When Disaster Strikes

A GUIDE TO ASSESSING SEED SYSTEM SECURITY

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Louise Sperling

August 2008

Centro Internacional de Agricultura Tropical
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Address: Apartado Aéreo 6713
Cali, Colombia
Tel: +57 2 445 0000
Fax: +57 2 445 0073
Email: L.Sperling@cgiar.org
Web site: www.ciat.cgiar.org/africa/seed.htm

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Foreword

Over the past twenty years, the delivery of seeds and tools has become an extremely common method of humanitarian assistance to farmers stricken by natural or human-caused disaster. When these interventions first started, methodologies for distribution and procurement were very similar to those used in providing food aid – wide-scale distributions of seeds procured from a range of locations usually accompanied by a routine set of farming tools. Little attention was paid to farmer preferences, varietal differences, or even farmer needs, and in-country seed systems were largely ignored.

About ten years ago, Louise Sperling began to question the validity of these responses. Why did relief agencies need to provide seeds year after year to the same communities in the same countries? Why were tools needed each year as well? Why did studies show that seeds delivered as a part of international aid programs represented only a small portion of what farmers actually planted? What if, instead of helping an agricultural community get back on its feet after a disaster, seed aid actually distorted local markets and prevented sound seed systems from developing? While researching these issues, she became more and more convinced that seed interventions were occurring in areas where there was poorly identified need.

Together with Tom Remington of Catholic Relief Services (CRS), Sperling began to piece together the beginnings of a seed security system, which contained the same basic components as a food security system: availability, access and utilization (with the utilization component covering such important elements as seed quality and variety appropriateness, and farmer knowledge). Their work resulted in the 2006 publication of a series of Practice Briefs, entitled *Seed Aid for Seed Security: Advice for Practitioners*. This series shows that seed aid demands a great deal of agronomic, social and economic insight – well beyond the simplistic notion that seed aid is merely a logistical exercise centered on buying and distributing planting material.

To complement the briefs, Sperling began working, with CRS encouragement, on a complete guide to assessing the security of seed systems. Her rationale was that only through on-the-ground analysis and a clear understanding of the local and regional seed systems can an appropriate strategy for recovery be developed and implemented. This guide represents years of challenging research, public advocacy, and strategic thinking. In my eyes, it is the most important and useful document that has ever been written for guiding humanitarian practitioners toward sustainable programming in the agricultural sector that, ultimately, does no harm. It is a guide not only for disaster relief workers, but for those dealing with chronic agricultural development challenges as well.

As a strong supporter of this work over the years, USAID/OFDA is seeing an evolution of seed interventions proposed and carried out in some of the most challenging countries in the world. These interventions are becoming more refined and more context-specific as a direct result of the efforts described above. Through the practice briefs and now through this assessment guide, non-governmental organizations, UN organizations, and donor agencies are changing the way that they approach seed interventions following disasters. Agricultural interventions are becoming more carefully targeted, more farmer-oriented, and ultimately more sustainable.

It is my hope that this guide becomes widely disseminated and widely used among all humanitarian workers in the field, and that a Seed System Security Assessment becomes as standard a method for determining seed needs and for proposing interventions in this sector as a nutrition cluster survey is for any nutrition interventions in the health sector.

Laura Powers
Agriculture and Food Security Advisor
Office of US Foreign Disaster Assistance
US Agency for International Development

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This guide benefited from the insights of a number of staff in humanitarian organizations and experts on seed systems and livelihoods. Special thanks go to Tom Remington of Catholic Relief Services (CRS) who helped conceptualize the guide and who has promoted the notion that seed security assessment is something that truly matters. With Tom's encouragement, various CRS field teams in East, West and Central Africa tested early versions of the guide – in Thies, Senegal; Douentza, Mali; Debub, Eritrea; and West Darfur, Sudan.

Several people gave valuable advice or commented on specific sections. Leigh Andersen, Tim Dalton, Shawn McGuire, Melinda Smale, and Sophie Walker helped advance the seed market analyses. Eva Weltzien lent her wisdom especially on issues of plant breeding and biodiversity. Tom Osborn shared comments on formal seed sector functioning, H.D. Cooper contributed greatly to the decision trees appearing in Step 7, and discussions with Jean Claude Rubyogo have sharpened reflections on seed systems more generally. Across all themes, Gerry Toomey's very unusual editorial skills have helped render specialized content more intelligible and more accessible to a range of potential users.

My 'bosses' at The International Center for Tropical Agriculture (CIAT) have been wonderfully supportive of this work, which does not fit easily into the standard research and development ('R&D') box. Long before climate change or food crises became areas of heightened interest, Joe Tohme, Robin Buruchara, and Steve Beebe encouraged rigorous investigation within high stress environments, and in unstable, even emergency scenarios. It is a privilege to work with such colleagues, willing to address the harder of challenges, especially among the more disadvantaged.

The US Agency for International Development very generously funded the development of this guide. Within their Office for Disaster Assistance, Laura Powers and Julie March have been much more than strong project managers: Their intellectual contributions have helped to shape the specifics of this assessment tool. It is their vision – to make seed aid more effective for poor people and more responsive to them – which has been the driving force behind this project.

Finally, it is those living and working amid crises who have fundamentally shaped this seed system security assessment guide. Humanitarian relief workers, against considerable odds, try to figure out what farmers want and need. For their part, farm families – women, men, children – survive, adapt and strive to move forward, whether the outside aid is effective or not. My admiration and thanks go to these true 'front runners'.

Louise Sperling
July 2008

The aim of this seed system security assessment tool is to encourage more targeted strategies for addressing the continuum of acute and chronic seed insecurity problems plaguing small farmers. Tailoring aid support to specific seed system constraints should lead to both short- and longer-term gains for beneficiaries. But it should also lead to more cost-effective interventions by relief agencies and development workers.

Feedback on this guide is most welcome. Please address comments and suggestions to L.Sperling@cgiar.org or, via regular mail, to Louise Sperling, CIAT, A.A 6713, Cali, Colombia.

Introduction

Aims

This guide presents a seven-step method for assessing the security of farmers' seed systems in situations of acute or chronic stress. The occasion may be a natural disaster such as a flood, drought, earthquake or insect pest invasion; or it could be a crisis of human making such as civil war, political instability or economic recession. Whatever the crisis or stress, the guide serves as a practical field manual for donor agencies, government ministries, nongovernmental organizations, and individuals charged with agricultural relief and recovery, including those with little or no expertise in seed systems.

PHOTO: LOUISE SPERLING, CIAT

Children: Seed security is key to food security

The method presented here – we call it Seed System Security Assessment, or SSSA – helps managers and field staff assess whether interventions in seed systems are needed, and if so, guides the choice of relief or development actions. By following the steps laid out in this guide, humanitarian agencies will be able to:

- Determine whether there is short-term insecurity of the seed system, long-term insecurity, or both.
- Home in on specific problems related to the insecurity, such as low availability of seed, lack of farmer access to it, or poor seed quality, and the underlying causes.
- Immediately lay out an action plan to counteract acute seed insecurity or, in the case of chronic, longer-term insecurity, to define a set of countermeasures.

Rationale for a guide on Seed System Security Assessment

Why do we need such a guide to SSSA and related interventions? Don't we know how to execute direct seed distributions during times of stress? Aren't we already adept at conducting seed vouchers programs and seed fairs? And during a crisis, if the planting season is imminent, isn't it better to give out seeds to farmers right away and do the necessary follow-ups or evaluation later? We've been doing things this way for many years! Do we really need to work differently?

The answer is that our understanding of the effects of emergency seed programs has improved immensely in the past five years, and that there are both flaws in current practices and much scope for improvement. As it turns out, intervening in seed systems is serious business. Seed is at the heart of agricultural production and determines what farmers grow and whether they will have a harvest. As part of the harvest is often saved as seed to be sown in subsequent seasons, even short-term interventions in the seed system may have significant effects over years.

We've learned that badly designed and poorly implemented seed aid during a crisis harms farmers, making them even more vulnerable to uncertainties. Supplying them with seeds of unsuitable crop species or varieties results in low yields and wastes scarce labor and land. Unnecessary seed deliveries suppress regional economies and undermine emerging or growing seed markets. The bottom line is that 'do-gooder' aid, though well intentioned, may create long-term dependency, at the same time weakening local coping mechanisms.

Avoiding these pitfalls is a major concern for professionals and institutions intent on delivering better seed aid and better seed system support. Emergency seed aid interventions must be carefully matched to the local ecology and to people's preferences. For example, there's no point in giving farmers planting material for a cassava variety intended for commercial starch production when the

real need is for edible cassava roots for the dinner table or local sale. Designing suitable interventions is a tall order since, in the wake of a disaster; time may be short for anticipating the next season's needs.

In brief, this guide to SSSA aims to help humanitarian agencies boost the positive effects of seed aid.

Overview of SSSA

This guide presents a method for understanding seed systems during a crisis and its aftermath, and for identifying what seed-related assistance is needed. The guide walks the decision maker and relief worker through a series of discrete steps. These include analysis of the effects of the disaster on seed systems, identification of possible problems to be addressed, and choice of actions to alleviate the constraints identified.

More specifically, the guide is structured to help the personnel of humanitarian agencies:

1. Identify zones for assessment and possible intervention.
2. Describe the normal status of the crop and seed systems.
3. Describe the broad effects of the disaster on these farming systems.
4. Set goals for agricultural relief and recovery operations based on farmers' needs.
5. Assess the post-crisis functioning of seed channels to determine whether short-term assistance is needed.
6. Identify any chronic stresses that require longer-term solutions and identify emerging development opportunities.
7. Determine appropriate short- and longer-term responses based on the analysis of priority constraints, opportunities, and farmer needs.

Each step is presented as a separate section but in a similar format, for clarity and ease of use:

- **Introduction**. Why this step is important and how it fits with the other steps in the process.
- **Scope of work**. Activities in each step.
- **Guiding questions**. These help the assessment team orient its thinking, including specific issues to be explored. There is some overlap in the guiding questions, from one SSSA step to another, as similar information may come from multiple perspectives. This redundancy is useful, allowing the team to cross-check information.
- **'How to' notes**. Suggestions on how data can be collected and common pitfalls avoided.
- **Checklists**. These review sheets encourage the team to double-check whether key issues within each step have been understood well enough to effectively guide practical action.

Steps 5 and 7 merit special mention at the outset.

Step 5, assessing the functioning of seed channels during a period of stress, is at the heart of this guide and is the most challenging step of the assessment in terms of field work. Following up on seed supplies requires significant legwork: interviews with individual farmers, or farmer groups and communities, contact with seed traders, market inquiries and visits, and consultation with formal sector specialists. Step 5 leads the relief worker through different loops to understand how home production and social networks are functioning during a crisis and in the stressful aftermath; how the local seed and grain markets are holding up or have changed under stress; and possibilities for tapping into the formal seed sector and commercial supplies. These different types of seed channels need to be assessed and then their joint potential for meeting farmers' needs evaluated.

Step 7 matches responses to the situation. It provides decision trees for examining possible interventions and discusses when they may or may not be appropriate. Organizations will, of course, choose interventions that are not only appropriate but also within their capacity to implement. So, in step 7 there may be a balance to strike – between the ideal response and the most practical response in view of available capacity and resources.

Again, we emphasize that mismatched responses are not neutral: they can cause damage for years to come. Some humanitarian agencies, after going through the steps of an SSSA, may conclude they lack the expertise to do the job well, and may ultimately decide to focus on other types of assistance.

Who should use this guide?

This guide is aimed at people who have the task of planning post-disaster response, including those involved in decisions about the kinds of immediate relief needed. Seed systems work is never really short-term in the sense that giving food or blankets may be

Table 1. Assessment activities before and after a disaster

Seed System Security Assessment (SSSA) for situations of acute and chronic stress					
Pre-disaster	**Post-disaster**				
Preparedness: Determine normal status of crop and seed systems. Identify chronic system needs and development opportunities	Describe effects of disaster	Set goals for relief and recovery	Determine short-term seed security. Are seed channels functioning?	Identify longer-term chronic stress and/or emerging opportunities	Lay out action plan
Timing: Months/seasons before the disaster	Immediately after the disaster	As soon as possible after the disaster; at least one or two months before the next growing season			

Source: adapted from the Red Cross and Red Crescent Societies

short-term. When seed aid is given, the intervention should, as a minimum, provide follow-up through the planting and harvest periods.

The guide can also be used by those involved in recovery and rehabilitation in areas of chronic stress, as it provides tools for reflecting on seed system functioning over the longer term. While the guide aims to be accessible to development workers who aren't seed system specialists, it does require that users be committed to learning about local agriculture in some detail. Seed system responses are most effective when tailored to the specific context. A crop variety that grows well in one agroecological zone may be unsuited to another only 20 kilometers away. Similarly, crop and varietal priorities may differ markedly between neighboring ethnic groups, or between poor farmers and those with more economic cushioning.

Application and timing

This guide has been designed as a project-level analytical tool, that is, for assessing conditions in a specific, spatially defined zone of action. It is intended for a team that wants not only to 'find out' (assess) what's going on, but also to implement a project in a targeted and effective manner. Some of the tasks outlined in the guide are desk-based; others require field-based data gathering. Parts of the guide can also be used as preparatory tools. For example, building profiles of local crop and seed systems (Step 2) can be done beforehand, particularly in zones of chronic stress where emergencies may be 'near-predictable' and relief measures repetitive. Probing for chronic stresses (Step 6) can likewise make humanitarian workers ready for swift and appropriate action. Such preparatory work represents a good 'knowledge investment'.

Ideally, the full SSSA assessment should be done before any intervention. Depending on the size and heterogeneity of a zone, the field assessment can be conducted in three to ten days, or sometimes longer if the zone is particularly vast and varied. However, a late assessment is definitely better than none at all. Some components of the SSSA, such as Step 6, can easily be conducted as an intervention unfolds. An SSSA can even be carried out at the end of the cropping season – to see the effects of implementation and to gather base material needed to prepare a response for the next crisis.

It is important to emphasize that an SSSA is dynamic. Teams may go back and forth among steps as new information reshapes thinking or as new events on the ground unfold. Once baseline information (e.g., on crops, seed systems, and market structures during normal times) has been collected, it should take just a few days to prepare an update if yet another cycle of crisis should occur. Table 1 sketches out the broad sequence of activities.

Team composition

Who should be recruited to the assessment team? It's important to include people who know the local farming systems well, such as extension workers and development project agronomists. It is also useful to have an economist on the team to help with market analysis, as well as representatives from the formal seed sector and agricultural research systems. But the team should also have solid representation from organizations or other groups who will be directly

involved in subsequent relief and recovery. Drawing on diverse expertise and organizations helps the SSSA to get in-depth background information, to focus quickly on the most important problems, and to catalyze coalitions for action. Input from local groups is, of course, essential to an SSSA. These include farming communities, local traders, government officials, and respected elders. While representatives of these groups may be too busy to join an assessment team, the provision of feedback to local populations should be explicitly programmed.

What is included, what is not

Finally, this guide gives insights on seed and seed system issues. The wrong crop, the wrong variety, or the wrong approach may determine the bottom line for the farmer and her family: whether they have enough food to survive. Agriculture is not vague or homogeneous. Plant adaptation tends to be location-specific and social and cultural preferences often vary among groups in close proximity. The information gathered about local conditions needs to be specific enough to allow humanitarian agencies to intervene 'on the mark'.

This is *not* a general guide on livelihoods. It doesn't cover the range of domains in which an organization might intervene after a crisis – areas such as water supply, health, and livestock production. This SSSA guide is intended to aid action in the specific area of seed supply for agriculture. The process presented here nevertheless includes a number of 'overview' steps, to prevent seed-related needs from being evaluated in a contextual vacuum. In fact, we add the word 'system' in the title of the guide to ensure that the big picture is never very far away, and that it influences both broad and specific design.

This is also *not* a general methods guide. If humanitarian workers don't have basic field skills – for example, they don't know how to conduct individual interviews and focus groups, how to collect and analyze qualitative and quantitative data, or how to select farmers and communities for a survey – they should not take major roles in field assessments.

Structure of the guide

The guide is divided into three main parts. This introduction, Part 1, is followed by brief but essential background information on seed systems and the concept of seed security. The bulk of the guide, Part 3, then lays out, in seven steps, the nuts and bolts of conducting a seed system security assessment. Three appendixes complete the guide: a glossary of technical terms, a list of abbreviations, and a list of bibliographic resources.

Background to Seed Security Assessment

Seed security and food security: What's the difference?

Farm families are 'seed secure' when they have access to seed of adequate quantity, of acceptable quality, and in time for planting. Here we define seed broadly to include not just grains that are sown, but also cuttings, tubers, and other agricultural planting materials. Helping farmers obtain seed enables them to produce for their own consumption and sale. So fostering seed security contributes to food and livelihood security more generally.

While seed security and food security have some elements in common, they are nevertheless quite different. 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 seed (or the right seed) for planting. This happens more rarely, but can occur if seed stocks kept in the house become infested with insect pests or are otherwise contaminated, or if a disease outbreak requires a switch to a resistant crop variety.

Despite these key differences between food security and seed security, determinations of seed security have nearly always been based, implicitly or explicitly, on food security assessments. Evaluators assess food needs and then just extrapolate seed requirements as part of the aid package. Similarly, they may estimate existing food stocks by measuring harvests or crop losses. If there is a sharp drop in the harvest, they know there will also be a steep decline in food availability. However, this direct link is not necessarily true of seed systems; that is, a production shortfall doesn't necessarily lead to a seed shortfall.

Ways of calculating seed system needs versus food security needs also differ. We stress the concept of a seed 'system' here since assessments of seed security go well beyond tallying up seed needs on a calculator, although that may be part of the work. Attaining seed security means finding ways to support the systems that give farmers ongoing access to seed of the crops and varieties they require. In many cases, this has little to do with delivering seed directly to farmers and a lot to do with supporting and strengthening the channels through which farmers obtain planting materials on their own.

Small-scale farmers' seed sources: Formal and informal systems

Small-scale farmers obtain their seed from various sources. These are loosely grouped into what are called formal and informal seed systems, the latter sometimes referred to as local, traditional or farmer seed systems.

