working truck. Depot-owners may source from their own (large-scale) farms. They may also use loans and contracts with small-scale farmers in particular regions to gain exclusive access deals to their production at harvest. This means that, even though depot-owners deal in large volumes, they can still often trace their provenance of what they sell, to a single region or even a single group of farms. Some depot-owners also deal explicitly in seed; for example, one Kalemie trader showed four tons of maize, which had been sorted and stored separately, which he intended to sell as seed at a higher price. Depot owners tend to sell across regions, and generally do not focus on local retail sales to individual buyers; there were no retail shops linked to the depots. Rather, the retail role is filled by day-traders. In Kalemie these traders were exclusively women who sit by the road and sell small amounts (100 kg or less) directly from sacks. They are found near the depots, and the grain they sell comes from the depots, either purchased by them or sold on commission. Strikingly, there were no permanent retail shops selling grain in Kalemie or Nyunzu; sales to consumers or farmers were at market stalls or alongside the road near depots.

The scale of supply channels, range of selection, and prices may differ for different types of traders. For example, farmers in Tabac complained about the quality of seed available in the local market, especially for horticultural seed, and preferred travelling to Kalemie (only 11 km away) to get better prices, or a better range of potential seed.

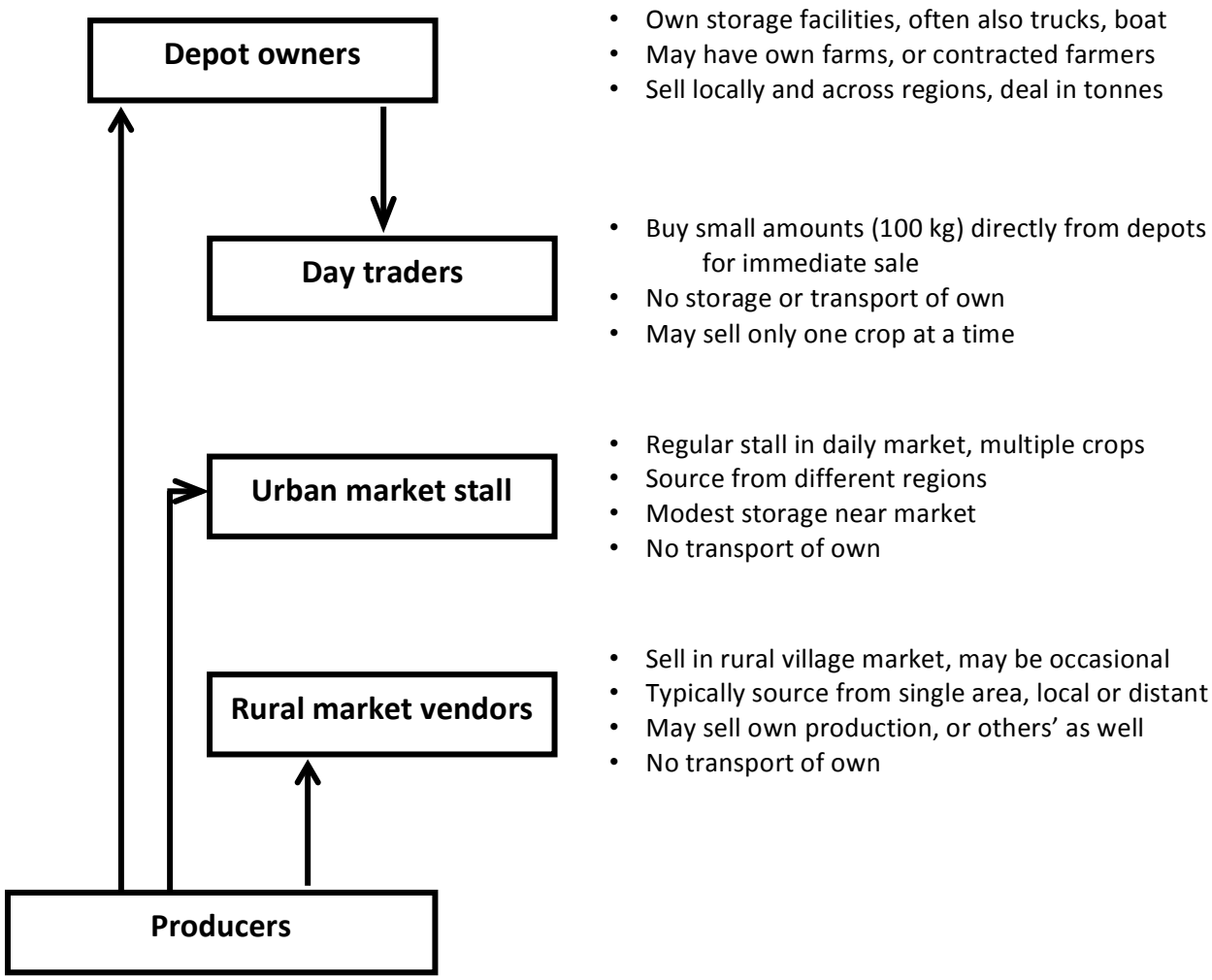


Figure 3.3. Seed/grain flow between actors in Kalemie.

Seed flow mapping: regional mapping for Kalemie and Nyunzu territories

Flows of 'potential seed' are closely connected to those of grain movements. Generally, 'potential seed' moves from areas with higher productivity to areas with lower productivity, as for grain. In DRC, highly productive areas are associated with available land, soil quality, and labor supply, as well as with good rainfall / irrigation. Transport infrastructure is also crucial in shaping flows between regions. For example, Kalemie has more options for transport via Lake Tanganyika, or via the train. In contrast, the additional 200 km of road travel from the lakeshore to Nyunzu renders flows from those sources uneconomic, especially compared with the abundant supplies from within Nyunzu Territory. Finally, variety characteristics can also be an important factor in flows. For instance, popular bean types for consumption are red, brown or white in color – and these are all widely-associated with Moba Territory, their region of origin. Thus, Moba is important in bean seed flows, and buyers will seek 'Moba beans' as distinct from Tanzanian beans, which are yellow in color.

Figure 3.4 diagrammatically shows sources of 'potential seed' for Kalemie for two contrasting crops – a) maize and b) groundnuts. The thickness of the arrows shows sources' relative importance in flows. For maize, the most important source is Moba, followed by Nyunzu, with the northern part of Kalemie coming third. In contrast, groundnuts come from all

surrounding Territories, with Nyunzu supplying the greatest amounts. Flows for beans and rice (not shown) have a similar diversity of sources. For beans, Moba is the leading source (particularly the Vyura area), followed by Tanzania. Kalemie itself (especially the Kabimba area) is the leading source for rice, followed by Tanzania, then Nyunzu, Kongolo, and finally Kindu (in Maniema Province).

Figure 3.5 shows flows for Nyunzu. As a surplus-producing region, the great majority of seed/grain sold in Nyunzu market originates from within Nyunzu. Even so, flows come from multiple sources for all major crops. For example, maize and groundnuts have numerous major production regions in the north, south and west of the Territory, while most rice comes from the north of Nyunzu and the border areas of Kongolo.

Figure 3.4. Sources of potential seed for Kalemie for (a) maize, and (b) groundnuts.

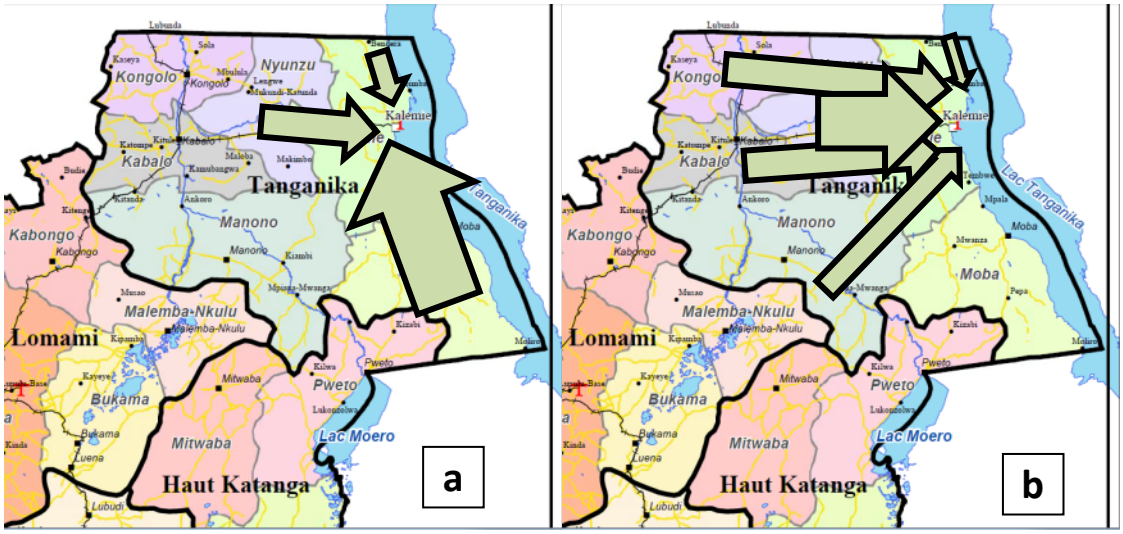
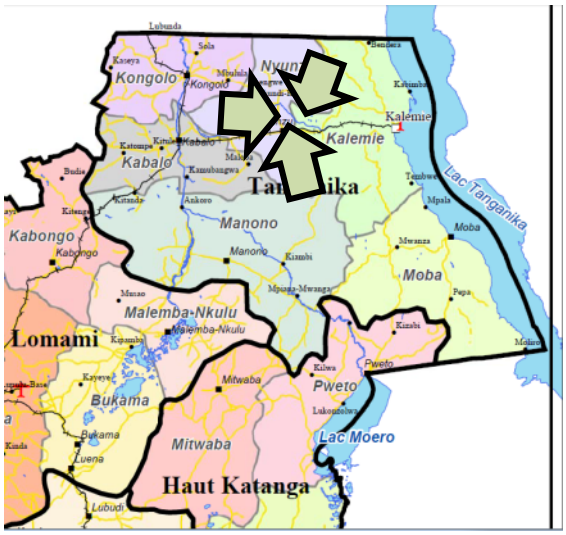


Figure 3.5. Sources of potential seed for Nyunzu.



These flows demonstrate that there are multiple sources of seed/grain for all the major crops. This means that a poor harvest in Kalemie would not necessarily lead to the

unavailability of potential seed in the Kalemie markets, as surrounding regions are the main sources. Availability is also not an issue in Nyunzu, as it is historically a productive region and Nyunzu market is supplied by many surrounding communities within a 60-80 km radius, using all four main axes (roads) for supply.

Understanding seed flows to assess supply and adaptation (quality)

To assess supply (is seed available!), one needs to have insight not only in to the level of traders, but also into the zones which can supply potential seed (that is, grain which is adapted and will grow in a specific local region). As Figure 3.3 attests, key market actors do not just deal with local production, but trade across regions and even countries. Figures 3.4 and 3.5 confirm the importance of these flows across regions.

The SSSA did not note major issues of adaptation between the principal source regions and where potential seed would be sowed. Markets in Nyunzu were largely supplied from the Territory, so adaptation was not a major issue. The seed/grain sold in Kalemie markets was generally adapted for sowing in Kalemie. Relatively little came from other countries or agroecological zones – for instance, Tanzanian maize had little presence in Kalemie markets. Where there was long distance trade was for beans, which have wide adaptation; beans from both Moba and Tanzania were commonly sowed in Kalemie, with good results. Only for maize was adaptation ever mentioned, with a few suggestions that maize from some parts of Moba was not suited for all of Kalemie. The absence of multi-locational trial data makes it difficult to assess issues of adaptation any further. In any case, issues of physical and phyto-sanitary quality (e.g. seed with low germination potential) were raised more often than any concern about genetic adaptation.

Field example: seed flows to major town centers: Kalemie and Nyunzu

The SSSA clearly showed that stocks immediately available in local markets are weak indicators of seed availability, due to the larger flows. A field example shows how mapping of seed flows is important for understanding the supply of seed immediately available in an area, compared to that which can become available. In focus group discussions, Tabac farmers complained that good quality groundnut seed was not available for sale in their village. According to them, the best seed came from Nyunzu or Manono, but the rural vendors who travelled from village to village selling this seed at sowing time would usually have sold their stock well before reaching Tabac sell their wares ("All the ground nut is sold by the time they reach Mulange!"). Yet, only 11 km away in Kalemie, there were abundant supplies from these regions, and others. Moreover, farmers who could travel to Kalemie preferred buying seed from there, due in part to the better selection available there.

Potential seed and price

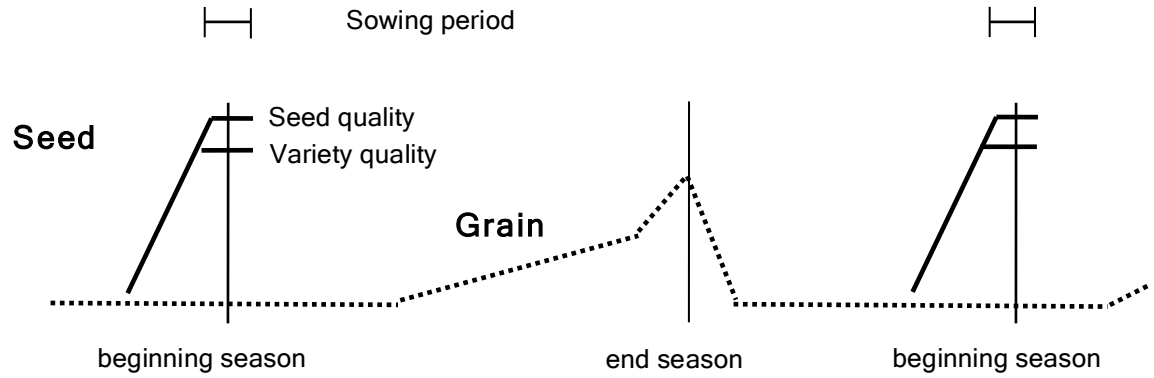
As a final facet of analyzing local seed/ grain markets, we look at the issue of price of seed and grain, and how prices might fluctuate according to seasonal patterns.

