SEED SYSTEM SECURITY ASSESSMENT

EASTERN AND COASTAL KENYA

An assessment funded by:

**The United States Agency for International Development/
US Office of Foreign Disaster Assistance**

September 2011

CORE RESEARCH TEAM

International Center for Tropical Agriculture (CIAT)	Louise Sperling
Catholic Relief Services	Mwende Kusewa Charles Ndegwa Martin Waweru
Kenya Agricultural Research Institute	David Karanja Tarcisius Mutuoki Vincent Kega
World Vision	Jackline Waeni
Catholic Dioceses	Shauri Kuethia Zinje Mwandama Abigail Mwende Alex Musyoka Nicolas Nkanda Robert Gichuge
University of East Anglia School of International Development	Shawn McGuire
Denmark (consultant)	Lasse Englyst Olsen

Acknowledgements

Support from the US Office for Foreign Disaster Assistance of the US Agency for International Development made this work possible. We greatly appreciate the financial backing and intellectual contributions of Julie March, Laura Power, Laura Meissner and Eric Witte. CRS/Kenya provided the much needed logistical support, and special thanks go to PM Jose (Country Representative CRS Kenya), Adele Sowinska (Head of Programs, CRS Kenya) and Kinyanjui Kaniaru (Deputy Head of Programs, CRS Kenya). Geoff Heinrich (Senior Technical Advisor, Agriculture and Environment, CRS) helped to initiate the SSSA in the eastern and coastal regions and has provided ongoing intellectual contributions.

The insights of many people shaped this work: men and women farmers, government ministry personnel, crop and livelihood specialists, local seed producers, seed companies, agro-dealers, traders, agro-enterprise specialists, humanitarian relief personnel, and others. Thanks to all for helping to sharpen the results.

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 need to be seized upon soon and with vigor.

Acronymns

CIAT	International Center for Tropical Agriculture
CBSP	Community-based seed production
CD	Catholic Diocese
CRS	Catholic Relief Services
DSD	Direct Seed Distribution
HH	Household
IDP	Internally Displaced Population
NGO	Non-governmental organization
FAO	Food and Agriculture Organization (also UN-FAO)
G	grams
GoK	Government of Kenya
Kg	Kilos
Ksh	Kenya Shilling
LR	Long Rains (February to June)
MT	Metric Tons
OPV	Open Pollinated Variety
SR	Short Rains (October to January)
SSSA	Seed System Security Assessment
SVF	Seed Vouchers and Fairs
WV	World Vision

Table of Contents

EXECUTIVE SUMMARY vi

I. Introduction 1

II. Background to Seed System Security Assessment 3

III. Seed Systems in Eastern and Coastal Kenya: Brief overview..... 10

IV. Field Findings: across Sites 24

Summary: Acute Seed Security Finding……..40
Summary: Chronic Seed Security Findings +Emerging Opportunities....51

V. Overall Recommendations: across sites 53

Seed Security: Immediate Responses Needed
Seed Security: Medium-term Responses Needed
Promoting Accurate Seed System Security Assessments

VI. References 58

VII. Annex: Action plans by site 60

Citation: CIAT, CRS, Caritas, KARI, World Vision and University of East Anglia. Seed System Security Assessment, Eastern and Coastal Kenya. September 2011. Nairobi, Kenya: Catholic Relief Services and International Center for Tropical Agriculture.

Comments and updates are welcome by the SSSA team. Please contact the assessment coordinators at l.sperling@cgiar.org and mwende.kusewa@crs.org.

.

EXECUTIVE SUMMARY

This report presents the results of a Seed System Security Assessment in Eastern and Coastal Kenya, implemented September 2011, several weeks prior to the time of planting. The assessment focused on result of Long Rains (LR) 2011, and immediate projections for Short Rains (SR) 2011 planting.

A seed system security assessment (SSSA) reviews the functioning of seed systems which farmers use, both formal and informal. It assesses whether seed of adequate quality is available and whether farmers can access it. The approach also promotes strategic thinking about the relief, recovery or development vision needed. For instance, during the stress period, should aid aim to restore the system as it was, *ex ante,* or aim to strengthen it? A SSSA goes well beyond a conventional seed needs assessment as it hones in on specific seed security problems communities face, and then steers response to actions which alleviate specific constraints, and often improve systems. (For full description of method, see http://www.ciat.cgiar.org/africa/pdf/sssa_manual_ciat.pdf).

Three sites were chosen for the assessment : in Kathonzweni, Tharaka North and Magarini. The sites include zones where participating non-governmental organizations (NGOs) have been prepared to address seed security-related constraints and opportunities. The three selected sites also represent well the cross-section of the regions in which drought-stressed agriculture and seed aid continue to unfold. Within Tharaka North, a fourth site, was also assessed, tied specifically to Internally-Displaced Persons (IDPs) suffering from prolonged land disputes.

This report presents the seed security findings and recommendations across all four sites. Site-specific reports and recommendations tailored for each site have been posted separately and can be obtained through Catholic Relief Services (Mwende.Kusewa@crs.org). Here, we focus on the across-site results as these may have broader relevance to drought-prone areas in Eastern and Coastal Kenya where seed security responses are being planned in the short (1-2 seasons) and medium-term (3-5 seasons).

Note that this assessment coincided with a period when preparations by the Government of Kenya to disperse an estimated 1000 MT of Direct Seed Aid (DSD), particularly destined for the lower Eastern Province zone (D. Karanja, personal communication) and including maize, sorghum, cowpea and greengram. A preliminary assessment of seed needs had been coordinated by the UN-FAO, but delays in data provision meant that official action plans were laid before assessment results could be analyzed so as to inform programming.

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.

Summary: Acute Seed Security Findings

1. The LR 2011 was a poorly performing one across crops, with yields judged poor in 30-65% of cases. So it was a stressful season . However, in terms, of seed security issues, quantities sowed only modestly dipped (- 2%). Some farmers planted less anticipating that the rains would not be sufficient (so why waste seed), but money constraints were the major reason for their planting less (45% of cases). Farmers simply did not have the resources to buy seed. Seed availability itself was not identified as a constraining issue to use. Note that maize seed use especially declined.

2. Farmers in the SR 2011, aim to plant the same or more in 73% of cases (monitoring crop by crop), although increase in the overall kgs to be sown is modest (+1.25%). For those planting more, the main drivers are access to : new varieties, better developed markets and more land. For those planting less, the key constraint is poor finances (no money, seed price too high).

3. Farmers do not see themselves as victims needing outside seed aid. For LR2011, seed aid provided less than 6% of their seed sown. For SR 2011, farmers anticipate about 4% of their needs to be met through seed aid. They are not factoring in free seed aid to meet their seed needs in any significant way.

4. In terms of seed source strategy, it is useful to compare the LR 2011 and SR 2011 seasons. To compensate for low home stocks, farmers are increasing their use of local markets for seed, from providing 39% of their total seed supply in LR 2011 to 55% of seed to be sown in SR 2011.

5. Comparing LR 2011 and SR 2011, a relatively bigger change for farmers is anticipated in terms of agro-dealer use. In LR 2011, agro-dealers provided 14% of the seed farmers sowed (mostly maize and cotton.) In SR 2011, farmers indicate 27% will come from agro-dealers. Maize and cotton will still predominate, but farmers also seek greengrams and cowpea certified seed from agro-dealer shops. Farmers want more legumes, and they want new varieties of legumes, and they indicate a willingness to pay for them.

In main issue in SR 2011 therefore revolved around markets. Can markets deliver? and can farmers afford to buy the supplies on hand?:

Can markets deliver seed?

6. Agro-dealers themselves indicated no shortage at all of supplies to be put on offer. While many in the regions had not yet received stocks from various centralized storage depots at the time of the SSSA, there was no indication that overall supply could not meet farmer demand.

7. For seed supply from formal agro-dealers, other constraints emerged:

i. geographic access to shops was far. Places like Tharaka North have no formal stockists at all. The nearest are in Meru town, 50 km or 2 to 3 hours away by bus. (although note that Kenya Seed for instance was planning to put an agent in Mikinduri, 24 km away).

ii. specific varieties desired were sometimes not on offer (for non-maize) .Agro-dealers put mostly maize on offer, along with horticultural seed packets. Farmers complained about not finding desired varieties of sorghum (like gadam) and a range of desired greengram and cowpea varieties.

8. For supply of seed from local grain markets , trader assessments, mapping of actual supplies, and mapping of potential seed flows and deliveries indicated there would be no availability problem. While immediate stocks seemed short in several areas at the time of the SSSA, traders were hoarding stocks elsewhere until prices rose steeply for critical sowing periods .

Can farmers afford to buy the supplies on hand?

9. SR 2011 seed costs will rise higher than LR 2011 costs by 26-103%.

   Costs are high for three reasons:

   i. For SR 2011 Farmers are buying more seed overall. (Own stocks provided 36.6% of seed sown LR 2011 but only 10.5% of SR 2011 seed sown).

   ii. For SR 2011, farmers are intensifying use of certified seed, which per kg is 200 to 500% more expensive than seed of same crop obtained from market.

   iii. More generally, certified seed is packaged in relatively large packs. At least for the legumes, 2 kg bags, often the smallest size, can cost some 350 Ksh. (smaller packs: 100 , 250 500 g would be more affordable—and desired.)

   Stress on finances will be a significant problem for many. In Kithuki, for instance, the average farmer expects to spend 3711 Ksh for seed in SR 2011, or about the equivalent of a medium-sized goat.

10. For IDPs, rises in seed costs will be 59% from LR 2011 to SR 2011. This general assessment of money stress, is in addition to other ongoing concerns that make them especially vulnerable in the farming areas of Ntoroni. There households report that they 'farm with fear'. They might not plant due to threats, they might abandon fields due to insecuirty, some say, they are chased away at harvests (for example in 2009). Parcels rented to them may also be expensive (e.g. 5000 Ksh year, 2000-3000 season) as well as of poor fertility.

Community assessments

11. Even in this context of stress, communities (in focus groups) assessed themselves as 80 to 100% seed secure, across crops and sites. They are partly shaping strategies to compensate for seed lost in harvest LR 2011 and to take advantage of new opportunities (such as enhanced use of agro-dealers, and especially seeking out new varieties of legumes – especially of cowpea and greengram.

    This positive statement needs to be tempered for the IDPs in Ntorini. They are not counting on outside aid, but project that sowing levels will be down by some 7% in SR 2011.

Summary: Chronic Seed Security Findings + Emerging Opportunities

The review of longer term trends in seed security in Eastern and Coastal Kenya shows both positive moves forward- as well as ongoing bottlenecks.

1. There has been some dynamism in seed sources, but particularly for maize. Other 'new sources' for seed of many of the legumes or cereals tend to be subsidized ones, non-sustainable ones.

2. New variety access has been impressive, with over 70% of households (71.3%) indicating having accessed a new variety in the period 2006-2011, principally of maize, cowpea, greengram and sorghum. For maize, there are multiple channels for new introductions (agro-dealers, government, NGOs) , but for the legumes, and especially new varieties of greengram and cowpea, it is hard for farmers to find specific desired varieties. Lack of access to the white sorghum varieties (grown for the brewing industry) also was cited as a problem.

3. Organic fertilizers (manure/compost) have been employed by 70-75% of the population and particularly on cowpeas, greengrams and maize. Overwhelmingly, animal manure is applied, with nearly no use of crop residue or kitchen refuse. In contrast, 6-10% of farmers use mineral fertilizers (and only on the same three crops. Most find they are too expensive, not necessary, or they do not know how to use them.

4. Pesticide use is fairly high (62-79% of farmers per season), again on maize, greengrams and cowpea. It would have been higher had the rains not come late (and plants withered before application became possible). Such widespread use reflects the high constraints farmers face with continual insect damage, especially on greengrams.

5. Farmers are eager for market development, but currently there is very little agricultural transformation in rural communities: flours, chips, but not much more. This means that farmers cannot reap the benefits of value addition from their raw agricultural products.

6. Seed aid, that is free distribution of seed (under emergency and development initiatives) has been conducted on a large scale, with 73.1% of the sample having received such aid a mean of 1.6 times in the last 5 years. Such aid can promote dependency: some households have received seed assistance 6 times in 6 years.

7. Female-headed households do not seem to face dramatically worse seed security concerns than those that are male-headed, although there are modest indications that they are planting relatively less for the SR 2011. (Such gender-differentiated insights might require further investigation.)

So, all in all, there has been some dynamism in seed/farming systems in a short five-year period. However, it is time (past-time) for some of the non-maize seed access and general marketing bottlenecks to be alleviated.

RECOMMENDATIONS

Seed Security Emergency Response: General Overview

1. Seed Availability of seed *per se*, was not identified as the major problem in any of the assessed sites. Rather access to seed was a compelling issue in all zones, due to a) relatively greater quantities of seed being purchased, and b) farmers' putting relatively greater emphasis on certified seed use, for maize, greengrams and cowpea. **Recommendation** In this context, emergency 'seed-related' interventions might best be designed to increased access/purchasing power of farmers.

2. Most seed security problems encountered in all assessment sites were not short-term ones. **Recommendation:** Any response in the short term should aim to be linked to longer-term recovery and development. As one example, this might including linking farmers more efficiently to sources of new varieties, especially and legumes even in the early recovery phase.

3. The site-specific SSSAs have shown that 'one size does not fit all'. The four sites assessed (including the IDPs) had different problems and challenges. A blanket response, such as giving free seed or conducting standard seed vouchers and fairs, may not solve problems with the specificity needed. **Recommendation.** Interventions need to be tailored to specific seed security constraints and opportunities **(**see Annex for specific action plans).

4. Emergency seed aid is becoming repetitive. **Recommendation**: In zones where emergency seed aid has been implemented three seasons in a row, decision-makers (donors, GoK, NGOs and other humanitarian partners) should program a formal review so as to determine the necessity of the aid.

Seed Security: Immediate Responses Needed

The major urgent problems at each site center around farmers having access to seed (point #1 above). Emergency inventions should be geared to addressing access problems.

5. Vouchers linking farmers to local markets and agro-dealers and direct cash transfers are important immediate aid options which give farmers increased access to crops and varieties of their choice. Given the specific constraints found in Eastern and Coastal Kenya, vouchers and fairs which also give farmers access to innovations should be encouraged (point #2 above: linking relief to development).

<u>Specific Recommendations Linked to #5 and use of voucher and fair programs</u>

5.1 Two sets of vouchers would useful, those which focus on access to informal sector seed and those specifically designated for formal sector (certified) seed from agro-dealers. In terms of the latter, agro-dealers should be required to pack seed in especially small quantities (50g, 100g) so farmers can test varieties and quality seed through voucher purchase.

5.2 Given farmers' high interest in legume seed, special efforts should be made to ensure that seed of greengram, cowpea and pigeon pea are especially on offer.

5.3 More generally, efforts should be made to bring significant crop diversity overall into the voucher and fair programs so to encourage greater production stability.

5.4 Linked to 5.3, Maize should be banned from the voucher and fair programs as its continued use has compromised farmers these drought-prone regions .

5.5 To oversee the quality of seed put on offer from informal sector, a range of actions should be put in place.

i. A Screening Committee (farmers, NGO representatives, others) should vet all seed being put on offer;

ii. Traders participating in fairs should show that they used adequate basic storage methods. (Having special storage facilities is even better).

5.6 To follow-up on the quality of seed put on offer from the formal sector and agro-dealers, farmers should be advised to keep packs and receipts so as to be able to address any complaints.

Seed Security: Medium-term Responses Needed

There is need for a broad-based rethinking on how to improve the seed security of small holder farmers in drought-prone regions. We suggest a first set of areas for priority action.

Formal Seed Sector

6. Production of foundation seed needs to be scaled up across of range of non-commercial crops, to form the base of an extensive, decentralized, seed production system. For the drought-prone regions, focus should be put especially on the legumes. Items such as forage seed, key for farming system stability in drought-prone areas, might also be considered. While the production of such foundation seed currently rests with the national research institution KARI, additional private sector multipliers (under the guidance of KARI) might be considered to increase quickly and on a large scale.

7. As a general recommendation**,** incentives need to be put in place to encourage agro-dealers to become more smallholder farmer client oriented.

Linked to #7

7.1 Agro-dealers should pack farmer- preferred crops varieties and fertilizers in 'test sizes' and 'affordable use' sizes.

7.2 Agro-dealer placement has to be expanded to serve also those in more remote areas. Networks of centralized trade agent might be facilitated to complement the network of bigger agro-input stores. GIS mapping might help guide placement of stores so as to reach a maximum number of farmers.

7.3. Farmers need to become more aware of the means by which they can redress grievances with agro-dealers (e.g., around quality of product). Awareness campaigns educating farmers in redress possibilities might be considered.

Integrated and informal seed sectors

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 for drought-prone zones; nor b) the range of varieties. At this point, the decentralized seed multiplication initiatives seems to be having very modest (near nil) impact in drought- prone zones. It is also being propped up by institutional buyers, rather than from demand from smallholder farmer clients.

8. As a general recommendation, sustainable decentralized seed production models need to be confirmed for the drought-prone zones, especially for the legumes.

Linked to #8

8.1 Decentralized seed multiplication groups need to develop an assessment of the cost-effectiveness of their organization and 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.

8.2 Links need to be specifically catalyzed to tie decentralized seed producers with continuing and new sources of germplasm.

9 Mechanisms for giving all farmers regular access to new varieties need to be intensified. Sale through agro-dealers (#7.1) provides only one venue. Sale in regular country stores (dukas), open markets (also point #11 below) or even supermarkets (with proper labeling) might be considered.

10 Storage losses on-farm need to be combated in multiple ways: triple bagging or small seed silos are options to be considered for technical and social suitability.

11 Given that local markets (and their traders) are important for farmers' seed supply, more attention should be given to encouraging that these open seed/grain markets 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.

Agro-enterprise development: market chains

Seed security in Eastern and Coastal Kenya, as well as food and livelihood security generally, are linked to the financial capacity of farmers. 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 in the case of maize and manioc. Significant market chain prospecting needs to be carried out and agroenterprise development needs to be strengthened at the local and regional levels. In this vein, the following first set of measures is recommended:

12. Profitable business models that serve local markets with good-quality produce, especially in collaboration with existing formal and informal market actors, need to be catalyzed. Transformation of cassava has been but one market chain tested in drought-prone areas.

13. Market information needs to be further promoted to become more timely and trustworthy, providing information on volumes, prices and products at local and regional scale. This can be facilitated especially through the use of radio and cell phone information systems.

Finally, in terms of specific technical recommendations it may be appropriate to state the obvious: drought- prone regions need better roads and more irrigation. As one government official interviewed during the stated: "There are 5+ major rivers in Tharaka. Instead of seed aid, yet again, why not invest in irrigation development?"