PHOTO: JEAN CLAUDE RUBYOGO, CIAT

Poor practice in seed aid makes farmers even more vulnerable – seed distributed weeks too late

The formal system provides farmers with 'modern' varieties which it promotes in the form of high-quality seed, either 'foundation' or 'certified' seed. It involves a chain of activities, usually starting with plant breeding and ending with the official release of finished varieties. The formal system is governed by regulations intended to maintain varietal identity and purity, and to guarantee physical, physiological, and sanitary quality. Seed is marketed through officially recognized outlets by way of national agricultural research systems, and sometimes via relief seed programs. The central premise of the formal system is that there is a clear distinction between 'seed' and 'grain'. The formal system is especially important when seed is used to grow crops for commercial purposes, as in the case of produce destined for export or food processing. In such instances, the uniformity and high quality of the end product must be guaranteed.

The informal seed system centers on local or farmer varieties. It might also move 'modern' varieties that have been multiplied by farmers (so they are in fact second-, third- or fourth-generation 'modern'). The informal system includes most of the ways in which farmers themselves produce, disseminate, and procure seed: directly from their own harvest, through barter among friends, neighbors, and relatives, and through local grain markets or traders. Seed is produced, and often sorted, as an integral part of farmers' grain production rather than as a discrete seed production enterprise. Local technical knowledge and standards guide informal seed system performance, including the requirements of local markets. Because of its ability to meet local needs and preferences, the informal system provides most of the seed farmers use. Worldwide, this amounts to between 80% and 90% of seed stocks.

Farmers often obtain their seed through both formal and informal channels for different kinds of crops. In southern Africa, for example, small farmers may routinely procure maize hybrids through formal seed systems (stockists, commercial companies, government parastatals, and relief agencies), beans from their own harvest or local grain markets, and sorghum seed from their neighbors. It is also not unusual for a household to meet its seed needs for a single crop from different seed channels. Bean farmers throughout eastern and central Africa, for example, obtain some of their seed from their own stocks, some from markets or neighbors, and may acquire a handful of new material (to test) from extension agents or research stations.

Figure 1 depicts the formal and informal seed systems, their component channels, and how the channels are linked. There are many flows between these two systems. For instance, new 'modern' varieties, though launched by the formal system, may move into informal channels quickly, and be disseminated farmer-to-farmer or even sold in local markets. Sometimes local varieties, or landraces, are brought into the formal system and then released officially. Figure 1 also shows the special importance of local seed/grain markets. Such markets are crucial for farmers to meet their seed needs, and especially for poor farmers and in difficult times. For many farmers, local markets are a good bet, after home stocks, as they may put on offer the same varieties farmers routinely sow. There are important exceptions to this pattern. Vegetatively- propagated crops such as bananas, yams, sweet potatoes, and cassava are generally not sold in markets; and in regions where markets are poorly developed, planting materials may be sold only rarely.

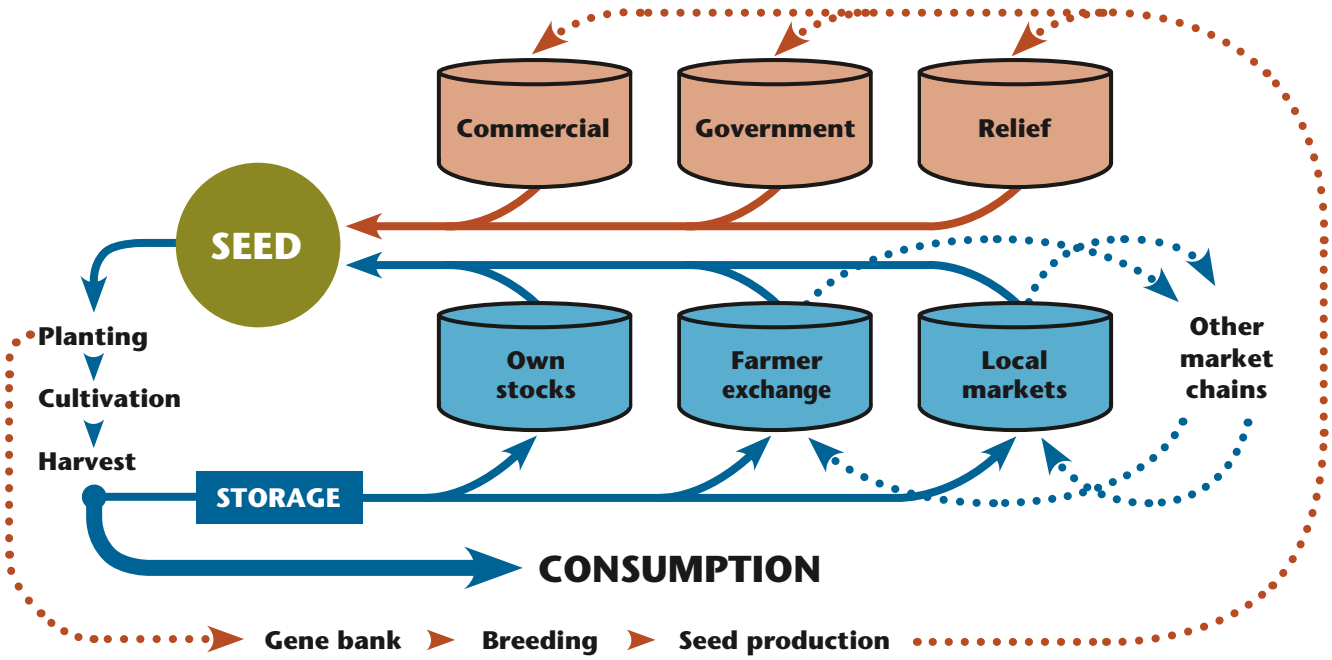


Figure 1. Channels through which farmers source seed

Sources are represented by the cylinders. Farmers' own seed stocks, exchanges with other farmers, and purchases through local grain markets (the blue circuit) constitute informal channels. Commercial seed suppliers, government or research outlets, and relief agencies constitute formal channels (the orange circuit). Adapted from Almekinders and Louwaars (1999), appearing in Sperling, Cooper, and Remington, Journal of Development Studies *(2008).*

Table 2. Three essential elements of seed security

Element of seed security	Description
Availability	Sufficient quantities of seed can be obtained within reasonable proximity (spatial availability) and in time for critical sowing periods (temporal availability).
Access	People have adequate cash or other resources (for example, financial credit or friends and relatives willing to help out) to buy appropriate seed or barter for it.
Quality	Seed is of acceptable quality: it is healthy and useable, and its varietal attributes (genetic traits like size, shape, and taste of grain) are acceptable to the farmer.

Source: modified from Remington et al. 2002

One seed system isn't necessarily better than the other. Proponents of informal seed systems often view the formal sector as a threat to crop system resilience and agrobiodiversity. Proponents of the formal seed system believe commercial seed production of high-quality seed of new varieties is a prerequisite for sustained increases in crop productivity.

Some channels may be differently affected by disasters than others. One shouldn't assume that a breakdown in one channel means a breakdown in all. For instance, in times of sociopolitical upheaval, such as civil war, formal government channels such as seed parastatals often cease to function, while local ones, such as the seed/grain markets, continue to operate. In contrast, in times of disease outbreak, such as epidemics of cassava mosaic virus in East and Central Africa, resistant varieties bred by formal channels may prove more durable.

Key elements of seed security

A seed-secure farmer isn't necessarily one who *produces* all the seed she needs. Rather, it's someone who *has access* to all the seed she needs on a reliable basis. She may produce some of it herself. She may buy some, as needed. She may get some through seed exchanges with neighbors. Seed security or insecurity has to be looked at crop by crop, as immediate constraints and opportunities often differ among crops. Seed security also has to be looked at collectively – as one crop may temporarily substitute for another during a crisis and its aftermath. For instance, short-maturing crops such as beans can help fill the hunger gap until those crops that take longer to mature, such as maize, are ready to harvest.

For farmers to be seed secure, three conditions must be met. As shown in Table 2, seed has to be available, farmers need to be able to access it, and the quality has to meet producer and consumer preferences.

Note that there are two broad aspects of quality: that of the seed itself, and that of the variety. Seed quality comprises attributes such as the germination rate and the presence or absence of disease, stones, sand, broken seed or weeds. Variety quality has to do with genetically-based traits such as adaptation to the local environment, plant architecture, time to maturity, seed color and shape, and palatability.

In assessing seed security, it's important to realize that the distinction between availability and access is somewhat blurred. If people are willing to pay a lot to transport suitable seed from faraway sources, for example, then it can be said that seed is always 'available'. In other words, having at one's disposal considerable means to 'access' seed can usually make seed available.

Stress rarely undermines all three elements of seed security simultaneously. The most common post-disaster seed-related problem experienced by farmers is reduced access. This is usually because market prices have gone up, or because farmers are no longer willing to exchange seed among themselves, or, most often, because farmers suddenly have a long list of urgent needs, just when their assets are in decline. For example, survivors of the 1994 Rwandan civil war generally lost considerable assets (e.g., tools, livestock, doors, windows, and even entire houses) and 'gained' a formidable set of expenses (e.g., medical care and labor for building repairs).

Actual scarcities of seed, that is having a problem of seed availability, are rare. They tend to happen when farming systems are wiped out en masse, as with the Tsunami in South and Southeast Asia in late December 2004. Quality concerns usually emerge only with major outbreaks of pests or diseases such as root rots and viruses. In this case, the varieties routinely planted by farmers may no longer be suited to local biological conditions – that is, they may not be able to combat disease or pest

pressures. Recurring epidemics of cassava mosaic disease (CMD), starting in the late 1980s, have meant that Ugandan farmers have had to repeatedly struggle to avert famine and find planting materials. Understanding the effects of these different stresses is important for guiding action.

Distinguishing acute insecurity from chronic insecurity

The concepts of seed security and insecurity are also nuanced by their duration – whether the problems are acute or chronic, with the understanding that such divisions are not hard and fast.
Acute seed insecurity is brought on by distinct events of short duration that often affect much of the population. It may be triggered by failure to plant, loss of a harvest, or high pest infestation of seed in storage. While in normal times seed security varies widely among households, during an acute event such as a flood or civil disturbance all households may be adversely affected.

Chronic seed insecurity exists independently of a disaster or acute stress, although it may be exacerbated by them. Such insecurity is often found among people marginalized in one of three ways: economically by poverty and by lack of land or labor; ecologically as in areas of repeated drought or degraded land; or politically such as in insecure areas, or on land with uncertain tenure arrangements. Chronically seed insecure populations may experience continual shortages of seed to plant, encounter difficulties in acquiring off-farm seed for lack of funds, and routinely have nothing available but low-quality seed and unwanted varieties. The result is households with built-in vulnerabilities.

Acute and chronic seed insecurity often exist side-by-side. Where emergencies tend to recur – drought-prone areas, for example – the ill effects of acute stress are nearly always superimposed on chronic problems, rooted in poverty. A disaster may affect all segments of the population to some degree as harvests decline, and may result in loss of some seed stocks. However, those just inside the margin of seed security in normal times may fall into seed stress if the response to the crisis is inadequate. Similarly, seed aid alone may not be enough to allow people living under chronic stress to regain a measure of seed security.

Designing and targeting the response to specific seed security constraints

Thinking through the three aspects of acute and chronic seed insecurity – availability, access, and seed quality – can help relief workers better design and target their responses. For example, if availability turns out to be the problem, then seed-based interventions, such as importing seed to address an acute shock or promoting community-based seed production enterprises to address chronic stress, may be appropriate.

Identifying seed access as a major constraint might wisely trigger a more holistic analysis of livelihood strategies. Providing farmers with cash or vouchers to get their preferred seed might be on the mark to address short-term problems of access. However, if chronic lack of access is the key problem, this should lead humanitarian agencies to look well beyond seed and seed security constraints. The continuing inability to obtain certain necessities of life is usually equated with basic poverty. Initiatives to help farmers generate income and strengthen their livelihoods are essential here. These issues are addressed more fully in step 7.

Suffice to say that, to date, there have been few explicit assessments of seed insecurity during or even after an emergency. Instead, relief agencies have made various ‘default’ assumptions. Most commonly, a problem of availability is assumed, that ‘there’s simply not enough seed to go around within the affected zone.’ Hence, relief workers spend their time calculating how much seed to buy and bring in – rather than assessing real constraints on the ground. Better understanding of seed security concepts, along with informed use of the SSSA method described here, should lead to more accurate problem identification and targeted response: Table 3 gives some examples.

Table 3. Seed system problems and broadly appropriate responses

Constraint on seed security	Short-term response	Longer-term response
Seed is not available	Direct distribution of seed	Support development of seed production, including commercial enterprises where viable
Poor and vulnerable farmers lack access to seed	Cash disbursement Seed fairs with vouchers or cash Local procurement and distribution	Poverty-reduction programs, e.g., support for the development of agroenterprises and other ways to generate income
Seed is of poor quality:		
If unhealthy seed ➤	Distribution of healthy or treated seed	Programs to address production or storage constraints (e.g., to reduce postharvest deterioration).
If unadapted varieties ➤	Distribution (through direct seed distribution (DSD) or seed vouchers and fairs (SVF) of varieties specifically adapted, which can tolerate stress	Participatory plant breeding to identify adapted and acceptable varieties

The Practical Work

We now turn to the practical work: how to conduct a seed system security assessment. There are seven main steps in the SSSA, listed in Box 1. The rest of the guide describes them in detail. Although the steps are presented sequentially, they involve going back and forth among steps during the field assessment, until the assessment team understands what is really going on.

This SSSA guide is designed first and foremost to address acute shocks – emergencies. However, a separate section is included to draw attention to longer-term trends. These may be negative trends, such as chronic stress patterns, or positive ones, such as opportunities for setting up agroenterprises or taking advantage of new crop varieties and other innovations.

Box 1. Seven basic steps in assessing seed system security

1. Identify zones for assessment and possible intervention.
2. Describe the normal status of crop and seed systems.
3. Describe the broad effects of the disaster on these farming systems.
4. Set goals for relief and recovery operations based on farmers' need.
5. Assess the post-crisis functioning of seed channels to determine whether short-term assistance is needed.
6. Identify any chronic stresses requiring longer-term solutions and identify emerging development opportunities.
7. Determine appropriate short- and longer-term responses based on analysis of priority constraints, opportunities, and farmers' needs.

Interest groups to focus on

In assessing seed security there are always choices to make about whom to focus on, about which segments of the population can provide the most valuable information for designing an intervention strategy. Here are four key categories:

PHOTO: STEVE WALSH, CRS

Preparing for seed fairs, Muyinga, Burundi

- The 'average' farmer will provide insights into the overall effects of acute stress.
- More vulnerable farmers, in addition to highlighting the effects of acute stress, should reveal chronic problems confronting the poorest.
- Commercial farmers can help uncover the effects of stress on cash crop production, including produce for export.
- Women and men may have very different needs, wants, and knowledge. Placing emphasis on one or the other group can give gender-specific insight.

Input from all interest groups can be gathered during the assessment. However, different groups will require different kinds of interventions to alleviate stress. Similarly, farmer groups will differ with regard to their tolerance to risk and their ability to exploit opportunities, such as hybrid varieties of crops and the use of fertilizers. These differences need to be taken into account in the design and implementation of action plans.

STEP 1

Identify zones for assessment and possible intervention

The first step in an SSSA is to identify and describe the broad zone or zones of interest, namely the physical locations where assessments should be carried out and where interventions might benefit victims of a natural disaster or other emergency. Precision is crucial since the effects of a disaster may vary over short distances. Moreover, variations in agroecology, farming practices, and local customs and culture may mean that two adjacent zones also have significantly different seed security needs.

Scope of work

In cases of acute stress – due to a hurricane or earthquake for example – the team should map the geographic extent and intensity of the emergency and determine zones for potential intervention. Where seed insecurity is chronic, define target zones and be clear about the rationale for overall boundaries. This 'emergency' mapping should include a general geographic description of the zone or territorial unit, including its natural or administrative boundaries, its area in square kilometers or square miles, and major roads and other elements needed to understand accessibility, especially as it affects remote communities.

Within general zones, distinguish sub-zones. It may be wise to conduct a separate SSSA for each major agroecological zone and cropping system, and for each ethnic or occupational group (such as 'primarily farmers' or 'livestock herders'). The description of each territorial unit should take a number of key factors into account:

- population size and density
- rainfall (number of seasons and seasonal totals)
- total area under cultivation, area and production by crop, and yields
- ethnic groups (who may have distinct farming and cultural practices)
- major variations in agricultural practices within zones, such as the use of irrigation
- how different populations (e.g., with resident and displaced communities) have been affected by the disaster.

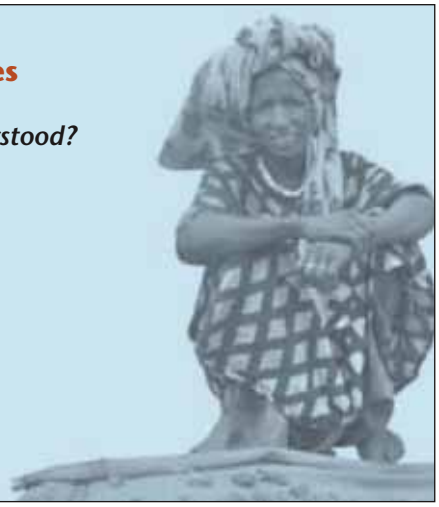
Box 2, which draws on the experience of Catholic Relief Service (CRS) in Mali, West Africa, gives a flavor of the features used to define sub-zones of the general zone of intervention.

Box 2. Defining sub-zones of a general zone of intervention

A seed system assessment in northern Mali focused on the administrative unit of Douentza Circle. The assessment followed a series of crises related to seed and agricultural systems, including flash flooding in selected areas in 2003–04, a severe drought and invasion of locusts in 2004–05, and a sharp shortage of rainfall in 2005–06. Three communes were given particular attention in the assessment as it was not possible to analyze in depth each commune in Douentza Circle. Djaptodji, Dangol-Bore, and Haire were chosen because they were heavily affected by the crises, particularly locusts; because in normal times they are among the major agricultural production areas; and because a majority of the population is sedentary. [Note: There are also nomadic pastoralists in this Circle.] The three communes represent the different agro-ecologies of the circle quite well. Djaptoji borders the Niger interior Delta region, and has several lakes that may flood with the river's rising water levels. As the floods recede, this area is suitable for flood recession farming, using residual moisture. The Dangol Bore commune is located on the north edge of the Dogon Plateau. The soil types and micro ecologies are influenced by the proximity of barren rocks and valleys that can easily overflow, causing flash floods during the rainy season. The team believes that the findings from these three zones can be extrapolated to wider areas in the Douentza region.