During non-sowing periods, grain and potential seed remain relatively undistinguished in terms of price. However, during sowing periods, extending some four to eight weeks prior to planting, two trends can be observed. First, prices spike for the most sought-after varieties

for sowing, that is, for the varieties that are most adapted, productive or which give the highest income return (i.e. those which could be used as potential seed). In areas of high stress, where few varieties may perform at all, prices between desired and non-desired varieties can differ by as much as 25-50%. Second, around planting time, traders may distinguish among batches of the same variety which are 'well sorted and stocked' from batches 'less well sorted and stocked', adding a price premium (≈ 5%) for the cleaner materials which presumably demand less labor to prepare for sowing. So sometimes prices reflect the differences between seed and grain in terms of 'varietal quality', and sometimes reflect the differences in terms of 'seed quality'. Farmers who pay these price premiums are undoubtedly buying seed *per se*.

Seed-related prices, unlike grain prices, do not rise during the hunger gap periods (and immediately pre-harvest) so the patterns of price rise and fall are quite distinct for seed and grain. Figure 3.6 conceptually suggests these price trends. The pattern below is sketched mainly for didactic reasons: grain price trends, in particular, may be highly variable by environment and time period.[4] That said, there was evidence of such price trends occurring in markets in Kalemie. For example, groundnut prices tend to rise steeply (a 25 – 50% increase) during the sowing period, and certain sought-after varieties obtained even higher prices. There were similar price premiums for which had been purposely sorted and stocked for planting food. These differences show that both seed and variety quality are recognized in seed/grain markets, and that there is appreciable demand for potential seed, as well as trader responses to meet this demand.

Figure 3.6 Trends in crop and seed prices in local seed/grain markets through the season, showing seed price peaks at sowing time and grain price peaks before harvest. Seed price differential takes into account variety quality (for the most sought-after varieties), plus, sometimes, additional seed quality features (i.e. a price premium for well-sorted stocks).



We turn to actual field findings in the next Chapter IV. These also include findings on how the local seed markets functioned in 2012. As a glimpse, seed supplies were available, though prices varied from the previous year. For example, maize prices in 2012 were nearly 60% above 2011 prices. In contrast, groundnuts were 7% cheaper, and beans showed little change in price. The availability of different crops from the harvests affects such seasonal fluctuations, though time in the season, seed and variety quality still remain major influences on the price of seed in markets.

[4] This section on price draws from Sperling and McGuire, 2010

Salient points: Formal + informal seed systems in Northern Katanga

Plant Breeding

1. The only INERA (Institut National pour l'Étude et la Recherche Agronomique) research station currently functioning in all of Katanga Province is located in the south, in Lubumbashi, with the actual testing site about 25 km away from this large city, in Kipopo. As SSSA sites are located in the northern part of the province, some research results from the South Kivu research station at Mulungu have also been of use in identifying adapted varieties. However, there is an urgent need to set up decentralized variety testing sites in northern Katanga itself.

2. Across 5 major crops (maize, cassava, bean, groundnut, soybean), some 43 varieties have been released for the eastern Congo region (Katanga, South Kivu, North Kivu).

3. Farmer access to new varieties has been low: within the SSSA sample (n=198) only 22.7% of farmers had accessed a new variety within the last 5 years and 41% of these accessions revolved around cassava (with groundnuts, maize and horticultural crops following in descending order).

4. Any Increased efforts on plant breeding need to be supported by efforts to improve seed production and delivery.

New Variety Multiplication/ Formal Seed Sector

5. At present, the National Seed Service, SENASEM, does not operate officially to produce the critical foundation seed (although there seems to be some unofficial multiplication and sale for which figures are not presently available). At present, SENASEM has no visible presence in the northern Katanga area.

6. INERA starts the seed multiplication cycle and multiplies a small amount of breeders' seed, with the scale of multiplication generally linked to magnitude of external donor funding. Decentralized seed multiplication partners, mainly select farmer groups, NGOs and the UN Food and Agriculture Organization then bulk up (i.e. further multiply) this breeder seed.

7. Within the northern Katanga area, multiplication by decentralized partners has encompassed a good range of crops: maize, rice, groundnuts, bananas, cassava. The seed multiplication efforts with cassava and bananas have been particularly important due the significant disease pressures both are facing.

8. Generally seed and planting material efforts are relatively new (2006 onwards) and have been piecemeal. As an example, nine organizations were identified as involved in seed production in Tabac at the time of the SSSA, with five having started since 2009

Variety input and delivery systems

9. The main delivery channel for the new varieties has been NGOs/FAO, for 77.6% of the cases identified in the SSSA. Note that this is not a sustainable channel. Social networks and the local market also provided some new varieties (9.5% of cases each).

10. Agro-dealer stores were virtually non-existent in the SSSA sites. None (0) were found in all of Nyunzu and Muhuya, despite its former reputation as an important breadbasket. Two-three newer ones were found in the town of Kalemie operating on a modest scale, and, in Tabac, two general goods stores (kiosks) had several tins of horticultural seed.

11. In terms of non-seed inputs, no mineral fertilizer was found on sale during the course of the assessment. A few bottles of field pesticides were located in Kalemie town. In contrast, both larger traders and farmers expressed a strong need for seed storage chemicals but asserted they were largely unavailable Traders assessed their storage losses at 40-50%; farmers estimates varied even more, 20-80% storage losses, especially for maize.

In brief, new varieties , high quality seed, and other key inputs (fertilizer, seed storage chemicals) are lacking all together, or severely underdeveloped across the zones of assessment.

Informal Seed Sector

12. The informal system is the key one across crops in northern Katanga and supplies over 96% of the total seed sown, with notable exceptions being rice and horticultural crops (cabbage, onions, eggplant).

13. Local markets, in particular, serve as the backbone of seed provision. For example, resident farmers accessed (or will access) 44 % and 41 % of their seed form the local market for the main seasons 2011-12 and 2012-13, respectively. For IDPS, reliance on market seed is even higher: 70% each season for the two seasons in question.

14. Traders strategically manage their stocks of 'potential seed', that is, grain which can usefully be planted. Within the SSSA sample, the majority of traders regularly used seven distinct practices to manage seed so as to arrive at a better product.

15. Trader seed flows were unobstructed during the time of assessment. Seed sold in Kalemie originates from a variety of regions. For instance, for maize, the most important source is Moba, followed by Nyunzu, with the northern part of Kalemie coming third. As a second example, for bean market seed, Moba is the leading source (particularly the Vyura area), followed by Tanzania. For Nyunzu, as a surplus-producing region, the great majority of seed/grain sold originates within Nyunzu itself as the region is a surplus-producing one.

16 In terms of prices at the time of assessment: maize prices in 2012 were nearly 60% above 2011 prices. In contrast, groundnuts were 7% cheaper, and beans showed little change in price. (The maize hike was due to poor production linked to the late start of rains 2012, season B.)

Given that the informal sector is an important force, opportunities for strengthening and professionalizing it further should be pursued. This might include explicit actions collaborating with seed/grain traders to: to introduce new varieties, raise seed quality and promote even more specialized seed trade.

IV. FIELD FINDINGS: ACROSS SITES

The fieldwork for the SSSA took place in August-September 2012, just at the cusp of planting time, as rains arrived early. It unfolded in Tanganyika District, northern Katanga, in the territories of Kalemie and Nyunzu and was triggered by a) a need to understand seed system functioning post-civil strife (war curtailing in the local region 2006) and b) a need to rebuild and establish structures and processes which can strengthen farmers seed security what used to be a breadbasket region (see Chapter: Rationale for SSSA).

The assessment considered two major themes. It analyzed the short-term, acute seed security situation, focusing on the 2011-12 main season (October 2011 to January 2012) and the imminent 2012-13 main season (October 2012 to January 2013). Both of these main seasons are technically referred to as 'season A'. Seed procurement strategies, quantities sown, crop profiles were all analyzed.[5] As the second thrust, the SSSA considered medium-term trends, including possible chronic seed security problems and emerging opportunities. Issues considered included crop diversification, agricultural product transformation, access to modern varieties, use of other inputs and seed aid received.

This section presents field findings on seed security across the assessment sites. Seed security concerns of the settled, resident population (referred to as 'all farmers') are separated from those of a small group of Internally Displaced Persons (IDPs) as the latter may have somewhat special needs.

Comprehensive site-specific reports have been prepared in French and are available from CRS Kalemie (Willy.Mulimbi@crs.org), and the tailored action plans have been appended in Annex I.

This chapter is organized first to report recent, 'acute' findings 2011-2013 and then analyses trends over multiple seasons, examining possible chronic stresses and developmental opportunities.

Acute Seed Security Findings: 'season A' : 2011-12, 2012-13

Issues of seed security were first scrutinized for the short term: how and where did farmers obtain seed for main 2011-12 season ('season A') ? Did they plant a 'normal' quantity of planting material? What do they assess as their seed security strategy and prospects for main 2012-13. (Note: seed system stability and resilience are best assessed by looking at multiple seasons in a row.)

All farmers: seed sources and quantities planted, season A 2011-12

Table 4.1 and Figure 4.1 show the sources and quantities of seed actually planted by farmers for the main 2011-12 season. Information is given in both table and graph form so as to make highly visible the relative use of sources and the scale of seed use from each. Several features are of note.

[5] The seed security focus is on the three crops farmers each consider 'most important' so there may be some under-reporting of secondary crops, which are also key for nutrition and income.

Overall, over 96% of the seed farmers sowed came from local channels, including from farmers' own stocks, the local market, or through social networks of neighbours, friends and relatives. This suggests the importance of informal seed systems as the core seed sources.

A closer look reveals that farmers' local markets were somewhat more important than own stocks as a source of seed (44 and 36% respectively) and suggests the degree to which farmers may have to buy, routinely, seed season after season. Home stocks were of some importance for all major crops apart from rice (or, seemingly, beans and cabbage, though sample sizes were very small). The local market as a key source was important for all major crops but cassava (where only 6% of the planting material was obtained from markets).

Neighbors, friends and relatives were especially important as a seed source for the vegetatively-propagated crop cassava. The strong use of such 'social network' channels to obtain cuttings and stems has implications for designing initiatives to multiply this planting material as well as for efforts to introduce new varieties such as those resistant to cassava mosaic virus.

Farmer seed producers, those community-based groups most often mobilized by the government, FAO or certain development projects, provided negligible amounts of the totals seed sown within the sample (0.08%) and only for cassava. They are at a fledgling stage, with modest (i.e. no measurable) impact on farm.

Agro-input dealers also provided negligible amounts of total seed sown (0.4%) and only for rice. Note that specialized agro-dealer shops were non-existent in the Nyunzu region, with less than 5 outlets found in Tabac/Kalemie (including the general goods stores which had a few tins of horticultural seed on hand).

Finally, seed aid,[6] which here includes both developmental and emergency aid, also has a minimal presence in the regions sample: 3.2% of the seed sown and only for the cassava and groundnut crops.

In sum, this northern Katanga region seems to be one still one largely organized around informal systems, with a seeming absence of formal systems altogether. We examine this theme throughout this report.

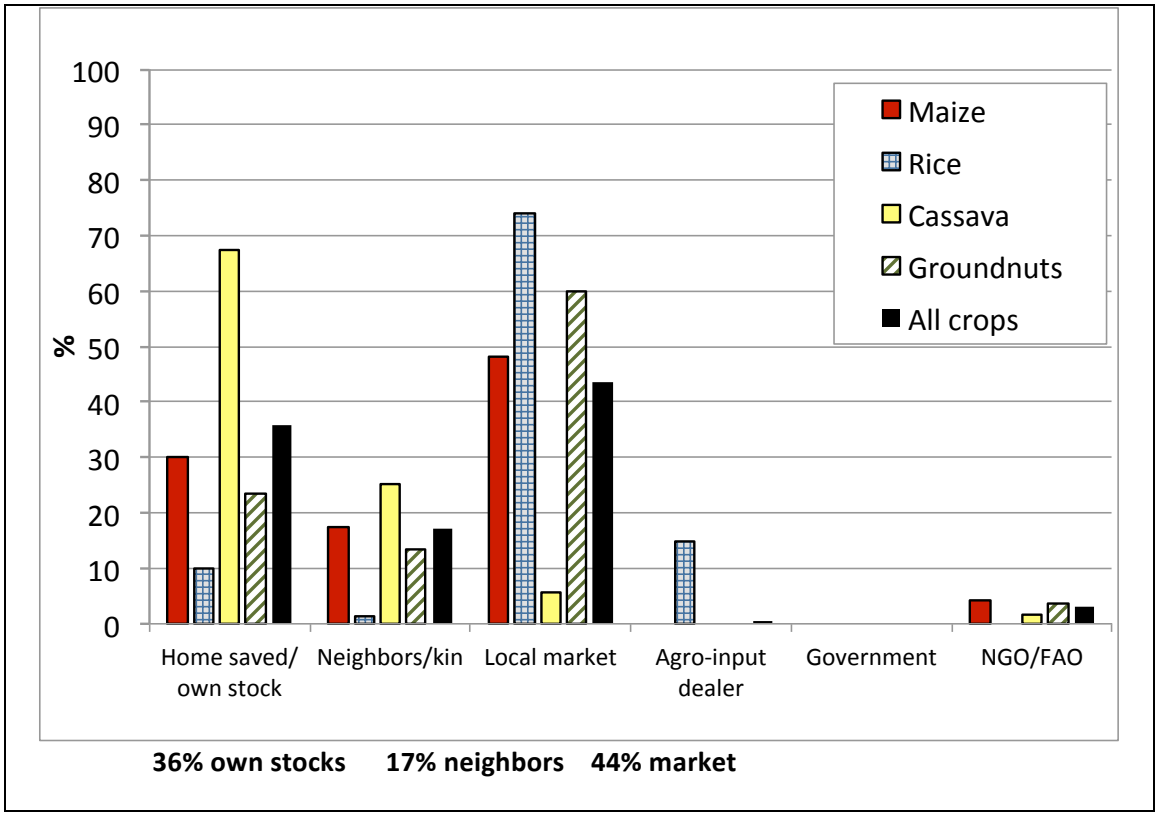
[6] The disaggregation of seed aid between NGOs and FAO in many tables and figures does not give a completely accurate representation of source as government or FAO-linked seeds may also have been distributed by NGOs.