Promoting Accurate Seed System Security Assessments

Classic seed need assessments inevitably conclude that 'seed is needed' and, in Eastern and Coastal Kenya usually advise that the response should be a direct seed distribution. While innovative at their inception (as they distinguished seed aid need from food aid need), such assessments are now outdated and need to be sharpened. Understanding of what happens to seed systems during disaster has become markedly more refined in the last five years: experience shows that *distinguishing among seed security constraints is key for recovery*.

14. As a general recommendation, we suggest that current seed security assessment methods, focusing just on counting seed, be significantly revamped.

<u>Specific recommendations linked to #14.</u>

14.1 ` National and regional formats for assessing seed security status should shift from those which calculate simplistic 'seed needs' to frameworks which recognize different types of seed security problems, and which tailor responses accordingly. These problems might include diverse constraints of seed availability, seed access and seed quality, which are distinguished by their presence in the short and in the long term

14.2 Seed security assessment capacity needs to be built at regional and local levels. Technical tools already exist to help NGO and government agricultural officials move forward on seed security assessments.

14.3 Given the complexity of the stresses in drought-prone areas, 'emergency' seed aid-related work has to think strategically and longer-term. Assessments related to seed security, can and should incorporate more developmental elements, including issues related to system stability, opening and strengthening of markets, and equity concerns.

14.4 This expanded focus suggests that the 'skill set of those assessing seed security' has to be broadened. Minimally SSSA requires inputs from formal and informal seed sector specialists, farming system specialists, marketing professionals, and gender/ livelihood analysts. Nutritional expertise might be considered as an added bonus. Hence: multidisciplinary teams should be mobilized for seed system security assessments.

14.5 More generally, a political environment for 'real seed security assessment' has to be established. This is no easy task. *Technical advances in methods alone will not lead to more accurate assessments.(political will needs to change)*

Strong seed security frameworks at a national level and strong leadership ensuring that seed security assessment is given focus (as distinct from food security and other non-food item assessments), can enable seed assistance in Kenya to become more demand and problem driven. More accurate assessments will bolster the ability of seed- related assistance to address farmers' compelling seed security problems and to seize on important, emerging opportunities.

I. INTRODUCTION

Rationale for Report

This report presents the results of a Seed System Security Assessment (SSSA) in three Districts of Kenya. The assessment took place in September 2011 and was implemented for four major reasons.

The Long Rains of 2011 (March to June) largely failed across Eastern and Coastal Kenya resulting in harvest loss across large range of crops. Continuing drought prior to the Short Rains (October 11 onwards) led humanitarian practitioners to speculate on possible seed security concerns among smallholder farmers for the upcoming season.

Eastern Kenya in particular has been the site of near continuous emergency seed for at least 20 years, or 70% of all seasons since 1992 (Sperling et al., 1997, Sperling et al 2008). Another distribution of 1000 MT of direct seed aid (including maize, sorghum, greengram and cowpea) was also being planned by the Government of Kenya (GoK) and partners at the exact time of the 2011 assessment. Is this response of direct seed distribution needed and is it addressing farmers' immediate seed security concerns? Further, in the medium and longer-term, have repeated seed aid distributions made farmers less vulnerable? What has been gained (or compromised) through such aid? In-depth assessments were undertaken in several distinct farming regions-to assess the diverse seed security scenarios and then to recommend tailored actions to respond to specific constraints.

CRS Kenya Agriculture program and its partners have been long interested in seed systems more generally have been involved in a range of programs supporting processes of seed selection and varietal development, conservation, exchange and improved storage methods (see CRS 2009). 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 quiet 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 Eastern and Coastal Kenya was designed to give honed technical insight and to train professionals in fast-evolving seed security assessment and intervention design methods. The training lasted two weeks, and involved six organizations.

Aims and Structure of Report

The report presents the results of the SSSA in Eastern and Coastal Kenya during September 2011. It presents the findings on seed security across the three districts, Kathonzweni, Tharaka North and Magarini and includes additional information on a fourth site focusing only on internally displaced persons (Ntoroni, in Tharaka North). The IDP site may have somewhat special needs due to continuing disputes over land use.

Comprehensive site by site reports are available from CRS Kenya (mwende.kusewa@crs.org).

In terms of report structure, Chapter II introduces the SSSA methodology and reviews the actual methods used in the September assessment, including the rationale for the choice of sites. Chapter III provides a brief background to Kenya'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 by seed security issues in the acute phase (LR 2011, SR 2011) and then honing in on medium and longer-term , chronic stresses and emerging opportunities.

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 even in 'drought-prone zones', which are themselves somewhat diverse.

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 2011. 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

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 September 2011 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

Seed System Security Assessment

A SSSA reviews the functioning of the seed systems farmers use both formal and informal. It asks whether seed of adequate quality is available and whether farmers can access it. The SSSA also promotes strategic thinking about the relief, recovery or development vision needed. For instance, during a period of stress, should efforts aim to restore the seed system to its former state, or should they aim to strengthen it? Should efforts focus on crops for food, income or both? Should interventions be linked to crops tied with the most vulnerable (e.g., women)? (see Sperling, 2008 for 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 Eastern and Coastal Kenya SSSA are sketched out in Table 2.3. They include a range of qualitative and quantitative methods and draw on multiple stakeholder insights. Geographic Information System (GIS) tools were also used to map seed availability and seed flows within and among regions. Of special note is that the sample sizes were relatively big for a quick assessment: 199 individual farmer interviews, over 8 focus group discussions often with 40 people or more, and about 50 seed/grain trader interviews.

Table 2.3: Investigative thrusts and methods used in the SSSA Eastern and Coastal Kenya

Type of Investigation	Commentary
Background information collection	• Plant breeding, formal sector seed supply • Decentralized seed multiplication
Database utilization	Use of GoK databases
Key informant interviews	State government officials, Agro-dealers Civil Society project personnel, Seed producers
Focus group discussions (> 8) Community-based Women's groups	Separate community and women-only FGDs, discussing: • agricultural and variety use and trends • seed source strategies, by crop • women's crop/seed constraints+ opportunities • livelihood/coping strategies
Farmer interviews (N=199) • 161 settled population • 38 internally displaced people (IDPs)	Topics covered: • seed source patterns/ manure-fertilizer use • seed aid and new variety access
Seed/grain market analysis (N=50 traders)	Assessment of: • crop and variety supplies on the market • sourcing areas and pricing patterns • seed quality management procedures • GIS mapping of seed flows

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 slightly 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 practice run by women ---as men were working off-farm, or not engaged in daily decisions. The extent of female-managed households was impressive, for instance, in Kithuki, the women's focus group put the number at 75% with many homes having been run by women for over a decade due to prolonged periods of male absence.

Of the 199 HH interviewed, 166 were among the settled population and 38 among a group of internally displaced persons. The IDPS were found only in the Tharaka north area (site; Ntoroni) and had been displaced due to ongoing land disputes around the Tigania-Tharaka boundary. While some of disputes had endured over 30 years, other clashes were more recent (on and off over 5 years) and had resulted in the IDPs generally having smaller plots, often feeling that the land loaned to them was substandard, and having a sense of marked land tenure insecurity (i.e. they might be pushed off even during a growing season). Table 2.4 summarizes household sample characteristics.

Table 2.4: Eastern and Coastal Kenya household (HH) sample characteristics (N =199)

Feature	Description	% Sample
Type of HH	Adult headed Grandparent headed	**97.0** **3.0**
Resident status	Resident IDPs	**81** **19**
Sex of HH head	Male Female	**63.8** **36.2**
Area cultivated	Below 1 acre 1-2 acres over 2 acres	**5.6** **24.1** **70.3**

Site Choice

Sites were chosen so as to link mainly to link the assessment to action, and hence closely followed partner priorities. Figure 2.1 indicates the general location of sites. with Table 2.5 presenting more detailed parameters.

Figure 2.1. Geographic location of SSSA zones, September 2011

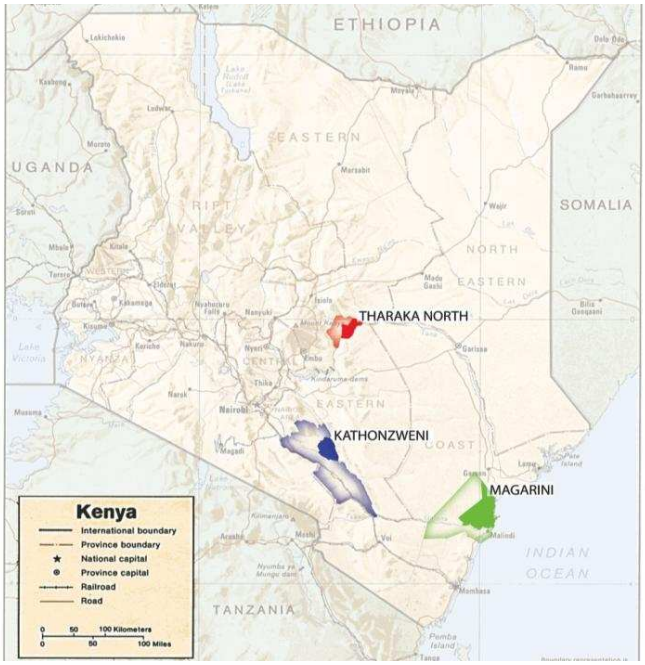


Table 2.5: Select descriptive parameters of sites chosen for assessment.

County	Implementing Partner	District	Division	Location	Rainfall	Major crops currently grown	Major crops 'Newer crops'	Key stresses
Makueni	Cathoilc Diocese (CD) Machakos/ WV- Makueni	Kathonzweni	Kathonzweni	Kithuki	LM3 500mm- low areas 800-1200 hills	Maize, greengrams cowpeas pigeon peas cotton, cassava	Cassava White sorghum	Drought, insect pests, birds
Tharaka Nithi	CD- Meru/MoA	Tharaka North	Mukothima Gatue	Ntoroni (IDPs) Gatue	LM3- Ntoroni 500- 800mm bimodal LM4-Gatue	LM 3 – green grams, cowpeas, Pigeon peas,Millet LM 4- Millet, cowpeas, sorghum, greengrams	LM 3 IDPS- Dolichos, Beans, white sorghum, maize, cotton LM4- Prosso millet, maize, cotton	LM 3 IDPs- Drought, Insect pests, diseases, birds, land degradation. LM4- Drought, Land degradation
Malindi	CD- Malindi/MoA	Magarini	Marafa	Bungale	LM3 1200mm+	Cowpeas, cassava, green grams, maize	Sweet potatoes(orange fleshed),white sorghum, cotton	Drought, Birds

Additional notes

- The Tharaka north site was the classic 'drought-prone' one: arid, poor infrastructure/roads, little rural enterprise
- Tharaka north also heavy sorghum site (92% of farmers) where virtually none in Kathonweni(aside from new white variety for brewing) .
- Tharaka North had the site of Ntoroni- where there are Internally-displaced persons, due to land disputes
- Both Magarini and Kathonzweni sites have well-developed urban centers nearby.
- Kathonzweni has heavy maize orientation. also some rural enterprise investment.
- Magarini site close to quite humid zones—and coasts, fishing, sell-developed trade.(also highest rainfall)

Seasonal Overview

Of specific note were the seasonal patterns of crop performance around the period of the seed system security assessment (2011). Community focus groups assessed The Long Rains (LR) 2011 to be uniformly poor across crops and sites, with the exception of cowpeas in Kithuki. (Note that cowpea is harvested very early—as much of the crop is eaten as green vegetable).

The stresses were multiple: maize did poorly due to moisture stress (drought); greengrams were heavily attached by insect pests, and the sorghums, particularly white, suffered very heavy bird damage (which is often the case when a new crop or variety is introduced).

The immediate seasons prior to LR 2011 were relatively good ones, except in Kithuki were LR 2010 was also a poorly performing one. Additionally, in Kithuki, where maize is dominant, farmers claimed they had not really had a 'good' maize season for some 10 seasons, since 2006. In SR 2006, with harvest in 2007 maize thrived to due to an unusual rainfall, El Nino-associated event.

Table 2.6: Community assessment of crop performance over three past seasons.

Crop	LR 2011	SR 2010	LR 2010
Kithuki			
Maize	X	XX	X
greengram	X	XX	X
Cowpea	XXX	XXX	X
sorghum	X	XX	X
Gatue			
greengrams	X	XX	XXX
Millet	X	XX	XXX
sorghum	X	XX	XXX
cowpeas	X	X	XXX
Magarini			
Maize	X	XX	XXX
greengrams	X	XX	XXX
Cowpea	X	XX	XXX

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

So in brief, the time of the SSSA was just after a dramatic acute drought period. In most sites, however, seasons previous were not unusually stressful.

The SSSA was also conducted during a period when the northern regions of Kenya- mainly extensive pastoral areas, were experiencing a more prolonged drought and, in addition, particularly heavy refugee influx from Somalia, due to continuing but intensified political insecurity and population insecurity.

In terms national radio and newspaper coverage, as well as international humanitarian information coverage, the time of this seed system security assessment (SSSA) was considered a highly volatile and stressful one. Some of the press labeled the drought as 'the worst ever experienced'.

III. SEED SYSTEMS IN EASTERN AND COASTAL KENYA: BRIEF 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 system).

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 Kenya SSSA show just above 80% coming from local channels in the eastern and coastal regions (see Chapter IV, Table 4.1).

What is important to highlight is that farmers themselves obtain their seed through both formal and informal channels, and both merit serious attention. In Eastern and Coastal Kenya, for example, the same small farmers may routinely procure maize hybrids through formal seed systems (agro-dealers, commercial companies, government parastatals, and, sometimes, relief aid), beans from their own harvest or local grain markets, and cassava cuttings from their neighbors. It is also important to note that these channels can be quite dynamic, evolving over time, but also season to season. For example, one key finding of this Kenya SSSA is that small farmers, even in these drought prone zones, are aiming to increase their use of certified seed, especially for the crops of maize and greengrams and cowpeas for SR 2011. (Chapter IV). Much of this trend is attributed to their desire to access new varieties.

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), including in Eastern and Coastal Kenya. In terms of relief, the GoK was in the midst of planning a major direct seed distribution (DSD) during the time of the SR 2011. Projections indicate that 1000 MT of seed was being procured (including maize, sorghum, greengram and cowpea). Follow-up (January 2012) suggests that the aid was delivered somewhat late and that much of it remained in farmer storage areas, perhaps for use in another season.

Note that relief seed aid has become repetitive in nature in the drier areas of Kenya: it has been given 75% of the seasons since 1992 (Sperling, 2002). With the random sample of the SSSA, 73% of farmers

had received seed aid within the last 5 years, with a mean frequency of 1.6 times each (see Chapter IV, Table 4.24).

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 one community assess the general advantages of accessing seed from each of the diverse channels.

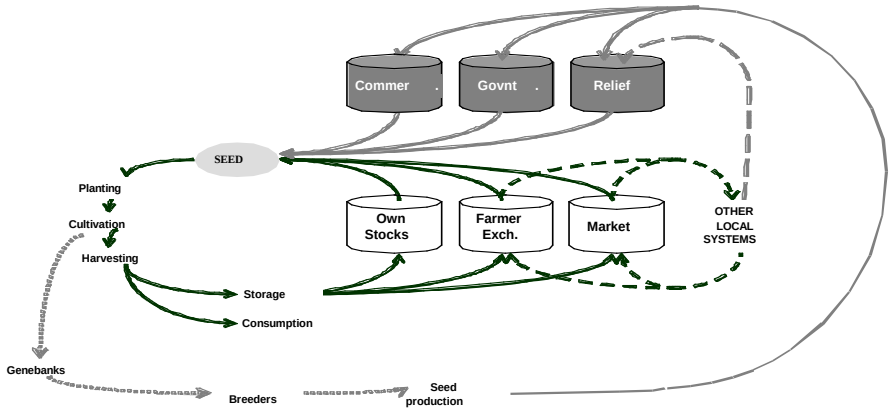


Figure 3.1.: Channels through which Farmers Procure Seed. These are depicted by the cylinders: Own seed stocks, exchange with other farmers , and purchase through local grain markets constitute 'informal' channels, while commercial seed stockists, government or research outlets , relief supplies constitute formal channels. The arrows indicate the flow of seed in the 'informal' and 'formal' sectors respectively. Adapted from Almekinders and Louwaars (1999).

The next sections emphasize a few key points on varieties and seed system structures serving the drought prone zones of the SSSA. The formal breeding and seed sector are first quickly reviewed and then the focus shifts to the informal seed systems and particularly the local seed/grain markets.

Table 3.1: Advantages and disadvantages of using diverse seed channels : perspective from a community. Tharaka North, Sept 20 2011.

Advantages	**Disadvantages**
Own stocks • Early planting • Know the seed well • Well sorted • Having your own seed means if it rots you can re-plant	• Seed sometimes degenerates and Production goes down • Due to mono-cropping lowers production because crops planted in the same field and no rotation
Local Market • You get when you need it • Can get a seed loan • You select the best	• You may get wrong seed especially mixing of varieties • Seed may get unviable seeds • Expensive needs money plus prices increasing • May not know seed and plant Something you didn't want • may get false weight
Neighbors • Know seed as is from neighbors • If it rains overnight you get seed immediately • Short distance • Can get seed on loan • Is same ecological zone	• The neighbors may have no seed • May not treat seed well
Government (relief seed) • You get seed when you don't have • Good yields • Early maturity/Drought resistant • Tolerant to agro-ecological zones • Seed is free • 80-90% germination • Well packed	• Late • Not everyone gets • Not enough for planting • Sometime the amount given will not even save a dying child

(note: no agro-dealer mention here. Such shops are located far from the community)

Formal Seed Systems in Eastern and Coastal Kenya: salient points related to drought-prone areas

Achieving food security is one of the main goals of the Kenyan Ministry of Agriculture (Karanja, 2011a) While for many years, there has been a GoK emphasis on maize production, mainly due to large consumer demand, the GoK is increasingly promoting and advocating consumption of what have been termed as 'orphan crops' (which seem to include most crops but, maize and commercial non-food crops). Hence, in addition to the 1000 MT of seed relief which the GoK was projected to give for SR 2011, the GoK has a parallel plan in operation SR 2011 program to distribute 600MT of seed of orphan crops , destined mostly for drought-prone areas. This seed of orphan crops is expected to be given as seed loans, to be bulked up, repaid, and further circulated to other farmers.

Variety development systems for drought-prone areas

To move forward on promoting food security in drought-prone zones, the GoK also has an extensive program in plant breeding for these areas. Drought-tolerance as a breeding criterion is being stressed, as are issues of low soil fertility and resistance/tolerance to various insect pests and diseases depending on the crop. Crops grown in drought-prone area exhibit multiple constraints, beyond moisture stress. Table 3.2 indicates some of the crops and varieties being promoted by GoK/Kenya Agricultural Research Institute (KARI) for drought-prone regions.