Source: CRS Mali/Partners, 2006 (edited excerpt)

Guiding questions for Step 1: Defining the general zone of action and possible sub-zones



Are those factors that might necessitate division into sub-zones well understood?

- Agroecological variations?
- Key differences in agricultural production?
- Population diversity (ethnicity, caste)?
- Possible unevenness in infrastructural development?
- Varying impacts of the disaster?
- Other factors?

How-to notes: Zone identification

To identify SSSA zones, consult national and regional emergency services and examine published documentation on general agroecological zones and distribution of populations. Census bureaus, universities, ministries of agriculture, and specialized monitoring units (focusing on rural economic conditions, agriculture or farm households) might all house useful information. In many cases, the broad zones of potential action are predefined as they are areas where NGOs or other development organizations are already working. In some cases, zones for action may be pre-assigned by disaster-coordination authorities, who may want to minimize duplication of aid assistance. Also, availability of funding might determine the size or number of zones/sub-zones. Actual field visits to define the broad zone of action may be necessary when implementers are new to the area or when background data are sketchy or unavailable.

Checklist for Step 1: Identify zones for assessment and possible intervention

Apply this checklist to each key crop.

Questions	Yes	No	Comment	Further action needed
Has the general zone of action been well defined? If yes, what are the boundaries of the general zone of action?				
Should the general zone of the SSSA be divided into distinct sub-zones? If yes, why? What are the sub-zones? How many? Names/boundaries?				

STEP 2

Describe the normal status of crop and seed systems

Within the zone identified for possible action, how do the crop and seed systems function under normal conditions? Answering this question is the focus of Step 2. Let's say drought is a recurring stress in a semiarid zone. It can be considered 'normal' for those agroecological circumstances. In this case, the assessors should aim to understand the agricultural and seed system patterns and strategies that have allowed farmers to routinely cope with such climate-related stresses.

While this step is concerned mainly with crop and seed profiles, additional factors may need to be included in the analysis of those agricultural systems in which livestock are particularly important. For such systems, information should be collected with regard to farm animal species and breeds, their importance in the production system, livestock management practices (for example, grazing, fodder cultivation, and housing), and crop–livestock tradeoffs.

Box 3. Profiling crop and seed systems in normal times: The basics

A. What are farmers' most important crops in normal times? What do they use them for? Consumption, income or both? What lesser crops might become important in times of stress?

B. How do farmers usually get seed or other planting material for these crops?

C. What are the sowing parameters for each major crop? Average area planted? Seeding rates? Multiplication rates (ratios of seed/grain harvested to seed planted)?

D. Are there important or preferred varieties of specific crops?

E. Which inputs are essential for particular crops or varieties?

F. Who in the household is responsible for decision making, managing crops, and disposing of crop products at different stages of production and post-production?

Scope of work

For each zone or territorial unit under consideration, the different agricultural and seed systems need to be described. The broad questions to be answered by Step 2 are listed in Box 3; each is then described in more detail in the rest of this section.

Some answers to these questions may be valid across households and socioeconomic groups, while others may not. So it could be important to repeat the analysis for distinct types of households or target groups – for example, female-headed households. Answers may also vary by ethnic group, and certainly will vary by agroecological zone. Clearly, then, an assessment covering a small area will not be valid as the basis for country-wide interventions. We now look in more detail at these six elements to show how decision-making can begin even during routine information collection.

A) What are farmers' most important crops?

Not all crops contribute equally to farm livelihoods. A quick analysis can highlight those that are most important for direct consumption and/or income. (Income generators often allow farm families to buy survival items in times of stress). Furthermore, men and women may have different crop priorities and crops critical for poor farmers may not be so important for the better-off. It is often useful to immediately identify crops most pertinent to the well-being of vulnerable groups.

Crop profiles change from season to season and even within a single season, and there may be staggered sowing and harvest dates. While crop profiles may also change during a period of stress, these variations can usually be anticipated. For all these reasons crop calendars prove useful as tools for determining which crops to focus on and as guides for establishing a broad time frame for possible interventions.

Table 4. Crop production in Djapotodji, Mali (Delta Zone), by season and use

Crop	Crop use		
	Consumption	Income/barter	Forage
Rainy season: June–October			
Rice (irrigated)	✔	✔	✔
Rice (rainfed)	✔	✔	✔
Pearl millet	✔		✔
Sorghum	✔		✔
Cowpea	✔	✔	✔
Bambara nuts	✔	✔	
Hibiscus	✔	✔	✔
Gumbo (Okra)	✔		
Post-rainy season (off-season): November–February			
Horticultural crops, e.g., onions and cabbage	✔	✔	
Floodplain cultivation season: February–September			
Sorghum	✔		✔
Pearl millet	✔		✔
Cowpea	✔	✔	✔
Cassava	✔	✔	✔
Sweet potato	✔	✔	✔

Source: CRS Mali/Partners, 2006

How-to notes: Important crops

Much of this information can be gathered even before a disaster happens, through desk-based research and interviews with key informants such as agricultural officers and extension workers. Farmer focus groups are also a useful source of information on crop preferences and end uses associated with gender and wealth status.

One should not rank crops in a hard and fast manner – as in designating one as absolutely more important than another. Typically, different crops serve different purposes and many crops have multiple uses. For instance, bananas may be important both for making beer and for generating cash; beans may be essential to meeting dietary protein needs; and cassava may serve as a major source of calories.

Table 5. Sample crop calendar over two seasons for selected major crops in mid-altitude Rwanda

Crop	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beans	h		S			H				s		
Maize		h S					H		s			
Sorghum	s						h					s
Sweet potatoes	s	s	h	S			H				S	s

s = sowing period, season 1; h = harvest period, season 1
S = sowing period, season 2; H = harvest period, season 2
Source: J.C. Rubyogo, personal communication

B) How do farmers usually get seed for these crops?

A farmer can usually obtain seed from a range of sources, even for the same crop. For example, she might get some of her bean seed from her own stocks and some from local markets, allowing her to make up for an inadequate harvest or poor storage conditions. The use of multiple seed channels for the same crop is important because weakness or failure in one channel can be compensated by use of another.

Seed for different crops may also routinely be obtained through quite different channels. Hybrid maize seed is normally obtained from formal sector or commercial sellers, while sorghum seed can easily be obtained from home harvests as its multiplication rate is high and the harvest can be directly used for seed.

The range of channels from which farmers obtain their seed may change over time. For example, there is a growing number of informal traders who move high-quality (but still uncertified) seed. At the same time, relief seed is becoming routinely available in areas of high poverty. Hence the need for the assessment teams to be aware of the full range of seed channels used by farmers, and to remain abreast of current trends in seed supply. Table 6 gives a hypothetical example of how a household in Kenya or Rwanda might source seed, tailoring the use of specific channels according to need.

C) What are the seed requirements for each major crop?

Here we look at quantifiable seed needs. With basic agronomic information, the amount of seed farmers need can be calculated, with a view to predicting shortages or surpluses. The greater the seed multiplication rate of a crop/variety, the smaller the proportion of a normal harvest needed to meet sowing needs in the next season. Small-seeded crops generally have high multiplication rates; thus, only a small proportion of the harvest is needed as seed. For example, millet and sorghum, the dominant small-seeded crops of dryland Africa, generally require less than 5% of the harvest to meet seed needs. So even in a bad year, seed requirements for these crops are unlikely to be a big drain on the harvest. In the case of large-seeded crops such as groundnut, farmers may have to set aside as much as 10% of the harvest as seed. Seed availability is more likely to be an issue with these crops, especially in bad years. Box 4 presents simple formulas for calculating seed-sowing needs and subsequent harvests. Tables 7a, 7b and

Table 6. Seed sources as a proportion of seed supply for most important crops: Hypothetical example, East Africa

Crop	Own production (%)	Social networks, neighbors, and friends (%)	Local markets (%)	Formal sector (%)	Total (%)
Beans	50	5	45		100
Sorghum	95	5			100
Maize	40			60	100

How-to notes: Identifying seed sources

1. *All possible sources of seed – the 'where' – should be explored for each crop. With this initial tally in hand, the most important source can be identified, followed by secondary and tertiary sources. Here are typical sources to consider:*
   - *Home harvest. Seed is saved from the previous harvest and stored at the homestead.*
   - *Local market. Seed is bought from open markets or local shops that stock grain and seed (often a mix of both). This may include both local varieties and improved varieties such as self-pollinated beans or open-pollinated variety (OPV) maize.*
   - *Stockists. Farmers procure seed from specialized shops that carry certified seed, fertilizers, pesticides and other agricultural inputs.*
   - *Extensionists/projects. Seed is supplied by government agents who normally promote varieties coming from research or the private sector.*
   - *Relatives or neighbors. In this case, seed is typically given as a gift.*
   - *Seed aid/relief. Seed, either commercially supplied or from grain markets, is given as emergency aid, or as assistance to the poor or vulnerable. Donors may include governments, NGOs or churches.*
2. *The 'how' should be made clear in the description: By what means is the seed sourced? Is it obtained free of charge, through barter, or by cash payment?*
3. *'Who' is interviewed is also quite important, particularly with regard to wealth status. While richer farmers may have substantial seed stocks, poor farmers may have to rely on social networks or they may have to buy seed from the market.*

7c present examples for different crops, in good and bad years.

For locally important crops, basic production data, such as the multiplication rate, will be common knowledge among agronomists and farmers in the area. To accurately estimate sowing needs per household, you also need to find out the average area per household typically sown to a particular crop, and how much seed per hectare farmers sow (seeding rates).

As examples, Table 7a shows the relationships among various agricultural factors for beans and sorghum in Rwanda, in normal times. Table 7b, drawing on the data from northern Mali, shortcuts the process to show how much seed farmers normally need and how much they normally harvest (rough averages). This can be refined, factoring in both seed sorting practices (tossing out small or broken seeds) and re-sowing rates (replanting when the first sowing does not sprout, which often happens during a drought). Table 7c increases the precision by drawing on actual field data for two areas of differing agricultural potential in Ethiopia, and contrasting a good versus bad harvest year.

The message from Tables 7a–7c is consistent: a production shortfall does not necessarily imply a seed shortfall – not even in a bad year, and not even when one or more re-sowings are needed. For many crops analyzed in Africa (for example, common bean, Fava bean, maize, sorghum, groundnut, wheat and teff), there will potentially be enough seed on offer even if harvests drop by as much as 90%. We say 'potentially' as the quality of seed from the harvest has to be adequate and farmers have to be able to save sufficient stocks until sowing time. This may be particularly challenging in regions with just one growing season per year.

Box 4. Seed needs from harvests

For a given crop (and variety) and area to be planted, it's easy to calculate the amount of seed a farmer will need for sowing, as well as the size of harvest to be expected.

Let PA be the area to be planted by a farmer, in hectares. Let SR be the seeding rate, that is the amount of seed, in kilograms, that needs to be sown for each hectare of the crop and variety in question. Let MR be the multiplication rate of that crop or variety, namely the ratio of harvestable grain to seed sown. Using these three variables, we can determine sowing needs (SN), in kilograms, for the area to be planted, and the expected harvest (H), in kilograms (some of which may be used in the next cropping season as seed), using a few simple formulas:

SN = PA x SR
H = PA x SR x MR
Thus, H = SN x MR

A note of caution: The formula for SN assumes a crop is sown only once. However, under certain conditions seeds of an initial sowing may fail to germinate. So farmers may end up planting a crop two or even three times, thus doubling or tripling their sowing needs.

Tables 7a, 7b and 7c give a few examples of seed needs in light of potential harvests of specific crops.

A simple calculator, in Microsoft® Office Excel format, can be downloaded from [www.ciat.cgiar.org/africa/seed_manual.htm]. Here's an example of the inputs and outputs for a hypothetical case.

INPUTS

Parameter	Value	Units	Example
PA	**0.5**	ha	0.5
SR	**15**	kg/ha	15
MR	**166.6667**	ratio	166.6667
SN		kg	7.5
H		kg	1250

OUTPUTS

Parameter	Value	Units	Formula
PA		ha ha	PA = SN/SR PA = H/(SR x MR)
SR		kg/ha kg/ha	SR = H/(PA x MR) SR = SN/PA
MR		ratio ratio	MR = H/(PA x SR) MR = H/SN
SN	7.5	kg kg	SN = PA x SR SN = H/MR
H	1250.0003	kg kg	H = PA x SR x MR H = SN x MR

How-to notes: Calculating seed quantities

Any assessment of the quantities of seed required should be grounded in farmers' actual behavior. For good reasons, standard on-farm practice may differ substantially from officially recommended practice. So use farmers' own sowing densities as the basis for calculations. In addition, farmers' seed versus grain sorting percentages (e.g., what proportion is set aside as seed compared with what is eaten or thrown out as non-seed) should be factored in when calculating quantities of seed needed.

Table 7a. Seed needs per household: beans and sorghum in mid-altitude Rwanda

Seed parameter	Beans	Sorghum
Planted area per household (ha)	0.25	0.25
Seeding rate (kg/ha)	100	10
Sowing needs (kg)	25	2.5
Multiplication rate (grain produced divided by seed sown)	8	100
Harvest (kg)	200	250
% of harvest required to meet sowing needs (100 divided by the multiplication rate)	12.5	1.0

Table 7b. Sowing needs per household: pearl millet and groundnut in northern Mali

Seed parameter	Pearl millet	Groundnut
Sowing needs (kg by normal farmer area)	10 to 20	15
Harvest (kg)	430	125
Proportion of harvest needed for seed (%)	2.3 to 4.7	12

Table 7c. Examples from eastern Ethiopia, sorghum: high- versus low-potential area in good and bad years

Seed parameter	Chiro (highland)	Mieso (lowland)
Planted area per household (ha)	0.5	0.75
Sowing need (kg)	7 to 8	11 to 12
Harvest, good year (kg)	1250	1600
Proportion of harvest needed for seed, good year (%)	0.56 to 0.64	0.75
Harvest, bad year (kg)	400	260
Proportion of harvest needed for seed, bad year (%)	2.0	4.6

How-to notes: Identifying varieties

It is often difficult to identify varieties on the basis of name only. Farmers in one area may use the same name for a cluster of varieties – for example, 'yellow'. Or they may use different names, such as 'development' and 'red', for the same variety, particularly if they have received it from different sources. Names may also change over short distances. When identifying varieties, it is important to collect the descriptive features along with the name. These include color, shape, and relative time to maturity (early, normal or late maturing). Carrying seed samples (in the case of seed-propagated crops) to compare against farmers' seed or in order to solicit farmer insights can also be useful.

D) Are there important or preferred varieties of specific crops?

Different varieties may serve different purposes in a household. While certain varieties may be grown specifically for home consumption, others may be preferred for sale. Some aspects of postharvest processing, such as ease of threshing or cooking quality, may result in women and men having different varietal preferences. The choice of varieties cultivated may also reflect differences in agroecological, socioeconomic, and other conditions between farms, households, and communities. For example, people with easy access to markets may have fertilizers and pesticides on hand; in that case, there is less incentive to plant a variety tolerant to local pests or poor soils. Also, the relevance of different varieties may increase or diminish over time, even within a single household, as conditions change.

The important task here is *not* to make an inventory of all the varieties farmers use. Rather, varieties central to food security and income need to be identified – by name, but especially by attributes. The continuing presence of these varieties within farmers' seed systems will serve as a sign of ongoing production stability.

E) Which inputs are essential for particular crops or varieties?

Inputs are sometimes essential for basic crop performance (Table 8). The focus here should be on those routinely used by 'normal' and poorer farmers. A focus on 'progressive' farmers might skew the assessment of what is needed.

F) Who within the household or production unit is responsible for decision making, managing crops, and disposing of crop products at different stages of production and post-production?

In compiling crop and seed profiles for normal times, it is essential to get an overview of the divisions of labor by gender, caste, ethnic group or other key distinguishing feature. Divisions of labor may be intricate and the associated technical knowledge highly specialized. Collecting this information is important for two reasons. First, the assessment team needs to find out who has the kinds of precise information needed to shed light on various aspects of agriculture in normal times. It is inefficient to question people who aren't knowledgeable about the

Table 8. Framework for assessing what inputs may be essential for farmers

Inputs	Critical for which crops?	Where are they normally obtained?	Amounts used (specify units)	Comments
Inorganic fertilizer (specify)				
Manure (specify, e.g., animal manure or green manure)				
Pesticides (specify, e.g., type of insecticide or fungicide)				
Other (specify)				

How-to notes: Assessing inputs

In assessing input needs, it is important to use actual farmer practice as the standard, just as we noted earlier for calculating seed requirements. What happens in farmers' fields often differs markedly from officially recommended practice.

topic. Second, it is important to find out who makes decisions and who controls crop products, so as to understand how an emphasis on a specific crop or variety may create advantages or disadvantages for a certain group or groups.

Gender-related divisions are often not as straightforward as a set of guiding questions might suggest. The examples in Table 9 are taken from an SSSA in Mali. Different kinds of divisions were seen even over very small distances and within the same ethnic groups. All this variation – in crop and variety choice, ownership and management and by zone, ethnic group, and gender – suggests that any interventions have to be informed by a solid understanding of the local target zone. Only with such a refined perspective can the assessment team accurately target specific groups for assistance and ensure equity in program design.

Guiding questions for Step 2: Divisions of agricultural labor and implications for action

- Are there specific crops associated with women? With men? List them.
- Do women and men have separate plots? Describe the situation.
- For each key crop, what is the division of labor by gender? Are different stages of crop management associated with women or with men? Describe the situation, including processing and other postharvest activities.
- Who decides on the use of harvest and postharvest products, for consumption, storage, processing or sale?
- Who 'owns' or immediately benefits from crop consumption, direct sale of crops, and processed crop products?