Table 4.1: Seed (kg) planted and sources all farmers used, 2011-12 across sites

Crop	Total kg sowed	% of total seed							
		Home saved	Friends, neighbors	Local market	Agro-dealer	CBSP*	Govt	NGO / FAO	Producers under contract
Maize	1961	585	339.5	941.5	0.0	0.0	0.0	85	0.0
Rice	203	20	3	150	30	0.0	0.0	0.0	0.0
Cassava	1846	1242.9	465.5	106.6	0.0	5.6	0.0	28.8	0.0
Sweet potato	1	0.0	1	0.0	0.0	0.0	0.0	0.0	0.0
Groundnuts	3285	766	438.8	1961.5	0.0	0.0	0.0	119	0.0
Beans	35	0.0	0.0	35.0	0.0	0.0	0.0	1.0	0.0
Cowpea	10	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chickpea	4	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0
Aubergine	<1	0.0	0.0	0.35	0.0	0.0	0.0	0.0	0.0
Cabbage	<1	0.0	0.0	0.56	0.0	0.0	0.0	0.03	0.0
Onion	<1	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
Taro	14	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL, all crops kg.	7351	2638	1252	3196	30	6	0	233	0
TOTAL all crops %	100	35.9	17.0	43.5	0.4	0.08		3.2	

* CBSP= community-based seed group

Figure 4.1. All Farmers (N=168) seed sources, main season 2011-2012 (season A)



Are farmers unusually seed-stressed, main season 2011-12?

To understand better any possible vulnerability, the SSSA team asked farmers to compare the season A 2011-2012 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 2011-12 patterns 'normal' or 'different' (sowing more or less) from what you usually do?

For the major crops, farmers reported that, overall, they slightly decreased quantities planted, by 5.08 % (Table 4.2). Groundnuts were proportionally decreased the most, by about 21 %, along with maize, -8.0 %, due to seasonal changes and heavy reliance on markets as a seed source. In contrast, crops that can bring in income, such as rice and horticultural crops seem on the rise. (The sample for rice is small: results to be interpreted with caution).

Table 4.2: All farmers - Amounts for 2011-2012 - more, less, or same?

CROP	# HH	% of HH MORE	% of HH SAME	% of HH LESS	Change among those sowing crop % mean
Maize	108	16.7	42.6	38.9	***-7.89***
Rice	8	50.0	37.5	12.5	**242.50**
Cassava	156	21.2	44.9	34.0	***-1.76***
Sweet potato	1	0.0	0.0	100.0	
Groundnuts	125	16.8	36.8	45.6	***-20.64***
Beans	3	33.3	66.7	0.0	
Aubergine	2	50.0	50.0	0.0	
Cabbage	5	40.0	40.0	20.0	**36.00**
Onions	2	0.0	100.0	0.0	
Taro	1	0.0	100	0.0	
TOTAL	**413**	**19.4**	**42.4**	**37.8**	***-5.08***

* Means are only calculated for crops with 5 entries or more

Note that sowing amounts portray only of the picture. For the three major crops (those with larger sample sizes) farmers judged yield and harvests as 'good', especially for maize and cassava. Groundnuts did slightly less well, 2/3 of farmers judging harvests as 'good'.

Table 4.3: All farmers- Assessment of yield, by crop, main season 2011-2012

Crop	# HH	How was the yield (%) good	average	poor
Maize	115	72.2	10.4	17.4
Rice	10	50.0	20.0	30.0
Cassava	160	80.0	10.6	9.4
Sweet potato	1	0.0	100.0	0.0
Groundnut	137	64.2	15.3	20.4
Beans	3	66.7	0.0	33.3
Cowpea	1	0.0	100.0	0.0
Aubergine	2	100.0	0.0	0.0
Cabbage	6	66.7	0.0	33.3
Onions	2	50.0	50.0	0.0
TOTAL	**438**	**71.7**	**12.6**	**15.8**

So, in brief, the 2011-12 main season seems to have been a normal one in terms of sowing quantities and a fairly positive one in terms of yields. This does not obscure the fact that farmers describe ongoing stresses, which are now considered 'normal'. *Inter alia*, these include 'changing season' (climate variability, problems with cassava diseases and bean insect pests, etc.; see Chapter II: 'Seasonal overview).

All farmers: seed sources and quantities to be planted, main season 2012-13

Farmers in the northern Katanga region were asked the same questions on actual seed sources and quantities to be planted for the next major season, season A, (October to January) 2012-13, which was just starting at the time of the SSSA. While 'planned seed sources' are not 'hard' (directly-measured) data , they are a good indicator of whether farmers expect seed stress or other related troubles. Further, given that many of the interviews were conducted by former aid providers, farmers answering this question could have also shown bias by trying to elicit seed aid help. In contrast, the results below show a strong continuing trend toward self-sufficiency and even expansion.

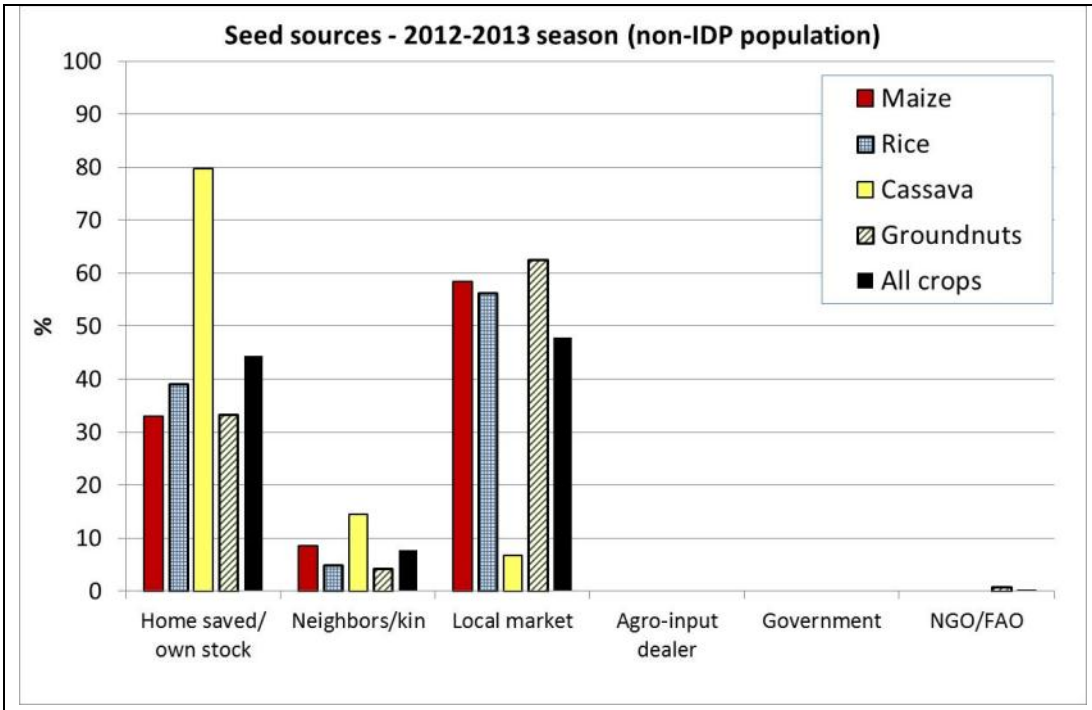
Several features are of note:

1. Percentage use of own stocks and markets both rise between seasons.
2. Aggregate quantities to be sown has increased by about 25% (7352-to 9265 kg).
3. On a negative note, select sources for innovation (agro-dealer, CBSP) remain minimal to non-existent.

Table 4.4: All farmers - Seed planned by source 2012-13 (% of all seed)

		% of total seed							
Crop	**Total kg sowed**	Home saved	Friends, neighbors	Local market	Agro-dealer	CBSP*	Govt	NGO / FAO	Producers under contract
Maize	2349	775.5	200.1	1373	0.0	0.0	0.0		0.0
Rice	205	80	10	115		0.0	0.0		0.0
Cassava	2238	1783.4	323.5	152	0.0	6.25			0.0
Sweet potato	5	5	0.0	0.0					
Groundnuts	4389	1458	182	2739.8	0.0	0.0	0.0	30	0.0
Beans	58	0	0.0	58	0.0	0.0	0.0		0.0
Chickpea	4	0	4	0.0	0.0	0.0	0.0	0.0	0.0
Aubergine	<1	0.5	0.0	0.1					
Amaranthe	<1	0.55	0.0	0.0					
Cabbage	<1	0	0.0	0.8	0.11			0.03	
Taro	14	14	0.0						
Onions	<1			0.3					
Tomatoes	<1			0.2					
Okra	<1							0.05	
TOTAL kg	**9265**	**4117**	**720**	**4439**		**6**		**30**	
TOTAL %	**100**	**44.4**	**7.8**	**47.9**		**0.07**		**0.3**	

Figure 4.2. Planned sources for cropping seasons 2012-13 all farmers (N=168)



44% own stocks 8% neighbors 48% market

Are farmers seed-stressed in 2012-13?

To complete the analysis, we compared farmers' projections for 2012-13 planting with what they assess as normal amounts of seed; that is, are they planning to plant more, less or the same?

About ¾ of farmers plan to maintain or increase the amounts they sow in 2012-13 although the planned overall increases to only 5.18 %, so the situation is a somewhat stable one with a slight upward trend. Crop profiles from one season to another seem relatively static.

Table 4.5: All farmers- Amounts for short rains 2012-13 more, less, or same?

CROP	# HH	% of HH			Change among those sowing crop
		MORE	SAME	LESS	% mean
Maize	111	19.8	54.1	26.1	**5.86**
Rice	8	25.0	62.5	12.5	**10.42**
Cassava	146	25.3	55.5	17.8	**4.85**
Sweet potato	1	100.0	0.0	0.0	
Groundnuts	136	25.0	37.5	36.8	**4.65**
Beans	6	33.3	16.7	50.0	**14.00**
Cowpea	1	0.0	100.0	0.0	
Amarenthe	2	0.0	100.0	0.0	
Aubergine	3	33.3	66.7	0.0	
Cabbage	6	16.7	50.0	33.3	***-4.17***
Okra	1	0.0	100.0	0.0	
Tomatoes	2	0.0	100.0	0.0	
Onions	2	0.0	100.0	0.0	
Taro	1	0.0	100	0.0	
TOTAL	**425**	**23.5**	**49.6**	**26.4**	**5.18**

Means are only calculated for crops with 5 entries or more

IDPs: seed sources and quantities planted, season A, 2011-12

The SSSA focused a parallel set of questions to the internally displaced population (IDPs). IDP camps were assessed only in Tabac, where populations had been residing about two years. Notable was the high degree of contract labor within the IDP population (c.700 out of 900 HHs working). Also, many had been given access to land in the Plateau area by the customary chief, although not to the rich and well watered valley bottoms.

Were the seed sources used by IDPs comparable to those used by the overall farmer sample? Normally, one would hypothesize that this potentially vulnerable population would depend more heavily on different types of outside help.