Table 3.2: Crops and varieties being promoted by GoK/KARI for drought-prone regions

Crop	Variety
Maize Two big initiatives here: • drought-tolerant maize • water-efficient maize for Africa (WEMA)	KCB/DLC KDV 1-4 Kenya SeedCompany:DH01, DH02 Maize varieties from Montsanto, Agriseed Kamuka 1 (stalk borer tolerant)
Sorghum	Gadam (white) Serena and Seredo (red)
Pigeon pea	Mbaazi 1 (short maturing) KAT 60/8 (medium maturing) Mbaazi 11 (long maturing)
Common beans	Kat B1,Kat B9,.KatX56, KatX69
Greengram	N26
Dolichos	EH001

source: D.Karanja, 2011a

Variety delivery systems

The results of the Kenya SSSA showed an impressive 71.3% of farmers in the drought-prone zones accessing some new varieties within the last 5 years (Chapter IV: section 'New Varieties'). These consisted mostly of maize, cowpea, greengram and sorghum varieties (Chapter IV, Table 4.20).

The delivery channels by which farmers' accessed the new varieties were relatively varied, with the most important four (in order of descending importance) being from: the government (usually as relief aid) , agro-dealers (especially for maize), local markets, and NGOs/FAO. (Chapter 4, Figure 4.8).

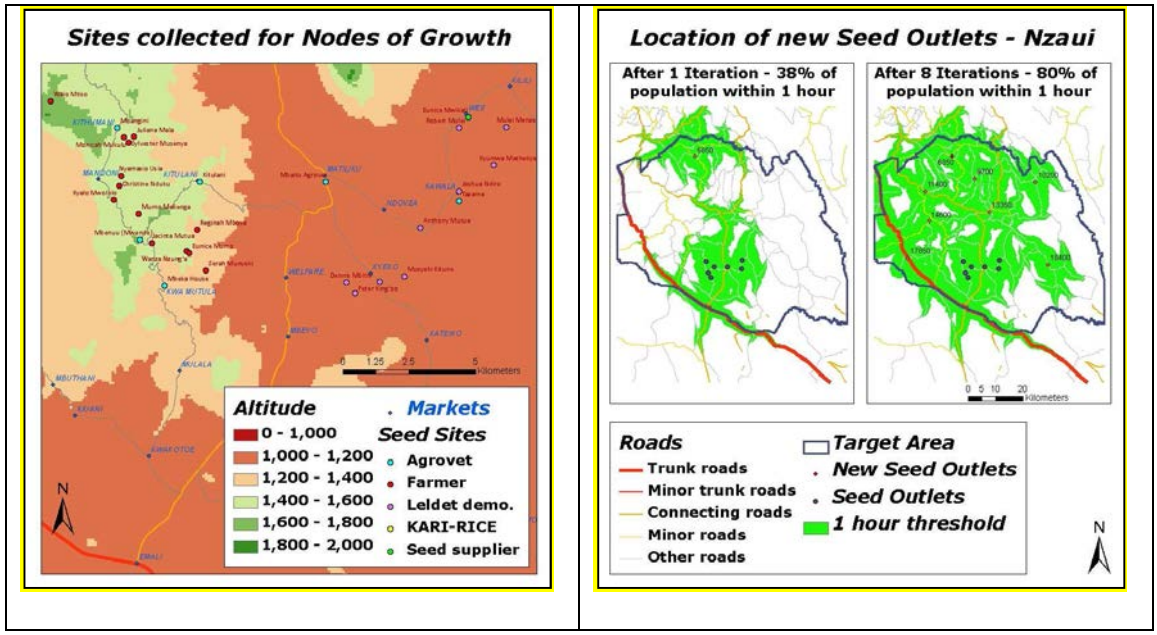
It is notable that two of these key channels are not sustainable ones: government relief and NGO/FAO assistance. Also there are problems with getting access to agro- dealers.

Agro-dealer placement and drought-prone areas

Farmers within the Kenya SSSA indicated that they had easy access to an agro-dealer only in one out of the four sites, in Kithuki/Kathonzweni.

Larger analysis indicates that access to agro-dealer might be a generalized problem for the drought-prone zones of Kenya. One GIS mapping exercise showed that in the area of Nzaui only 23% of farmers were within a 1-hour walk to an agro-dealer (meaning that 77% had considerable difficulties reaching such a seed outlet). Modelling on adding new agro-dealers indicated that 38% of farmers could potentially be reached if just one new store were added, and 80% reached if 8 new stores were added (figure 3.2).

Figure 3.2: current Seed outlets in Nzaui and modeling of additional ones: 2009



So, in brief, new varieties for drought-prone zones might be reaching smallholder farmers, but not necessarily in sustainable ways nor through seed delivery structures which serve them effectively.

Formal seed systems drought-prone areas.

As a last issue on the formal sector, we look at seed supply. While Kenya has some 76 seed companies, about 70 of these focus on maize and horticultural crops (D. Karanja, *personal communication, September 2011).* For other crops, The GoK itself is making strides to scale up the production of basic seed for the orphan crops (Tables 3.3,3.4 and 3.5 below). Further, within the last five years, a few small and medium private sector companies, such as Leldet and Dryland, Frescho and East African Seed have aimed to diversify the products on offer to farmers, including multiplying a large range of legumes.

However, overall, the seed supply for orphan crops remains relatively low in relation to need and in relation to expressed demand. Farmers within the SSSA asserted they had difficulty getting access to new varieties of legumes, especially greengram and cowpea. Nor did the SSSA teams see much legume seed on offer in agro-dealer stores at the time of assessment.

Tables 3.3, 3.4 and 3.5 report official government figures on the basic seed bought by partners over three years. The tables include seed from KARI and two other companies. Notable is the large amount of seed bought from the MoA's multiplication of orphan crops. Of interest, also, is the of number of individual farmers directly seeking from KARI. (Might these individuals serve as key seed bulkers?)

Table 3.3: Basic seed distribution , July 2007 to June 2008:

Description	# participating	Quantity bought (kgs)
NGOs	21	42,250
MoA (normal)	21	4,274
MoA (orphan crops)	80	453,000
CBOs	10	1,523
Individual farmers	414	8,835
Seed companies	3	3,175
KARI centers/programs	8	443
Private companies	3	3,783
Churches	3	674
Schools	2	17
Total		**517,974**

source: Karanja,2011b

Notes: figures do not include seed relief from seed companies.
Figures also do not include seed put on offer during seed fairs.

Table 3.4: Basic seed distribution July 2008 to July 2009

Description	# participating	Quantity bought (kgs)
NGOs	10	11,330
MoA (normal)	8	622
MoA (orphan crops)	66	529,000
CBOs	4	4,483
Individual farmers	750	7793
Seed companies	1	180
KARI centers/programs	4	37,329
Schools	1	8
Total		**590,745**

source: Karanja,2011b

Table 3.5: Basic seed distribution July 2009 to June 2010

Description	# participating	Quantity bought (kgs)
NGOs	40	91,764
MoA (normal)	35	13,846
MoA (orphan crops)	56	686,000
CBOs	14	2,996
Individual farmers	1401	18,556
Seed companies	5	370
KARI centers/programs	10	16,512
Private companies	12	1,524
Quasi-Government*	9	869
Total		**832,437**

source: Karanja,2011b

Notes. Quasi government are: KEPHIS, ICIPE,ICRISAT,CABI, etc.

Informal Seed Systems in Eastern and Coastal Kenya: salient points related to drought-prone areas

Sorghum, millet, greengrams, cowpeas, cassava, beans , and pigeon pea constitute some of the crops that are important in the informal seed sector in Eastern and Coastal Kenya. Except for maize and cotton, the informal sector supplies over 90+% of the seed Kenyan farmers sow. 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 during and after seasons of stress in Kenya. Simply, due to poor harvests, farmers are forced to access a larger portion of their seed off farm and in local markets. For example, in the LR 2011, farmers accessed 38.5% of their seed from local markets and in the SR 2011, figures were projected to rise 54.6% , due the previous drought season (Chapter IV, Table 4.4). 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 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, for livestock feed, for 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, whose prices prove higher than those obtained from routine food grain alone. Box 1 gives broad overview of how farmers and traders strategically manage their stocks of 'potential seed', that is, grain which can usefully be planted. Table 3.6 gives an idea of frequency of each management practice traders use to distinguish seed from grain, form the SSSA sample of traders interviewed. There are at least seven different practices which over half of the traders interviewed use to encourage a better product.

BOX 1: MANAGING ' POTENTIAL' SEED

Open markets serve as an important source for farmers' seed. While these are commonly referred to as 'grain' markets, farmers and traders exercise considerable agency in managing and selecting among grain supplies to ensure that some can be used as 'potential seed'.

Traders don't sell just anything	**Farmers don't plant just anything**
Traders aim to sell a high quality product and clearly recognize that some of their stocks will be used as seed: prices do double around planting time for 'potential seed' . Here is how traders in Tharaka North (Gatue) manage potential seed: • produce is first assessed; if clean, kept for seed; • varieties are kept separate • (best varieties, different prices) • twigs, stones, broken seed re moved • protective chemicals (ash) used in storage to minimize damage	In scouting out potential seed from markets, farmers seek out varieties, they know. They further screen for visible quality traits: are the grains mature?; are they not damaged by pests?. Farmers may also buy potential seed within a larger grain batch and make the refinements for 'seed' at home, sorting out the non-seed trash (the twigs, pebbles, sand, broken grains.) As important as the product is the provider. Farmers try to buy planting material from people they trust—sellers who will tell them the origin, so as to know if the material is adapted--- and sellers who will be held responsible—if the planting material proves sub-standard.

Table 3.6: Trader practices in managing potential seed, SSSA sample, September 2011

		% of answers 'yes'										
CROP	*N*	*Get grain from spec regions*	*Seek out varieties*	*Buy from spec growers*	*Keep vars pure*	*Keep fresh harv stocks*	*Grade stocks*	*Germ tests*	*Special storage*	*Sort out waste*	*Sort out bad grains /seed*	*Sell seed and grain sep-ly*
Green grams	16	88%	94%	63%	88%	69%	25%	13%	56%	31%	44%	56%
Millet	5	100%	100%	*80%*	100%	100%	0%	40%	40%	20%	20%	60%
Cow pea	15	80%	80%	53%	67%	73%	27%	7%	47%	33%	33%	60%
Pigeon pea	4	75%	75%	75%	100%	100%	75%	0%	50%	75%	75%	75%
Maize	10	90%	50%	60%	50%	40%	20%	0%	70%	40%	50%	30%
sorghum	2	100%	100%	100%	100%	100%	50%	50%	50%	50%	50%	50%
ALL	**52**	**87%**	**81%**	**63%**	**77%**	**71%**	**27%**	**12%**	**54%**	**37%**	**42%**	**54%**

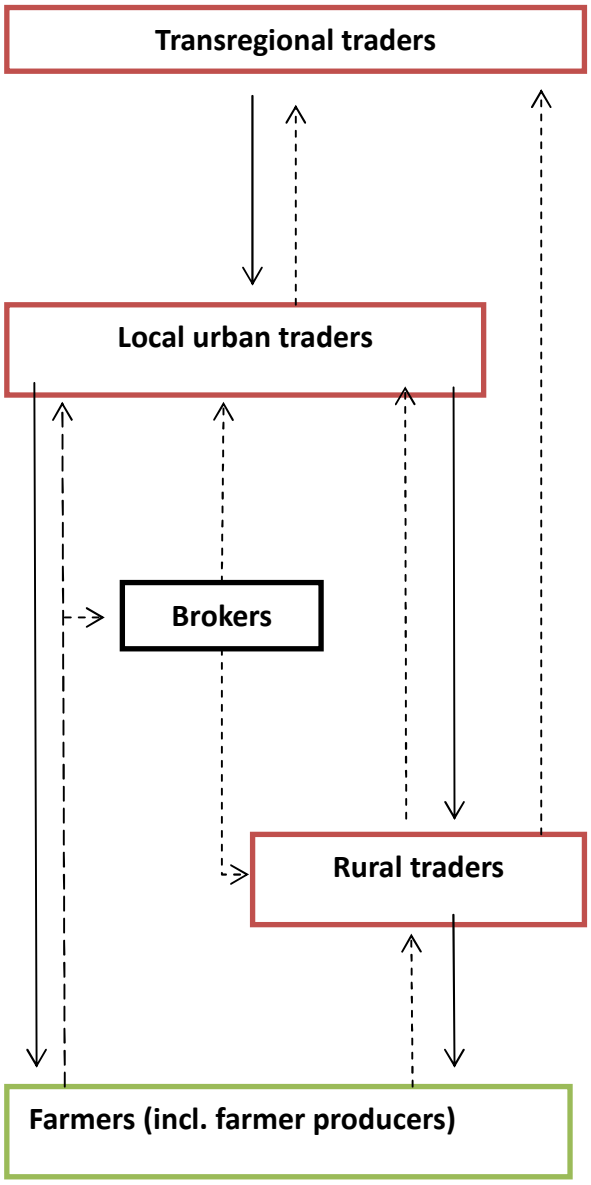
Distinguishing among traders : general structure of seed/grain markets

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 or donkey.

Figure 3.3 gives a general overview of key traders (market actors) in Eastern Kenya based on the SSSA field study . Scales of operation, and the assets they possess, prove to be the key distinctions amongst these different actors. Starting at the bottom (or at the grassroots), farmers sell their harvest either directly to traders (in rural areas, or sometimes, in towns as well) or to brokers. Brokers are engaged by a trader – particularly after good harvests – to buy from farmers directly, or from smaller traders. These brokers vary in expertise, from off-duty taxi drivers transporting between field and shop, to more specialized agents who supply shops from other regions. Also, some farmers perform the broker role themselves, and bring produce of several farms for sale to urban or rural traders. While urban traders have more capital assets, and more extensive supply networks than rural trader shops, both types of traders can buy directly from farmers – this can be important for some traders to guarantee provenance. Clear assurances of provenance also tend to come from open-market traders, who sell small amounts of potential seed at planting time, often well-sorted and selected, which is sourced from their own production or from neighbours. Finally, transregional traders move seed/grain longer distances, and have the greatest capacity for storage and ability to engage in price arbitrage.

At sowing time, these flows reverse, though there were no reports of broker involvement at sowing during the SSSA, September 2011. Rural traders often keep small quantities, and if their supply has been

inadequate in quality or quantity, farmers may bypass them and buy from urban traders. For example, shops in rural Bungale, Magarini District, had thin supplies, and farmers often travelled 50 km away to Malindi city to buy potential seed - sometimes with one farmer buying for several others.



- Traders with significant capital
- Extensive storage facilities
- Transport by trucks
- Cross border trade
- Buy at harvest and sell at sowing time

- Often enough capital to buy larger volumes
- Storage in bags on floor
- Purchase directly from farmers or rural traders
- Have own transport or use brokers
- Some are smaller open market stands

- Middlemen, often bodaboda- or matatu drivers
- Little money, score a marginal profit
- Buy from farmers or local rural traders
- Used mostly after a good harvest

- Low capital
- Storage in bags on floor
- Typically no transport of their own
- Send blokers after good harvest
- Farmers come and sell after bad harvest

Figure 3.3. Seed/grain flow between actors. Broken lines represent harvest and full lines represent sowing time.

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 implies, seed/grain markets are not only 'local', but are also part of a much wider market system with links to other regions and even countries. Tracing of seed/grain flows proves to be important for understanding not only availability of supplies, but also price. It is key to understand flows for several concrete reasons:

- Seed flows mean that seed availability is rarely just a **local** phenomenon. Potential seed supplies of from other areas may alleviate local shortfalls; conversely, it may sometimes occur that market stocks mostly flow outwards, due to high prices in other markets, or to speculation.

- Prices are affected by national factors (e.g. due to urban demand, national supply restrictions) as well as local ones[2]

The SSSA showed that flows vary by crop, as do issues of adaptation. Maize, beans, and greengrams are widely traded, with significant cross-border movement. However, 'potential seed' of maize tends to be more local, and the maize sourced from high production areas like Taveta (and from Tanzania) is unsuitable for sowing in Eastern Kenya. Adaptation is also an issue with pigeon pea, where different varieties have different maturation times; like maize, key variety attributes may not be visually obvious. In contrast, beans and green gram varieties are easily distinguished (and pure varieties can be sorted), and widely-adapted varieties exist for drylands such as 'Rosecoco' and 'ka-yellow' (beans) or 'nylon' and 'uncle' (green grams). Greengram is widely sowed, so well-suited for trade over wider scales.

So, the size of adaptation zones varies by crop, but also some crops are easier to identify by variety. For crops like maize and pigeon pea, it is both important and difficult for farmers to be sure they are buying the variety they expect. This shows the importance of trust / quality assurance for maize and explains why some shops work hard to develop a reputation for adapted seed of known provenance for maize, and are able to charge premium prices (see Box 2). Conversely, greengram flows could be long-distance, as there were fewer adaptation issues; price differences reflected variety characteristics and variety purity, more than a desired region of origin.

Also, assessment of seed flows showed that traders at more local scales in seed/grain markets tended to supply more adapted material. This was particularly so for open-market traders, who competed on seed purity and varietal quality and source locally. There was evidence of local shops (both rural and urban) maintaining separate variety stocks, with clear provenance, and obtaining higher prices for adapted varieties. In contrast, long-distance trade is less locally-adapted though even transregional may respond to adaptation concerns when their buyers demand specific varieties (Table3.6). However, note that a rural shop may not be always able to influence what arrives in long-distance trucks: building relationships with suppliers is key.

[2] Sophie Walker (2005) details regional price influences in an unpublished report "Analysis of Seed / Grain Marketing Functioning in Stress Periods in Mbeere and Tharaka Districts October 2004"

Box 2 gives an example of how compelling quality issues are for the shopowner, as well as for the farmer.

Box 2: Building reliable seed supplies to a rural shop: Kathonzweni, Makueni

This woman has run a village shop since 2006, selling grain and potential seed of several crops. She stores a modest amount of seed from previous harvest, but suffers storage losses due to poor quality (adulterated/expired?) storage chemicals.

For maize, she sells packs of certified hybrid seed, as well as OPV maize. She uses brokers to obtain supplies of OPV maize, green gram, and pigeon pea. She has had problems in the past with adaptation: e.g. maize from highland Machakos that is unsuited to Kathonzweni, or pigeon pea with "disappointing" season length. She notes that increased demand can make it harder to obtain expected varieties: "when everyone is buying a seed for a crop like pigeon pea, you have to get seed from far away, and it could be mixed." More critically, she bought green gram seed that was a mixture of three varieties in 2006: this turned out to have low commercial value, and she ultimately had to clear this stock at a loss. She now demands pure green gram stocks, and refuses brokers' supplies until they changed her practice. As a result of being able to supply pure varieties, she believes the reputation of the Division has improved, drawing outside buyers there at harvest to buy green gram. Over time, she has built relationships of trust with select brokers who can supply pure and adapted varieties. This is important to her commercially, but also politically, as she is also the Location Chief.