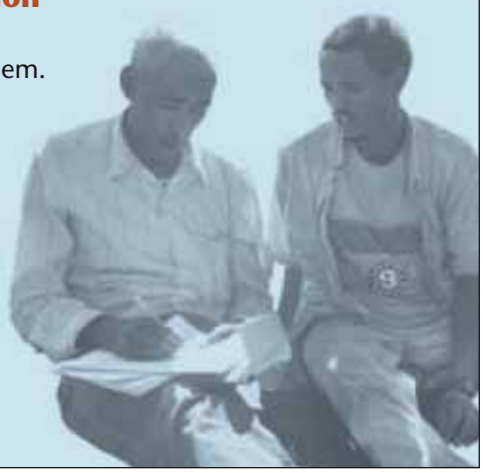


Table 9. Divisions of labor by gender: Examples from Douentza Circle, Mali, within a 70 km radius

Location: N'Gouma Ethnic Group: Peuhl	Location: Sobo Ethnic groups: Bozo, Bambara, Peuhl and Tamacheik	Location: Wakere Ethnic group: mostly Bambara	Location: Sarafere-Mirion Ethnic group: Bambara
Men do all the agricultural work. Women make and sell mats.	Both women and men farm, but manage their fields separately. Men grow millet, groundnuts, Bambara nuts, and rice. Women grow groundnuts, Bambara nuts, rice, cowpea, and horticultural crops (tobacco, onions, tomatoes, and peppers).	Women manage the rice and horticultural crops. Men manage the other crops: millet, sorghum, groundnuts, Bambara nuts, cowpea, and hibiscus.	Women help during the sowing of millet and the transplanting of rice. Men do the rest of the work – on millet, sorghum, cowpea, groundnuts, Bambara nuts, and rice.

Source: CRS Mali/Partners, 2006

Checklist for Step 2: Describe the normal status of crop and seed systems

Questions	Yes	No	Comment	Further action needed
For the next season, have the two or three crops essential for food security been clearly identified?				
For the next season, have the two or three crops essential for generating income been clearly identified?				
Does the varietal information collected give sufficient insight into which varieties (by crop) might be acceptable to farmers – in case seed-related intervention is needed? Evaluate crop by crop if necessary.				
Do any of the key crops for food or income generation absolutely require external inputs?				
Have the poverty implications of focusing on each of the key crops been clearly outlined? Does an emphasis on the poor demand a special crop or variety focus?				
Have the gender implications of focusing on each of the key crops been clearly outlined? Does an emphasis on women demand a special crop or variety focus?				

STEP 3

Describe the broad effects of the disaster on farming systems

Before focusing on the seed system or even the agricultural system more generally, the assessment team needs to have a grasp of the broad effects of the disaster or crisis to determine whether any agricultural intervention is actually needed. Even if such action is warranted, humanitarian workers must nevertheless also consider whether it is feasible.

Scope of work

This overview, Step 3, is not intended to be a detailed analysis of the effects of the disaster. Such an in-depth exercise is generally conducted by others, as part of a national assessment, usually with the aid of a broad information-gathering instrument such as a livelihoods survey. Rather, Step 3 looks at the disaster through an agricultural lens. It aims to answer the question: Should we even think about initiating action in the domain of agricultural and seed systems?

Many answers to the guiding questions for Step 3 will be available in other forms and from various sources. The trick here is to filter the information according to its relevance for a possible agricultural or seed-related set of actions. The exercise, while simple, is quite important for ensuring that the 'big picture' is kept in mind.

Guiding questions for Step 3

Overview

- What are the key characteristics of the disaster?
  - type: simple/complex, one-off, repeated, chronic
  - timing: rapid or slow onset
  - duration: ephemeral or prolonged
  - causes: 'natural' or of human origin
  - geographic and demographic factors: numbers of people and regions affected, heterogeneity of impact (e.g., some affected by flood, others not; some displaced, others not).
- What assets were lost? Include a description of losses at the local, regional, and, if appropriate, national level.
- Were markets disrupted? Describe what happened.
- Were other services such as telecommunications disrupted? Describe what happened.
- If the crisis involved conflict and displacement of people, have there been changes in access to land?

Exploring whether agricultural intervention may be warranted

How has the crisis affected agricultural systems?

- What has been the impact on natural capital?
  - Land degradation (soil erosion)?
  - Water shortages (drought)?
- What has been the impact on human capital associated with agriculture?
  - Has there been a large loss of agricultural knowledge due to death, displacement or migration?
  - Has there been a change in labor availability due to death, displacement or migration?

(continued next page)

- What has been the impact on social capital in agriculture?
  - Have war, civil strife or political tensions altered, or are they likely to alter, cooperative arrangements such as labor sharing?
- What has been the impact on financial capital (especially arrangements such as agricultural credit)?
  - Has there been an impact on assets such as crops and livestock produced exclusively for sale?
  - Have other income opportunities been lost?
- What has been the impact on physical capital?
  - Loss of productive assets – irrigation infrastructure, draft animals, tools, granaries?
  - Loss of crops and livestock?
  - Loss of domestic assets such as homes and furnishings?
  - Changes to roads used to transport farm produce?
  - Closure of regional markets?

Is a farming-related intervention feasible from the beneficiaries' point of view?

- Are farmers confident the situation is now stable and secure enough for them to successfully cultivate, harvest, and sell or consume a crop?
- Do they have sufficient access to fields and other means of production (manure, implements, draft animals)?
- Are they prepared to reengage in agriculture?

From the point of view of relief organizations and development workers, is an intervention to address the acute stress a feasible option?

- Is there enough time for analysis, design, and implementation of an intervention, before the next cropping season?
- Is the required agricultural expertise, both technical and social, available to ensure that the advice is sound and that planned actions have a good chance of benefiting stressed populations?
- Will this be a one-off intervention, or will it be linked to a longer-term recovery process?
- In which areas could your organization work on corrective action?

Checklist for Step 3: Describe the broad effects of the disaster on farming systems

Questions	Yes	No	Comment	Further action needed
From the farmers' perspective: Is it feasible to carry out an agricultural/seed intervention within the zone?				
From the implementers' perspective: Does your organization have the technical expertise needed? Does your organization have the necessary logistical backup to ensure a timely intervention?				
Which aspects of the disaster have had or will have a significant impact on seed and agricultural/systems?				

STEP 4

Set goals for agricultural relief and recovery operations based on farmers' needs

The next step in the seed system security assessment is to identify, weigh, and set goals for relief and recovery. As new information improves the team's understanding of existing seed systems, the stresses they have endured, and how these systems might evolve, the goals should be reviewed and possibly revised.

Such strategic reflection increases agencies' chances of meeting the needs of populations under stress. It replaces the traditional automatic response of merely delivering inputs such as seed, which may or may not be appropriate for the context and, even if appropriate, may not be used due to other factors.

Scope of work

In setting overriding goals, humanitarian agencies may aim to either restore the agricultural system to its previous state or promote a different and presumably improved system. Whatever option is chosen, those planning the intervention should ensure that the response addresses farmers' immediate needs and demand.

A few points merit consideration. First, one cannot intervene in every aspect of the farming system, across all crops. Choices have to be made regarding the crop focus. Should it promote quick recovery? Or should it maximize return on investment? Second, if the crop and seed systems already in place have clear strengths, an overall aim of any intervention should be to 'do no harm'. Changing these systems could put those strengths at risk. However, if the system is already plagued with weaknesses or is deteriorating, such conditions may argue strongly against any effort to restore the pre-crisis state of affairs. Doing so would most probably be a disservice to already stressed populations and could reinforce their vulnerability. Finally, it should be made clear at the outset of the SSSA which group or groups are considered the priority target beneficiaries. Is it the farmers? If so, which ones? Women? Men? Commercial farmers? Subsistence-oriented farmers? Or are local seed/grain traders, seed companies, or perhaps agroenterprises the main targets?

This 'goal setting' step is really only finished once the full SSSA has been completed. It is presented early in the SSSA process to stimulate thinking. Implementers may reflect on Step 4's guiding questions throughout the assessment. But they should draw conclusions only at the end – once all the pertinent information is in.

Guiding questions for Step 4

Overview: Reviewing the current system and opportunities

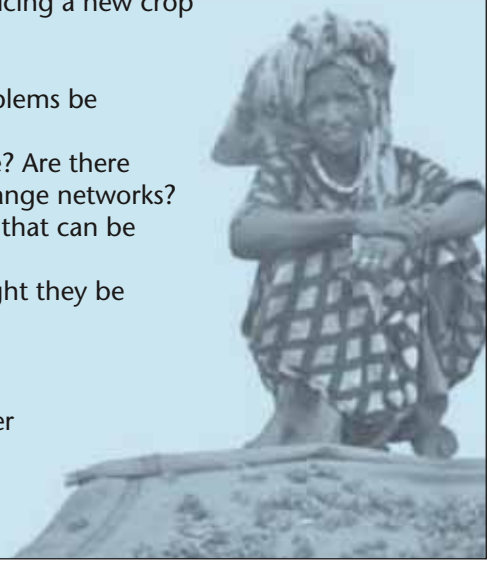
- What are the strengths and weaknesses of the pre-crisis cropping and seed system practices?
- Are the crops and crop varieties to which people have access generally appropriate?
- Do people have access to markets for inputs and farm produce?
- Are there social networks or institutions to distribute planting material? To share knowledge about crops and seeds?
- Is there a culture of experimentation with, and evaluation of, new crops and/or seed?
- Are people eager to explore new niches, such as seed trading?
- Are there unexploited opportunities, such as agroenterprise ventures?

A return to the earlier status quo . . .

- If the aim is to restore the pre-disaster system, should the intervention focus on income-generating crops, staple crops or crops essential to system resilience? Why?
- Which crops have been affected most by the crisis? Should the focus be on these? Why or why not?
- Are the affected crops critical for immediate food security? Are there substitutes (or other opportunities) locally available to fill the gap?

. . . Or a strategy to improve the crop, seed or agricultural system

- What evidence is there that change is needed? What types of change?
- Should the intervention focus on the same crops cultivated earlier by farmers? Why? Should old and new crops be combined? (Remember that introducing a new crop means new markets have to be identified as well.)
- Should crop diversification be promoted as an explicit strategy?
- Is there evidence of seed quality problems? How might these problems be addressed?
- Is there evidence that new crops and varieties would be accessible? Are there bottlenecks in the formal sector, local seed/grain markets or exchange networks?
- What strengths and opportunities does the surviving system have that can be exploited?
- What are the risks of adopting a strengthening strategy? How might they be anticipated and addressed?



Responding to immediate farmer demand

- Is there evidence of shifts in the local economy, especially in farmer demand and needs?
- Are there trends in crop or variety usage? Why might these be occurring and to what effect?

Checklist for Step 4: Set goals for agricultural relief and recovery operations based on farmers' needs

Questions	Yes	No	Comment	Further action needed
Do the strengths of the agricultural system justify efforts to restore it to its earlier state? Is there evidence that 'more of the same' is the best option? If yes, specify.				
Has a rationale for focusing on income-generating crops or food security crops been adequately explained?				
Should there be changes to the system? If yes, specify. Is there evidence in hand that these measures will be 'good bets'? If yes, specify.				

STEP 5

Assess the post-crisis functioning of seed channels to determine whether short-term assistance is needed

It's now time to assess how the seed sources and channels used by farmers are actually working, including for those priority crops in the upcoming cropping season. Step 5 is the heart of the SSSA. Its aim is to find out whether enough seed is available, whether it's the right seed (what farmers need and want), and whether farmers actually have access to it.

Scope of work (Step 5 as a whole)

To get a good grasp of the state of seed security, centering on quantity, quality, and accessibility, there are three key channels to examine:

- home production, including immediate harvests, stocks stored at home, and stocks shared among friends, neighbors and relatives (social networks)
- seed/grain markets, both local and regional
- formal channels, including parastatals and commercial enterprises which offer improved varieties and certified seed.

Some initial decisions also have to be made about which crops to emphasize. Major food crops, providing the bulk of calories and protein in people's diets, will be essential components. If sales of farm produce are also critical for survival, then the analysis might also focus on major cash crops. In all cases, crops suitable for the upcoming season, as well as those hit hardest, should be given explicit attention.

These assessments of seed channels take place in several locations: on-farm, in the presence of men and women farmers; in community groups; in the marketplace, with seed/grain traders and farmer-buyers; and in formal seed sector offices, where information on the supply of seed of improved varieties is available. Secondary information, on seed pricing and other topics, is also useful and can be obtained from databases such as those used in marketing information systems or early warning systems.

In the rest of this section, we go through the assessment process seed channel by seed channel, even though the activities of Step 5 must, of course, culminate in a synthesis or overview of all sources.

Step 5A) Assessing home production and social networks

The home production category includes three sources: farmer harvests, seed stock from previous harvests stored within the community or household, and seed harvested and stored by neighbors, friends or relatives, which presumably can be given as gifts or bartered.

Remember that information has to be gathered crop by crop (for the key crops, depending on goals established in Step 4). Government or development personnel who know the area well sometimes can provide a useful overview. Farmers will know best what has happened in their particular families, villages or zones. These groups may have different views on the situation and different units/methods for expressing their current insights. Such cross-checking is useful.

Scope of work (Step 5A, home production)

The guiding questions below address issues of seed availability, access, and quality. While 'access' is not a problem for what a farmer already has (in the field or house), it can become a special problem, even among closest relatives, when stocks run short. In times of stress not all share.

Guiding questions (Step 5A): Home production and storage of seed, specific issues

Harvest: post-disaster seed supplies

Availability

- During the last period of stress, what was the harvest like? Describe the situation for each key crop.
- How much of the harvest do farmers normally need for seed, as a proportion of the harvest, or as the gross amount by weight or volume?
- Did farmers harvest enough to supply all their seed needs? Only a portion of their needs? None of their needs? Explain.

Quality

- How do farmers assess the quality of seed obtained during the most recent period of stress?
- Is this different from the quality they would normally get with seed from a harvest?
- Are the varieties (by crop) harvested by farmers still adapted or suitable in the post-disaster period?

Seed stores/stocks

Availability

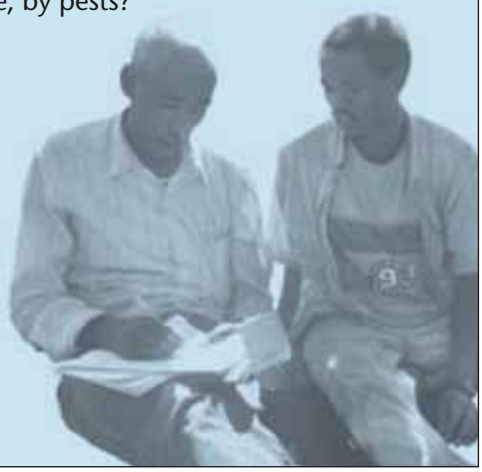
- Has seed from the most recent harvest been retained in storage? Describe the situation.
- Have seed stocks from prior harvests been stored? Describe the situation.
- Are the amounts in storage sufficient to cover seed needs (by volume, by percentage)? If not, what amounts are still needed?
- If critical seed stocks have been eaten, why?

Quality

- In general, what is the viability of seed currently in storage (how long it can be stored)?
- Has there been any major damage of seed in storage – for example, by pests? Describe the situation.

Networks, neighbors, friends and relatives

- If farmers need additional seed, will they be able to get it from neighbors post-stress?
- What is the range of the amounts of seed that are generally available (expressed as a percentage of needs)?
- Has the disaster or stress changed access to neighbors' seed supplies in any way?
- If seed is available, under what conditions might farmers obtain it? Would it be given as a gift or as a loan? Would they have to buy it?
- Would all farmers have access?



How-to notes for Step 5A: Assessing home production and social networks

Agreeing on terminology and units of measure

As relief workers and farmer groups in an action zone often speak different languages, there is plenty of room for confusion over terminology. It is crucial that all parties involved understand each other when they talk about 'variety', 'seed', and other key concepts. SSSA team members can clarify the notion of 'variety' by giving examples of varietal names routinely sown by farmers. For instance, Ikinimba ('little black') and Kirimukwe ('beautiful') are varietal names of beans grown in Rwanda. In contrast, 'seed' is something farmers plant in the ground which can include either or both of these varieties.

The term 'quality' may be hard to translate. So, again, it's prudent to converge on meaning through the use of examples. 'Good quality' might refer to the large number of plants that sprout from a given quantity of sown seed. Or it may mean seed that looks mature (no undeveloped grains) or that is neatly sorted (no pebbles, twigs or sand).

Some farmers know international weights and measures (such as kilograms); others don't. In many cultures, farmers have their own standard measures. This might be a food container such as a margarine tin, used in many African countries, or a certain size of sowing basket. For larger quantities, farmers in many sites refer to a set size of woven bag, a sack. To help farmers make more accurate estimates, be prepared to do calculations in local measures and then convert the numbers later to a more widely used standard.

Checklist for Step 5A: Identify zones for assessment and possible intervention

Apply this checklist to each key crop.

Questions	Yes	No	Comment	Further action needed
Are adequate amounts of home-produced seed available for sowing? This includes both seed from a farmer's own harvest and seed harvested by neighbors. Do you know roughly what proportion of total farmer seed needs for this crop can currently come from home/ own production?				
Is this a crop that farmers still want to plant? Is it adapted to local conditions? Is there still demand for it?				
Are the varieties available through farmers' own production still suitable for planting next season?				
Does the quality of the seed meet normal farmer standards? Has the disaster in any way changed the quality of seed in the field or in stock? Is the seed of good enough quality for sowing, in view of needs arising from the disaster or chronic stress?				

Step 5B) Assessing local seed/grain markets

The next seed source we look at is local markets. Farmers often tap into these markets if they have shortfalls in their own stocks, want to renew 'tired' seed (e.g., seed of low quality), or are looking for new varieties. Use of local markets tends to intensify in times of stress, as reductions in harvests usually force farmers to obtain a larger proportion of their seed off-farm.

Assessing seed security issues related to use of local markets requires a lot of hard thinking and analysis. Not all key crops and varieties are found at local markets. Also, it may be difficult to distinguish between grain and seed sold at local markets, as the two may not be produced, labeled or even sold separately. The bottom line is that it can be done – and in a relatively short time!

Before laying out the scope of work for the markets portion of Step 5, we briefly examine the grain/seed dichotomy. This section also pays a bit more attention to methods since the 'how to' aspects may be less obvious than for other tasks in the SSSA.