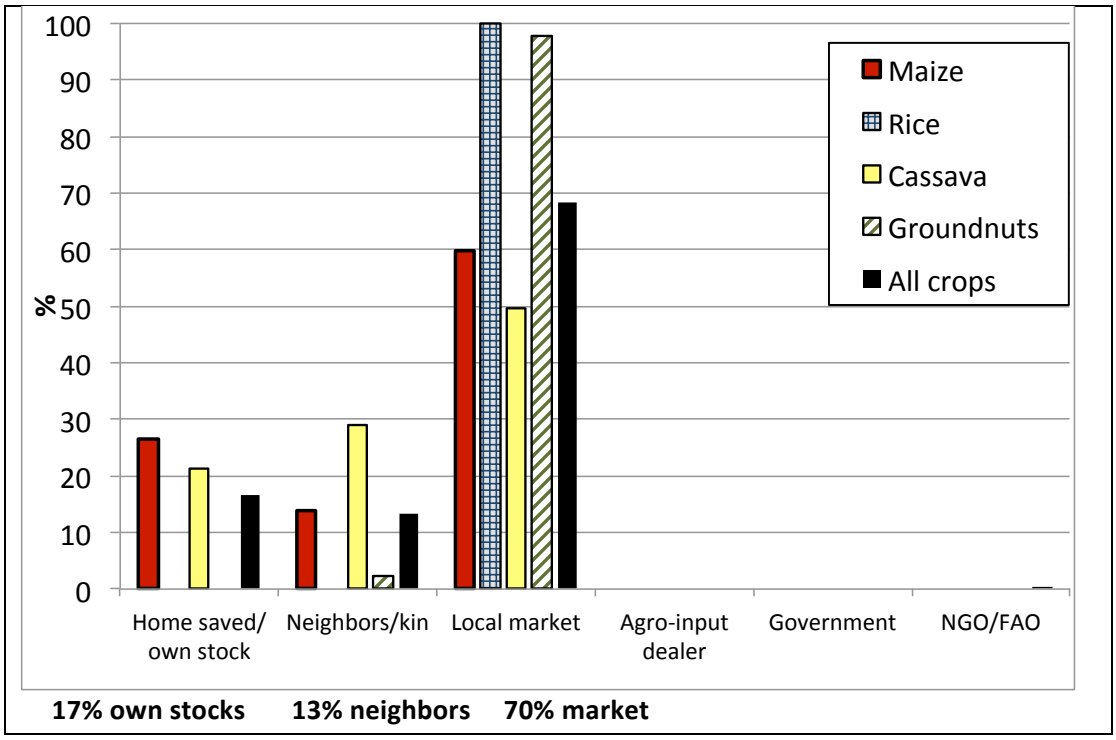
Table 4.6 and Figure 4.3 show that IDPs generally sourced seed in the same way as the resident population for the 2011-12 main season: IDP access to outside seed aid was near negligible. The main differences were in scales of use of seed sources: IDPs had less access to seed from social networks (13% of seed versus 17% for the resident population. Also they relied more heavily on the market for seed (68% of their seed versus 44% for the resident population). In the case of IDPs, 99+ % of their seed sown came from informal seed channels.

One clear conclusion here is that farmers' own channels provide the lion's share of seed sown, even in the case of the potentially vulnerable.

Table 4.6: IDPs' seed planted by source, main season 2011-12 (season A) (% of all seed)

Crop	Total kg sowed	% of total seed							
		Home saved	Friends, neighbors	Local market	Agro-dealer	CBSP*	Govt	NGO / FAO	Producers under contract
Maize	152	40.2	21.0	90.5	0	0	0	0	0
Rice	20	0	0	20	0	0	0	0	0
Cassava	76	16.3	22.1	37.8	0	0	0	0	0
Groundnuts	85	0	2.0	83	0	0	0	0	0
Amaranthe	<1	0	0	0	0	0	0	0.03	0
Cabbage	<1	0	0.01	0	0	0	0	0.44	0
Tomatoes	<1	0	0	0.13	0	0	0	0.44	0
Onions	<1	0.0	0.02	0	0	0	0	0.84	0
TOTAL, kg	**339**	**56.5**	**45**	**231**	**0**	**0**	**0**	**2**	**0**
TOTAL %	**100**	**16.7**	**13.3**	**68.3**				**0.5**	

Figure 4.3. IDPs seed sources, main season 2011-12 (season A) four major crops



Are IDPs seed-stressed, main seasons 2011-12, 2012-13?

Were IDPs seed stressed in 2011-12? . Did they sow quantities of seed as 'normal', gauged by IDPS themselves (and recognizing that many scant access to agricultural land). access.

The answer is a marked 'Yes' , across crops. Sowing levels were down some 20% (19.8) for the 2011-12 season. However, this decline from their 'normal' was projected to be less dramatic for the 2012-13 season, with estimated declines only at 6%.

Even with these dips (which became less dramatic from one season to another), IDPs were counting on no aid at all for the 2012-13 season. Simply, seed-linked assistance, either from governments, the UN or NGOs is not something they have come to expect (Figure 4.4). In fact, IDPs on their own were making important production investments from one season to another, increasing total kgs sown from 335 to 608, an 80% increase from 2011-12 to 2012-13. IDPs themselves, largely through market purchase, were expanding use of seed (and, by extension, field size).

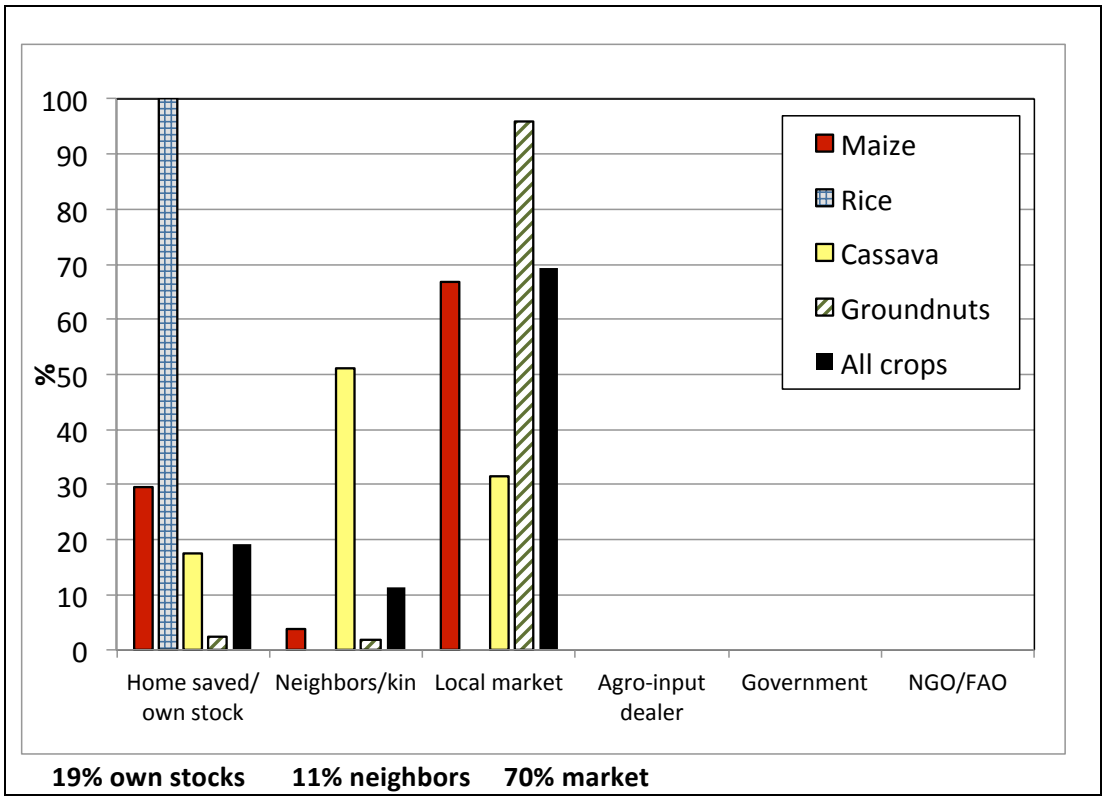
Table 4.7: IDPs - Amounts for 2011-12 - more, less, or same?

CROP	# HH	% of HHs			Change for all sowing this crop
		MORE	SAME	LESS	Mean %
Maize	13	15.4	38.5	38.5	***-2.2***
Rice	1	100.0	0.0	0.0	
Cassava	14	7.1	64.3	28.6	***-7.0***
Groundnuts	9	11.1	33.3	55.6	***-32.5***
Amarenthe	2	50.0	0.0	50.0	
Cabbage	6	33.3	33.3	33.3	***-33.3***
Tomatoes	6	16.7	33.3	50.0	***-31.4***
Onions	7	28.6	0.0	71.4	***-65.3***
Taro	1	0.0	0.0	100.0	
TOTAL - all	**59**	**18.6**	**35.6**	**44.1**	***-19.8***

Table *4.8:* IDPs - Amounts for 2012-13 - more, less, or same?

CROP	# HH	% of HHs			Change for all sowing this crop
		MORE	SAME	LESS	Mean %
Maize	18	11.1	61.1	27.8	***-7.2***
Rice	1	100.0	0.0	0.0	
Cassava	16	12.5	75.0	12.5	***12.3***
Groundnuts	16	0.0	56.3	43.9	***-32.2***
Beans	1	0.0	100.0	0.0	
Amarenthe	1	0.0	0.0	100.0	
Cabbage	4	0.0	75.0	25.0	
Tomatoes	4	25.0	50.0	25.0	
Onions	5	0.0	40.0	60.0	
Taro	2	50.0	0.0	50.0	
TOTAL	**68**	**11.8**	**58.8**	**30.9**	***-6.0***

Figure 4.4. IDP farmers' planned seed sources (%) 2012-2013



Focusing on potential problems areas and spurring production

Potential problem areas

The relatively 'normal' picture for 'all farmers' (non-IDPs) in the main seasons of 2011-12 and 2012-13 should not obscure the fact that there are still vulnerable populations and regions where farmers are stressed: farmers stated in 37.8 and 26.4% of crop cases that they were planting less of particular crops in the two seasons examined. In parallel, IDPs indicated they were planting less in 44.1 and 30.9% of crop cases for 2011-12 and 2012-13, respectively.

To understand more clearly the nature of the stress, farmers were asked to explain why they were planting less of a given crop. Many and diverse reasons were given. These reflect important stresses: "there was no new forest to clear for the maize" (a reason given in the Muhuya region where farmers still practice 'slash and burn"), or "I had no one to help as my son went off to the mines." Reasons also suggest emerging opportunities, for example, "I moved away from maize as I want to put more efforts in horticulture!" Table 4.9 explain why all farmers (non IDP) specifically plant less during the two seasons.

During 2011 and 2012, there were four main reasons normal (non-IDP) farmers sowed less. First, the weather: in 2011-12, the start of the A season was erratic. **However, most important for both seasons, was money constraints, which forced people in c. 45-63% of cases to buy less seed.** Significant health problems and labor constraints were also cited as key to a secondary degree. Important to note is that <5% of farmers indicated that

constraints linked with seed not being available —and this mainly had to do with scarcity of planting material for cassava (Table 4.9).

Table 4.9: Reasons (% of responses) all farmers cited for plant LESS of a given crop in main seasons 2011-2012 and 2012-2013.

Reason	2011-12 (N=156)	2012-13 (N=112)
SEED- RELATED (or indirectly linked)		
Seed availability		
No seed available in market	0.6%	2.7%
No seed/cuttings available from neighbors	4.5%	3.6%
Seed access		
No money to buy seed/poor finances or seed too high	44.9%	63.4%
Seed quality		
Seed available is not good quality or the variety is not liked	1.9%	0.9%
sub-total: Seed-related	**51.9%**	**70.5%**
NON-SEED FACTORS OF PRODUCTION (Limits)		
No/insufficient labor	7.1%	6.3%
Illness/health problems	18.6%	9.8%
No/insufficient land or land not appropriate/sufficiently fertile	3.2%	2.7%
Lack of tools/tractor/ other machinery to farm	1.3%	0.9%
Plant pests/diseases make production not possible	0%	0.9%
Animals/predator make production not possible	1.3%	0.9%
Lack of other inputs: controlled water supply/irrigation or fertilizer	0%	0.0%
Poor weather/rainfall	10.3%	0.0%
Insecurity	0.6%	0.0%
sub-total: Factors of production-related	**42.3%**	**21.4%**
OTHER PRIORITIES/STRATEGIES		
Markets for crop or crop products not well-developed	0%	0.9%
Other priorities than agriculture (e.g. have shop)	0%	0.0%
Other	3.2%	3.6%
Changing crop priorities or agricultural practices	1.9%	1.8%
TOTAL	**99.4%**	**98.2%**

In reference to IDPs, reasons for sowing less in 2011-12 and 2012-13 also heavily revolved around money constraints in 57.7 and 81% of cases for each season respectively (Table 4.10). Illness also figure emerges as a key reasons for planting less, as does seed not being locally available. Due to the small local market in Tabac, many farmers on a routine basis travel to Kalemie for seed, some 15 km away—as it is often cheaper. Note that lack of land among IDPs was not cited as a major constraint. (Due to small sample sizes, results should be interpreted with caution).

Table 4.10: Reasons (% of responses) IDPs cited for planting LESS of a given crop in main seasons 2011-2012 and 2012-2013.

Reason	2011-12 (N=26)	2012-13 (N=21)
SEED- RELATED (or indirectly linked)		
Seed availability		
No seed available in market	11.5%	9.5%
No seed/cuttings available from neighbors	0%	4.8%
Seed access		
No money to buy seed/poor finances or seed too high	57.7%	81.0%
Seed quality		
Seed available is not good quality or the variety is not liked	7.7%	0%
sub-total: Seed-related	**76.9%**	**95.2%**
NON-SEED FACTORS OF PRODUCTION (Limits)		
No/insufficient labor	3.8%	0%
Illness/health problems	7.7%	0%
No/insufficient land or land not appropriate/sufficiently fertile	0%	4.8%
Lack of tools/tractor/ other machinery to farm	0%	0%
Plant pests/diseases make production not possible	3.8%	0%
Animals/predator make production not possible	3.8%	0%
Lack of other inputs: controlled water supply/irrigation or fertilizer	3.8%	0%
Poor weather/rainfall	0%	0%
Insecurity	0%	0%
sub-total: factors of production-related	**23.1%**	**4.8%**
OTHER PRIORITIES/STRATEGIES		
Markets for crop or crop products not well-developed	0%	0%
Other priorities than agriculture (e.g. have shop)	0%	0%
Other	0%	0%
Changing crop priorities or agricultural practices	0%	0%
TOTAL	**98.7%**	**100%**

The real seed security issue: Money

In reviewing seed security constraints across two main seasons (2011-12, 2012-13) and two populations (normal settled farmers and IDPs) what comes out clearly is that the major reason for planting less of a crop has to do with money, that is not having the resources to buy additional seed. **The degree of potential money stress becomes more visible as one tallies the amounts money concretely needed to buy seed. In the main season 2011-12 main season, average expenses for the settled population were about 22,000 FC (Table 4.11). For the main season 2012-13, money needed for seed purchased rose slightly, to about 25,000 FC (Table 4.12).**

For the settled population (all farmers), it is groundnuts that absorb the lion's share of seed costs (64-78% of costs). Simply, large quantities of groundnut seed sown are purchased season after season (see tables 4.1 and 4.4). Groundnut, a quick-maturing crop, is sold to generate money particularly for school fees, and, in all cases, it stores poorly, due to insect pests and human theft. Mothers also complain that groundnuts are hard to conserve/protect from the desiring needs of young children.