Field example: seed flows drought-prone areas

A field example shows how mapping of seed flows is important for understanding the supply of seed immediately available in an area (and hence available to local farmers) and that can or will be come available . **The SSSA clearly showed that stocks immediately in local shops are weak indicators of seed availability, due to the larger flows**. Here is one small concrete example: A rural merchant in Bungale, Magarini re-sells the same greengram for sowing that she purchased after harvest. Due to drought in 2011, she only has 50 kg to sell. However, she planned to travel herself to Malindi in October, and purchase 90 kg originating from Mpeketoni, an area with a good reputation for quality. Given the proximity of Malindi (50 km), availability does not seem to be a problem in Bungale, but rather access and quality could pose problems. Travel to Malindi is expensive for some. Also, though farmers do get others to buy seeds on their behalf in the city, they may still be vulnerable to mistaken purchases, or cheating if they do not buy it themselves.

Chapter IV gives two more examples, linked to assessing availability of seed through trader assessments, and, in this case, very large trader assessments. (Tables 4.15 and 4.16) Both cases give the same message: seed availability has little to do with local availability as potential seed supplies are routinely brought in from larger regions.

The final issue on assessing possible seed availability for an area is to determine the extent of the supply region. This is explored below.

Seed flow mapping: regional mapping to drought-prone area

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. Thus, to some extent these flows follow rainfall patterns, though major production areas for dryland crops such as greengram (e.g. Tharaka, Kitui, Muiji) could hardly be called humid. For Kathonzweni, seed flows down from highlands (such as Machakos) and, for Magarini, seed flows inland from the wetter coastal areas. Reputation is important factor, as seed from some is valued more, e.g. Mpeketoni in the Lamu district north of Malindi. There is evidence that particular regions, like some individual merchants, gain a reputational 'rent' for being associated with good quality seed, and so gain price premiums.

Figure 3.4 diagrammatically show sources of 'potential seed' for the Kathonzweni district. Cowpea, pigeon pea and greengram are roughly sourced from the areas indicated by the red circle and from the fertile area of Himo in northern Tanzania, via the border markets of Oligotoktok and Taveta. In drought times, imports from Himo increase. Similar movements occur with beans, only that beans can travel even further and are sourced from Uganda through the market in Busia. For maize, adapted seed is much more locally-sourced (green circle), as OPV maize from further away, even Machakos, may not be suitable for the semi-arid conditions. Some varieties of certified (hybrid) maize are suited as well, though these flow through formal channels.

It is important to understand the distance involved for moving 'potential seed, in this case to Kathonzweni, drought-prone region. Adapted maize might be moved only 25 miles, while adapted cowpea, pigeonpea and greengram could be moved some 100 miles—and still grow.

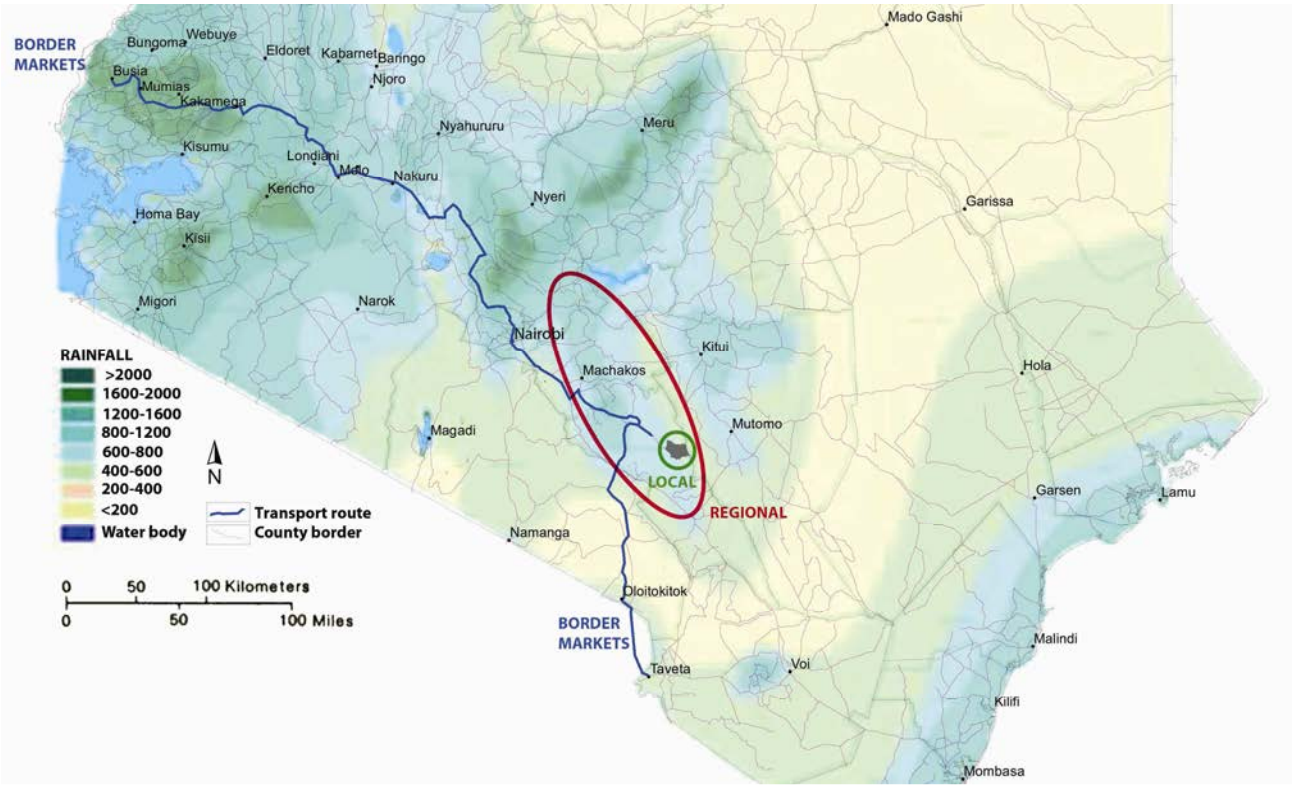


Figure 3.4. Sources of potential seed for Kathonzweni. Green ring represents local sources (maize), red ring regional sources (green gram, cowpea) and blue line represents main transport routes for trade to the area.

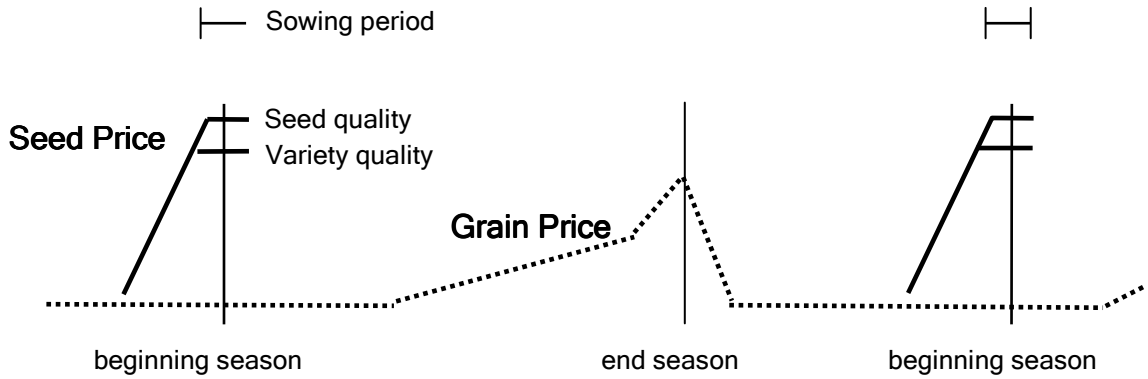
Potential seed and price

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 3.4 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. [3]

Figure 3.4 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 now turn to actual field findings in the next Chapter IV. These also including findings on how the local seed markets functioned LR 2011 and SR 2011. As a glimpse, seed supplies were available, but prices spiked by some 50 to 100% Table 4.17. Also, the SSSA team had select concerns about the quality of seed on offer as trader hoarded the best potential seed bags until 'last minutes; waiting for the prices to rise (just before sowing).

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

IV. FIELD FINDINGS: ACROSS SITES

The fieldwork for the SSSA took place in September 2011, a few before planting time. (Indeed, the rains started in one site, Tharaka, the day the assessment team left the fields.) The assessment was triggered by a poor Long Rains' season (March-July 2011) and fears that the extensive drought in Kenya's northern areas would continue, for a second season, SR 2011, into Kenya's Eastern and Coastal zones. Further, in Eastern Kenya, in particular, erratic rainfall tends to be the norm and seed aid has been given there 75% of all seasons since 1992 (Sperling, 2002 ; Sperling et al 2008). So the SSSA served as a time for reflection on both short and longer-term strategy.

The assessment considered two major themes. It analyzed the short-term, acute seed security situation, focusing on the Long Rain (LR) 2011 season (extending March-July) and the 2011 Short Rain (SR) season (generally extending October 11-January 12). Seed procurement strategies, quantities sown, crop profiles were all analyzed. 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.[4] Seed security concerns of the settled 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 due continual disputes over land use, season to season (and even during seasons).

Comprehensive site by site reports are available from CRS Kenya (mwende.kusewa@crs.org), and the tailored action plans have been appended in Annex I.

This chapter is organized first to present findings of the LR 2011 and SR 2011, acute, and then analyses trends over multiple seasons.

Acute Seed Security Findings, LR and SR 2011

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

[4] 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.

All farmers: seed sources and quantities planted, LR 2011

Table 4.1 and Figure 4.1 show the sources and quantities of seed actually planted by farmers for the main LR 2011 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.

Overall, over 80% 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' own stocks and local markets were almost equally important as the major sources (36.6 and 38.5% respectively) and suggests the degree to which poor farmers may have to buy, routinely, seed season after season. Home stocks was of some importance for all crops but cotton. Local market as a source was important for all crops but cassava and cotton.

Neighbours, 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 0% of the seed sown within the sample. While they may have a presence nationwide or even in select zones of the assessment area, they are obviously at a fledging stage, with modest (i.e. no measurable) impact on farm.

Agro-input dealers provided a small proportion of the seed overall, 14%, but was particularly important for two crops: maize (26.7% of total seed sown) and cotton (52.6%). Note that agro-dealer access was consider 'easy' only in one of the three sites: Kithuki. Use of these shops could potential rise a) if the placement of agro-dealers were made more accessible to rural clients and b) if such agro-dealers put a larger range of products on offer. Increased demand for certified legume seed, and in particular, green gram seed did emerge as a finding of the SSSA (reflected in Table 4.14).

Finally, seed aid[5], which here includes both developmental and emergency aid, provided slightly under 6% of the total seed sown in the LR 2011 season. In terms of the major crops, it was particularly important for cotton (18% of the seed sown) which is a more developmental, market-oriented crop, and for sorghum (23.5% of seed sown) which is often given by the breweries to multiply (particularly the white variety, Gadam). Although sample sizes were quite small, developmental seed assistance seems of note also for pigeon pea, cowpea and the millets, crops that are being promoted to encourage crop diversification.

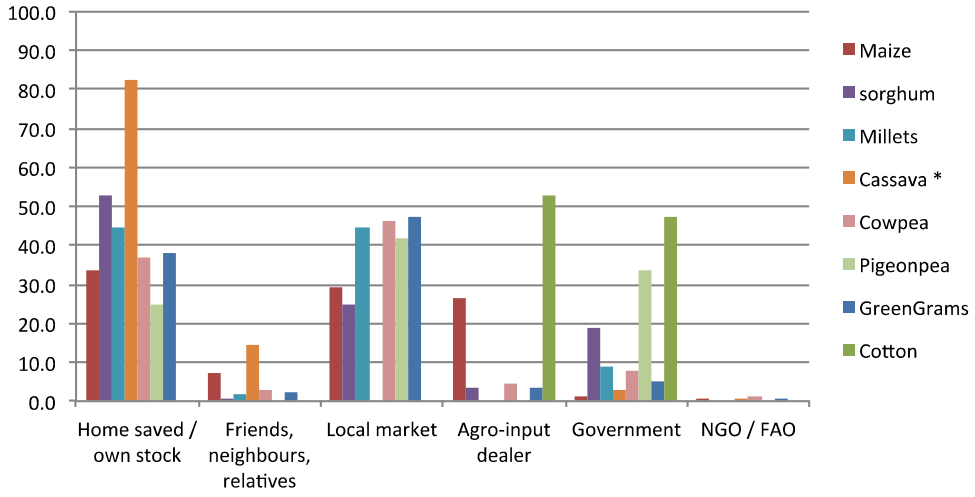
[5] The disaggregation of seed aid between NGOs and FAO in many tables and figures does not give a completely accurate representation of source as government or FAO-linked seeds may also have been distributed by NGOS.

Table 4.1: Seed (kg) planted and sources farmers used, LR 2011 across three sites

Crop	Total kg sowed	% of total seed								
		Home saved	Carryover - maize	Friends, neighbors	Local market	Agro-dealer	CBSP*	Govt	NGO / FAO	TOTAL %
Maize	1857,5	33,3	1,7	7,2	29,4	26,7	0,0	1,3	0,3	**100,0**
Sorghum	125,0	52,8	0,0	0,4	24,8	3,2	0,0	18,8	0,0	**100,0**
Millets	310,5	44,4	0,0	1,6	44,8	0,0	0,0	9,2	0,0	**100,0**
C assava	18,3	82,2	0,0	14,2	0,0	0,0	0,0	3,2	0,4	**100,0**
Cowpea	884,5	37,0	0,0	2,8	46,3	4,7	0,0	7,9	1,0	**99,8**
Pigeonpea	12,0	25,0	0,0	0,0	41,7	0,0	0,0	33,3	0,0	**100,0**
Greengram	1280,0	38,0	2,0	2,5	47,3	3,7	0,0	5,2	0,9	**99,5**
Cotton	38,0	0,0	0,0	0,0	0,0	52,6	0,0	47,4	0,0	**100,0**
TOTAL, all crops	4525,8	36,6	1,3	4,4	38,5	13,5	0,0	5,2	0,6	99,9

- CBSP= community-based seed group

Figure 4.1. Farmers' (N=161) seed sources, Long Rains (LR) 2011, 8 major crops



Are farmers seed-stressed LR 2011?

(Are the amounts of seed sown in LR more or the same as usual? what about the yields?)

To understand better any possible vulnerability, the SSSA team asked farmers to compare the LR 2011 quantities of seed they sowed, by crop, with what they would normally sow at the same time each year. Basically, the question was this: Were the LR 2011 patterns 'normal' or 'different' from what farmers usually do, as gauged by the farmers themselves?

For the six major crops, farmers reported they that they overall, slightly decreased quantities planted, but by a mere 2% (Table 4.2). Maize was proportionally decreased the most, by some 9%, as rains were delayed and a good number of farmers decided simply not to sow this longer duration crop. In contrast, during this stress period, cassava planting rose markedly.

Table 4.2: All farmers:- Amounts for Long Rains (LR) - more, less, or same?

Crop	Number of farmers	% of households			Change in seed quantities for all growing the crop
		MORE	SAME	LESS	mean %
Maize	108	9,3	43,5	47,2	-9,06
Sorghum	21	19,0	47,6	33,3	2,54
Millets	44	11,4	52,3	31,8	-3,60
Cassava	6	50,0	33,3	16,7	11,81
Cowpea	142	12,0	53,5	33,8	-3,65
Green Grams	142	21,8	39,4	37,3	4,24
TOTAL	**463**	**15,8**	**46,9**	**38,0**	**-2,00**

Note that sowing rates portray only of the picture. The crop yield and general harvests obtained were reported by farmer as quite dismal, with maize, sorghum and millets particularly giving poor performances, the first due to rain shortage , and the latter to bird damage problems.

Table 4.3: All farmers: assessment of yield, by crop, LR 2011

Crop		How was yield?					
		N			%		
	total N	good	average	poor	Good	average	poor
Maize	153	36	18	99	23,5%	11,8%	64,7%
Sorghum	22	5	4	13	22,7%	18,2%	59,1%
Millets	54	13	8	33	24,1%	14,8%	61,1%
Cassava	9	3	6	0	33,3%	66,7%	0,0%
Common beans	1	1	0	0	100,0%	0,0%	0,0%
Cowpea	185	52	56	77	28,1%	30,3%	41,6%
Pigeonpea	3	1	0	2	33,3%	0,0%	66,7%
Green Grams	179	40	49	90	22,3%	27,4%	50,3%
Cotton	3	0	2	1	0,0%	66,7%	33,3%
TOTAL	**611**	**152**	**144**	**315**	**24,9%**	**23,6%**	**51,6%**

So, in brief, there were modest seed use in LR 2011, but marked harvest losses. However, the drought, which was the focus on international efforts, mainly affected maize. Insect attack and bird damage were prominent –and ongoing stresses—for the legumes and sorghum/millets.

All farmers: seed sources and quantities to be planted in SR 2011

Farmers in Eastern and Coastal Kenya were asked the same questions on actual seed sources and quantities to be planted for the next major season, SR 2011 which was but a few weeks away at the time of the SSSA. While 'planned seed sources' are not proven 'hard' data , they are a good indicator of whether farmers expect seed stress or other related troubles. Furthermore, 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 trend toward self-sufficiency – and away from asking for seed-related aid.

Farmers in the full sample stated that what they expected as their sources for the imminent SR 2011 season. There were three distinct trends away from those found LR 2011.

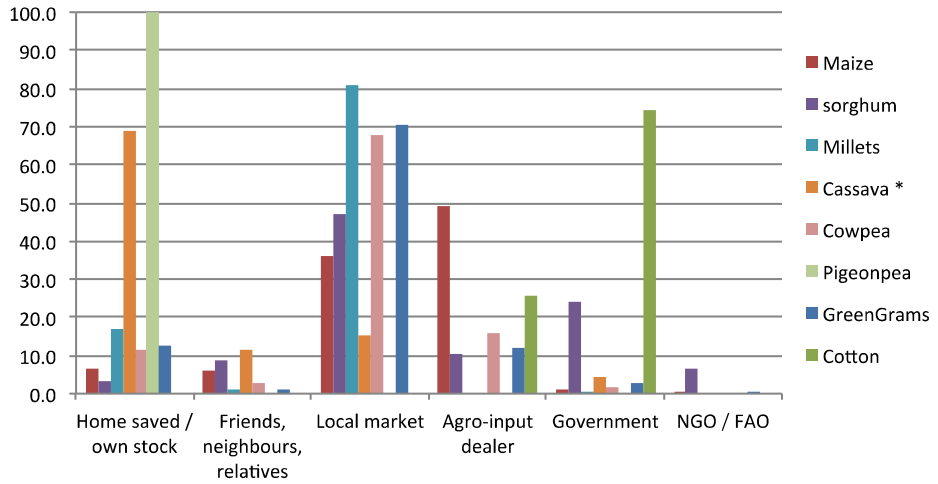
1. Little home-saved was anticipated for the SR 2011.
2. Heavy use of local markets was to help fill some of the seed gap.
3. There was an explicit intensified use of agro-dealers to access for the normal crops of maize and cotton. However, there was a big push anticipated to get new varieties of the legumes and especially of greengrams and cowpeas from agro-dealer sources.