Seed and grain at local markets

For some key crops or varieties, planting materials will not be available at local and regional markets. For instance, farmers often get their banana cuttings directly from other farmers, on-farm. Nor is all the grain sold in farm markets suitable for use as seed. Nevertheless, local markets are an important source of seed for farmers throughout the developing world. This is especially true for legumes such as common beans and chickpeas, and for cereals such as barley, sorghum, and wheat.

Farmers rely on a special wisdom in selecting seed from local markets. They seek out varieties they know, and usually from sellers they know, in the hope that their seed purchases will be adapted to their own farms. Before sowing the seed, farmers also remove inert matter such as pebbles and twigs, as well as broken or damaged grains.

Unfortunately, seed/grain traders – those selling in open markets and moving supplies within and across regions – are not always so discriminating. Some do make the seed/grain distinction explicitly, sourcing their products by agroecological zone, specific variety, or production and sorting method. But others make no distinction in practice, and may not even understand the difference. So, part of this section of the guide suggests ways to decide 'what is seed' and 'what is grain' among the goods sold by traders.

Traders must be considered core partners in the seed system assessment process. During normal times seed/grain markets are particularly important for poorer farmers. But during a crisis or period of stress, they become a vital source of seed for many farmers, in addition to being critical suppliers to government and NGO implementers engaged in seed aid. Traders can also provide insight into the dynamics of seed supply and markets during periods of stress – for instance, how drought, floods or civil strife affect seed availability, farmers' access to seed (prices, bartering), and seed quality.

Finally, current and historical databases (e.g., those used in market information systems and early warning systems) may provide useful information about seed/grain prices and volume. These sources are not absolutely necessary and, in many locations, may simply not exist; but when available, they can serve as a useful cross-check on information gathered by other means. Here again, the seed/grain distinction poses a problem, which we explore further on.

Scope of work (Step 5B, markets)

Market analysis as a component of an SSSA has four parts:

- outlining existing market structures as they pertain to seed security
- assessing the functioning of markets for seed from the trader's point of view
- assessing the functioning of markets for seed from the farmer's point of view
- supplementing trader and farmer assessments with price and volume data from official databases (where available)

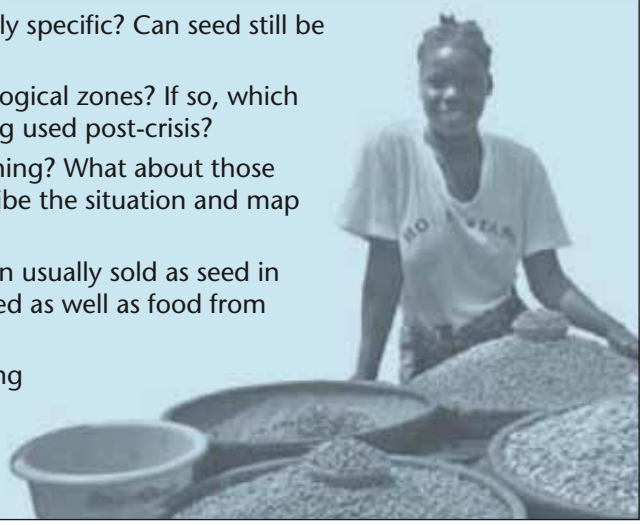
A full-fledged seed market analysis is beyond the scope and information needs of an SSSA. Here we focus on practical methods and indicators to help development personnel make decisions about market 'usability'. These methods are quick and relatively accurate. What we need to know is clear: Do markets normally provide seed? Can they continue to provide appropriate seed in this time of stress? How do current quantities, quality, and prices compare with those seen in normal times, as assessed by the suppliers (traders)? As assessed by the buyers (farmers)? Also, are ranges of variation within acceptable limits for farmers?

Market structures

Much of the necessary information about market functioning in the zones affected by the stress or disaster will already be common knowledge and can be quickly obtained, especially from government officials and major traders.

Guiding questions (Step 5B): Overview of market structures in zones of action

- Does a network of markets routinely serve farmers in the zone of action?
- Has the disaster facilitated or hindered the continued functioning of markets? (Markets tend to function normally during a drought, for instance, and usually but not always normally during conflict. Floods may affect market functioning.)
  - Is grain moving freely within the territory and into and out of the territory? Are there security issues or problems with transport routes? If such obstacles exist, describe and analyze them.
  - Are farmers able to move, sell, and buy freely? Are security, transport, and distance to markets problems for them? Who has access to markets? Who does not?
- Is the agroecological zone served by the market highly specific? Can seed still be sourced from this zone?
- Could suitable seed be obtained from other agroecological zones? If so, which ones and how far away are they? Are these now being used post-crisis?
- Are most local markets within the region still functioning? What about those within walking distance of most communities? Describe the situation and map out key markets if possible.
- Are those crops that are important for the next season usually sold as seed in the local markets? In other words, do farmers buy seed as well as food from local markets?
- Are the varieties that farmers routinely buy for planting material usually on offer at local markets? Is there reason to believe they will be on offer for the up-coming season?



How-to notes for Step 5B: Assessing markets in the main zone of action

Information on basic market structure can be readily obtained in interviews with local authorities such as governors, mayors, and their technical staff. Cross-checking of information against other sources is vital. It is usually possible to refine or clarify answers to seed/grain overview questions by interviewing large-scale traders and truckers.

Interviews with local agronomists and farmer-buyers can shed light on the issue of agroecological adaptation of crops and varieties. They should also be able to indicate whether the zones from which traders are bringing seed, post-disaster, can deliver adapted varieties. Note that zones of adaptation differ widely among crops. Figure 2 provides an example from Ethiopia.

It is important to be aware of possible cultural biases or stereotypes related to seed acquisition from markets. While informants may have good insight into the extent to which farmers rely on local markets to meet seed needs, the assessor may have to take certain sensitivities into account, especially in one-on-one interviews. In some cultures, market use is considered the normal practice, and the wise one. In others, use of markets is a sign of poverty or that one is 'a bad farmer'. So farmer-buyers may sometimes be reluctant to share accurate information.

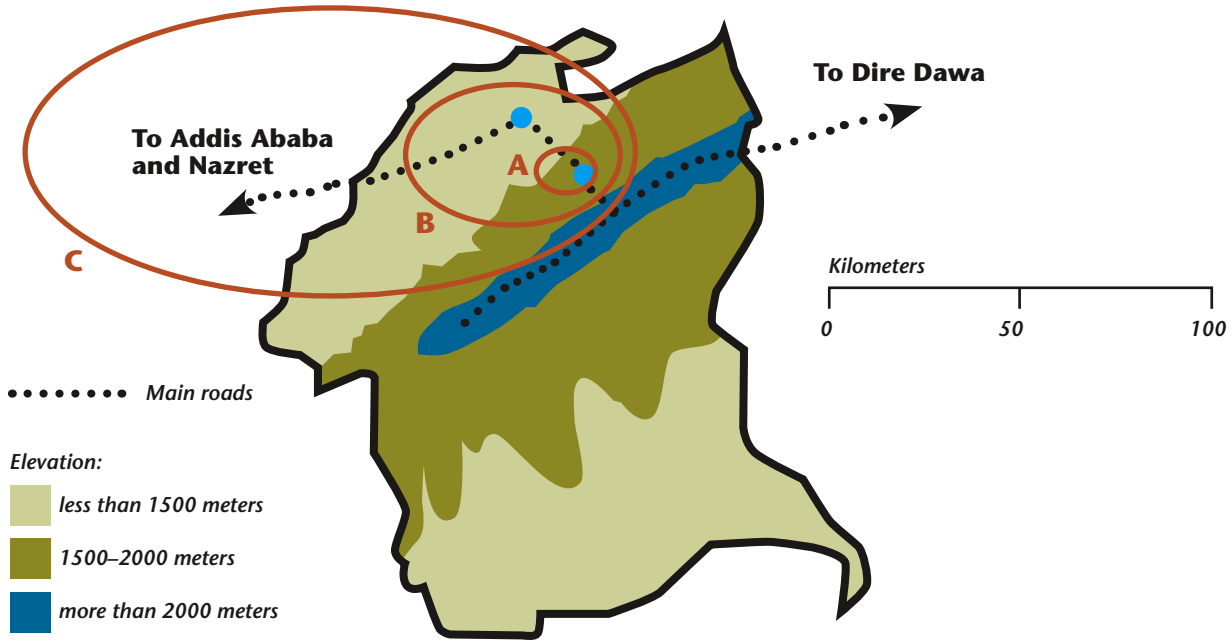


Figure 2. Different scales of adaptation for seed in West Hararghe Zone, Ethiopia

Crops with highly local adaptation, such as sorghum, are generally obtained locally (ellipse A), or at least from an area of similar elevation. Crops such as maize, with intermediate adaptation, may be sourced from farther afield (ellipse B). Improved varieties of common bean may be widely adapted to conditions in a much larger area (ellipse C), with seed often obtained from large producers 200 kilometers away. (Figure by S. McGuire)

Trader insights

One of the hardest aspects of gathering market intelligence for an accurate SSSA is deciding whom to interview and how to sort out seed versus non-seed data. Traders are perhaps ***the*** key people to interview for assessing markets. The rest of this subsection gives tips on how to differentiate among traders and interview them.

How to tell one trader from another

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. If the assessment team is to understand overall potential

How-to notes for Step 5B: Interviewing traders

When interviewing traders, bear in mind that they may have vested interests and are always keen to make a sale. Relief workers and other aid personnel involved in alleviating a crisis are among the most sought-after buyers because volumes are high and payment is usually rapid. Thus, interviews with traders to obtain objective information must be divorced from any contact or action linked to seed purchases. So don't even consider getting reliable market intelligence when you're putting in a seed order! Traders 'smelling' potential business will usually supply information that suggests seed is available, that "it can be found".

Traders will also probably be more comfortable revealing details of their business if they have an explicit guarantee that the information will remain confidential. As in any profession that relies on interview techniques to obtain potentially sensitive information, those conducting the SSSA should respect ethical guidelines regarding confidentiality, privacy, and consent.

supplies for a region, big traders (regional traders or wholesalers) need to be interviewed, as these business people may be able to bring seed/grain from afar. However, because the focus of the assessment is to understand supplies of grain that are of suitable quality as seed, it is also important to work with traders who transact directly with farmers and understand their needs. Through traders we aim to understand volumes, prices, and quality and to distinguish which grain supplies can be used as seed.

A series of preliminary questions to individual traders can help the assessment team grasp the differences in scale and scope at which traders operate. Answers may not be exact (as we might expect from those competing in business), but should be good enough to provide an overall picture of who trades where, on what scale, and in which commodities (crops, seed or grain, and so on).

Besides interviewing individuals, the team also has to map the 'trader hierarchy' for moving seed (versus grain) in and out of a given region. It is possible to start at the farm level, recording who collects from farmers, how they do it, the timing of transactions, and the varieties involved. However, it is also useful to start at the top, with the bigger traders, and move down the hierarchy. This mapping of trader hierarchies isn't difficult and can be readily combined with questions about individual trader attributes.

The example in Figure 3 is from eastern Ethiopia. At the level closest to farmers (the 'collectors'), the distinction between seed and grain is made very clear. Collectors are often tasked by their employers (medium- and large-scale traders) to find specific varieties of a certain quality type. However, in this case, even select 'big traders', those moving 100 tons of sorghum in any one season, may source crops/varieties directly from farmers and from a single agroecological zone, suggesting that large quantities of seed may be moved through markets. The precise mapping of the chain differs by crop in the Ethiopian case. For instance, beans and coffee usually start from farmer producers and go up the chain and out of the region. Generally there would not be any resale downwards. In contrast, sorghum, teff, maize, and wheat have both upward and downward flows, A to D and D to A.

Remember, in examining the role of traders, it is important to distinguish clearly between *grain* trade and *seed* trade, for each level in the trading hierarchy.

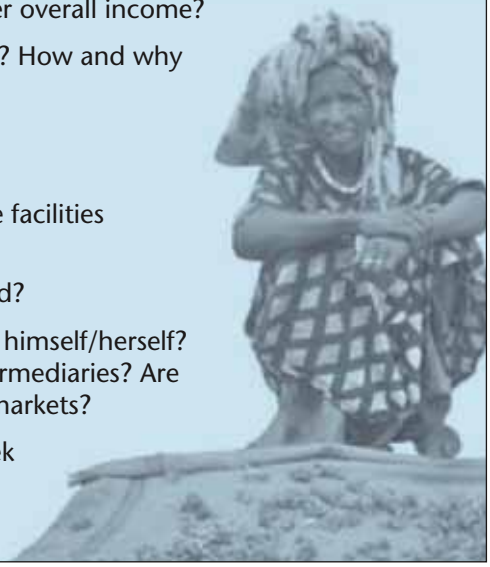
Guiding questions (Step 5B): How to tell one trader from another . . . Whom exactly are you interviewing?

Trader characteristics

- How long has the trader been in business?
- Is this work full-time, half-time, or occasional? Is the trader mainly a farmer, or is some other type of business predominant? How important is trading to his/her overall income?
- Which commodities are traded? Crops/varieties only? Which ones? How and why has the commodity mix changed over time?

Assets

- What type and size of transport facilities does the trader have? Are facilities owned or rented?
- What types of storage facilities are used? Are they owned or rented?
- How are commodities obtained? Are they produced by the trader himself/herself? Are they obtained directly from farmers, or indirectly via rural intermediaries? Are they obtained from traveling traders, retail markets or wholesale markets?
- What are the trade volumes of key crops – by season, month, week or other relevant interval? (Note: Traders may be reluctant to answer such sensitive questions.)



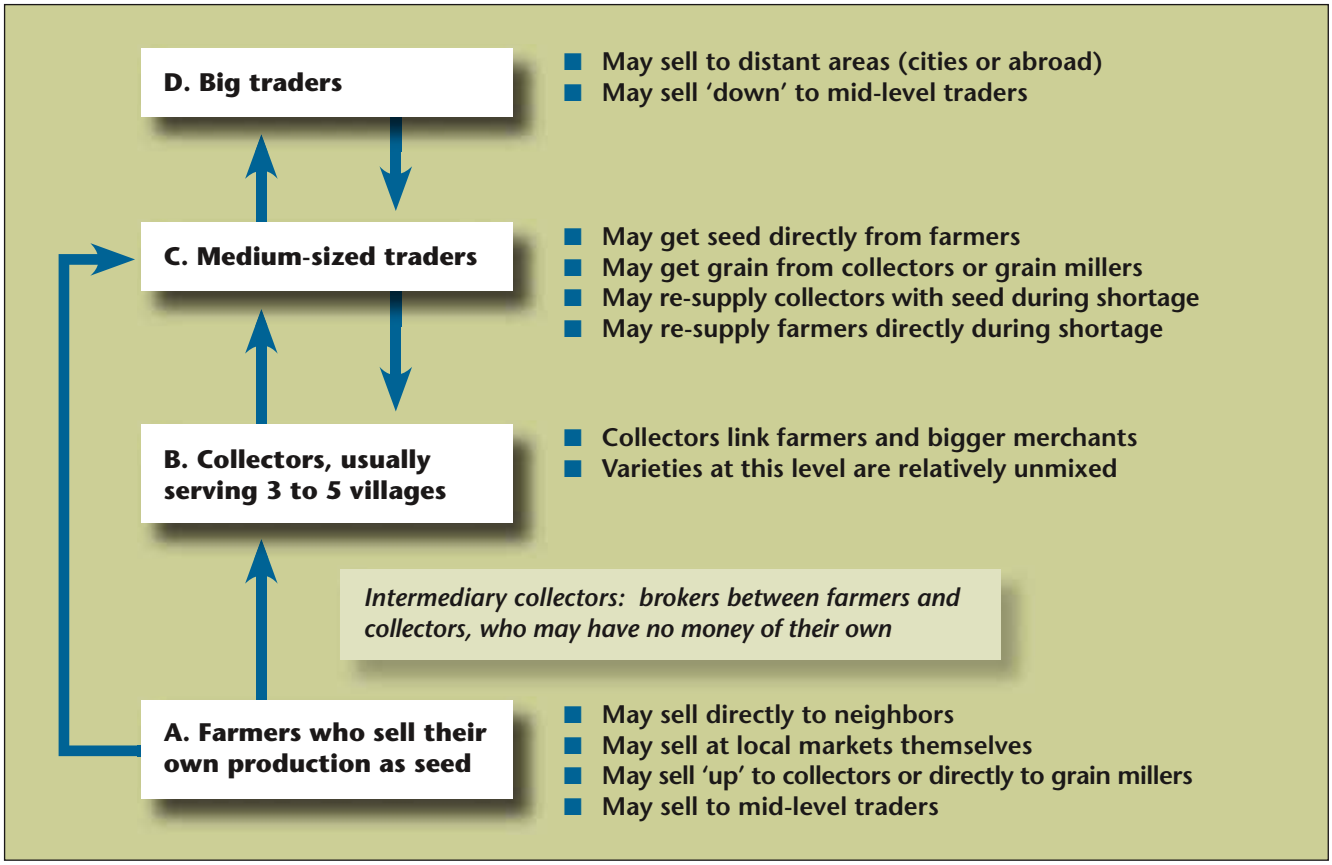


Figure 3. Four levels of a grain/seed trading system, based on an example from Ethiopia
Source: modified from Sperling et al. 2007

Guiding questions (Step 5B): Gathering information from traders on grain/seed commerce in current period of stress and upcoming season

Seed supply zones

- How do the zones currently supplying seed due to the crisis compare with those that provide it during normal times? Are they sufficiently similar in terms of agroecology so that areas of the new supply zone could also serve as sources of suitable seed?

Seed volumes

- How much seed do traders estimate they now have available or could be made available for the upcoming cropping season? This can include new acquisitions, seed obtained from sources of 'last resort', as well as seed they stocked during previous seasons.
- Do traders have any reason to believe that seed volumes of a particular crop/variety will be greater or less than the norm? Explain.

Prices

- What is the current price of the crop/seed in the local market?
- How do prices compare with those in effect at the same stage in previous seasons? Specify prices by crop and record changes as percentages (e.g., 10% increase).

Lending/borrowing

- Are traders providing credit to farmers during this crisis? Have they done so during previous periods of stress?