Maize represents a secondary seed expense (16-28% of total seed costs). For the settled population, cash expenditure for cassava planting material is modest.

SEED EXPENDITURE: ALL FARMERS

Table 4.11: Average spending for seed, 3 main crops, main season: 2011-12, all farmers

Three main crops	# sowing	Spending			
		Local market	Agro-input shops	Market + shops	% of total
Cassava	156	1366.2	0.0	**1366.2**	**6.3%**
Maize	107	3524.1	0.0	**3524.1**	**16.2%**
Groundnuts	126	16861.0	0.0	**16861.0**	**77.5%**
Total (of 3)		**21751.2**	0.0	**21751.2**	**100.0%**

Table 4.12:Average spending for seed, 3 main crops, main season: 2012-13, all farmers

Three main crops	# sowing	Spending			
		Local market	Agro-input shops	Market + shops	% of total
Cassava	146	2082.2	0.0	**2082.2**	**8.3%**
Maize	111	7075.3	0.0	**7075.3**	**28.1%**
Groundnuts	135	16032.9	0.0	**16032.9**	**63.6%**
Total (of 3)		**25190.4**	0.0	**25190.4**	**100.0%**

SEED EXPENDITURE: IDPs

Tables 4.13 and 4.14 show the breakdown of seed costs for IDPs, across both seasons. **Several trends for the IDPs are distinct from the settled population.** Cash needs leaped up for the IDPs as they are recovering and greatly expanding agricultural activities. For both seasons monitored, IDPs obtain about 70% of their seed for the market, which means that expansion of agriculture translated to expansion of seed costs. Note that the rise **in seed costs is remarkable: from an average of FC 18731 to 28457. Second, while IDPs have the same large costs for groundnut seed, they equally have to heavily invest in, and pay for, cassava planting material. Simply, cassava is a staple and the normal social networks which provide planting material for the settled population do not equally serve this displaced group.**

To put these costs in perspective, 25,000 FC is equivalent to c. $ US 28, and the annual income of a family in this northern Katanga area may reach $ US 300-350 (personal community SSSA team estimate). So, (very) roughly, multiplying for two seasons (acknowledging the A is more important than the B), seed costs could absorb $40 or 10-15% of the family budget on a routine basis. This is a considerable expense, especially for a product which is not even guaranteed.

Table 4.13: Average spending for seed, 3 main crops, main season: 2011-12, IDPs

Three main crops	# sowing	Local market	Agro-input shop	Market + shops	% of total
Cassava	14	5392.9	0.0	**5392.9**	**28.8%**
Maize	13	3654.8	0.0	**3654.8**	**19.5%**
Groundnuts	9	9683.3	0.0	**9683.3**	**51.7%**
total (of 3)		**18731.0**	**0.0**	**18731.0**	**100.0%**

Table 4.14: Average spending for seed, 3 main crops, main season: 2012-13 IDPs

Three main crops	# sowing	**Spending**			
		Local market	Agro-input shop	Market + shops	% of total
Cassava	16	8625.0	0.0	**8625.0**	**30.3%**
Maize	18	6377.8	0.0	**6377.8**	**22.4%**
Groundnuts	16	13454.4	0.0	**13454.4**	**47.3%**
total (of 3)		**28457.2**	**0.0**	**28457.2**	**100.0%**

Spurring production

To complete this analysis of the rationale for farmers' planting decisions, we end on a positive tone, focusing on why those who planted more in season A 2011-12 did so and the rationale for why those intending to plant more season A 2012-13 (Table 4.15). Households plant more for multiple and diverse reasons, the first being because they had good harvest and have more seed available, at no cost. Getting access to more land, and seizing on new marketing opportunities also directly expanded seed use (and hence expanded land area). Finally, receiving seed free did make a difference, especially for crops such as cassava, where access to cuttings can be a problem.

Note that a good number of farmers interviewed in Muhuya indicated they could expand areas still further (i.e. either they maintained areas or increased only slightly). Land is abundant. The constraint is the demand side: poorly developed markets (including little transformation) and abominable roads linking Muhuya to Nyunzu (a distance of 15 km that can takes hours to negotiate).

Table 4.15: Reasons farmers gave for planting MORE than normal of a given crop, main seasons 2011-2012 and 2012-2013 (% of responses).

Reason	2011-12 (N=91)	2012-13 (N=80)
SEED RELATED		
Seed availability		
More seed available due to good harvest	36.3%	38.8%
More seed available due to free seed	16.5%	10.0%
Seed access		
More money to buy seed or seed price low	0%	0%
Got credit to buy seed	0%	0%
Seed quality		
Have especially good seed or good variety	0%	0%
sub-total: Seed-related	**52.7%**	**48.8%**
NON-SEED FACTORS OF PRODUCTION (opportunities)		
Good/increased labor	4.4%	5.0%
Feeling strong/healthy	1.1%	1.3%
Have more land/more fertile land	11.0%	11.3%
Have tools/tractor, other machinery to help farm	0%	0%
Have access to irrigation, fertilizer or other inputs (for example, stakes)	1.1%	1.3%
Good weather/rainfall	2.2%	2.5%
Good security (peace has arrived)	0%	0%
sub-total: factors of production-related	**19.8%**	**21.3%**
OTHER PRIORITIES/STRATEGIES		
Well-developed /new markets for crop or crop products	4.4%	5.0%
Have decided to give more priority to agriculture	2.2%	2.5%
Change in profile of crops	8.8%	10.0%
Other	9.9%	10.0%
TOTAL	**97.8%**	**97.5%**

Can the markets deliver seed 2012-13?

In all of this, the key question in seed security becomes "Can the markets deliver"? Will seed be put on offer, with the quality that farmers want and at prices that make purchase accessible for smallholder farmers?

Chapter III looked at general market functioning. Here, we review the some of the key issues related to market supply.

Market seed availability

As we have seen in both Chapter III and IV, formal sector seed is insignificant in supplying 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

Tables 4.4, 4.13 and 4.15, farmers in the assessment zones intended to increase significantly the quantities of seed planted for the upcoming 2012-13 main season. The issue is whether supplies of local market seed could meet this growing demand.

Several sources of information (which triangulate varied data) show that seed availability will not a problem in the zones of assessment for the 2012-13 season.

First, seed flow mapping (figures 3.4 and 3.5) demonstrates that there are multiple sources of seed/grain for all the major crops. This means a poor harvest in Kalemie would not necessarily lead to the unavailability of potential seed in the Kalemie markets, as surrounding regions are the main sources. Availability is also not an issue in Nyunzu, as it is historically a productive region, and Nyunzu market is supplied by many surrounding communities within a 60-80 km radius, using all four main axes (roads) for supply. All normal supply routes remained open at the time of the SSSA.

Second, farmers themselves said that 2011-12 had been an average or good season in 84% of cases (across crops). For the upcoming season, 2012-13, they were able to rely slightly more on their own stocks for seed, and slightly less, overall, on the market. For farmers, intended seed source strategies were normal ones.

Third, the SSSA team interviewed the very large traders in Kalemie and Nyunzu who somewhat control seed supply (there are four to five key individuals). Of the three major crops, bean supplies already available locally were seen as 'normal'. Large traders did deem maize and groundnut production overall as somewhat lower than normal (following the erratic rainfall), but not enough to result in local supply scarcity. Large traders could procure all the supplies they wanted: the issue was price. (To understand the scale of their operation, some move 100- 300 sacks a season per crop- or 12- 36 MT per crop).

Market seed quality

The potential seed was assessed available in all sites for 2012-13, but was the quality on offer acceptable? The SSSA team did not effect objective seed quality assessment, but rather drew on systematic farmer and trader insights, and on visual inspections in multiple markets. Hence the quality assessments are qualitative ones, but from multiple sources.

From the farmer point of view, seed drawn on the market 2011-12 was generally good. In 86% of cases (n=190) farmers stated they would re-sow the market-purchased seed in 2012-13 (versus only 71% of cases for resowing of seed received from the NGOs the same season). Interestingly, farmer discussions in the community focus groups suggested that they often use the market to renew and upgrade the quality of their seed stocks. (Note that there were no direct farmer evaluations of market seed on offer during the SSSA.)

Visually, the SSSA team visited three market centers and reviewed stocks of over 100 traders (interviewing in detail some 49 traders). The bean, groundnut and maize seed in the market looked well-sorted, by variety, and free of any inert material (stones, sand, sticks, debris).

Select farmer comments did suggest that, generally, groundnut seed quality should be improved, although no unusual complaints were linked to the current seasons. The main and ongoing compelling issue with quality was tied to cassava planting material (due to various cassava diseases), although, even here, some farmer assessments suggested that the diseased materials were tastier.

In sum, for quality, there was no evidence that the current quality of seed and other planting material, across crops, was different from the norm, or was particularly 'bad' – except for

cassava. Efforts to improve quality further could certainly be explored by working more closely and more systematically with a range of traders (Box 7).

Box 7: Working with market traders to improve seed on offer

Given that local markets, and traders are the backbone of farmer seed supply (40-60% of seed for select major crops) much more attention might be given to ensuring that these markets can supply the kinds of seed farmers need. One major challenge is how to leverage traders' efforts to gradually improve the quality of seed on offer in normal market channels.

- Seed/grain traders could be potentially powerful partners in helping to move *new modern varieties* widely within and among stressed farming communities. Methods should be tested for directly linking formal sector seed supply with informal trader seed/grain sellers. Distribution of variety samples (to stimulate demand); sale of small packets of seed; and more systematic sale of modern varieties in bulk are options that approaches that have had marked success in other countries in East and Central Africa.

- Seed/grain traders could also be partners in improving the seed quality *per se*. Procedures for (*inter alia*) segregating among varieties and reducing percentage of sub-standard grains could give farmer clients a better return for their purchase. Initial quality-related interventions have had promising results in West Hararghe, Ethiopia. Since 2002, those supplying CARE's relief seed program have been required: to have a license; separate out varieties, have a warehouse; and maintain specific seed stores (which are clean and insect free). CARE also trains traders in seed quality issues, and withdraws contracts from those who deliver substandard material. Such awareness-raising, capacity building and monetary incentives (such as CARE's) might be possible measures for encouraging gradual seed/grain quality improvements in other places.

- Traders could also be key sources for disseminating variety and seed information (e.g. which varieties are available and from where, cost, quality, performance). Traders move even in remote communities and equipping them with up-to-date seed-related information would raise awareness quickly among clients, but also among other important trader suppliers.

(Adapted from Sperling and McGuire 2010)

Market seed access/price

Finally, as with many seed security issues identified so far, one of the major constraints, if not *the* constraint, revolves around market price and farmers' purchasing power. Market prices for potential seed rise at critical sowing periods (see figure3.6) but had additional hikes, from planting time 2012-13, due to overall production declines (Table 4.16).

Table 4.16: Local market prices: Kalemie market (FC/kg)

Crop	Price start Sept 2012	Peak Sowing Price (Nov/Dec)	% increase
Groundnut	1000	1250-1500	+ 25-50%
Maize	650	950	+46%
Beans	750	750	No change

In brief, seed/grain market assessments showed potential seed to be immediately available in each area, or on order. Aside from cassava planting material, there were few unusual concerns over the quality of market seed: in fact some farmers actively used the markets to upgrade stocks. The main issue with market seed during the SSSA had to do the magnitude of needed purchase and with elevated prices for maize and groundnut.

Community assessment of seed security

Finally, as a cross-check to the above quantitative 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 50 people, men and women, and the discussions were intense and interactive.

Tables 4.17 and 4.18 present the communities' own assessment of those within their village who they deem seed secure for major crops for the upcoming 2012-13 season (which had virtually started at the time of the SSSA).

For Tabac, the community itself suggested it is 100% seed secure. In contrast, for Muhuya, the community raised key issues around those two crops for which seed has to be purchased in large quantities: for groundnuts and for maize. The main issue was 'money'. Note that the community prognosis was more pessimistic that farmers' individual quantitative assessments. For the Muhuya sample, only 12.3% suggested they would plant less for select crops 2012-13 specifically due to financial constraints.