The first two trends are commonly noted for farmers in stress contexts. However, the third—to move to certified seed—is relatively unique, for two reasons. Certified seed costs more than seed at the local market and farmers generally avoid risk of trying something new in difficult periods as they may not know how select new varieties will perform under their own management conditions.

Table 4.4: All farmers - Seed planted by source in short rains 2011 (% of all seed)

		% of total seed sown							
Crop	**Total kg sowed**	Home saved	Friends, neighbor	Local market	Agro-dealer	CBSP*	Govt	NGO / FAO	Total
Maize	1670,0	6,5	6,1	36,0	49,2	0,0	0,9	0,6	**99,4**
Sorghum	78,5	3,2	8,9	47,1	10,2	0,0	24,2	6,4	**100,0**
Millets	314,0	16,9	1,3	81,2	0,0	0,0	0,6	0,0	**100,0**
Cassava	32,6	69,0	11,5	15,3	0,0	0,0	4,2	0,0	**100,0**
Common beans	6,0	0,0	0,0	100,0	0,0	0,0	0,0	0,0	**100,0**
Cowpea	905,8	11,7	2,7	67,6	16,1	0,0	1,7	0,0	**99,8**
Pigeonpea	13,0	100,0	0,0	0,0	0,0	0,0	0,0	0,0	**100,0**
Greengram	1329,0	12,4	0,9	70,4	12,1	0,0	3,0	0,5	**99,3**
Cotton	97,0	0,0	0,0	0,0	25,8	0,0	74,2	0,0	**100,0**
TOTAL all crops	4490,4	10,5	3,4	54,6	27,0	0,0	3,7	0,5	**99,7**

Figure 4.2. Planned sources for cropping seasons SR 2011 all farmers (N=161)



Are farmers seed-stressed in SR 2011?

To complete the analysis, we compared farmers' projections for 2011 planting with what they assess as normal amounts of seed; that is, we looked at whether they are planning to plant more, less or the same?

Remarkably, over 70% of farmers plan to maintain or increase the amounts they sow in SR 2011, although the planned overall increases to only 1.25 % (so the situation is a somewhat static one). This ability to maintain sowing levels is perhaps itself remarkable after a dramatic drought season. Note that there is a shift in crop profiles, with maize slightly decreasing and sorghum markedly increasing. (N.B. the cassava sample is small).

Table 4.5: All farmers- Amounts for short rains 2011- more, less, or same?

		% of households			Change in seed quantities for all growing the crop
Crop	**Number of farmers**	**MORE**	**SAME**	**LESS**	**mean %**
Maize	108	7,4	55,6	36,1	-7,80
Sorghum	22	22,7	50,0	18,2	17,25
Millets	46	17,4	58,7	23,9	-3,98
Cassava	6	33,3	50,0	16,7	16,67
Cowpea	145	20,0	52,4	26,9	2,76
Green Grams	144	25,7	46,5	25,7	5,40
TOTAL	**471**	**19,5**	**52,9**	**27,8**	**1,25**

IDPs: seed sources and quantities planted, LR 2011

The SSSA focused a parallel set of questions to the internally displaced population (IDPs). 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.

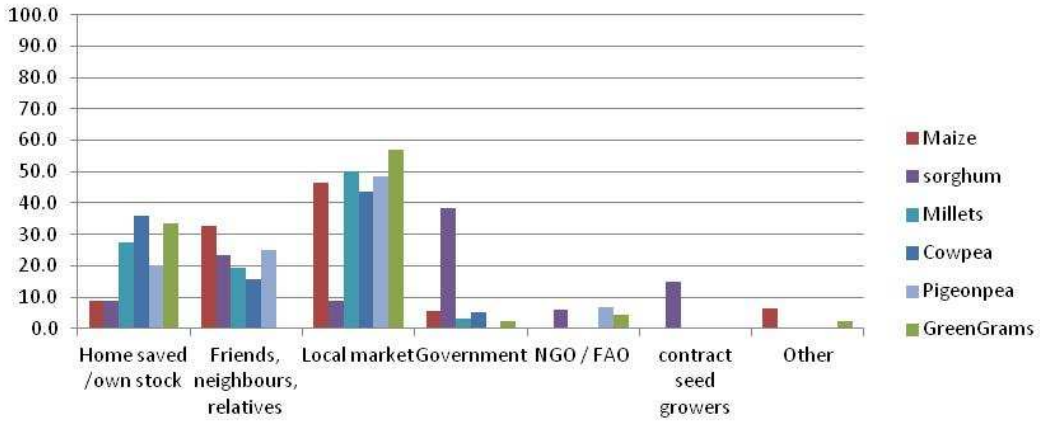
Table 4.6 and Figure 4.3 show that IDPs, returnees and refugees generally sourced seed for the LR 2011 main season in the same way as the full sample, but with over 90% of their sowing material coming from local channels, especially their own stocks and local markets, but also heightened support from friends, neighbors and relatives. Aid for the IDPs was about the same as for the 'all farmer' sample, 7.6% versus 5.8, respectively. Aid was particularly important for the speciality crop white sorghum, which in Ntoroni area is tied to the beer brewing enterprises. The main difference between the main sample and that of the IDPs was that the latter had 0% agro-dealer use.

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: Ntoroni –IDPs Seed planted by source in Long Rains 2011(% of all seed)

Crop	Total kg sowed	% of total							
		Home saved	Friends, neighbors	Local market	Agro-dealer	CBSP	Govt	NGO / FAO	TOTAL %
Maize	123,0	8,9	32,5	46,3	0,0	0,0	5,7	0,0	**100,0**
Sorghum	34,0	8,8	23,5	8,8	0,0	0,0	38,2	5,9	**100,0**
Millets	120,0	27,5	19,2	50,0	0,0	0,0	3,3	0,0	**100,0**
Cowpea	80,5	36,0	15,5	43,5	0,0	0,0	5,0	0,0	**100,0**
Pigeonpea	60,0	20,0	25,0	48,3	0,0	0,0	0,0	6,7	**100,0**
Greengram	323,5	33,4	0,5	56,9	0,0	0,0	2,5	4,3	**100,0**
TOTAL, all crops	741,0	26,5	13,5	49,7	0,0	0,0	4,9	2,7	100,0

Figure 4.3. IDPs seed sources, Long Rains (LR) 2011, six major crops.



Are IDPs seed-stressed LR 2011 and SR 2011?

Were IDPs seed stressed in LR 2011 , as it was a season of marked drought). Did they sow quantities of crops and seed as 'normal', gauged by IDPS themselves (and recognizing that many had been in an uncertain land tenure situations for not just seasons, but decades.

The answer is a marked 'Yes' , across crops. Sowing levels were down some 23% for LR 2011 and down 7% (minus 6.68 for SR 2011) (Tables 4.7 and 4.8)

However, even with these dips (which became less dramatic from one season to another), IDPS were counting little on outside aid for the SR 2011 season (less than 4% total). Simply, they expressed the concern that government structures—or aid structures are not serving them (Figure 4.4).

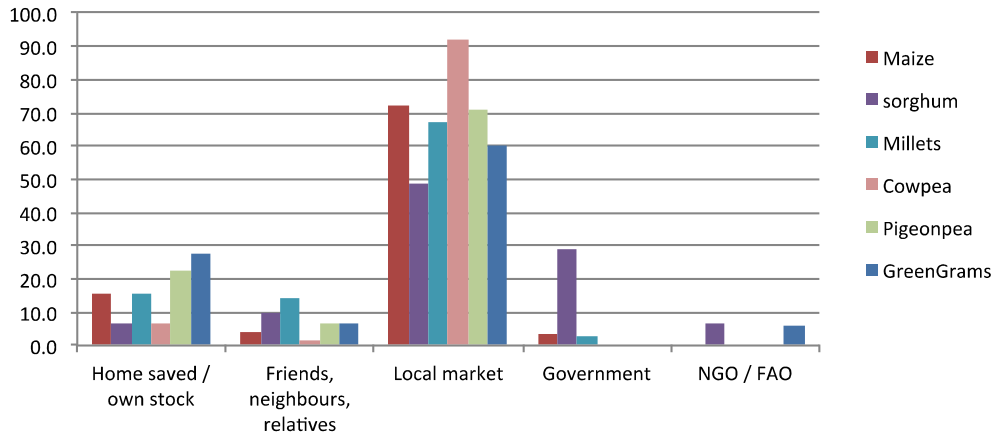
Table 4.7: IDPs Ntoroni - Amounts for long rains 2011- more, less, or same?

Crop	Number of farmers	% of households			Change in seed quantites for all growing the crop
		MORE	SAME	LESS	mean %
Maize	14	7,1	64,3	28,6	-8,45
Sorghum	11	0,0	54,5	27,3	-14,44
Millets	23	4,3	52,2	30,4	-17,33
Cowpea	15	0,0	20,0	73,3	-35,48
Pigeonpea	11	9,1	27,3	54,5	-26,67
Green Grams	34	8,8	23,5	64,7	-29,78
TOTAL	**108**	**5,6**	**38,9**	**49,1**	**-23,18**

Table 4.8: **IDPs Ntoroni - Amounts for short rains 2011- more, less, or same?**

Crop	Number of farmers	MORE	SAME	LESS	mean %
Maize	18	16,7	55,6	22,2	-1,79
Sorghum	8	12,5	75,0	12,5	3,13
Millets	21	19,0	38,1	38,1	-11,19
Cowpea	18	16,7	33,3	38,9	-2,71
Pigeonpea	10	10,0	20,0	50,0	-29,17
Green Grams	35	17,1	40,0	42,9	-4,45
TOTAL	**110**	**16,4**	**41,8**	**37,3**	**-6,78**

Figure 4.4. IDP farmers' planned seed sources (%) Short rains (SR) 2011 season (N=38)



Focusing on potential problems areas and spurring production

Potential problem areas

The relatively 'normal' picture for 'all farmers' LR 2011 and SR 2011 (that is, not including IDPs) should not obscure that there are still vulnerable populations and regions where farmers are stressed: Farmers statedIn 38.0 and 27.8% of crop cases[6] that they were planting less of particular crops in the two 2011 seasons. In parallel, IDPs indicated they were planting less in 49.1and 37.3 crop cases for LR 2011 and SR 2011, respectively.

To understand more clearly the nature of the stress, farmers were asked to explain why they were planting less of a given crop for both seasons . Many and diverse reasons were given. These reflect both Important stresses "the birds ate everything " (a reason that emerged particularly with the white sorghums), or I had no one to help, my husband died Also express emerging opportunities: – and emerging opportunities – "I am able to sow less now, because I have a great variety and sow in rows--- so fewer kilos are needed for much better harvest!." Table 4.9 explain why all (non-IDP) farmers specifically plant less during the two seasons.

During LR 2011, there were two principal reasons normal (non-IDP) farmers sowed less: first, the weather: when the rains came late, or failed altogether, farmers simply decided not to sow, and not to waste seed. However, more important, even during this drought, farmers sowed less as they lacked sufficient funds to buy seed (44.9% of cases) . Important to note is that only 1% of farmers indicated that constraints linked with seed not being available —and this had to do with scarcity of planting material for cassava .Reasons for normal farmers planting less in SR 2011 are similar, except that money constraints figure much more prominently, 69.5% of cases (table 4.9).

In reference to IDPs, reasons for sowing less in LR 2011and SR 2011 also heavily revolve around money constraints 60,4and 63,4% of responses for each season respectively. However, land constraints also figure very prominently, 28,3 and 22,0% of reasons for planting less (Table 4.10) . IDPs claimed they have less land, access to poorer rented land, and insecure land tenure.

[6] Each household has three crop cases on which they indicated planting strategy—on what they considered their three most important crops: for production, income, nutrition, according to household priorities.

Table 4.9: Reasons (% of responses) all farmers cited for plant less of a given crop in LR 2011and SR 2011

Reason	LR 2011 (N=176)	SR 2011 (N=131)
SEED- RELATED (or indirectly linked)		
Seed availability		
no seed available in market	0,0	0,0%
no seed/cuttings available from neighbors	1,1	0,0%
Seed access		
no money to buy seed/poor finances or seed too high	44,9	69,5%
Seed quality		
seed available is not good quality or the variety is not liked	1,1	0,8%
sub-total: Seed-related	**47,2**	**70,2%**
NON-SEED FACTORS OF PRODUCTION (Limits)		
no/insufficient labor	0,6	0,0%
illness/health problems	0,0	0,0%
no/insufficient land or land not appropriate/sufficiently fertile	2,8	1,5%
lack of tools/tractor/ other machinery to farm	0,0	0,0%
plant pests/diseases make production not possible	1,7	1,5%
animals/predator make production not possible	0,6	0,8%
lack of other inputs: controlled water supply/irrigation or fertilizer	1,1	0,0%
poor weather/rainfall	38,6	22,9%
Insecurity	0,0	0,0%
sub-total: factors of production-related	**45,5**	**26,7%**
OTHER PRIORITIES/STRATEGIES		
markets for crop or crop products not well-developed	0	0,0%
other priorities than agriculture (e.g. have shop)	0	0,0%
Other	1,7	0,8%
Changing crop priorities or agricultural practices	3,4	0,0%
TOTAL	**97,7**	**97,7%**

Table 4.10: Reasons (% of responses) IDPs cited for plant less of a given crop in LR 2011and SR 2011

.Reason	LR 2011 (N=53)	SR2011 (N=41)
SEED- RELATED (or indirectly linked)		
Seed availability		
no seed available in market	1,9	0,0%
no seed/cuttings available from neighbors	0,0	0,0%
Seed access		
no money to buy seed/poor finances or seed too high	60,4	63,4%
Seed quality		
seed available is not good quality or the variety is not liked	0,0	0,0%
sub-total: Seed-related	**62,3**	63,4%
NON-SEED FACTORS OF PRODUCTION (Limits)		
no/insufficient labor	0,0	2,4%
illness/health problems	1,9	0,0%
no/insufficient land or land not appropriate/sufficiently fertile	28,3	22,0%
poor weather/rainfall	5,7	2,4%
Insecurity	0,0	0,0%
sub-total: factors of production-related	**35,8**	26,8%
OTHER PRIORITIES/STRATEGIES		
markets for crop or crop products not well-developed	0,0	0,0%
other priorities than agriculture (e.g. have shop)	0,0	0,0%
Other	1,9	2,4%
Changing Crop priorities or changing agricultural practices	0,0	0,0%
TOTAL	**100**	**100,0%**

The real seed security issue: Money

In reviewing seed security constraints across two season (LR 2011and SR 2011) 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 addition seed. Lack of seed (that is it not being available) and seed quality(not finding the right variety or right quality seed) do not figure as limiting factors (and account for <2% of responses). **The degree of money stress becomes more visible as one tallies the amounts money concretely needed to buy seed. In the LR2011, average expenses per site and farmer fell between 688 and 1825 Ksh—or comparable to the purchase of a small-medium sized goat. For the SR 2011, money needed for seed purchased leaped up 50-103%!** (Table 4.11)

Table 4.11: Farmers' cash needs for seed purchase (KSH) LR 2011 vs SR 2011

Site	LR 2011	SR 2011	% increase
Kithuki	1825	3711	+ 103
Gatue	917	1824	+ 98
Magarini	1652	2079	+ 26
Ntoroni (IDPs)	688	1096	+ 59

Tables 4.12 and 4.13 give more specific into why the increase into money needed from one season to another, using the case data from Kithuki. 1) Farmers are buying more kgs of seed overall ; 2) they are increasing quantities of seed bought on the local market and from agro-dealer shops; 3) they are shifting some purchases from local market seed toward agro-dealer suppliers, with the latter being significant more expensive . (note in the figures below that seasons fluctuations in prices were not factored. hence, the total figure increases may be below actual Ksh amounts needed).

Table 4.12: Kithuki : Money spent for seed purchase by crop - LR 2011

	Total purchases (kg)		**current price (KSh /kg)**		**Aggregate price**		**Average purchases (KSh/HH) 2) FOR 'typical farmer'**			
Crop	Local market	Ag input dealers	Local market	Ag input dealers	Local market	Ag input dealers	Local market	Ag input dealers	All	% of total
Maize	371	170	40	200	14840	34000	329.8	755.6	**1085.3**	**59.4%**
Cowpea	119.5	2	65	175	7768	350	172.6	7.8	**180.4**	**9.9%**
Greengrams	200	26	100	200	20000	5200	444.4	115.6	**560.0**	**30.7%**
TOTAL	**690.5**	**198**			42608	39550	**946.8**	**878.9**	**1825.7**	**100.0%**

* this year's prices to last season's purchases

Table 4.13: Money planned for seed purchase by crop - SR 2011

	Total purchases (kg)		**current price (KSh /kg)**		**Aggregate price**		**Average purchases (KSh/HH) 2) FOR 'typical farmer'**			
Crop	Local market	Ag input dealers	Local market	Ag input dealers	Local market	Ag input dealers	Local market	Ag input dealers	All	% of total
Maize	407	458	40	200	16280	91600	361.8	2035.6	**2397.3**	**64.6%**
Cowpea	159.5	46	65	175	10368	8050	230.4	178.9	**409.3**	**11.0%**
Greengrams	227	90	100	200	22700	18000	504.4	400.0	**904.4**	**24.4%**
TOTAL	**793.5**	**594**			49348	117650	**1096.6**	**2614.4**	**3711.1**	**100.0%**

Spurring production

To complete this analysis of the rationale for farmers' planting decisions, we end on a positive note: why those who planted more in LR 2011 did so and why those intending to plant more SR 2011 aim to do so (Table 4.14) . Households plant more for multiple and diverse reasons, the first being because they got an especially good new variety (in this case, mainly of greengram). Getting access to more land, and seizing on new marketing opportunities also directly expanded seed use (and hence expanded land area). Finally, having more seed, either through harvest or receiving it free, did make a difference , especially for crops such as cassava, where cuttings can be a problem, where access to cuttings can be a problem.