Quality of grain/seed

- Are the seed/grain supplies available in the market of 'normal' quality (e.g., stored fairly well, not discolored, not damaged by pests).
- Would the farmers be content to plant seed of the quality currently available in the market?

Traders' ability to source seed during periods of stress

- Did traders have trouble obtaining seed/grain after the last period of stress (e.g., drought)? If so, what problems were encountered (e.g., costs or logistics) and which crops were affected? Are traders experiencing difficulties (or encountering opportunities) for the current season?

How-to notes for Step 5B: Mapping grain/seed trade

A trader's recall can be quite precise if the interviewer probes with questions about specific recent events or years of unusual market stress, as in the case of severe drought. Ask about specific crops according to the zone supplying the grain/seed. Differentiate between a trader's buying and selling price and between supplies considered mere grain and those that can be used as seed. Remember too that traders may sell supplies already stocked in warehouses as well as newly acquired stocks. So both sets should be included in the tally of 'volumes available'.

Various indicators can shed light on seed market stress or opportunities. Among those often cited by traders are changes in:

- *the geographic zones supplying grain/seed*
- *price*
- *volumes available or sought**
- *seed quality*
- *scale of seed loans (credit) or gifts.*

Prices always fluctuate between harvest (when grain is abundant) and sowing. At sowing time, price increases for popular varieties are higher than those for other varieties. During a crisis, too, there may be steep price hikes, whether due to trader behavior or to real changes in supply-related factors such as higher transport costs. It's easy to see, then, that seed prices will inevitably rise sharply during a sowing period that coincides with a crisis or its immediate aftermath.

One challenge is to assess how much of the price rise is within a 'normal' and 'manageable' range for the target beneficiaries. It may be that the poorest, chronically stressed farmers cannot afford seed even in the best of times. So it is useful to formulate objective cutoffs points, that is, indicative price ceilings for various categories of farmers.

** Note: Traders may scale up their volume of seed during a crisis, anticipating greater demand from farmers, humanitarian organizations, and government aid departments.*

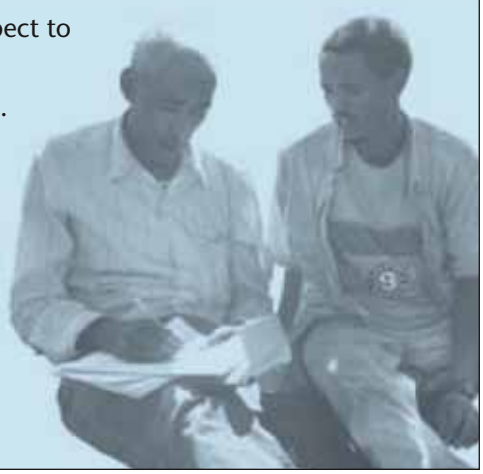
Guiding questions (Step 5B): Gathering information from farmer-buyers on market issues

Markets during normal times

- For which crops might farmers normally source seed in the markets?
- For each crop, are the key seed varieties needed usually on offer?
- Overall, how do farmers assess the quality of market seed? Poor? Acceptable? Good?

Markets during periods of stress

- During the crisis, have the usual crops and varieties one would expect to see been on offer? Describe the situation.
- Do market offerings match local preferences? Specify crop by crop.
- How does seed quality compare with what farmers normally find in the market?
- How do current prices compare with what one usually finds during this season?
- Are there credit arrangements in place? Do they differ from usual arrangements? If so, in what way?
- What do farmers say about using the market for seed once the crisis is over?



How-to notes: Interviewing farmer-buyers

Farmers in markets are obviously busy people and may have no more than perhaps 20 minutes to spare for an interview. An alternative, or complement, is to interview farmers in their homes, just after market day. With this option, you have to ensure that the selected interviewees are people with relevant experience, either farmers who bought seed or farmers who actively chose not to after visiting the markets.

Farmers always complain about prices, even during normal times. Generally they would prefer not to have to buy seed (hybrids being the main exception). During a crisis, farmers may have lost considerable assets; so buying seed becomes an extraordinary burden, especially since they may have other priorities such as paying for house repairs or medical bills. You may have to probe to determine whether and how prices and seed quality after a stress differ from those observed during a normal sowing period, and how a given magnitude of change alters farmers' crop management.

Farmers' insights

To understand market functioning, it is vital to get the perspective of farmer-buyers. Be aware that their perceptions may be quite different from traders', especially when it comes to quality and price. The best time to gather precise information on what they actually do, rather than on what they say they do, is when they are shopping for seed in the markets.

Insights from current and historical databases

Historical information on commodity prices in local markets can complement the results of interviews with farmers and traders. Such time-series data may also point to a shortage or surplus of a certain crop, as when the current price range differs significantly from the norm. Only an economist or marketing professional will be able to carry out this task of interpreting prices.

Cereal supply and price trends can be obtained from a range of sources. These include country-specific food security assessments and food security databases, such as those conducted or maintained by the UN Food and Agriculture Organization or sometimes by smaller organizations such as Save the Children. Countries that operate early warning system (EWS) databases may also have useful supply and price information available.

In exploiting these databases, keep in mind that they focus on food, not seed. So seed issues need to be teased out. When grain is well-sorted so that it can be sold as seed (i.e., pebbles, twigs, and immature or broken grains have been removed), or where a specific variety is known to have good seed potential, it will command a higher price. However, it is in the one to two months just before sowing that one can best monitor seed trends in the market, since prices may spike for the most popular varieties. Unlike grain prices, seed prices do not rise during the hungry period just before harvest. (Note that during an extended hungry period, grain prices may even exceed those of 'potential' seed.)

Historical price data are often on a larger and less detailed geographic scale than necessary to capture variations in a given agroecological zone or community. Data are best analyzed market by market, across a series of spatial units. Also, if the data covers a very long period, it may also need to be adjusted for inflation and referenced to conditions prevailing at that time, such as crop failure or massive overproduction. But in general, such time-series price data is a fair indication of seed availability.

Figure 4 illustrates broad seasonal differences between seed and grain prices. The graph is merely suggestive, to help assessors think about what happens within and between seasons. In reality, grain price trends are highly variable by crop and environment and may follow paths quite different from the one shown in Figure 4.

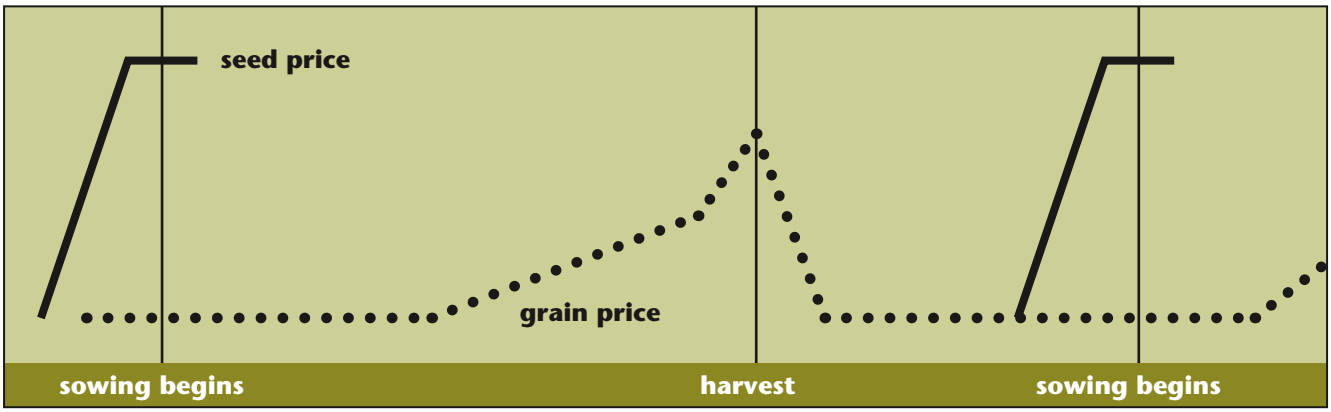


Figure 4. Trends in crop and seed prices in local seed/grain markets

The trends cover one complete cropping cycle. Seed prices peak at sowing time while grain prices peak before harvest.

Checklist for Step 5B: Seed supply from local seed/grain markets

Apply this checklist to each key crop.

Questions	Yes	No	Comment	Further action needed
Are markets generally functioning despite the disaster? ■ Are market days being held? ■ Is grain moving freely within, into, and out of the territory? ■ Are farmers able to move, sell, and buy freely?				
Are current grain/seed supply zones comparable to those during normal sowing times?				
Are current volumes of available seed/grain comparable to those under normal conditions (at same time during previous seasons)?				
Are crops and varieties that are still suitable for growing found in the markets?				
Is the quality of seed available in the market of normal quality (according to local farmer standards)?				
Are current market prices of seed/grain comparable to the prices at same time in previous seasons? If not, express this as the absolute price difference and as a percentage increase or decrease, i.e., magnitude of change (e.g., up 10%). If there is a price differential, is the magnitude likely to be a problem for farmers?				
Are there any broader signals of market stress (or of new opportunities)?				

Step 5C) Assessing formal sector supply

Formal channels are those that deliver improved varieties and certified seed. They are a relatively small group and include research stations, seed parastatals, and private sector seed companies (although private companies also sometimes distribute 'recycled' grain, that is, uncertified seed).

Relying on the formal sector for seed generally means that relief agencies are restricting themselves to a narrow range of crops and varieties. These are usually for medium and higher potential areas, and often are varieties that have been developed for specific commercial markets. The decision whether or not to promote hybrid seed after a disaster should be carefully considered as yields go down sharply if farmers re-sow such varieties. The key issue in using such formal sector seed during a disaster and its aftermath centers on variety quality: are the crops and varieties on offer suitable for farmers in stressed zones? If so, what volumes could be made available?

The physical and phytosanitary (health-related) quality of seed obtained through formal channels is nearly always adequate. Its 'certified' label is supposed to guarantee that it meets official purity, germination, and health parameters. Seed from commercial companies, however, may vary in quality, depending on local regulations or practice.

Scope of work (Step 5C, formal seed sector)

For this third part of Step 5, our inquiry parallels the market analysis in that we look at both the supply side and demand side. The first set of questions focuses on the supply side. This comprises the formal research system whose scientists developed, adapted or tested the varieties, and the commercial sector – government agencies and/or private companies – that market the varieties and distribute samples via extension. The second set of questions guides the gathering of information from the demand or user side – the farmers.

The supply side can give clear answers as to what is recommended and the potential quantities of seed available for improved varieties. It is the farmers, however, who decide the fate of such varieties, whether they become known in the community and whether they are indeed usable.

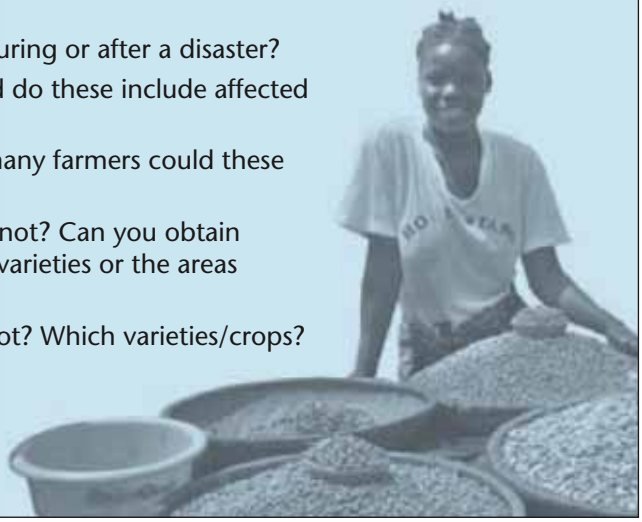
Guiding questions (Step 5C): Interviews with players in the formal seed sector

Normal times/general

- For the most needed crops, is there is a set of formal sector varieties? Is there a commercial seed sector as well?
- What percentage of seed sales goes through the private sector versus government outlets and projects? (It's useful to know this to avoid inadvertently damaging the private seed network by cornering the market.)

Post-disaster

- Which crops/varieties are available from this sector during or after a disaster?
- To which zones are these crops/varieties adapted and do these include affected zones?
- What quantities might be made available and how many farmers could these serve?
- Do farmers normally use such varieties? Why or why not? Can you obtain figures on the proportion of farmers who plant such varieties or the areas covered?
- Do farmers buy seed from this sector? Why or why not? Which varieties/crops? Can you obtain figures on certified seed use?
- How easy or difficult would it be to move seed from this sector to zones of stress? What would be the constraints? Would it arrive in time for planting?



Guiding questions (Step 5C): Interviews with farmers about formal sector seed supply

Varieties

- Are farmers in the region aware of new varieties? If so, through which channels do they get information? Specify by crop.
- Do farmers have access to these new varieties? Through which channels? Specify by crop.
- Have farmers in the region used new (modern) varieties for their specific agroecosystems? If so, which varieties of which crops? Estimate the percentage of farmers using these varieties.
- If they have had experience with new varieties, how do farmers assess variety performance on-farm and in terms of other qualities (e.g., taste, marketability)?
- Are these crops/varieties appropriate for all farmers? Explain.
- Are there specific conditions under which these crop/varieties need to be managed?
- Are these new crop/varieties appropriate for the conditions of stress farmers face?

Commercial/certified seed

- Do farmers buy commercial/formal sector seed? Why or why not? Specify crops and varieties.
- Through which channels can farmers gain access to the commercial/formal sector seed?
- Is such seed appropriate for all farmers? Explain, with reference to each crop and variety.
- Under which conditions would farmers use such seed?
- Is this commercial/certified seed appropriate for the conditions of stress farmers face?

Checklist for Step 5C: Seed supply from formal sector

Questions	Yes	No	Comment	Further action needed
Are the crops/varieties on offer appropriate for farmers' needs during periods of stress?				
Are the varieties on offer suited to particular stress zones?				
Is there evidence such crops/ varieties will perform under farmer conditions?				
Is there evidence that farmers (including farmers under stress) like these varieties, show demand for them, and will continue sowing them?				
If farmers use commercial/ certified seed, are the current conditions suitable for their planting?				
Can the amounts of formal sector seed available meet the need for seed aid? If not, what proportion of farmers' needs could be served by formal/commercial sector supplies?				

Overview checklist for Step 5: Analysis of seed channels

Crop by crop analysis or, if appropriate, analysis pertinent to the overall system

Questions	Yes/no, comments/clarification				
	Home	*Neighbors/ exchange*	*Local markets*	*Formal sector*	*Overall assessment*
Is seed available?					
Is seed accessible?					
Is the seed of sufficiently good quality?					

Perspectives on regions and populations (crop by crop)

Questions	Availability	Access	Quality
What is your overall assessment of seed supply for this crop?			
Are there specific regions with problems?			
Are their specific populations with problems?			

Any other concerns on seed channel functioning? Add needed information or observations.

Questions	Yes	No	Comment	Further action needed

STEP 6

Identify chronic stresses requiring longer-term solutions and identify emerging development opportunities

Before deciding on the most appropriate responses to the crisis, the assessment team needs to consider the long-term situation. If acute stresses remain the sole focus of attention, the SSSA could fail to capture other significant factors, whether strengths or weaknesses. This would result in a misdiagnosis of the situation.

Scope of work

The goal of this step is to identify long-term negative trends, at the same time paying attention to positive influences and new opportunities for improved seed system security. On the negative side, for instance, the team might ask whether ongoing stresses, such as chronic drought, are reducing harvests year after year? Or it might investigate whether farmers are adopting less sustainable or less productive management practices? On the positive side, Step 6 aims to highlight potentially beneficial options for farmers such as introducing a new crop or variety or perhaps developing a particular kind of agroenterprise.

The aim of Step 6 is to get relief and development workers to think long-term, even while they are reacting to what looks like a situation of acute stress. However, if a long-term research or development program is being contemplated, then a comprehensive, in-depth analysis of livelihood trends and production systems will be warranted. Such a detailed exercise is beyond the scope of this SSSA guide.

This section lists a preliminary set of signals to help the assessment team think of the big picture and reflect on longer-term issues: whether the seed systems are subject to chronic stress and declining seed security, and whether there exist immediate or potential development opportunities.

Signals of chronic stress

There are a number of clear signals or indicators of long-term negative trends. However, they may not provide any insight into the root causes of problems. Much of the work of Step 6 is to probe for such factors. Given our focus on seed security, the signals listed below are all based on observations of the cropping system alone. Within a broader livelihoods context, for instance, consumption of famine foods or increased out-migration may also indicate a malfunctioning cropping system.

Here are eight signals of chronic stress on seed security:

- Aid is being given season after season, in the absence of acute stress (such as floods).
- Crop failure and purported lack of seed become cyclical, recurring perhaps every two or three years.
- There is a lack of seed stored in houses or elsewhere in the community where it is normally maintained in quantity.
- Seed experts, typically wealthier farmers, do not have excess stocks of seed.
- There are dramatic declines in seed quality including viability; more farmers are sowing seed they know to be of significantly inferior quality, that is, seed with low germination rates and poor health status.
- Crop profiles are changing because a particular variety or crop is lacking.
- Use of 'non-preferred' varieties, or ones farmers dislike, is steadily rising.
- Seed prices in local markets remain high, exceeding even the spike typical of normal sowing times.

Identifying development opportunities

It may be possible to frame seed system strengthening so that it both responds to existing problems and opens the door to exploit novel opportunities. Here are some of the signals that development options merit exploration:

- lack of farmer awareness of, access to, or use of new varieties
- heavy reliance on a narrow range of subsistence crops
- heavy reliance on only one or two cash crops
- lack of marketing of agricultural raw products beyond the region
- lack of on-site processing of agricultural products, or links to processing ventures
- lack of agroenterprises in general, with most crops produced being consumed locally.

Guiding questions (Step 6): Longer-term seed constraints

Availability

- Do farmers lament a general shortage of seed for specific crops or varieties which forces them to plant smaller areas than desired?
- Do farmers cite reasons why these crops/varieties aren't available locally? Marketing problems? Poor transport? (If farmers complain of high prices, or not having funds to buy what is on offer, this is an accessibility problem.)

Accessibility

- Do farmers claim that high seed prices have forced significant changes in their agricultural strategy, such as having to plant smaller areas, use non-preferred seed, or change the area planted to different crops?
- Do farmers mention a decline in seed bartering networks which previously gave them access to seed?