Table 4.17 Tabac community assessment of seed security for main season 2012-13

Crop	How many out of 100 HH sow	# who will be seed secure this coming season	% seed secure	comments
Cassava	100	100	100%	
Maize	75	75	100%	problem with damage in storage: 40-50% loss
Groundnut	50	50	100%	
Rice	60	60	100%	

Table 4.18 Muhuya community assessment of seed security for main season 2012-13

Crop	How many out of 100 HH sow	# who will be seed secure this coming season	% seed secure	comments
Cassava	100	100	100%	
Maize	90	40	c.45%	Issue of money
Groundnut	80	30	c. 40%	Issue of money

Summary: Acute Seed Security Findings

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

From the farmer point of view, 2011-13

Residents/non-IDPS

1. For the 2011-12 main growing season, farmers (residents/non-IDPs) sowed only slightly less than normal (-5.08%) in terms of overall quantities planted. Crop yields were rated to be generally good in 71% of cases.

2. Farmers relied on local channels to access 96%+ of their seed during the 2011-12 season. Local markets were a crucial core for ensuring seed security, supplying 44% of total seed sown. 'Friends and kin' as a source were important especially for the vegetatively-propagated crops (cassava and sweet potato), which has key implications for how these cuttings might move more widely and quickly.

3. For the 2011-12 season, seed from agro-dealers was negligible (<0.5 % and only for rice). Seed obtained from FAO/NGOs was also minimal: 3.2% of all seed sown and focusing on maize and cassava planting material.

4. Farmer projections for the 2012-13 main season show much of the same, with somewhat more of a positive trend. Almost 75% of farmers plan to maintain or increase the amounts sown across crops, with a modest overall aggregate seed increase of + 5.18%. (Hence from -5.08 in 2011-12 to +5.18 for the upcoming season).

In brief, for resident farmers, the seed security situation 2011-2013 revolves around the norm and is not particularly dynamic.

IDPs

5. For the 2011-12 main growing season, IDPs sowed almost 20% less than 'usual' in terms of overall quantities sown (comparing amounts sown in the camps versus what they would do on their home plots). Crop by crop, 54% of farmers stated that they sowed the same amount or more than is their norm.

6. IDPs relied on local channels in much the same way as the resident population—only to a greater degree. For the 2011-12 season, IDPs relied on local channels, for nearly 100% of their seed. Humanitarian provided only 0.5% of their seed. Local markets were the crucial core for ensuring seed security, providing 70% of total seed sown. Note that IDPs are purchasing seed, and in large quantity.

7. The reported plans of IDPs for the 2012-13 main season show planting trends on an upward path. Over 70% of farmers plan to maintain or increase the amounts sown across crops. The aggregate amount also moves from a 20% drop below normal in 2011-12 (# 5 above) to a 6% drop for 2012-2013.

In brief, for the IDPs, the seed security situation is somewhat stressed for 2011-2012, but projected to improve markedly in 2012-2013.

8. The relatively progressive picture should not obscure that there are still vulnerable populations and regions where farmers are stressed: resident farmers indicated they were planting less of in 37.8 and 26.4% of crop cases for 2011-12 and 2012-13, respectively . In parallel, IDPs indicated they were planting less in 44.1 and 30.9% of cases, respectively.

9. The rationale for using less seed (a general proxy for decreasing land area) is key. During 2011 and 2012, resident farmers gave four main reasons for sowing less: the weather, as the start of the A season in 2011-12 was erratic; money constraints (which accounted for 45-63% of the cases among those 'sowing less'); health problems; and labor shortages. Seed availability was mentioned as a constraint by fewer than 5% of the residents, but proved to be a more important factor for the IDPs. Due to the small local market in Tabac, farmers often travel to Kalemie for seed and IDPs have challenges meeting such travel costs. (Note that lack of land among IDPs was not cited as a major constraint.)

11. Understanding farmers' rationale for expanding seed use (a general proxy for expanding land area) is also central for laying a base to spur production. Households will plant more in 2012-13 as a good harvest means more seed available at no cost (36% of responses) . Getting access to more land, and seizing on new marketing opportunities also directly expanded seed use (13% of responses). Finally, receiving seed free did make a difference, especially for crops such as cassava, where access to cuttings can be a problem (17% of responses).

<u>On the supply side, 2011-2013</u>

Given farmers' dependence on the local markets for large proportions of their stock, the central questions for seed security in the 2012-13 season revolves around markets. Can they supply enough seed and acceptable seed? Subsequently, can farmers then afford the seed on offer?

Can the markets deliver enough seed?

12. Several sources of information show that seed availability will not a problem in the zones of assessment for the 2012-13 season.

    - Seed flow mapping demonstrates that there are multiple sources of seed/grain for all the major crops. All normal supply routes remained open at the time of the SSSA.

    - Farmers assessed that 2011-12 had been an average or good season in 84% of cases (across crops). For the upcoming season, 2012-13, they are able to rely slightly more on their own stocks for seed, and slightly less, overall, on the market.

    - The very large traders in Kalemie and Nyunzu (the few key individuals who control seed supply) assessed that seed stocks were overall would be adequate. Bean supplies already available at the time of the SSSA were deemed 'normal'. Supplies of maize and groundnut production overall were deemed somewhat lower than normal for food (following the erratic rainfall of season B) but sufficient for seed. Large traders could procure all the supplies they wanted: the issue would be price. (To understand the scale of their operation, some move 100-300 sacks a season per crop, or 12-36 MT per crop).

Can the markets deliver acceptable seed?

Will the quality on offer be acceptable? While the SSSA team did not conduct objective seed quality assessments, the team did gather farmer and trader insights, and effect visual inspections.

13. The quality overall was assessed as acceptable, but with select concerns.

- From the farmer point of view, seed obtained from the market 2011-12 was generally good. In 86% of cases (n=190) farmers said they would re-sow the market-purchased seed in 2012-13 (versus only 71% of cases for resowing of seed received from the NGOs).
- Visually, the SSSA team visited three market centers (interviewing in detail some 49 traders). The bean, groundnut and maize seed in the market looked well-sorted, by variety, and free of any inert material (stones, sand, sticks, debris).
- Select farmer comments did suggest that, in general, groundnut seed quality should be improved, although no unusual complaints were linked to the current seasons. The main and ongoing compelling quality issue was linked to cassava planting material (due to various cassava diseases), although, even here, farmer assessments suggested that the diseased materials were tastier (especially for the local sombé).

In sum, there was no evidence that the current quality of planting material, across crops, was different from the norm or was particularly 'poor'. Ongoing stresses were noted with cassava disease.

Can farmers afford to buy the seed on offer?

The major constraint surrounding seed security, for both the resident population and the IDPs enters on money. The degree of potential money stress becomes more visible as one tallies the amounts money concretely needed to buy seed.

14 Cash needs for seed purchase among resident farmers was about 22,000 FC for the 2011-12 season and is projected to rise to 25,000 FC for 2012-13. For IDPs, such expenses are comparable and rising even more quickly: about 19,000 FC for 2011-12 and 28,500 FC projected for 2012-13.

The good news for both residents and IDPS is that farmers are expanding land areas cultivated. However, because of reliance on market seed, expansion is ever so costly.

Community summary

How did communities themselves assess the potential of their members to achieve seed security (that is, having seed in stock or being able to access it elsewhere?) For Tabac, the community itself suggested that 100% were seed secure across their major crops. In contrast, for Muhuya, the community raised key issues for two crops where seed has to be purchased in large quantity: groundnuts and for maize. Community focus groups suggested that only 40-50% could plant their desired amounts. Note that this figure was much higher than the individual quantitative interviews revealed in practice: for 2012-13, in only 12% of crop cases were farmers' planning to plant less due to financial constraints. This latter percent falls well within the range of 'normal' for communities with significant poverty levels. A part of the community is stressed on a routine basis (not only this season).

CHRONIC SEED SYSTEM CONCERNS + EMERGING OPPORTUNITIES

We now move to examining more systemic trends in northern Katanga 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 men, 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: dynamism in use of seed sources, crop diversification and processing, seed aid delivery, access to new varieties and use of select inputs: inorganic and organic fertilizers and seed storage chemicals.

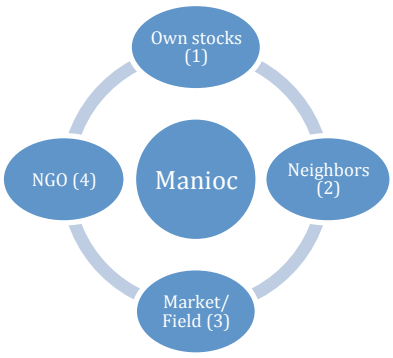
Seed system sourcing-- dynamic trends

Community mapping of seed sources served to trace general trends in seed source strategy. Groups mapped seed sources for a particular crop and compared current sources with those used five years previous. The analysis shows that there has been some near no dynamism in sources— with the exception of cassava.

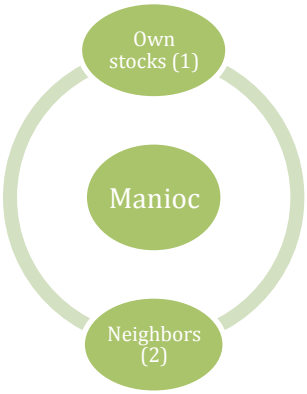
The first example is drawn from Muhuya and focuses on cassava (Fig 4.5). There were few people in Muhuya in 2007 as people had fled the war: hence it was difficult to buy cuttings/stalks from other farmers' field. Today, five years later, both NGOs and 'other farmers' are important additional sources for planting material. So new varieties and seed channels have expanded.

Figure 4.5 Muhuya: cassava sources

2012

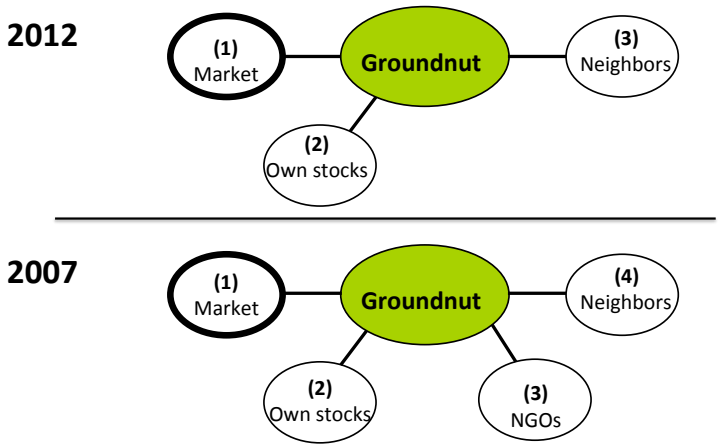


2007



A second example comes from Tabac and focuses on groundnut seed sources (Fig. 4.6). The principal source has remained the market over a five-year period (even more important than own stocks). The main change is that NGOs no longer help with groundnut seed in the zone.

Figure 4.6 Tabac: groundnut sources



Crop diversification and (few) value added products

Communities in Tabac and Muhuya also 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 (Tables 4.19 and 4.20). In each case, a fair range of crops is grown and, farmers put heavy emphasis on crops for income generation. However, transformation levels overall are low, mainly only resulting in different types of flour, alcohol and street food (e.g. doughnuts and chikwangue).

Table 4.19: TABAC Diversity of crops, but with modest transformation

Crops	Importance for Food	Importance for Income	Transformation?
Cassava	XXX	XXX	XXX (Flour, chikwangue)
Groundnut	XX	XXX	-
Maize	XXX	XXX	XXX (Flour, alcohol)
Rice	XX	XXX	X (Hulled rice)
Horticulture	XX	XXX	
Oil palm	X	XXX	XXX (Oil, fuel, soap, nuts)
Sugarcane	XX	XXX	-
Sweet potato	XX	XXX	-
Taro	X	X	-
Banana	XX	XXX	XX (Wine, Chikwangue)
Beans	XX	X	-

X indicates relative levels of importance, with more X's being relatively more important

Table 4.20: MUHUYA: Diversity of crops--- but little transformation

Crops	Importance for Food	Importance for Income	Transformation?
Cassava	XXX	XXX	Flour, alcohol, soap, doughnuts
Maize	XXX	XXX	Flour, alcohol, bread
Groundnut	XXX	XXX	Oil , chikwangue
Bean/cowpea	XX	XXX	-
Paddy rice	XX	XXX	Hulled rice
Horticulture	XX	XXX	-
Soybean	X	XX	-
Bambara	XX	X	-
Sesame	-		Oil

X indicates relative levels of importance, with more X's being relatively more important

The SSSA team did note exceptions, both negative and positive, to these diversification trends. Some of the poorest farmers, particularly in Muhuya, really do rely on basically one crop- cassava (Box 8). But at the other end of the spectrum, a number of richer innovators, especially traders in Nyunzu, are paving the way for transforming cassava and maize flour on an impressive scale (Box 9). Strategies for catalyzing positive developments at both extremes need to be explored further.

Box 8: Can you survive on only cassava: households in Muhuya?

In Muhuya, it was striking that some households only grow cassava, noted in interviews and confirmed in a discussion with a group of women from Muhuya. These women also made clear that surviving on cassava alone is, at best, very difficult: "If you grow only cassava, you will have family difficulties!" Depending only on cassava leads to poor-quality diets, a lack of cash, and vulnerability to shocks such as cassava mosaic disease. Even if some households who say they only grow cassava are overlooking a small amount of intercropped maize, this still means a very heavy reliance on cassava. Muhuya farmers all agreed that this was a bad idea indeed.

Heavy reliance on cassava is rarely a choice. Muhuya farmers have experience in the past (pre-war) with a wide range of crops, and those growing only cassava state a clear desire to re-diversify. What holds them back is poor access to seed. Some can borrow seed from other farmers (paid back double at harvest). However, those growing groundnuts or maize buy much of their seed from the market, and relatively little seed is retained locally for loaning to others. Borrowing seed (even at a 2:1 'repayment rate') is only possible if you know the donor well – and if they have anything to lend. Farmers want to re-diversify their crops, and are willing to pay for seed if it is worthwhile. What is clear is that improving access to seed from a diverse range of crops, and improved on-farm seed storage methods, could help some farmers widen their crop profile, and move away from a perilous near total_ dependency on cassava alone.