Table 4.14: Reasons all farmers (% of responses) gave for planting MORE than normal of a given crop in Long rains 2011and SR 2011

Reason	LR 2011 (N=73)	SR 2011 (N=92)
SEED RELATED		
Seed availability		
more seed available due to good harvest	8,2	2,2
more seed available due to free seed	8,2	6,5
Seed access		
more money to buy seed or seed price low	5,5	2,1
got credit to buy seed	1,4	1,1
Seed quality		
have especially good seed or good variety	31,5	30,4
sub-total: Seed-related	**54,8**	**42,4**
NON-SEED FACTORS OF PRODUCTION (opportunities)		
good/increased labor	0,0	1,1
feeling strong/healthy	0,0	0,0
have more land/more fertile land	15,1	14,1
have tools/tractor, other machinery to help farm	0,0	0,0
have access to irrigation, fertilizer or other inputs (for example, stakes)	0,0	3,3
good weather/rainfall	5,5	7,6
good security (peace has arrived)	0,0	0,0
sub-total: factors of production-related	**20,5**	**26,1**
OTHER PRIORITIES/STRATEGIES		
well-developed /new markets for crop or crop products	11,0	16,3
have decided to give more priority to agriculture	1,4	4,3
Other	4,1	3,3
TOTAL	**91,8**	**92,4**

Note that few IDPs actually expanded sowing amounts: in the LR 2011 there were 6 cases for the SR 2011, 18 cases. The major reason for sowing more is that IDP had obtained access to more farm land--- the lack of which has been one of their key agricultural constraints.

Can the markets deliver seed SR 2011?

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 seed/grain market functioning. Here summarize the salient issues to determine if there are supply problems--- or not.

Agro-dealer formal seed—supply SR 2011

The SSSA interviewed agro-dealers and formal seed sector companies in every site of the assessment. Quantities of supplies on offer, were 'as normal for the time of year'---several weeks before sowing. Maize and vegetable seed were especially on offer, along with various types of fertilizers and pesticides. Quantities were still modest in relation to the tons that would arrive from central depots as soon as the sowing period was imminent. Few supplies were found of cowpeas and greengrams, which are legumes increasingly sought by farmers.

The main issue with agro-dealers in terms of enhancing seed security had to do with their placement (see Chapter III for geographic mapping). Among the three main assessment sites, only in Kithuki did farmers have easy access for farmers to agro-dealers. In contrast, travel from Tharaka north to Meru took 2-3hours by bus. The distance From Magarini to Malindi agro-dealers was somewhat closer (50km) but expensive. Note that the smallest seed pack found in agro-dealers was a 2 kg one. This may be a suitable unit for farmers' seeking maize varieties they know and which have been long tested in an area. However, it is a large amount for legumes, as ; a) farmers frequently want a test sample of the variety, say 50 to 250 g; and b) they seek to get the variety (the genetic material) but don't need large amounts as they feel they can multiply subsequent seed themselves.

Local seed/grain market-supply SR 2011

As we have seen, farmers routinely get large amount of their seed from local markets: they carefully seek out 'potential seed' from the grain supplies (Chapter III, Box 1). Further, as shown in and Tables 4.4, 4.12.aand 4.13, farmers in the assessment zones intended to increase significantly the quantities of seed bought from the local market during SR 2011. The issue is whether supplies of local market seed could meet this growing demand.

Market seed availability

Very large traders , among the largest in each zone assessed, anticipated few/no problems with seed stocks for the SR 2011. From a large trader perspective, two examples appear below. In Kathonzweni, stocks were already available in at the time of the SSSA (mid-September) or were 'on order' (Table 4.15) . In the Malindi site, serving also Magarini, one major trucker described how stocks during this post-drought period *were equal of above what would normally be expected* (Table 4.16).

Table 4.15: Stocks of 'potential seed' available with larger traders in Kathonzweni town (September 2011)

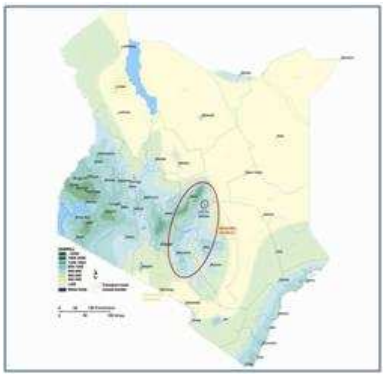
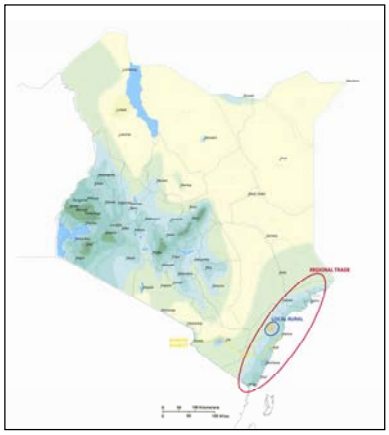
CROP	Current stocks (kg)			
	"Gateway Agrovet"	"Mbuvo stores"	"Coco Beach's shop"	TOTAL
Maize	3000	900 (from whole cob)	0 (expects 4500 from Nairobi)	3900
Pigeon pea	50	180	0 (will order 900 from Himo)	230
Green gram	550	1800	0 (will get 1800 from own production)	2350
Cowpea	48	360	0 (will order 900 from Masongaleni (KARI)	408
Bean	96	3600	0 (will order 900 from Busia)	3696

Table 4.16: Interview with truck driver in Malindi showing volumes in normal and sowing times, and expected volumes for October 2011 (1bag=90kg)

Crop	Production area	Volume (bag / month)*			% change	
		Non sowing time	Sowing time (Oct 2010)	Sowing time (Oct 2011, projected)	Non-sowing to sowing time	Normal year (2010) to drought year (2011)
Pigeon pea	Taveta Tz (Himo)	50	90	110	80.0	22.2
Green gram "big" = KS20	Taveta Tz (Himo)	45	70	90	55.6	28.6
Cowpea	Taveta Kenya	7	15	15?	114.3	0?

This availability of potential seed makes sense when one views the catchment zones from which potential seed might be accessed. Figure 4.5 gives two examples. Even if seed is not quickly available locally, due to poor local harvests, it can be easily trucked in from a much wider zone elsewhere. (see Chapter III for specific discussion of adaptation zones for grain which can be used as seed).

Figure 4.5. Sourcing zones for 'potential seed' two of SSSA sites.

Tharaka north	Magarini
	

Market seed quality

So potential seed was available in all sites SR2011, but was the quality on offer acceptable? It is important to mention that the SSSA team had some concerns about the quality of seed at a single market, Kathonzweni center, at the exact time of the SSSA. At that time, there were only limited stocks for sale and many seemed bags seemed poorly sorted, with grain broken or damaged. These poor public stocks contrasted with those seen in' the back rooms' of traders, who were waiting the price to jump before making available their better stocks—those which could be used for sowing. This conscious hoarding makes business sense . The best products should be put on offer when they can fetch the best prices.[7]

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. Formal seed sector prices stay fairly constant. In contrast, market prices for potential seed, that is grain that has the variety and other quality characteristics that allow for sowing , shot up at critical sowing periods, even as much as 100% increases within a two-week period, as sowing time nears and the first rain falls (Table 4.17).

So, in brief, seed/grain market assessments showed potential seed to be immediately available in each area, or on order.[8] There was some concern about seed quality in a single site for the small amount of bags offered for sale but perusal of stocks held back, in trader storage, showed considerably better sorted materials . The main issue with market seed during the SSSA had t o do with greatly elevated prices.

[7] Note that this hoarding behavior has implications for being able to extrapolate supplies available—at critical times. Most visible supplies, publically on offer in markets, will change dramatically within a week or two----and sowing becomes imminent.

[8] Post SSSA follow-up showed that potential seed stocks poured into markets mid—to late October.

Table 4.17: Local market prices: (ksh/kg) Kathonzwei/Kithuki September to mid-October 2011

Crop	Price end Sept 2011	Early Sowing Price (+ 1 week)	Peak Sowing Price (+ 2 weeks)
Maize	40	50	60
Greengram	100	120-150	200
Cowpea	60-70	80	100
Pigeon pea	60-70	80	100

Summary: Acute Seed Security Findings

12. The LR 2011 was a poorly performing one across crops, with yields judged poor in 30-65% of cases. So it was a stressful season . However, in terms, of seed security issues, quantities sowed only modestly dipped (- 2%). Some farmers planted less anticipating that the rains would not be sufficient (so why waste seed), but money constraints were the major reason for their planting less (45% of cases). Farmers simply did not have the resources to buy seed. Seed availability itself was not identified as a constraining issue to use. Note that maize seed use especially declined.

13. Farmers in the SR 2011, aim to plant the same or more in 73% of cases (monitoring crop by crop), although increase in the overall kgs to be sown is modest (+1.25%). For those planting more, the main drivers are access to : new varieties, better developed markets and more land. For those planting less, the key constraint is poor finances (no money, seed price too high).

14. Farmers do not see themselves as victims needing outside seed aid. For LR2011, seed aid provided less than 6% of their seed sown. For SR 2011, farmers anticipate about 4% of their needs to be met through seed aid. They are not factoring in free seed aid to meet their seed needs in any significant way.

15. In terms of seed source strategy, it is useful to compare the LR 2011 and SR 2011 seasons. To compensate for low home stocks, farmers are increasing their use of local markets for seed, from providing 39% of their total seed supply in LR 2011 to 55% of seed to be sown in SR 2011.

16. Comparing LR 2011 and SR 2011, a relatively bigger change for farmers is anticipated in terms of agro-dealer use. In LR 2011, agro-dealers provided 14% of the seed farmers sowed (mostly maize and cotton.) In SR 2011, farmers indicate 27% will come from agro-dealers. Maize and cotton will still predominate, but farmers also seek greengrams and cowpea certified seed from agro-dealer shops. Farmers want more legumes, and they want new varieties of legumes, and they indicate a willingness to pay for them.

In main issue in SR 2011 therefore revolved around markets. Can markets deliver? and can farmers afford to buy the supplies on hand?:

Can markets deliver seed?

17. Agro-dealers themselves indicated no shortage at all of supplies to be put on offer. While many in the regions had not yet received stocks from various centralized storage depots at the time of the SSSA, there was no indication that overall supply could not meet farmer demand.

18. For seed supply from formal agro-dealers, other constraints emerged:

    iii. geographic access to shops was far. Places like Tharaka North have no formal stockists at all. The nearest are in Meru town, 50 km or 2 to 3 hours away by bus. (although note that Kenya Seed for instance was planning to put an agent in Mikinduir, 24 km away).

    iv. specific varieties desired were sometimes not on offer (for non-maize) .Agro-dealers put mostly maize on offer, along with horticultural seed packets. Farmers complained about not finding desired varieties of sorghum (like gadam) and a range of desired greengram and cowpea varieties.

19. For supply of seed from local grain markets , trader assessments, mapping of actual supplies, and mapping of potential seed flows and deliveries indicated there would be no availability problem. While immediate stocks seemed short in several areas at the time of the SSSA, traders were hoarding stocks elsewhere until prices rose steeply for critical sowing periods .

Can farmers afford to buy the supplies on hand?

20. SR 2011 seed costs will rise higher than LR 2011 costs by 26-103%.

    Costs are high for three reasons:

    iv. For SR 2011 Farmers are buying more seed overall. (Own stocks provided 36.6% of seed sown LR 2011 but only 10.5% of SR 2011 seed sown).

    v. For SR 2011, farmers are intensifying use of certified seed, which per kg is 200 to 500% more seed of same crop obtained from market.

    vi. More generally, certified seed is packaged in relatively large packs. At least for the legumes, 2 kg bags, often the smallest size, can cost some 350 Ksh. (smaller packs: 100 , 250 500 g would be more affordable—and desired.)

    Stress on finances will be a significant problem for many. In Kithuki, for instance, the average farmer expects to spend 3711 Ksh for seed in SR 2011, or the equivalent or about the equivalent of a medium-sized goat.

21. For IDPs, rises in seed costs will be 59%from LR 2011 to SR 2011. This general assessment of money stress, is in addition to other ongoing concerns that make them especially vulnerable in the farming areas of Ntoroni. There households report that they 'farm with fear'. They might not plant due to threats, they might abandon fields due to insecuirty, some say, they are chased away at harvests (for

example in 2009). Parcels rented to them may also be expensive (e.g. 5000 Ksh year, 200-3000 season) as well as of poor fertility.

Community assessments

22. Even in this context of stress, communities (in focus groups) assessed themselves as 80 to 100% seed secure, across crops and sites. They are partly shaping strategies to compensate for seed lost in harvest LR 2011 and to take advantage of new opportunities (such as enhanced use of agro-dealers, and especially seeking out new legumes varieties of cowpea, greengram.

    This positive statement needs to be tempered for the IDPs in Ntorini. They are not counting on outside aid, but project that sowing levels will be down by some 7% in SR 2011.

CHRONIC SEED SYSTEM CONCERNS + EMERGING OPPORTUNITIES

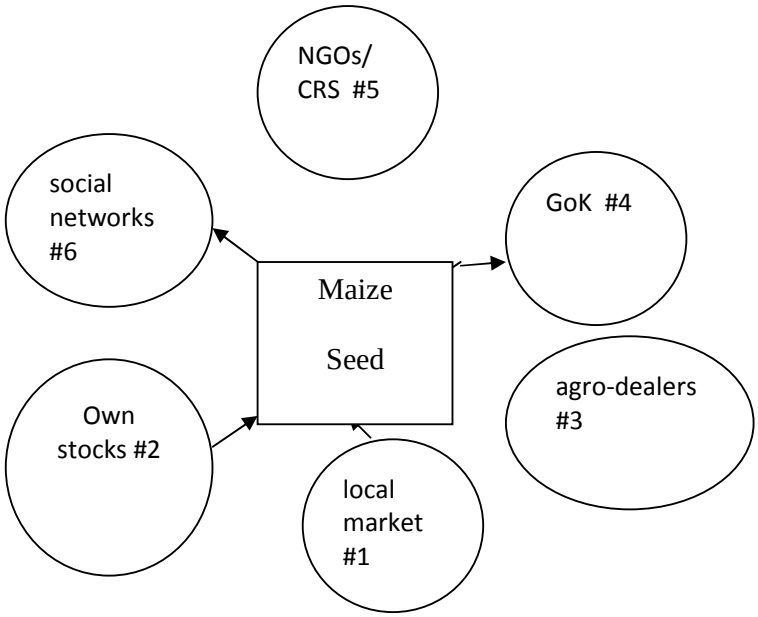
We now move to examining more systemic trends in Eastern and Coastal Kenya agricultural and seed security. Community -level assessments were done in all 4 sites (3 settled + 1 IDP) and involved a range of methods: community meetings, special focus groups with women, and key informant interviews (with 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 inorganic and organic fertilizers.

Seed system sourcing-- dynamic trends

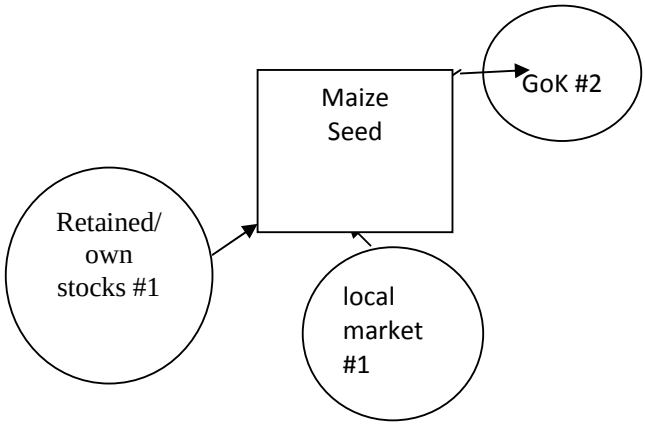
Community mapping of seed sources served to trace general trends in seed source strategy. Groups mapped seed sources for a particular crop and compared current sources with those used five years previous. The analysis shows that there has been some dynamism in sources—but mostly for maize. Also, in many cases, seed source 'innovations are not sustainable—hence NGOs give new varieties one-off , or governments give free aid. Cowpeas seed is still hard to find, as are select varieties of sorghum—i.e. gadam, the white variety used for brewing. Several mapping examples below give of sense of how variable the seed system innovation has been in Eastern and Coastal Kenya.

Figure 4.6 : Kithuki: sources for maize seed:

2011



2006

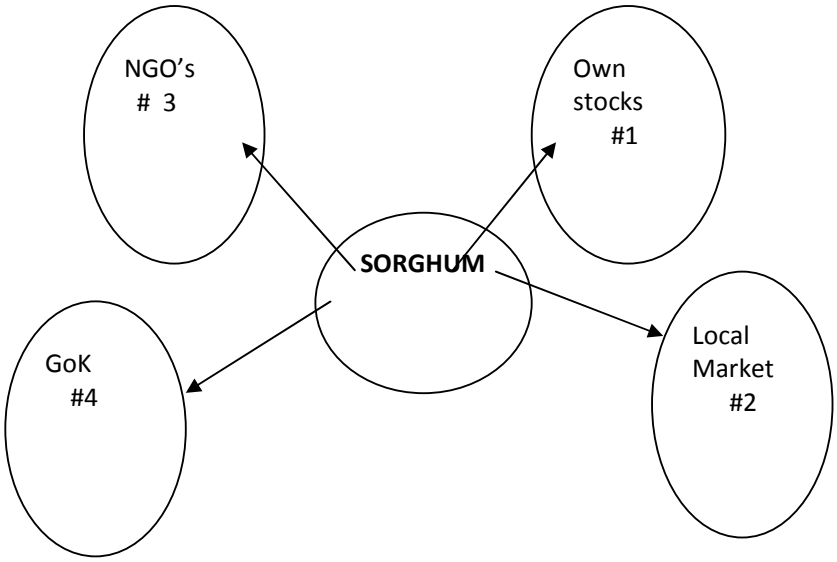


Notes: Kithuki

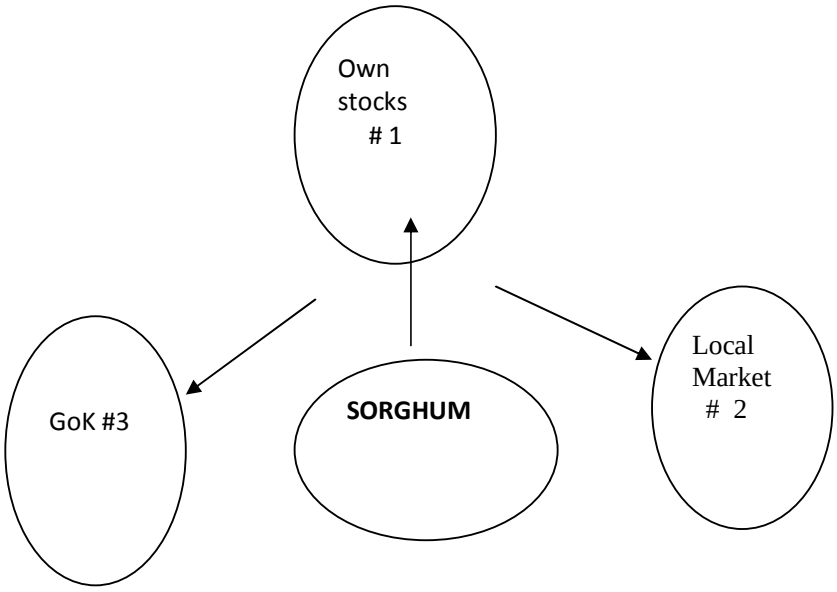
- Sources for maize seed have become much more diversified in the last five years.
- Communities indicate that 'own stocks' is no longer the #1 source—but rather the local market.