Quality

- Are farmers planting what they consider unadapted (or 'inferior') crop varieties because they cannot find anything better? These would include crops with low yields, the wrong cycles, poor taste, or poor marketing qualities.
- Are farmers planting what they consider low-quality seed, because they cannot find anything better?
- Are farmers continually having to re-sow fields because of germination or emergence failures?

Long-term seed security issues

- Do farmers comment on a decline of seed quantity, quality or accessibility over the longer term (say five to ten seasons)? If so, why? Do they feel they cannot solve these problems?
- Have farmers repeatedly and regularly been the recipients of seed aid – say once every three seasons? If so, why?
- Are there some farmers who always have seed available, never have a problem accessing seed, and are satisfied with both the varieties and the quality of their seed? Why are these farmers 'seed secure' and what can one learn from them?

Guiding questions (Step 6): Development opportunities for improved seed security over the longer term

- Do promising new varieties exist for the agroecosystems in question? If so, do farmers have access to these new varieties? What are the potential uses of the varieties by farmers and under which circumstances?
- Have there been positive trends in crop choice and evolution? If so, for whom? What were the conditions for success and how can these be sustained?
- Could existing marketing opportunities for agricultural products be strengthened?
- Are there 'best bets' for development of novel market chains?
- Have agroenterprises been developed regionally? If so, what were the salient features for startup and success? Also analyze those that failed or were phased out.

Checklist for Step 6: Identify chronic stresses requiring longer-term solutions and identify emerging opportunities

Questions	Yes	No	Comment	Further action needed
Are there clear signals of chronic stress in the zone? If so, what are they? If there are chronic stresses, have some of the root causes been identified? Have previous interventions been implemented to address specific chronic stresses? If so, with what results? Might further specific actions be taken to address elements of chronic stress? If so, which actions should be taken and where? Is there evidence that these are good bets?				
Is there evidence of crop- or seed-related innovation within the zone? If so, what have been the results for different kinds of farmers? Is there room (or need) for existing innovation options to be reinforced or expanded? If so, how might this be achieved?				
Do any particular seed- or agroenterprise-related actions merit consideration for the future? If so, what evidence supports this?				

STEP 7

Determine the most appropriate responses, based on analysis of priority constraints, opportunities, and farmers' needs

In this final step, we move from problem definition to the identification of concrete actions to alleviate stresses on seed security. The SSSA must be good enough to allow the team to weigh the various response options. Reflecting on potential field-level action will reveal the extent to which the information gathered during the first six steps has provided sufficient understanding of the negative and positive trends in seed system functioning.

Scope of work

In section A of Step 7, we present three decision-making trees. These link seed security problems that may arise during acute or chronic periods of stress, with possible responses to those problems.

After this logic exercise, we discuss the types of seed problems that field evidence has shown are likely to arise in the face of different types of disasters. So section B is a kind of disaster-and-seed-stress classification scheme.

In section C, we present a few snapshots of actual humanitarian relief responses that have been implemented.

Section D summarizes common responses to acute stress (from the supply side). This overview and typology of responses will help humanitarian organizations understand the kinds of constraints that the current repertoire of responses can or cannot address.

Before plunging into the detailed work of Step 7, the assessment team should do a 'reality check'. Use checklist A to quickly assess whether agricultural interventions are warranted and possible – from the perspectives of both the farming population and potential implementers. Checklist B is also a reality check, to be completed at the very end of Step 7. It is an aid in confirming the validity of the assessment team's selected response.

Checklist for Step 7: *Before* proceeding with step

Questions	Yes	No
Is there reason to believe the agricultural system was affected by the disaster or crisis?		
Is a farming-related intervention feasible from the beneficiaries' point of view?		
Do you, the humanitarian agencies and relief workers, have the expertise to intervene?		
Do you have enough time to intervene, that is, before the onset of the next planting season?		
Proceed with intervention planning only if you have been able to answer yes to all four questions.		

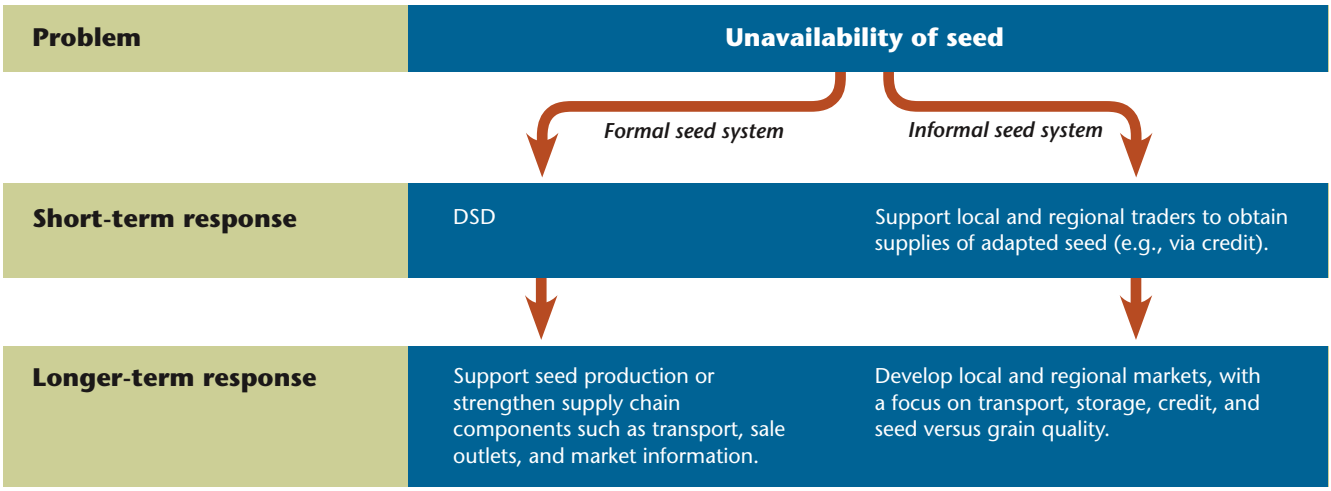


Figure 5. Decision tree for options to respond to unavailability of seed

Step 7A) Decision-making trees for seed security response

If acute and chronic constraints on seed security are present, they should have emerged clearly in Steps 1 to 6 of the SSSA. For the immediate response, remember to focus on the crops most important for the following season. Any strategy should also take into account how seed for different crops is normally sourced – informal, seed channels, formal, or both – and whether a shift in seed channel source is warranted.

The decision trees aim to stimulate thinking about which specific options for action are most appropriate for which types of problems.

Problem: Seed isn't available

A problem of seed availability means there is an absolute lack of seed in an area to meet the minimal needs of farmers. Stocks on-farm (in the homestead and local community), in markets, and/or within the formal sector are low. This does not often happen during a crisis, but can arise for a range of reasons, as we explain below. Different problems require different responses. The decision tree depicted by Figure 5 provides an overview of possible responses.

In the short term, lack of seed may be due to extreme pre-harvest crop damage (e.g., by a natural disaster), to theft, or to unusual damage to household seed stocks. This absolute lack is often associated with 'spatial' unavailability. While seed may be available regionally, perhaps it cannot be delivered because of a breakdown of the transportation system, security problems, or a natural disaster. It may also be related to 'temporal' unavailability – as when demand immediately after the disaster dramatically increases, especially demand for alternative crops or varieties that mature quickly.

An acute lack of seed means outside sources must be tapped. This may involve giving out seed or eliminating constraints on transport. Depending on the crop, seed might come from formal or informal channels, or both, and the type of response could be either direct seed distribution (DSD) or seed vouchers and fairs (SVF), in which local and regional traders play an important role.

Lack of seed over the longer term is quite rare. On the one hand, seed may in fact be available in the region, but nonfunctioning transportation systems or, more generally, weak market infrastructure (e.g., lack of traders' access to credit, insufficient storage facilities, or unfavorable pricing policies) can create continual shortages. On the other hand, crop failures due to escalating disease can result in a chronic lack of planting material. Here, a problem of seed *quality* also comes to the fore: the varieties available will no longer thrive in a given locality. Formal sector seed proponents may also lament the unavailability of modern varieties; but again, this constraint relates more to variety quality than to an absolute lack of planting material.

Depending on the nature of the problem, a number of options are available to combat chronic seed stress. Implementers might develop or enhance local seed production from small enterprises or microenterprises, building on existing local producers or newly created groups. In these cases, seed prices should be only marginally higher than those for food and feed, and

the producers should maintain quality and variety integrity at levels at least as high as farmers can count on in normal times. Production should focus on farmer varieties or on improved varieties of crops in demand by local farmers and consumers.

Strengthening transport and sales of seed via diversified routes and multiple distribution points is another response option. It is often useful to build on existing channels, commercial or otherwise, to keep costs low; however, these will not necessarily be seed channels per se. Local commodity stores, nutritional/health centers, and schools could prove useful as seed sellers. And along with enhancing dissemination of seed, development workers need to reinforce decentralized information channels, since the absence of a market information system may prevent prospective seed suppliers from responding to demand.

Problem: Inadequate access to seed

A problem of access arises when the desired seed is available locally but farmers lack the means to buy it or otherwise obtain it. Access problems due to constraints on market functioning, such as a lack of security that restricts human movement, occur much less frequently. Responses obviously need to be tailored to the kind of constraint, whether on the demand or supply side. The decision tree in Figure 6 sketches possible responses to constraints on access to seed.

Short-term lack of access to seed is usually due to such factors as farmers' low purchasing power or reduced scope for bartering and other forms of mutual help. Following a crisis, there may be significant losses of rural assets, erosion of social networks, a breakdown of trust (especially in situations of conflict), a reluctance on the part of neighbors to help each other, or an uncertain future that discourages lending for seed purchases. In rare cases seed may actually be available, but farmers lack access to it because of constraints on the supply side, such as security risks for travelers or impassable roads after flooding.

In the short term, the most direct way to enhance farmer access is to give cash or vouchers, which allows them to procure seed at markets or fairs. If security is a problem, activities to enhance safety during periods of seed provision should be included in the design of the intervention. In cases of severe social disruption, such as a brutal civil war or pandemic, implementers might also consider direct seed distribution, since farmers may not want to 'get together' to do business.

When lack of access to seed is chronic, it is nearly always linked to poverty. Farmers may have low purchasing power, social networks may be constricted (and seed not routinely shared), and seed loans may not be a financially sound option because of the substantial interest the farmer must pay. In these cases, relief agencies and other implementers need to think well beyond seed-related responses. Giving seed directly – again and again – or organizing repeated seed vouchers and fairs are little more than expensive stopgaps. Interventions to alleviate problems of access should be part of a broader poverty-reduction program, perhaps including the development of novel income-generating activities such as agroenterprises. (Ferris, S et al, 2005). Expanding the repertoire of cash crops, dual-purpose crops, or even off-farm employment might be considered.

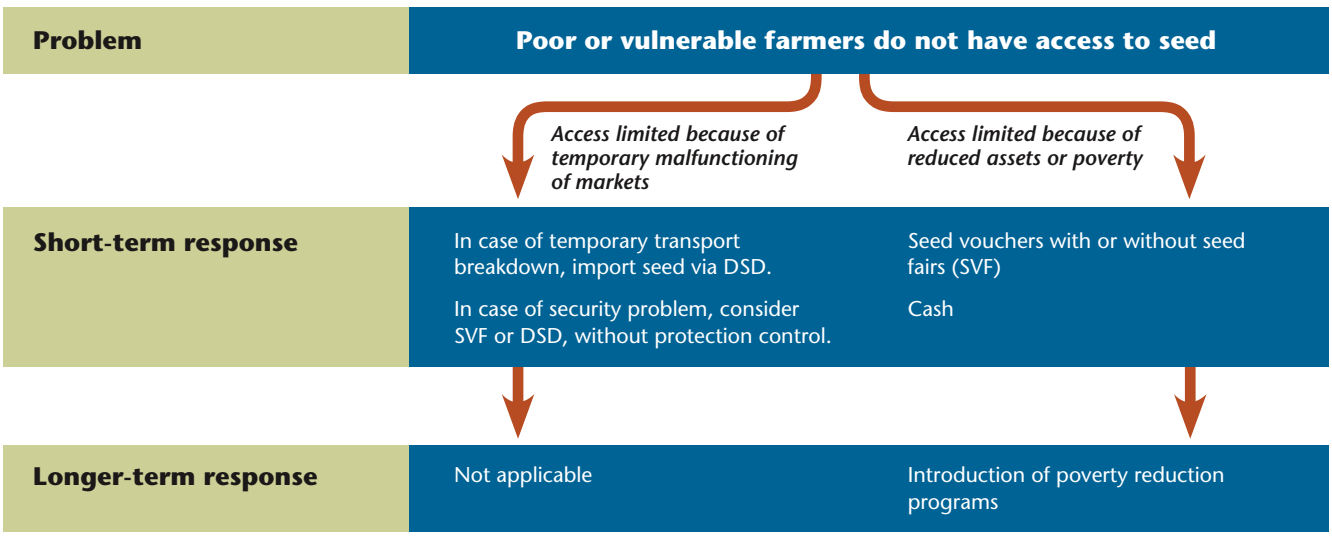


Figure 6. Decision tree for options to respond to constraints on access to seed

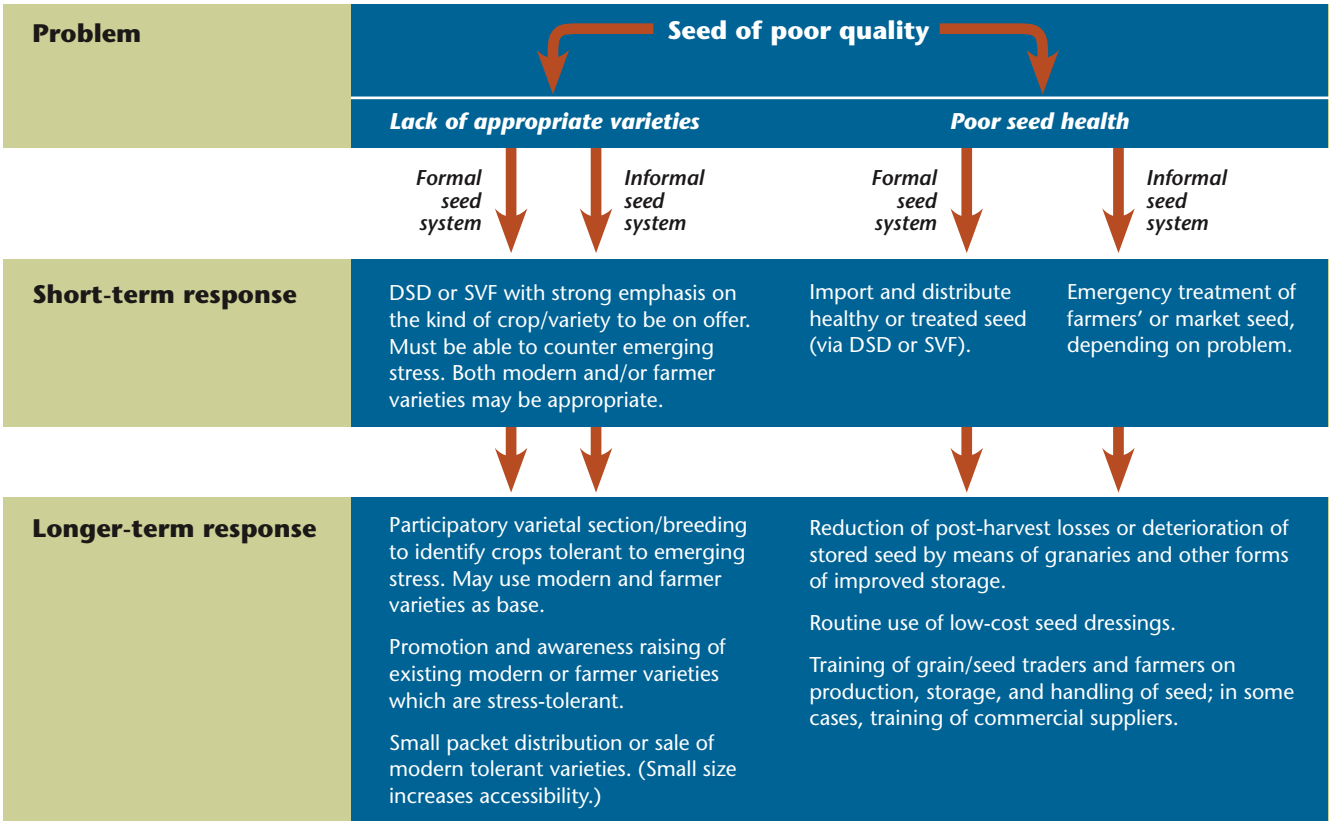


Figure 7. Decision tree for options to respond to problems of poor seed quality

Problem: Poor seed quality

There are two broad aspects of seed quality to consider. The first is variety quality: Are the varieties on offer adapted to the local situation and do they represent the more productive and high-value options available? Here the emphasis is on genetic attributes such as plant type, duration of growth cycle, and seed color and shape. The second distinct aspect is seed health, namely the quality of the planting material itself. While we often use the term 'healthy' to refer to diverse aspects of seed quality, in this instance we need to zero in on three types of attributes:

- sanitary: whether pests or diseases are carried on, in or with the seed
- physiological: germination rate and vigor
- physical: the amount of accompanying debris such as stones, sand, and weeds, and the proportion of broken or otherwise damaged seed

As we have seen, responses need to be tailored to the nature of the problem. The decision tree presented in Figure 7 groups possible responses by whether they address concerns and opportunities related to variety quality or seed health.

Variety quality

Farmers do not often experience short-term problems of variety quality, that is, shortages of varieties adapted to their overall conditions. Of course there are cases where crops or specific crop varieties suddenly seem 'unadapted' because of marked disease or pest build-up – as with cassava mosaic virus, or root rots in beans, or infestations of the parasitic weed striga in maize and other cereals. More often, short-term concerns over variety quality arise when implementers sense that a potentially useful modern variety, not yet available to farmers, could be made available, and quickly, via emergency aid. Curiously, then, this concern comes not from a 'problem', but from the identification of a potential opportunity.