Box 9: What one trader in Nyunzu needs to expand this transformation business.

'Mr. X' has been involved in the agricultural transformation business for almost 25 years and is one of the few in Nyunzu town who works on a larger scale. He focuses on maize, cassava and rice. The demand for flour, especially from the mines (about 60% of this clientele) means that business is on the rise.

To give an idea of scale, in three months of 2012, Mr. X ground and sold 150 sacks of maize (1.8T), processed 10T of cassava, and hulled some 50 sacks of rice (6T). Much of the maize and rice comes production comes from his own fields but, as his cassava is young, he bought the full set of tubers from elsewhere.

So what are some of Mr. X's concerns for further expansion?

- A network of bigger multipliers might best be organized. Scouting out raw suppliers here and there takes energy—and the quality is so very variable.
- Stockage losses have to be diminished. Maize losses can amount to 20-50 %, and no protective products are available locally.
- Maize production overall seems on the decline as forest margin land (needed for the traditional slash and burn) becomes more scarce. Other cultivation methods to use?

Then there are the roads, the heavy costs of rented transport, the range of taxes (official and unofficial)….

New varieties

Continuing to search for innovation, we move to the issue of new varieties. Within the context of assessing seed security, it is especially important to consider new variety access as such varieties can be an economical way to increase production quickly. Figure 4.7 and Table 4.21 show the extent of variety introductions 'during the last five years' within the sites sampled . Only 23 % of farmers reported that they had recently accessed new varieties (although whether these are 'modern' or new local varieties cannot be determined). The varieties were largely accessed through NGO/FAO channels (i.e. non-sustainable conduits) and consisted mainly of cassava, maize and horticultural crops. The need for ongoing and innovative variety delivery channels is pressing (Box 10).

Figure 4.7. Farmers' sources of new varieties, 2007-2012 ('last five years').

Table 4.21. new variety types, by crop.

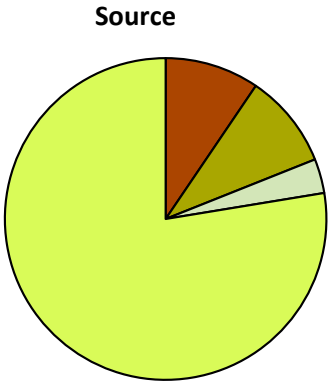


Table 21: new variety types

Crop	Variety introductions
Maize	11
Cassava	47
Sweet potato	2
Groundut	22
Beans	1
Amarenthe	3
Aubergine	1
Cabbage	11
Gombo	2
Tomatoes	9
Onions	5
Taro	1
All crops	115

22.7% obtained a new variety

41% of new varieties cassava

Box 10: Innovative channels for getting new varieties out

Congolese farmers need better access to new varieties. No sustainable conduit currently gives them easy seed access—for ANY crops.

Why not build ***multiple channels*** to render seed accessible to ALL:

- Small packs could be offered by seed companies
- Seed (esp. maize and legume) needs be sold in normal venues (rural shops)
- Seed loan groups should be formed, but with quality controls and clear marketing plans
- Agro-enterprise groups formed- around seed

There are wonderful possibilities for enhancing farmers' access to new varieties ---quickly.

Input use: Fertilizer + Manure/Compost + Storage Chemicals

Select input use was also examined during the northern Katanga SSSA as complement to the seed security analysis. This included attention to farmers' use of a) inorganic fertilizer, b) manure and compost , and c) seed storage chemicals.

Do farmers in this northern Katanga region use inputs (or non-seed inputs)? The short answer is a strong 'no', across farmers of all types of wealth and market orientation.

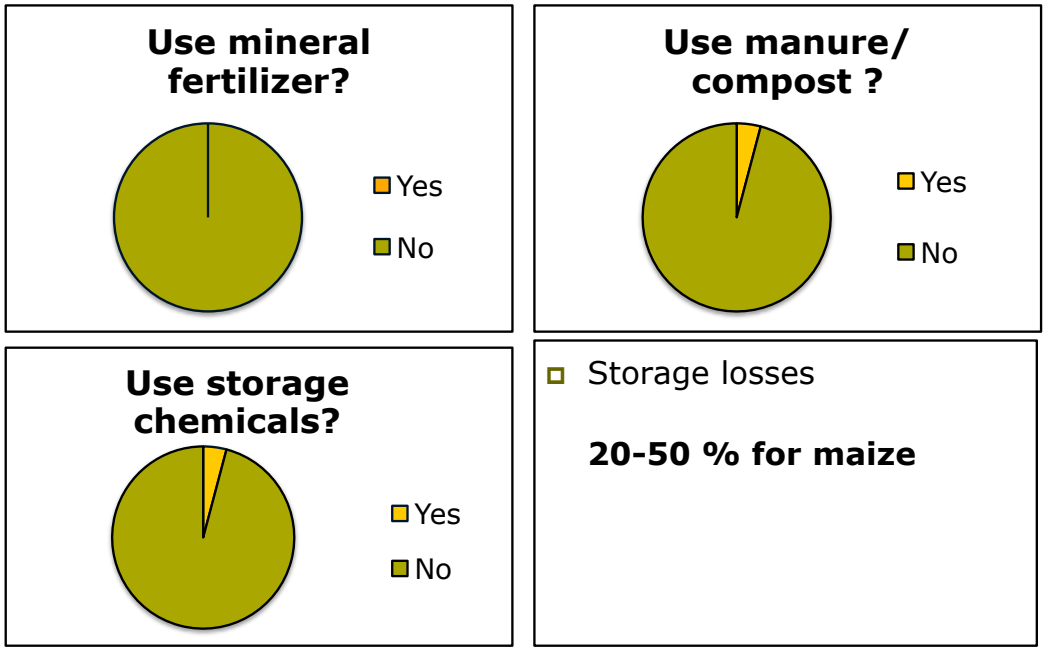
For mineral fertilizer, none of those interviewed (n=198) actually used this input in the 2011-12 main season, and only one indicated possible use for the upcoming season (on maize). Generally farmers indicated either that it was unavailable or that they did not know how to use it. A smaller portion, 17%, suggested that the fertile soils of the region did not require mineral fertilizer.

For compost/manure, seven farmers in the sample (4.2%) used it 2011-12 and planned to continue using it for the upcoming season. The organic input use comes solely from livestock (small and larger). No farmer used field residue or kitchen refuse. Main reasons for non-use paralleled those given for mineral fertilizer: farmers did not know how to use them (40%), they were not necessary (33%) or simply they were not available (25% or responses).

The lack of storage and field chemical use (esp. pesticides) was perhaps the most surprising as farmers and traders (even the largest traders) reported significant storage losses on a routine basis : estimated 20-50% loss for maize alone. In terms of such chemical use, 7 farmers used it 2011-12 and 6 farmers projected use for 2012-13. Actual use was mainly on cabbage and tomatoes (so application must have been in the field and not focused on seed). Given the expressed demand, the overriding reason for non-use was non-availability of the products (44% of responses). Another 35% also said they did not know how to apply such chemicals. (Only 11% justified the non-use by their not being necessary.)

Rendering a range of chemical products available—for use on horticultural crops in the field and to prevent seed storage losses would seem to be an immediate priority.

Figure 4.8: Use of select inputs by farmers within the SSSA sample, 2011-12



Seed Aid

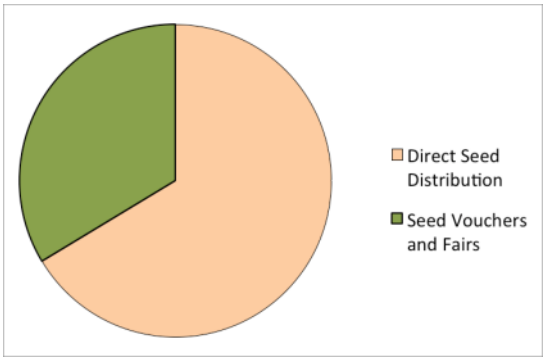
As the last 'input' we examined receipt of seed aid. Here we include both emergency assistance and developmental aid, as farmers themselves often cannot make the distinction.

The SSSA results show that about 1/5 of farmers have received seed aid some time during 2007-2012. In this period, they have received it a mean of 1.3 times, with a few farmers having received aid up to 3 times, or about once every 2 years (Table 4.22). The main means of delivery has been direct distribution, although vouchers (combined with fairs) have been implemented on occasion, mainly by CRS and its Catholic Diocese partners (Figure 4.9).

Table 4.22 All farmers : overview of seed aid frequency 2007-12 ('last five years').

# HH	Received seed aid ? (%)			# HH receiving aid	# times aid received			
	Yes	No	total		Mean	Std dev.	Min	Max
196	23.0%	77.0%	100.0%	45	**1.3**	0.56	1	3

Figure 4.9: Means of delivery of seed aid 2007-12 (% of cases)



Comparing possible differences in seed security-related issues:

- ***Male and female-headed Households;***
- ***Farmers with different land areas***

Finally, the SSSA teams searched for possible differences within populations, for all issues above, e.g., seed sources used, quantities planted, use new varieties, manure/compost, storage chemicals, access to seed aid.

Analyses were done by two major variables: sex of household head (male or female-headed households) and area under cultivation (<0.5 ha, 0.5-1.0, > 1.0-2.0, > 2.0).

- In terms of male-headed and female-headed households, three trends were found to be significant. Female-headed HH generally had small cultivated areas and had less access to new varieties. In contrast, such HH were expanding sowing rates (and presumably land areas) at a faster rate than male-headed households.

- In terms of trends among HH cultivating different field areas, one trend was particularly marked: HH with 0.5-1 ha (near the bottom but not the very bottom) were expanding land use more markedly than others. Differences were also found in

compost/manure and seed storage chemical use, with larger HH using more—but numbers were small here and the main message is that the smallest HH use no inputs at all. Certainly, further stimulating targeted production advances among female-headed households needs to be given some priority.

Table 4.23 summarizes these results. Box 11 gives additional insights into how agricultural women describe their challenges.

Table 4.23: Differences in select seed security issues a) among M/F headed households and b) households cultivating different land areas?

Issue	Differences? (t-tests)
Male vs. female headed Households	
Size of fields	*YES* (female-headed households smaller fields)
Sowing amounts 2011-2012	*no*
Sowing amounts 2012-2013	*no*
Planting trends	*YES* (female-headed expanding faster)
Use compost/manure	*no*
Use of mineral fertilizer	*no*
Use of storage chemicals	*no*
Use new varieties?	*YES* (female-headed less use)
Times received seed aid?	*no*
Households cultivating different size land areas	
Sowing amounts 2011-2012	*YES* (HH with 0.5-1 ha expanding at faster rate)
Sowing amounts 2012-2013	*YES* (HH with 0.5-1 ha expanding at faster rate)
Use of compost/manure	*yes (but weak trend). Household with more land tend to use more (as smaller HH use none)*
Use of storage chemicals	*yes (but weak trend). Household with more land tend to use more (as smaller HH use none)*
Use of mineral fertilizer	*no*
Use of new varieties	*no*
Times received seed aid	*no*

Box 11: Women and agriculture: some key issues from Tabac (from women's focus group)

Women are deeply involved in farming, with most activities done by both men and women – *provided* the man is present to work on the farm – and most land is jointly-managed. (Note that men and women in the same household may own separate field).

In Tabac, 25-30% of households are headed by women, with men absent through divorce, death, or departure to the mines or to other areas. A major issue for these women is gaining access to resources, particularly good quality land and the labor needed for preparing it. The best land in Tabac is in the valley bottom, where the recently-drained marshland is fertile. Much of this land has been given out already in Tabac, and anyone else must pay rent to plant here – 50 000 FC for three months. Women-headed households, with fewer breadwinners, are challenged by such costs, and by the preference of some landowners to deal through men. Thus, horticultural crops – lucrative and especially attractive to women – are not accessible to all women.

Tabac's alluvial soils are heavy and deep, and require twice as much work to manage as do lighter soils. Clearing trees, brush, and plowing are particularly hard work, and women-headed households have to pay for the labor to do these tasks. Women who are too poor to pay workers must either do these heavy jobs themselves (at a cost to area planted, or to other activities), or forego farming this fertile land.

Finally, cash needs mean that half of all women work off-farm themselves, taking them away from their own fields. It also means that women cannot always supervise hired labor for the heavy tasks on their own farms; they complain that the quality of this work can be poor.

Women want better income-generating activities that can provide them the means to reinvest in farming, especially the commercially-oriented farming of the Tabac Valley. Better support for savings and credit needs to be directed at women, especially women-headed households, and other targeted services to help them access land and labor.

Summary: Chronic Seed Security Findings and Emerging Opportunities

The review of medium-term trends in seed security in northern Katanga showed a few (!) qualified moves forward as well as many important and key bottlenecks.

Mixed (qualified) factors: positive and negative

1. New variety access within the survey area has been modest with 23% of farmers having had access to at least one new variety in the last five years. New varieties have been largely accessed through NGO/FAO channels, that is, through non-sustainable conduits. The need is pressing for ongoing and innovative variety delivery channels.