Figure 4.7. Tharaka North: sources for sorghum seed

2011



2006



Notes: Tharaka north

- Own stocks remain the main source for sorghum seed, supplemented by the local market
- The GoK routinely gives aid. More recently, NGOs help with new varieties

Crop diversification and (few) value added products

Communities 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 into value-added products geared, to increasing revenue margins. As an example, Tables 4.18 and 4.19 sketch the results of a community assessments in Bungale and Kithuki. In each case, a fair range of crops is grown in each zone, with several routinely sold to generate income, especially green grams and cotton (in Kithuki) . However, transformation levels overall are low, mainly only resulting in different types of flour and chips.

Table 4.18: Bungale, Diversity of crops, but --little transformation

Crop	Importance for food	Importance for Income	Transformation?
Maize	XXX	X	Flour
Green gram	XXX	XX	-
Cowpea	XXX	X	-
Cassava	XXX	XX	Flour and chips
Sorghum	XXX	-	-
Beans	XXX	X	-
Pigeon pea	XXX	X	-
Sweet potatoes	XXX	-	-

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

Table 4.19: Kithuki: Diversity of crops--- but little transformation

Crop	Importance for food	Importance for Income	Transformation?
Maize	XXX	X	Flour
Green gram	X	XXX	-
Pigeon pea	XXX	X	-
Sorghum	XXX	X	Flour (low price)
Cowpea	XXX	X	-
Dolichos	XXX	X	-
Finger Millet	XXX	X	Flour
Other miller	XXX	X	Flour
Beans	XXX	X	-
Cotton	-	XXX	-
Cassava	XXX	X	Flour

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

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, such varieties can be an economical way to increase production quickly. Figure 4.8 and Table 4.20 show the extent of variety introductions 'during the last five years'

(approximately the period 2006-2011) within the site samples . Overall, an impressive 71.3 % of farmers reported that they had recently accessed new varieties (although whether these are 'modern varieties ' or new local varieties cannot be determined). The varieties have been accessed through multiple channels, with a heavy weight toward government (via free distribution), agro-dealers, or local market. New varieties consisted mostly of maize, the legumes cowpea and greengram, and sorghum (mostly the white type used for brewing)

Figure 4.8. Farmers' sources of new varieties, 2006-2011

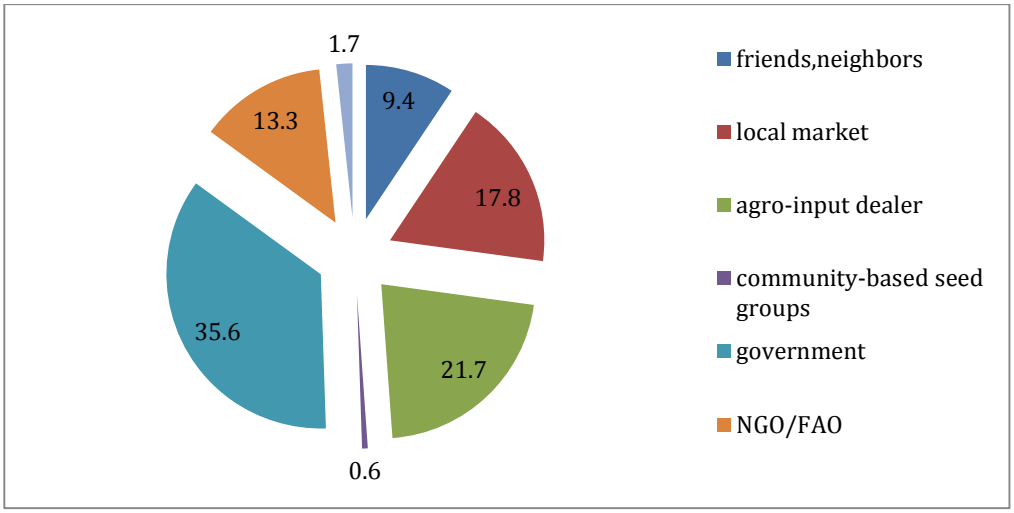


Table: 4.20: Farmer variety introductions, by crop, 2006-2011

Crop	**variety introductions N**	**%**
Maize	57	31.7
Cowpea	44	24.2
Greengrams	42	23.3
Sorghum	22	12.2
Millets	7	3.9
Cassava	0	0
Common beans	1	<1
Pigeonpea	4	2.2
Cotton	1	<1
Total crops	**180**	**100**

Manure/Compost, Fertilizer + Pesticide Use

Select input use was also examined during the Kenya SSSA as complement to the seed security analysis. This included examining farmers' use of a) organic and inorganic fertilizer and b) pesticide use .

Manure/Compost Use

In terms of compost or manure, the large majority of farmers (70% for LR2011 and 75% for SR 2011) use some both seasons (figures 4.9 and 4.10). Types used were consistent across seasons and included: large animal manure (cow,horse,donkey) for about 35% of cases, small animal for about 57% of cases and then poultry manure for about 7-8% cases. Crop residue was barely used (1.2% cases, each season) and kitchen refuse does not seem to have been recycled at all. So, in brief, animal manure is/was applied, but not much else. Most of not using neither manure or compost stated that it was not available or not needed as soils were fertile. A third reason suggested that a good number did not know how to use them.

For those using such organic fertilizer Clear priority was given to applying this input on maize, cowpea and greengrams (Table 4.21).

Figure 4.9. Manure/compost use LR 2011 (N=160 farmers)

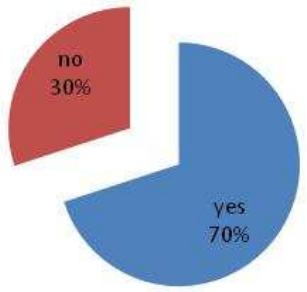


Figure 4.10. Manure/compost use SR 2011 (n=158 farmers)

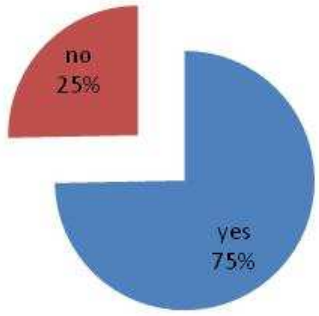


Table 4.21: Crops to which manure/compost were applied.

Crop	Long rains 2011		Short rains 2011	
	n	%	n	%
Maize	68	26,1%	77	27,8%
sorghum	9	3,4%	7	2,5%
Millets	19	7,3%	17	6,1%
Cassava	2	0,8%	3	1,1%
Common beans	0	0,0%	0	0,0%
Cowpea	76	29,1%	86	31,0%
Pigeonpea	1	0,4%	3	1,1%
Green Grams	80	30,7%	80	28,9%
Cotton	1	0,4%	1	0,4%
Total crops	261	100,0%	277	100,0%

Mineral Fertilizer use

Relatively few farmers in the sample used mineral fertilizers, 6% during the LR 2011 (figure 4.11) and 10% during the short rains 2011 (figure 4.12). If used, priority application went to cowpeas and greengrams (Table 4.22).

For those not using mineral fertilizer , major reasons, in order of importance, included: their being too expensive (45-50%of responses both seasons), not necessary (22-23% of responses both seasons), that farmers did not know how to use such mineral fertilizers (11-15% of responses) or that they simply were not profitable (7-8% responses).

Figure 4.11. Mineral fertilizer use LR 2011 (N=157 farmers)

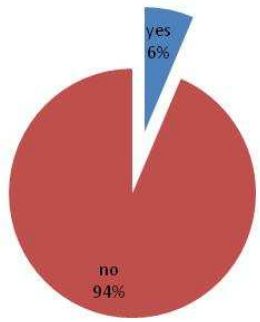


Figure 4.12. Mineral Fertilizer use- SR 2011 (N=157 farmers)

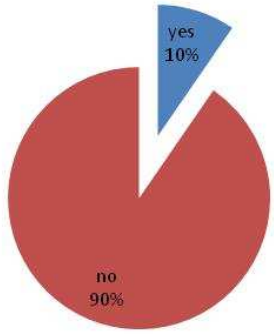


Table 4.22: Crops to which mineral fertilizer were applied

Crop	Long rains 2011		Short rains 2011	
	N	%	N	%
Maize	1	6,7%	2	8,7%
Sorghum	0	0,0%	0	0,0%
Millets	0	0,0%	0	0,0%
Cassava	0	0,0%	0	0,0%
Common beans	0	0,0%	0	0,0%
Cowpea	5	33,3%	8	34,8%
Pigeonpea	0	0,0%	0	0,0%
Green Grams	9	60,0%	13	56,5%
Cotton	0	0,0%	0	0,0%
Total crops	15	100,0%	23	100,0%

Pesticide Usage – Long Rains 2011 and Short Rains 2011

As a third major input the SSSA team reviewed pesticide use. It was surprisingly high, 62% during the LR 2011 (Figure 4.13) and projected to 79% during the SR 2011 (Figure 4.14). As in the case of compost/ manure and mineral fertilizer, cowpea and greengrams were given priority application, with maize a far third (Table 4.23).

In all of the above, one can say very little about efficiency of use, a topic that merits a great deal more analysis.

Figure 4.13. Pesticide Use LR 2011 (N=160 farmers)

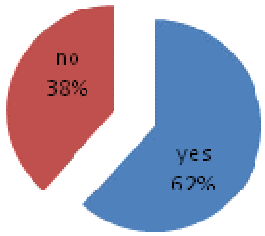


Figure 4.14. Pesticide Use SR 2011 (N=158 farmers)

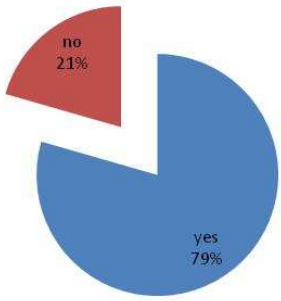


Table 4.23: Crops to which pesticides were applied

Crop	Long rains 2011		Short rains 2011	
	n	%	n	%
Maize	26	15,7%	32	15,5%
Sorghum	0	0,0%	0	0,0%
Millets	1	0,6%	2	1,0%
Cassava	0	0,0%	0	0,0%
Common beans	0	0,0%	0	0,0%
Cowpea	61	36,7%	75	36,2%
Pigeonpea	7	4,2%	7	3,4%
Green Grams	67	40,4%	88	42,5%
Cotton	2	1,2%	1	0,5%
Total crops	166	100,0%	207	100,0%

Note that total is higher than number of farmers, as each farmer using fertilizer could name up to 3 crops.

Seed Aid

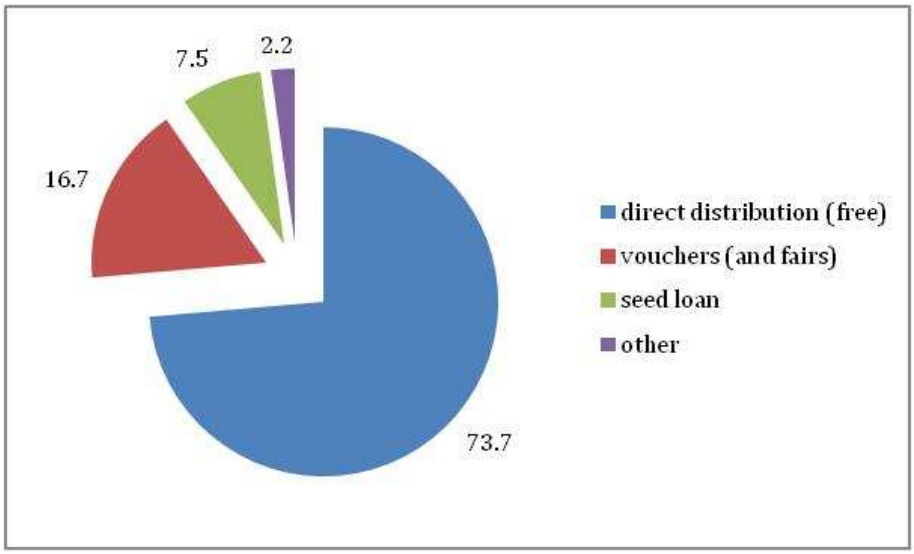
Finally, as the last 'input' we look at seed aid, which has been an important form of assistance in Eastern and Coastal Kenya. Here we include both emergency assistance and developmental aid, as farmers themselves often cannot make the distinction.

The SSSA results show that about three-quarters of the total population (73.1%) have received seed aid sometime between period 2006-2011. In this period, they have received it a mean of 1.6 times, with some farmer having received aid up to 5 times, or once every year (Table 4.24). The means of delivery has been one of Direct seed Distribution, although vouchers (predominantly combined with fairs) have been implemented on occasion, mainly by Catholic Relief Services and its Catholic Diocese partners (Figure 4.15).

Table 4.24 All farmers : overview of seed aid frequency 2006-2011.

# farmers	Seed aid in last 5 yrs? (%)		# of times seed aid obtained among recipients				
	Yes	No	# obtaining seed aid	Mean	SD	Min	Max
160	73,1%	26,9%	117	**1,6**	0,85	0	5

Figure 4.15: Means of delivery of seed aid 2006-2011 (% of cases)



Comparing possible differences in seed security-related issues:

- ***Male and female-headed Households***
- ***Farmers accessing different land areas***

The SSSA teams did also examine possible differences within populations, for all issues above, for example, seed sources used, quantities planted, use new varieties, manure/compost, pesticides, access to seed aid.

Analyses were done by two major variables: sex of household head (male or female-headed households) and area under cultivation (below one acre,1-2 acres, over 2 acres).

Differences were not reported, as there basically were no significant ones (Table 4.23). We found two weak trends only in the following

- For SR2011, male-headed househols are likely to expand use of seed (plant more) than female-headed households, and, conversely, female-headed households have a tendency to decrease seed use (plant less) ($p<0.0156$);
- For SR2011, those with land areas of > 2 acres have a greater tendency to use compost/manure more frequently ($p<0.0148$).

Table 4.25: Differences in select seed security issues a) among M/F headed households and b)households cultivating dfferent land areas?

Issue	Differences? (t-tests)
Male vs. female headed Households	
sowing amounts LR 2011	*no*
sowing amounts SR 2011	*yes (but weak trend)men expanding seed use, women contracting*
use compost/manure	*no*
use of mineral fertilizer	*no*
use new varieties?	*no*
times received seed aid?	*no*
Households cultivating different size land areas	
sowing amounts LR 2011	*no*
sowing amounts SR 2011	*no*
use of compost/manure	*yes (but weak trend). Household with moreland tend to use more*
use of mineral fertilizer	*no*
use of new varieties	*no*
times received seed aid	*no*

Summary: Chronic Seed Security Findings and Emerging Opportunities

The review of longer term trends in seed security in Eastern and Coastal Kenya shows both positive moves forward- as well as ongoing bottlenecks.

8. There has been some dynamism in seed sources, but particularly for maize. Other 'new sources' for seed of many of the legumes or cereals tend to be subsidized ones, non-sustainable ones.

9. New variety access has been impressive, with over 70% of households (71.3%) indicating having accessed a new variety in the period 2006-2011, principally of maize, cowpea, greengram and sorghum. For maize, there are multiple channels for new introductions (agro-dealers, government, NGOs) , but for the legumes, and especially new varieties of greengram and cowpea, it is hard for farmers to find specific desired varieties. Lack of access to the white sorghum varieties (grown for the brewing industry) also was cited as a problem.

10. Organic fertilizers (manure/compost) have been employed 70-75% of the population and particularly on cowpeas, greengrams and maize. Overwhelmingly, animal manure is applied, with nearly no use of crop residue or kitchen refuse. In contrast, 6-10% of farmers use mineral fertilizers (and only on the same three crops. Most find they are too expensive, not necessary, or they do not know how to use them.

11. Pesticide use is fairly high (62-79% of farmers per season), again on maize, greengrams and cowpea. It would have been higher had the rains not come late (and plants withered before application became possible). Such widespread use

reflects the high constraints farmers face with continual insect damage, especially on greengrams.

12. Farmers are eager for market development, but currently there is very little agricultural transformation in rural communities: flours, chips, but not much more. This means that farmers cannot reap the benefits of value addition from their raw agricultural products.

13. Seed aid, that is free distribution of seed (under emergency and development initiatives) has been conducted on a large scale, with 73.1% of the sample having received such aid a mean of 1.6 times in the last 5 years. Such aid can promote dependency: some households have received seed assistance 6 times in 6 years.

14. Female-headed households do not seem to face dramatically worse seed security concerns than those that are male-headed, although there are modest indications that they are planting relatively less for the SR 2011. (Such gender-differentiated insights might require further investigation.)

So, all in all, there has been some dynamism in seed/farming systems in a short five-year period. However, it is time (past-time) for some of the non-maize seed access and general marketing bottlenecks to be alleviated.

Table 4.26 summarizes the broad domains in which seed security concerns have been raised during the September 2011 SSSA. Except for a non-constraint of seed 'availability', issues have been raised in nearly all domains, concerning access and seed quality issues in the short and medium term. So while a direct seed distribution (which would address quality constraints), is *not* required) a range of urgent actions are. We address these more specifically in the next section on Recommendations.

Table 4.26: Summary of thematic areas where seed security concerns: Eastern and Coastal Kenya 2011

Parameter	**Acute**	**….Chronic/Dev**
Unavailability of seed	**Direct distribution of seed**	**(rarely problem)**
Farmers can not have access to seed	**Vouchers and cash** **(w/seed fairs)**	**Income generation activity;** **Agro-enterprise devpt** **Delivery systems Information systems**
Poor seed quality ▪ **poor varieties** ▪ **unhealthy seed**	**<u>Limited</u> introductions new varieties**	**Introduce new varieties/ with technical support** **Variety selection/ breeding** **Development of seed enterprises linked to new varieties**

V. OVERALL RECOMMENDATIONS: ACROSS SITES

The opportunity for the SSSA team to conduct assessments in diverse sites provided the field teams a useful perspective on seed security in drought-prone regions of Eastern and Coastal Kenya.

Site-specific recommendations have been included in each site report (available through mwende.kusewa@crs.org). Specific action plans appearing in the Annex.

Below, we put forward a set of recommendations which are applicable across all sites. These are divided between recommendations for the acute stress (emergency) period as well as those pertaining to medium-term actions.