2. There have been several notable efforts for multiplying clean cassava planting material to respond to the disease pressures of Cassava Mosaic Disease. In fact, 41% of the new varieties reaching farmers were of cassava materials (linked to #15). However, two of the bigger multiplication initiatives in northern Katanga were drawing to a close at the time of the SSSA: those spearheaded, by the UN- FAO and by the GLCI. Such a winding down occurs at a time when farmers still face a compelling need for clean planting supplies but also when several large traders (especially in Nyunzu) are drawing plans to expand their cassava flour processing (and product) business.

Negative and ongoing stresses

3. A fairly diverse range of crops is grown at each of the SSSA sites and, farmers put special emphasis on crops geared toward income generation. However, transformation levels overall are low, mainly resulting in fabrication of different types of flour, alcohol and street food (e.g. doughnuts and chikwangue). This means that farmers in northern Katanga have been unable to reap the benefits of value addition to raw agricultural products.

4. Seed system channels have generally remained static over the least five years, with the exception of important gains in introducing new cassava varieties and in expanding use of horticultural seed (cabbage, eggplant, onions).

5. Special problems were identified by communities linked specific supply chains. Select maize varieties were assessed as 'degenerated' and groundnut seed overall is purported to be declining in quality. (Note that groundnut seed, in particular is bought from local markets season after season.) The constraint identified around horticultural seed center on its relative 'unavailability'. The three concerns are distinct and merit separate targeted actions.

6. Input use for fertilizer or storage protection in northern Katanga is near non-existent. During the 2011-2012 main season, no household within the SSSA sample (N=198) used mineral fertilizer, only 4% used some manure and only 4% used chemicals to protect seed in storage. This latter lack is particularly worrisome as farmers and traders (even the largest traders) report storage losses of 20 -50% for maize alone.

7 Seed aid, that is free distribution of seed as part of emergency response and development initiatives, has been relatively limited in the northern Katanga region. About 1/5 of households have received such aid within the last five years (2007-2012) with a mean of 1.3 times. Delivery of aid has largely been through direct distribution although vouchers (combined with fairs) have been implemented by select orgnizations, including CRS and it Catholic Diocese partners.

Differentiation among households

8. When comparing results from male-headed versus female –headed households (HH), three trends were found to be statistically significant. Female-headed HH generally have smaller cultivated areas and have less use of new varieties (so they are distinctly disadvantaged). In contrast, such female-headed HH are their expanding sowing rates (and presumed land areas) at a faster rate than male-headed households.

9. When comparing trends of HH cultivating different size fields, one statistical trend was noted: those with 0.5-1 ha of cultivated and, (near the bottom stratum but not the very bottom) are expanding land use at faster rates than others. (Hence, there is some positive dynamism even among quite small landholders.)

In sum, overall there seems to be very little agricultural innovation in northern Katanga. Some groups of farmers are sowing expanded land areas—but largely in the absence of new varieties, fertilizer and storage inputs, and agro-processing possibilities. For select crops, the seed situation is not static but potentially declining: cassava, groundnut and maize.

V. OVERALL RECOMMENDATIONS: ACROSS SITES

The opportunity for the SSSA team to conduct assessments in two sites of the northern Katanga, Tanganyika district provided the field teams a useful perspective on seed security in this eastern Congolese region.

Site-specific recommendations have been included in each site report (available through Willy.Mulimbi@crs.org) and site-specific plans appear in Annex I.

Below, we put forward a set of recommendations which are applicable across sites. The recommendations are loosely clustered into five themes.

Important to signal is that the recommendations center on actions to alleviate chronic stress and to seize upon developmental opportunities. The SSSA did not find constraints that warranted an 'emergency response".

I. Variety development and introduction

There is a generalized need, northern Katanga to develop and identify varieties that are adapted, meet farmer preferences and respond to dynamic market needs.

Various steps might be considered to identify productive and accepted varieties.

1. Concerted efforts should be made to scale up the multiplication and distribution of 'proven varieties'. INERA has released some 16 varieties for eastern Congo, including Katanga (of maize, beans, cassava, groundnut, soybean) (Table 3.2), yet these are not generally found on farmers' fields.

2. Cleaning of the highly-appreciated formerly-released varieties might be explored. Farmers particularly expressed need to upgrade their 'degenerated maize' varieties.

3. Multi-locational sites might be quickly established for screening 'best bets' from elsewhere. In the current absence of a functioning government decentralized testing system, a temporary network of agricultural NGOs and universities, coordinated by the INERA, might be established across the region in key agro-ecological zones.

4. Screening sites for more exploratory germplasm trials should also be established (across key agro-ecological zones), using models which allow for end-user evaluation. Participatory Variety Selection (PVS), mother-baby trials, or Farmer Field Schools (FFS) are among the well-established variety screening formats which allow for intensive farmer and trader evaluations.

5. Decentralized screening might best be tied to decentralized seed producer groups. These can spur wider multiplication, once acceptable varieties have been identified.

Key is that: a) local adaptation be confirmed; b) farming communities be engaged to ensure performance and cooking/taste acceptability; and c) traders/dealers be involved to anticipate market acceptance.

II. Seed production and storage

Decentralized seed production needs to become a more strategic and effective force in serving farmers as the formal seed sector will never be able to handle a) the range of crops needed, nor b) the range of varieties. At this point, the decentralized seed multiplication initiatives seems to be having very modest impact (aside from anecdotal accounts of receiving new cassava planting material). Decentralized multiplication is also being propped up by institutional buyers (NGOs, faith-based groups), rather than by demand from smallholder farmer clients.

Sustainable decentralized seed production models need to be identified.

6. Decentralized seed multiplication groups need to develop an assessment of the cost-effectiveness of their organization and to develop a delivery strategy. They should be encouraged to produce only if a) viable markets are identified and b) their own agro-enterprise and marketing skills have been enhanced.

7. Links need to be specifically catalyzed to tie decentralized seed producers with continuing and new sources of germplasm (from INERA and elsewhere).

8. Storage losses on-farm need to be combatted in multiple ways, particularly to deal with storage constraints of crops such as maize and groundnut. Triple bagging or small seed silos are options to be tested for technical and social suitability.

9. Given that local markets (and their traders) are important for farmers' seed supply, more attention should be given to encouraging these open seed/grain markets to supply the kinds of potential seed farmers need. As one point of departure, seed/grain traders could be powerful partners in helping to *move new modern varieties* widely, within and among farming communities. Traders might also be linked to options for *safeguarding and improving the quality of seed they put on offer*. This could involve: linking traders to credible sources of good quality seed; working with them on techniques of seed bulking; recommending options for separate and improved seed storage.

10. Priority crop seed quality: cassava. Major initiatives to supply farmers with clean cassava planting material were drawing to an end at the time of the SSSA. New initiatives, which are locally –driven (possibly by farmers organizations) and which *sell clean planting material,l* need to be catalyzed immediately.

III. Delivery outlets and approaches

Farmers need regular access to outlets that can provide them with the varieties and quality seed they desire.

Formal sector delivery expansion

11. Current formal sector outlets (aside from horticultural crops) are very few (i.e. near non-existent) and located only in larger town centers. Those that have opened should be strengthened to provide particularly: a) a greater range of horticultural seed; b) seed storage chemicals and c) agricultural tools adapted to the milieu. (Note for tools, local blacksmiths may need to be engaged to fabricate axes, hoes, and machettes to meet local specifications.

Informal channel expansion

The situation remains that most farmers access the large majority of their seed in various types of local markets. Small farmers do *buy* the planting material. As an overall strategy, we suggest that:

Creative initiatives need to be developed to tie supply of new varieties and quality seed to the multiple venues where farmers routinely make purchases.

More specifically, the following might be tested:

12. Trials might be initiated for selling new varieties and high quality seed in more 'integrated' rural shops that is the stores where farmers buy sugar and matches and oil. Venders would have to be trained to provide farmers with the technical advice needed to guide informed seed choice and management.

13. Seed loan systems, which allow farmers to access seed of new varieties on credit, might also usefully be tested, with special monitoring devoted to analyze the quality of seed returned, and real repayment rates.

14. Seed fairs, of various types (whether emergency and development-related) might be regularly linked to sources of new varieties and quality seed;

15. Agro-enterprise groups might be spurred to focus on production and marketing of good quality seed.

All of the above 'informal outlet sales' can be facilitated if high quality seed is sealed and sold packed in small seed through plastic packs. Experience elsewhere suggests this should be done in small farmer- acceptable sizes (100 g? 200 g ?) and with labels reporting basic varietal characteristics.
http://www.youtube.com/watch?v=FQK8KjwmPsA

The last linked recommendation is as follows:

16. Farmer-focused, small pack sale models might be tested in the range of venues where farmers routinely buy seed and other goods (12-15).

If done smartly, the above suggested broadening of seed sale venues and seed sale formats should stimulate the creation of a broad customer base, focusing demand toward direct producers (small farmers) and away from reliance on large institutional buyers. The above also builds on the varied local market channels that all farmers use on a regular basis: transaction costs for farmers will subsequently be minimized.

IV. Information innovations: raising awareness and demand

Northern Katanga 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. rotation of soils and use of compost and manure. There is an urgent need to stimulate: a) a learning and experimentation environment; b) an environment that provides a wealth of technical information; and c) information channels that foster feedback mechanisms.

Several recommendations appear below related to information innovation follow. The focus here is on enabling the small farmer to draw in much needed innovations and to make more informed choices among multiple agricultural options.

17. 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 (particularly those returning from the mines) be included in these interactive learning processes.
18. Agricultural-linked information also has to be passed through a range of media. Some farmers (and traders) so 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.

V. Agro-enterprise development; and savings and loans

Ultimately, non-seed issues will drive the seed security sector. Food and livelihood security generally, are linked to the financial capacity of farmers. The last two recommendations focus on needs for: a) generating cash, through Village Savings and Loans (VSL) Programs and b) developing agro-enterprise market chains.

19. **Village Saving and Loan Programs (VSL)**: VSL can help address some of farmers' key access constraints (see '*Recommendations, Related Technical Issues*). In a relatively short time (12 – 24 months), VSL funds are often large enough to allow members to borrow enough money to access key agricultural inputs like seed and sometimes fertilizer or pesticides. Initial tests in nearby Moba (and elsewhere) have had very positive results.

20. **Rural agro-enterprises** are mechanisms of potential impact that are currently severely underdeveloped. Farmers are selling their agricultural produce in raw form, or only slightly modified as in the case of maize and cassava, sold as flour. As a start in promoting agro-enterprise development, profitable business models that work for

smallholder farmers need to be tested and then scaled-up (see '*Recommendations, Related Technical Issues* for suggestions on methodology). Ultimately, linking smallholder farmers effectively to markets is the best solution to increase incomes and both seed and food security, and also to create the demand that will support crop breeding and private sector production of good seed and/or planting materials of improved crop varieties.

Overall, this SSSA recommends a move away from short-term, gap-filling interventions and towards strategic investment in smallholder –driven variety, seed, and agricultural marketing.

Select technical Issues related to Recommendations[7]

1. Vegetatively- propagated crops like cassava and sweet potato require specialized production systems for planting materials. This is because the planting materials are: bulky to transport; have a relatively short 'shelf-life' once they have been cut off the parent plant; and they can carry with them any disease that the parent plant has. In addition, because they have exactly the same genetic make-up as the parent plants, they are easy for the farmers themselves to maintain and multiply, once they have them – and this in not attractive to commercial companies. Thus efficient decentralized farmer-based systems for the production of planting materials are likely to be more effective than relying on commercial companies to produce, distribute and market the planting materials.

2. Village Savings and loan (VSL) programs differ across agencies, but have some common fundamentals. They are 'accumulating savings and credit' programs. In these programs, small groups of 10 – 20 individuals join together. They agree on an amount that they are going to save regularly, and when they have accumulated sufficient capital they start making small loans to members of the group. In principle, the total amount of savings is never loaned out to a single individual at one time – in case of defaults. All loans are paid back at an agreed interest rate (usually 10 – 20% / month), so between the saving and the interest from the repayments, the funds tend to grow quite rapidly, even when the initial savings amount was quite small. At the end of 12 months the groups usually do a 'share-out', returning to each individual the amount they had contributed in savings, plus the associated interest. This amounts to an annual audit. The groups then usually agree on what amount of the share-out they will return to the 'kitty', elect new officers, and start the cycle again. These VSL programs are extremely effective in helping the very poor accumulate both savings and assets. The savings and access to credit provide a hugely important buffer against adversity and allow households to protect productive assets. The VSLs have proven to be a very effective way to generate cash – or access to credit – for even the poorest rural households.

3. In regards to agro-enterprise in northern Katanga transformation of cassava has been but the market chain of prime interest (along with some production of maize flour). One of the key things needed in order to link smallholder farmers to markets in sustainable and equitable ways is capacity building for the farmers in a range of key skill sets (see "Preparing Farmer Groups to Engage Successfully with Markets" www.crs.org/publications). As part of this process, farmers should be involved in a "market opportunity identification" process to identify key products that they can produce and market effectively in their communities. They also need to understand the value chains associated with those products so that they can decide at which point they should enter the value chain. Lastly, they need to be organized and have a well-developed business plan to assure success of their enterprise(s). Ultimately, generating more income will allow smallholder farmers to make larger investments in increasing their productivity (purchasing the necessary inputs and/or labor) and diversifying their production systems and enterprises.

[7] Modified from Southern Malawi SSSA report. Notes prepared by Dr. Geoff Heinrich.

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VII. ANNEX: ACTION PLANS

SEED SECURITY : ACTION PLANS

- Action Plan : Tabac/Kalemie

- Action Plan : Muhuya/Nyunzu