SEED SECURITY EMERGENCY RESPONSE: GENERAL OVERVIEW

5. Seed Availability of seed *per se*, was not identified as the major problem in any of the assessed sites. Rather access to seed was a compelling issue in all zones, due to a) relatively greater quantities of seed being purchased, and b) farmers' putting relatively greater emphasis on certified seed use, for maize, greengrams and cowpea. **Recommendation** In this context, emergency 'seed-related' interventions might best be designed to increased access/purchasing power of farmers.

6. Most seed security problems encountered in all assessment sites were not short-term ones. **Recommendation:** Any response in the short term should aim to be linked to longer-term recovery and development. As one example, this might including linking farmers more efficiently to sources of new varieties, especially and legumes even in the early recovery phase.

7. The site-specific SSSAs have shown that 'one size does not fit all'. The four sites assessed (including the IDPs) had different problems and challenges. A blanket response, such as giving free seed or conducting standard seed vouchers and fairs, may not solve problems with the specificity needed. **Recommendation.** Interventions need to be tailored to specific seed security constraints and opportunities **(**see Annex for specific action plans).

8. Emergency seed aid is becoming repetitive. **Recommendation**: In zones where emergency seed aid has been implemented three seasons in a row, decision-makers (donors, GoK, NGOs and other humanitarian partners) should program a formal review so as to determine the necessity of the aid.

SEED SECURITY: IMMEDIATE RESPONSES NEEDED

The major urgent problems at each site center around farmers have access to seed (point #1 above). Emergency inventions should be geared to addressing access problems.

5. Vouchers linking farmers to local markets and agro-dealers and direct cash transfers are important immediate aid options which give farmers increased access to crops and varieties of their choice. Given the specific constraints found in Eastern and Coastal Kenya, vouchers and fairs which also give farmers access to innovations should be encouraged (point #2 above: linking relief to development).

Specific Recommendations Linked to #5 and use of voucher and fair programs

5.1 Two sets of vouchers would useful, those which focus on access to informal sector seed and those specifically designated for formal sector (certified) seed from agro-dealers. In terms of the latter, agro-dealers should be required to pack seed in especially small quantities (50g, 100g) so farmers can test varieties and quality seed through voucher purchase.

5.2 Given farmers' high interest in legume seed, special efforts should be made to ensure that seed of greengram, cowpea and pigeon pea are especially on offer.

5.3 More generally, efforts should be made to bring significant crop diversity overall into the voucher and fair programs so to encourage greater production stability.

5.4 Linked to 5.3, Maize should be banned from the voucher and fair programs as it continued use has compromised farmers these drought-prone regions .

5.5 To oversee the quality of seed put on offer from informal sector, a range of actions should be put in place.

i. A Screening Committee (farmers, NGO representatives, others) should vet all seed being put on offer;

ii. Traders participating in fairs should show that they used adequate basic storage methods. (Having special storage facilities is even better).

5.6 To follow-up on the quality of seed put on offer from the formal sector and agro-dealers, farmers should be advised to keep packs and receipts so as to be able to address any complaints.

SEED SECURITY: MEDIUM-TERM RESPONSES NEEDED

There is need for a broad-based rethinking on how to improve the seed security of small holder farmers in drought-prone regions. Below, we suggest first set of areas for priority action.

Formal Seed Sector

9. Production of foundation seed needs to be scaled up across of range of non-commercial crops, to form the base of an extensive, decentralized, seed production system. For the drought-prone regions, focus should be put especially on the legumes. Items such as forage seed, key for farming system stability in drought-prone areas, might also be considered. While the production of such foundation seed currently rests with the national research institution KARI, additional private sector multipliers (under the guidance of KARI) might be considered to increase quickly and on a large scale.

10. As a general recommendation**,** incentives need to be put in place to encourage agro- dealers to become more smallholder farmer client oriented.

Linked to #7

7.1 Agro-dealers should pack farmer- preferred crops varieties and fertilizers in 'test sizes' and 'affordable use' sizes.

10.2 Agro-dealer placement has to be expanded to serve also those in more remote areas. Networks of centralized trade agent might be facilitated complement the network of bigger agro-input stores. GIS mapping might help guide placement of stores so as to reach a maximum number of farmers.

7.3. Farmers need to become more aware of the means by which they can redress grievances with formal agro-dealers (for example, around quality of product). Awareness campaigns educating farmers in redress possibilities might be considered.

Integrated and informal seed sectors

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 for drought-prone zones; nor b) the range of varieties. At this point, the decentralized seed multiplication initiatives seems to be having very modest (near nil) impact in drought- prone zones. It is also being propped up by institutional buyers, rather than from demand from smallholder farmer clients.

11. As a general recommendation, sustainable decentralized seed production models need to be confirmed for the drought-prone zones, especially for the legumes.

Linked to #8

11.1 Decentralized seed multiplication groups need to develop an assessment of the cost-effectiveness of their organization and 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.

11.2 Links need to be specifically catalyzed to tie decentralized seed producers with continuing and new sources of germplasm.

12 Mechanisms for giving all farmers regular access to new varieties need to be intensified. Sale through agro-dealers (#7.1) provides only one venue. Sale in regular country stores (dukas), open markets (also point #11 below) or even supermarkets (with proper labeling) might be considered.

13 Storage losses on-farm need to be combatted in multiple ways: triple bagging or small seed silos are options to be considered for technical and social suitability.

14 Given that local markets (and their traders) are important for farmers' seed supply, more attention should be given to encouraging that these open seed/grain markets 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.

Agro-enterprise development: market chains

Seed security in Eastern and Coastal Kenya, as well as food and livelihood security generally, are linked to the financial capacity of farmers. Rural agroenterprises 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 in the case of maize and manioc. Significant market chain prospecting needs to be carried out and agroenterprise development needs to be strengthened at the local, regional levels. In this vein, the following first set of measures is recommended:

15. Profitable business models that serve local markets with good-quality produce, especially in collaboration with existing formal and informal market actors), need to be catalyzed. Transformation of cassava has been but one market chain tested in drought-prone areas.

16. Market information needs to be further promoted to become more timely and trustworthy, providing information on volumes, prices and products at local and regional scale. This can be facilitated especially through the use of radio and cell phone information systems.

Finally, in terms of specific technical recommendations it may be appropriate to state the obvious: drought- prone regions need better roads and more irrigation. As one government official interviewed during the stated: "There are 5+ major rivers in Tharaka. Instead of seed aid, yet again, why not invest in irrigation development?"

PROMOTING ACCURATE SEED SYSTEM SECURITY ASSESSMENTS

Classic seed need assessments inevitably conclude that 'seed is needed' and, in Eastern and Coastal Kenya usually advise that the response should be a direct seed distribution. While innovative at their inception (as they distinguished seed aid need from food aid need), such assessments are now outdated and need to be sharpened. Understanding of what happens to seed systems during disaster has become markedly more refined in the last five years: experience shows that *distinguishing among seed security constraints is key for recovery*.

17. As a general recommendation, we suggest that current seed security assessment methods, focusing just on counting seed, be significantly revamped.

Specific recommendations linked to #14.

14.1 ` National and regional formats for assessing seed security status should shift from those which calculate simplistic 'seed needs' to frameworks which recognize different types of seed security problems, and which tailor responses accordingly. These problems might include diverse constraints of seed availability, seed access and seed quality, which are distinguished by their presence in the short and in the long term

14.2 Seed security assessment capacity needs to be built at regional and local levels. Technical tools already exist to help NGO and government agricultural officials move forward on seed security assessments.

14.3 Given the complexity of the stresses in drought-prone , 'emergency' seed aid-related work has to think strategically and longer-term. Assessments related to seed security, can and should incorporate more developmental elements, including issues related to system stability, opening and strengthening of markets, and equity concerns.

14.4 This expanded focus suggests that the 'skill set of those assessing seed security' has to be broadened. Minimally SSSA requires inputs from formal and informal seed sector specialists, farming system specialists, marketing professionals, and gender/ livelihood analysts. Nutritional expertise might be considered as an added bonus. Hence: multidisciplinary teams should be mobilized for seed system security assessments.

14.5 More generally, a political environment for 'real seed security assessment' has to be established. This is no easy task. *Technical advances in methods alone will not lead to more accurate assessments.(political will needs to change)*

Strong seed security frameworks at a national level and strong leadership ensuring that seed security assessment is given focus (as distinct from food security and other non-food item assessment), can enable seed assistance in Kenya to become more demand and problem driven. More accurate assessments will bolster the ability of seed- related assistance address farmers' compelling seed security problems and to seize on important, emerging opportunities.

VI. REFERENCES

Almekinders, C. and N. Louwaars, 1999. *Farmers' seed production: new approaches and practices,* London: Intermediate Technology publications, Ltd.

Bramel, P. and T. Remington, T. 2004 Relief seed assistance in Zimbabwe, In: L. Sperling, T. Remington, J.M. Haugen, J.M., and S. Nagoda (eds.), *Addressing Seed Security in Disaster Response: Linking Relief with Development* (Cali, Colombia: CIAT) , pp.159-179.

Catholic Relief Services (CRS). 2002 *Seed Vouchers and Fairs: a Manual for Seed-Based Agricultural Recovery in Africa.* Catholic Relief Services, developed in collaboration with International Crops Research Institute for the Semi-Arid Tropics and Overseas Development Institute. Nairobi, Kenya.

Catholic Relief Services (CRS), 2009. Kenya rapid seed system security assessment. Eastern Kenya. Nairobi: CRS

DANAGRO , 1988. SADCC Reproduction and supply project, main report (vol 1A) and Country Reports (vol 2A-2J).

Farrow, A., P. Seward, and P. Ssengooba, 2010. Final report and lessons learned from Project: Nodes of Growth: improving legume seed networks in Kenya. CIAT: Kampala.

Karanja, D., 2011a. Breeding and drought-tolerant varieties. Presentation to Kenyan Seed Security Assessment Workshop, Nairobi Kenya. 12 September 2011.

Karanja, D., 2011b. Types of seed systems and seed inventory. Presentation to Kenyan Seed Security Assessment Workshop, Nairobi Kenya. 12 September 2011.

Louwaars, N. 1994. Seed supply systems in the tropics: international course on seed production and seed technology. Wageningen: The Netherlands: International Agriculture Centre.

McGuire, S. 2001. Analyzing farmers' seed system: some conceptual components: in L. Sperling, ed., *Targeted Seed Aid and Seed-System Interventions: Strengthening Small farmer seed systems in East and Central Africa.* Proceedings of Workshop held in Kampala Uganda 21-24 (2000. Kampala: International Center for Tropical Agriculture, pp. 1-8.

Remington, T., Maroko, J., Walsh, S., Omanga, P. and Charles, E. 2002. Getting of the seed and tools treadmill with CRS seed vouchers and fairs. *Disasters* **26**(4): 302-315.

Sperling, L. 2002. Emergency seed aid in Kenya. some case study insights from lessons learned during the 1990s. *Disasters* **26**, 4, pp..283-287.

Sperling, L., T. Osborn, H.D. and Cooper, 2004. *Towards effective and sustainable seed relief activities,* Report on the Workshop on Effective and Sustainable Seed Relief Activities, 26-28 May 2003, FAO Plant Production and Protection Paper 181, Rome: FAO.

Sperling, L .and Remington, T. with Haugen, J.M. 2006. Seed aid for seed security: advice for practitioners. Practice Briefs 1-10. Rome, Italy, International Center for Tropical Agriculture and Catholic Relief Services.

Sperling, L., Cooper, H. D., Remington, T., 2008. Moving towards more effective seed aid. *Journal of Development Studies* 44 (4), 586-612.

Sperling, L. 2008. When Disaster Strikes: a guide to assessing seed system security. Cali: International Center for Tropical Agriculture.

Sperling, L. and S. McGuire, 2010. Understanding and strengthening informal seed markets. Experimental Agriculture, 46(2):119-136.

Walker, S., 2005. Analysis of Seed / Grain Marketing Functioning in Stress Periods in Mbeere and Tharaka Districts October 2004.Nairobi:unpublished manuscript.

VII. ANNEX: ACTION PLANS

SEED SECURITY : ACTION PLANS

- Action Plan : Kithuki (Kathonzeni)
- Action Plan : Gatue/Ntoroni (Tharaka North)
- Action Plan : Bungale (Margarini)

Seed System Security Assessment (SSSA) ACTION PLAN: KITHUKI SUB LOCATION Sept 2011

PROBLEM	SHORT-TERM	MEDIUM TO LONGTERM
1. Maize not performing (10 seasons in a row failure)	• Do not allow maize in seed fairs • Try to consciously promote crop diversification in seed fairs	
2. Market important source of seed, but quality is poor	• Encourage small packets sales at market and seed fairs (sensitizing traders) • Arrange meetings to sensitize farmers : to new varieties; to varied seed selection possibilities	Actively work with traders to improve seed quality • Link traders with more credible sources of seed supply (specific multipliers) • Insist on basic seed conditions for traders to participate in fairs (as CARE does in Ethiopia) • Work with traders to bulk certified seed (as CD Meru does in Tharaka)
3. Farmers moving to green grams and cowpeas but want special varieties	Seed pack sale and fairs with special vouchers designated specifically to new varieties	Disseminate information on new varieties • in local dialect. • Use FM radios • Farmer field radios
4. Farmers interested in certified but problems with • Availability • high costs • dealers not always reliable (fake seed, diluted seed)	Encourage KARI and the private companies to produce certified seeds of legumes for initial infusion of key varieties Promote small packs through media or policy groups- write policy brief Note that : Ministry through the regulatory Board KEPHIS do effect quality checks on agro dealers Tell farmers to keep packs and receipts (so as to be able to address any complaints NGOs to should take up advocacy and report for bad trade behavior	• Train agro-dealers on seed quality issues and storage • Lobby on policy of traceability of certified seeds. (farmers need have recourse)
5. Crop diversification needed but white sorghum is an issue		Think about crop input insurance

6. On-farm storage	Hermetic storage Triple bags?	Explore silos • metal silos for traders (larger sizes) • house hold metal silos (smaller sizes) hermetic storage
7. Pesticide quality		
8. Not enough fodder	Make forage seed available in seed fairs	
9. Availability of new varieties	(Ref to 3)	• Work with farmer groups to bulk new varieties. Make sure that the multiplication is tied to clear business plant and development of marketing skills •

Immediate action plan: Seed Voucher and Fairs 2011

1. Invite traders from Wote to ensure seed quality issues (23 km distant from Kathonzweni)
2. Farmer seed sellers- should insist that they have to sort by variety, remove broken grain and remove the pebbles
3. Should invite agro-dealers to fairs especially to provide green gram and cowpea seed- they should ensure they bring 1 kg packs
4. Make forage seed available in 20 grams packets – from KARI
5. Farmers producing forage seed in Kiboko and Wote should be invited to fairs
6. Have 2 types of vouchers- one for new varieties, one for local seed (proportions of each still to be decided
7. Do not allow maize in any form in fairs (even if new variety and certified)
8. Set up pre-screening of seed before presenting it at fairs (farmer + CRS + WV on joint committee)

Seed System Security Assessment (SSSA) ACTION PLAN: Gatue/Intoroni Sept 2011

Problem	Short-term response	Medium to longer-term response
1. Farmers lack cash to buy seed (market purchase is high as farmers lack own stocks)	Seed vouchers (linked to fairs) Encourage supplies =esp of cowpea red sorghum and cowpea (as seed seems in short supply). Encourage diversity of crops, overall. Ban all maize from seed fairs. Offer Two types of vouchers: • For local seed 600 ksh • For new varieties/certified seed 300. Ksh (Try to get certified seed packed in small packs) (specific certified seed: • Greengram- Ks20 • Pigeon pea 60/8 ('Mt Kenya') • Cowpea- KVU 419 (expose bad behavior of local traders who inflate process unduly?)	Seed bulking and multiplication enterprises—but always linked to clear business and marketing plan
2. Farmers want new varieties but have no access to them	Vouchers for new varieties at seed fairs Community-managed variety trials that offer some diversity	Pilot small pack sales in local duka shops
3. Post-harvest storage losses are high. Storage losses ongoing for all crops—but millets		Test small silos—specifically for seed storage.(focus particular attention on viability issues) Engage fabricator in Tigania who has some experience with silos Explore whether triple bagging technique is suitable for local conditions

4. Cowpea seed production problem- ongoing many years		Women's group in Ntoroni suggest they want seed production training and then will establish a seed bank. (test locally?)
5. High cost of certified seed		Work to actively encourage seed companies—such as Kenya Seed to pack in small sizes. (May have to go to Nairobi or headquarter operations)
6. No agro-dealer network	Demonstrate (and document) demand for certified seed by small farmers--- via seed fairs	

Context: Poverty levels extremely high Soil ls quite fertile in select areas; water main constraint	Kathita river: do explanatory analysis of use of this river for irrigation… (Consider development of special seed security proposal)

Seed System Security Assessment (SSSA) ACTION PLAN: BUNGALE , MAGARINI Sept 2011

	Problems	Solution short term	Medium term
1	Maize is important for seed but - poor local availability of modern and local varieties farmers want	- Encourage Small Packs of seeds at seed fairs - Link traders with existing seed producer farmers - Insist on basic storage methods for traders participating in seed fairs	- Link traders to reliable seed sources e.g. Kari and seed companies - Train farmers on seed quality, especially carry over hybrids - Encourage farmers do seed bulking of local and OPV varieties
2	Farmers are keen to use agro dealers, but cost and distance is limiting.	- Promote small packs and sell locally (also problem 5) - Encourage Malindi agro dealers to link with traders who can further retail for them	- Encourage Malindi agro dealers to open out lets in rural areas - Expose farmers to the advantages/attributes of distinct varieties
3	Few agro-enterprises or value addition going on.	- Transform cassava bulking group to value addition enterprise	- Explore and link farmers product uses and markets (cassava –tapioca)
4	Availability of new varieties limited and linked to aid.	- Stop using aid to promote new varieties, especially hybrid maize	- Introduction of new varieties has to be accompanied by technical information.
5	Low diversity of crops and varieties (Interlinked with low support for innovation)	- Capacity build on new crops and varieties	- Capacity build on new crops and varieties - Participatory varietal selection with KARI prior to release of new varieties
6	Farmers planting late. Waiting for irregular seed aid. DSD is routine.	- Set specific goals for seed related interventions - Do impact assessments seed related interventions	- Seed aid agents should keep sharing information on varieties/crops, distribution, beneficiaries, especially impact. - More deliberate targeting as a broad voluminous seed aid can “outcompete” rural agrodealers
7	Low soil fertility and poor soil management	- Capacity build on appropriate soil management practices and emphasis on use of organic manure (which is the local preference)	- Implement innovative ways of technology dissemination e.g. Farmer Field Schools.
8	Access to seed (of any type) limited for poor	- More deliberate targeting of seed aid and fertilizer - Do impact assessments (See 6)	- Strengthen local traditional savings groups - Explore diverse means for groups purchase of seed (save transport costs)