In the face of a significant environmental stress, and the need for a short-term response to it, implementers must be careful that what they offer is indeed adapted to the emerging situation. Whether the materials on offer are farmer varieties or improved varieties, they should have been previously tested or

grown under the specific conditions now at hand. A cautious but useful approach is to promote a basket (range) of varieties. In the face of *ad*versity, *di*versity can be the key to encouraging production stability.

If new varieties are to be introduced in a situation of acute stress, a few 'common sense' rules apply:

- There should be solid evidence that the variety grows under the conditions of stress being experienced by farmers.
- To reduce risk, only small quantities per farmer should be promoted.
- Each new variety on offer should be accompanied by a good deal of practical information so that farmers can decide whether to sow the variety and, if so, how to best manage it.

Over the longer term, farmers may need novel materials, either modern varieties or ones from other local farming systems, to allow them to respond to shifts in their cropping system. These may have been made necessary by environmental changes (such as atmospheric warming), rising disease and pest incidence, or inappropriate promotion of unadapted modern varieties. In some cases, farmers may not be able to maintain the levels of purity they desire in their own saved seed or that from the market. So the introduction of local (i.e., nearby) varieties may also contribute to reinvigorating the gene pool farmers rely on.

In the case of popular or well-known varieties already in use, implementers may wish to concentrate on promotion – making farmers more aware of the varieties, packaging or selling them in user-friendly quantities – and putting them on offer at agricultural and other events.

In some instances varietal development (plant breeding, selection, and field trials) may be necessary. Farmer participatory models should be considered for this research and development (R&D), especially where growing conditions are stressful. Collaboration between farmers and formal breeders ensures that the varieties eventually selected will actually grow under real production conditions, including farmer management practices, and that they meet local cultural, social, and economic preferences.

Seed health

Acute problems of seed health arise when farmers' own seed, or seed available from markets, is compromised or otherwise negatively affected by diseases or pests. In the short term, depending on the exact problem, implementers might be able to promote the use of seed dressings. More often, they decide to bring in new seed altogether, either treated local seed or certified seed. Labels alone do not guarantee seed health. Emergency grade seed is often just recycled (sorted and labeled) poor-quality grain. Furthermore, while certified seed may be 'clean', the variety may not be able to grow under stressful conditions.

Over the longer term, rectifying chronic problems of poor seed quality requires farmer-producers and seed/grain traders to modify the basics of production and postharvest handling of seed stocks. Depending on the nature of the seed quality problem, implementers may focus on methods to cut losses in household storage, pay more attention to crop management (including initial seed selection), or analyze and address seed quality constraints at a higher level in the grain/seed market chain. Technical initiatives here are often complemented by widespread training in seed production and handling. Involving traders in such seed-specific information and skill-building initiatives could have handsome pay-offs.

Step 7B) Corrolating seed security problems with type of disaster

The impact of a natural disaster or other crisis – such as drought or war – on seed security depends heavily on the local context. This includes factors such as the scale and timing of the disaster, the pattern and extent of damage, the way political events unfold, and the stability and resilience of farmers' normal seed systems. Nevertheless, analysis of many disasters and stressful situations over the years reveals some patterns in seed security changes. These first associations between seed security constraints and type of disaster are presented in Table 10. Drought generally has the most predictable (and mild) ill consequences for seed security, while diverse kinds of war pose the most variable, and often the most severe consequences. Matching disaster type with possible repercussions on seed security can be seen as the mirror image of the exercise we did in section A, namely to identify types of actions that can alleviate specific stresses on seed security.

Table 10. Linking disaster type with specific seed security problems: Field experience from Africa

Disaster or other stress	Features with the potential to undermine seed security	Seed security constraints most often uncovered	Insights from field experience
Drought	■ Harvests may be lower than usual but only in rare cases will they be a total failure. ■ Seed sharing may decrease due to seed scarcity. ■ There may be asset losses due to low harvest.	Access problem: some depletion of farmer assets.	Droughts are by far the most common trigger justifying DSD, particularly in southern Africa. However, evidence from the field shows that even with sharp declines in harvests, enough seed for planting is usually available, both from home production and markets. This is typical of drought-prone areas where small-seeded crops such as sorghum or pearl millet predominate.
Plant disease	■ Crop failure may be total. ■ Local crops and varieties may not be adapted to the disease. ■ Local seed production channels may not be able to immediately provide adapted varieties. ■ Seed sharing may decrease due to seed scarcity. ■ There may be asset losses due to low or no harvests.	Quality problem: varieties no longer produce.	The challenge with plant disease is to identify something that will grow under changed production conditions (in contrast to drought, where production conditions are stable). Also, finding enough resistant material may demand widespread seed multiplication efforts. Example: parts of eastern and Central Africa have been confronting crises and related seed-quality problems since the late 1990s with waves of CMD in cassava and a build-up of root rots in bean crops.
Plant pest	■ There may be total crop failure, even across crops. ■ Seed sharing may decrease due to seed scarcity. ■ There may be asset losses due to low or no harvests.	Access problem: Depletion of resources may be severe.	Seed security issues will vary by type of pest and extent of pest damage. Locust damage, which is not crop-specific, may be extreme, affecting various crops, and even trees, bushes, and grass (possibly affecting livestock forage supplies). Locusts, however, do not have lingering effects. They strike, destroy, and then disappear. Example: West Africa, for instance, has had waves of locusts: Northern Mali, attacked in 2004, resumed relatively normal crop production by 2005 (although it suffered droughts in between). *(continued next page)*

Disaster or other stress	Features with the potential to undermine seed security	Seed security constraints most often uncovered	Insights from field experience
Flood	■ Harvest failure may be total (crops wiped out). ■ Fields might be significantly damaged or destroyed. ■ There is the possibility of population displacement. ■ Local seed production channels may not be functioning. ■ Social relations generally remain the same but could change if families end up in camps for internally displaced persons (IDPs). ■ Markets, roads, and other infrastructure could be significantly disturbed. ■ There may be significant losses of assets (seed, livestock, and houses).	Availability problem likely; also, the required conditions for planting (arable fields) may not be in place. Prime problem might be extensive asset loss.	Problems of seed availability would normally be associated with floods. Example: However, in Mozambique, a highly flood-prone country, the government promoted SVFs and input trade fairs shortly after 2000, moving seed from one agroecological zone to another. That response puts the focus on 'access' constraints. Depending on the source of the flood water, soil issues (i.e. leaching, erosion) may need to be addressed before planting.
War **(quick onset, short and intense, staggered over zones)**	■ Harvests are lower than usual, but only rarely a total failure. ■ Perhaps no forced population displacement, although massive fleeing by some portions of the population. ■ Seed sharing may decrease due to ruptured social relations and seed scarcity. ■ Local seed production channels may (or may not) be functioning. ■ Security might be compromised, restricting agricultural work or use of public resources such as markets. ■ Asset losses due to small or no harvest (as when fields are abandoned).	Depends on nature of war: Could be problems of availability and access, or neither. Issues of protection could be key. Does one provide inputs to households if this might put them in danger?	Seed security problems encountered greatly depend on the specifics of conflict (onset, duration, extent, intensity). Example: Before war and genocide in Rwanda in the 1990s, many farmers had come to rely on formal sector channels for clean potato seed and new varieties. These arrangements broke down early in the conflict as government services retrenched and development projects pulled out. In contrast, local markets, the main source of beans, continued to diffuse bean seed during some of the worst events. So while potato production virtually collapsed, relying as it did on the formal sector, bean seed channels, which were based on local farmers' systems, continued on course for the most part. In the case of potatoes, there was a seed availability problem. For bean seed, the constraint was solely access. Note also that ruptures in social networks of 'seed sharing' were not a key factor. This is because the giving of seed was not part of Rwandan farm culture even before the crisis. *(continued next page)*

Disaster or other stress	Features with the potential to undermine seed security	Seed security constraints most often uncovered	Insights from field experience
War **(chronic conflict)**	■ Fields may not be planted, particularly if farmers are in IDP camps or if an area is insecure. So there may be total failure of production. ■ People may become displaced. ■ Social relations may change in IDP camps or, depending on root causes of the conflict, but may remain the same. ■ Local seed production channels may (or may not) be functioning ■ Infrastructure may be disturbed or may remain intact. ■ Markets function in secure areas only. ■ Asset loss is likely to be severe.	Depends on nature of war: Could be problems of availability and access, or neither. Quality, particularly variety quality, could be a problem should population move to new agroecological zones. Issues of protection could be key. Does one provide inputs to households if this might put them in danger?	It is difficult to generalize about longer-tem conflict. A 'war' is rarely homogenous, with conditions often in flux. Example: Darfur in 2008 is a good example. There are areas that move into and out of use over time, and different issues must be addressed in different places.

Step 7C) Case studies: Concrete action on the ground

This section describes select responses by humanitarian organizations in the face of real-life threats to seed security. What we see is that choices on the ground are not always as clear-cut as the decision trees in section A might suggest. Implementing agencies have many uncertainties to contend with, institutional philosophies which shape the type of response, as well as competing priorities to weigh. Few organizations have ever carried out a seed security assessment, although they may have made educated guesses. Sometimes their action plans aim not only to combat an immediate stress or stresses, but also to strengthen seed systems over the longer term. This set of approaches is sometimes referred to as 'linking relief to development' or 'transitional programming'.

Even the most knowledgeable and well-intentioned implementing groups occasionally commit 'bloopers' or encounter unexpected consequences of their interventions. Below we share some of these anecdotes, with the intention of illustrating two simple but important messages: When intervening to provide seed-related assistance, proceed with caution and with your eyes wide open! Also be ready to learn from your mistakes.

Box 5. Case study: Using seed relief to bolster economies and stimulate entrepreneurship

Implementing agency: Catholic Relief Services
Constraint addressed: seed access

CRS's approach, particularly in eastern and central Africa, tends to build on the seed systems farmers already use, especially local seed/grain markets. The rationale is to link seed assistance to broader bolstering of the local and regional economies. Promoting the SVF approach, CRS uses the baseline assumptions that seed is available after a crisis, that markets can intervene to regularize supply, and that farmers mainly lack the funds (or social networks) to access needed planting material.

In northern Burundi, Kirundo Province, CRS carried out a first set of SVF activities from 2001 to 2003: the seed needs of 33,000 farming families were met, some US$180,000 was injected into the local economy, and traders on average earned $160 in gross income. Hence, in crisis (in this case drought), CRS aims to directly support two types of beneficiaries: farmers and traders/sellers.

Overall, CRS reports (as of 2004) that seed fairs were conducted in 16 countries, with a total of 537 discrete seed fair events. These encompass contexts of conflict, drought, and flooding. A 2004 compilation of their experiences shows that, on average, 45% of SVF beneficiaries are women and 33% are sellers. Generally, between one-third and two-thirds of the funds used for assistance have gone back to the communities themselves – to local and large traders, stockists, and seed companies. In two countries , Madagascar and Lesotho, there were events where all the seed put on offer was sold, suggesting that supplies fell short of demand and that 'availability' posed a problem in those instances. Among its prime challenges, CRS notes the following: linking research products - including modern varieties - to the SVF activities (to introduce innovation), actively stimulating local traders to achieve higher seed quality, and ensuring that adequate crop and variety choices are put on offer.

Sources: Walsh et al. 2004, Bramel et al. 2004.

Box 6. Case study: Technical and organizational innovation in response to Uganda's epidemic of cassava mosaic disease

Implementing agency: National Agricultural Research Organization (NARO)
Constraints addressed: seed quality and availability

Cassava is the second major staple food crop in Uganda and is a mainstay of the poor. Starting in 1988, fields became severely infected with what was later identified as cassava mosaic virus, the cause of CMD. The virus subsequently spread at a rate of 20–30 kilometers a year and caused major annual losses – equivalent to 600,000 metric tons of fresh cassava, or a value of US$60 million. Some researchers worried that the 500 local cassava genotypes were threatened with extinction; so samples were collected and conserved. But a more urgent task was to enhance people's chances of having enough food to eat and enough healthy cassava cuttings to plant. The coordinated plan, led by Uganda's NARO, was quickly put in place. It involved not only bringing in the new materials (with support from the International Institute of Tropical Agriculture) but also destroying the old. Because CMD is so infectious, step 1 was to destroy infected cassava, even in farmers' fields. This demanded considerable communication skill by extension staff since it is hard for farmers to accept the idea of destroying a crop, especially one that is already scarce. Step 2 was to quickly identify CMD-resistant materials. Within eight years (1995–2003), 12 cassava varieties were released. Step three was to widely disseminate the cuttings to farmers for planting. Here, NARO's organizational ingenuity came to the fore. The research organization coordinated widespread training in the production of disease-free cuttings and worked with a decentralized network of partners which multiplied and distributed the planting materials countrywide. These partners included NGOs, churches, extension staff, and farmer groups. By 2003, 80% of Ugandan farmers were planting CMD-resistant varieties and a network of national cassava workers had been created to address the technology transfer problem on a more sustained basis.

Sources: Otim-Nape et al. 2000, Bua and Acola 2000.

Box 7. Seed relief that lets farmers strategize and that improves local market seed quality

Implementing agency: CARE
Constraints addressed: access and seed quality

CARE, like several other organizations, recently moved to a seed voucher approach, which fits in well with their rights-based agenda. In Haraghe, Ethiopia, to support farmers' strategizing even during an emergency, CARE extends voucher validity over a two-month period, allowing farmers to shop for the best deal and to gear their crop and variety choice to the rains (e.g., early or late-maturing materials).

A unique innovation in their approach comes from the supply side. CARE has farmers directly visit trader stores, but rigorously prescreens the merchants as potential seed suppliers via the voucher program. In addition to obtaining a license, traders agree to separate out varieties and maintain a warehouse and specific seed stores (which are clean and insect free).

Traders associated with CARE comment on their own changing practices due to CARE pressure (and opportunities). They claim:

- to have a better sense of the specificity of variety adaptation
- to have mastered the logistics of seed storage (fumigating, sealing storage spaces, removing inert material)
- to have gained greater appreciation of farmers' seed demand, in contrast to food demand.

One key trader even aims to seek out actively the early-maturing varieties of special interest to his west Harerghe clients. While CARE does 'train' traders in seed quality issues, it also takes punitive action (i.e., withdraws contracts) against those who deliver substandard material.

Sources: Hailu Merga, personal communication; Sperling et al. 2007.

Box 8. A sampling of seed aid bloopers and unexpected consequences

Rwandan war and sorghum seed. Shortly after the civil war and genocide, CARE distributed sorghum in anticipation of the February–June 1995 growing season. Follow-up showed that a good deal of the seed was brewed into local beer. While CARE was concerned that emergency aid had been transformed into 'booze', the beer is actually an important source of calories, provides income, and is even used as a weaning porridge. Clearly, aid workers and farmers did not necessarily have the same priorities. (From ODI 1996)

Kenyan drought and maize hybrids. After the 1997 drought, the Kenyan government gave priority to maize hybrids in its emergency seed distributions. Most poor Kenyans do not routinely use maize hybrids and they were impressed with its 'specialness' and even 'luxury value', but not necessarily just for direct sowing. A good number of farmers exchanged the packaged maize for more urgently needed items: salt, sugar, and oil. In this case, seed aid unexpectedly served a currency function. (From Sperling 2002)

Ethiopian drought and cash for relief. World Vision Ethiopia decided to test a new emergency response in Humbo (in the south) after the 2003 drought. While they assumed seed was needed, they decided to let farmers decide for themselves and launched a 'cash for relief' program. Follow-up showed that farmers invested nearly all the cash in purchases of livestock (cows and goats), with none of the recipients buying urgently needed seed. Perhaps 'emergency' needs in this instance were actually needs of a long-term nature. (WVE, personal communication, 2003)

Zimbabwe drought and sorghum mix-up. In 2002, CARE distributed seed of a drought-tolerant cereal crop, sorghum, in addition to maize, bean, and groundnut seed. The NGO contracted a number of relief specialists, including Seed Co., which subsequently provided about 500 tons of sorghum. A follow-up in 2003-04 showed that 4% of the seed was not 'Macia', a food variety suitable for human consumption, but rather a type of forage sorghum. So, despite buying from established seed houses and receiving the full requisite documentation, a portion of what CARE distributed was inappropriate. Observation: Even knowledgeable technical experts occasionally make mistakes. (Based on a joint statement by CARE International and Seed Co., July 13, 2004)

Darfur war and seed aid. In 2007, NGOs working in some regions of Darfur responded to seed shortages in the region with direct distributions, since they were concerned that farmers would not want to travel far from their villages to obtain seeds due to security risks. However, the farmers who received the seeds inspected the varieties and, if unhappy with them, they simply headed to the nearest market to exchange them for their preferred varieties. Access to the local markets may look quite different to international NGOs and local farmers.

Step 7D) Overview of recent responses to seed security problems

Table 11 summarizes the most common seed security responses by relief agencies, indicating their purpose and appropriate time frames for their use. Here relief workers can match responses they may already have implemented, with specific problems they are most likely to address on the ground.

Other approaches that are less commonly used also bear mentioning. Aid agencies can swap food for farmers' excess seed stocks in situations where varieties are highly location-specific and they want to ensure that any crop available locally is first considered for seed. The practice is complex and often requires significant labor for sorting grain to remove that which can be used as seed. Seed banking, another approach, may be organized in communities where social cohesion is strong enough to allow for this, where local varieties are in high demand, and where food and seed self-sufficiency are emphasized (possibly due to poorly functioning markets).

With Checklist B below, we come to the end of the SSSA. It is the final task – a second quick 'reality check', to bring us back to the big picture. Does the proposed solution address farmers' problems and can these actions be implemented to yield the desired consequences?

Table 11. Typology of current seed security responses to emergency

	Description/rationale	Constraints on which they should be targeted
Direct Aid		
DSD *Emergency provision: 'Seeds and tools'*	Procurement of quality seed from outside the agroecological region for delivery to farmers. The most widely used approach to seed relief.	Short-term response to address problems of seed availability especially in situations of total crop failure and/or long-term displacement of farmers. Also used to introduce new crops/varieties that are often supplied by the formal sector.
Local procurement and distribution of seed	Procurement of quality seed from within the agroecological region, for delivery to farmers. A variant of DSD.	Short-term response to address problems of seed access or highly localized problems of seed availability.
Provision of new varieties	Important where farmers need access to new genetic material.	Usually medium- or long-term response to address problems of seed quality (genetic/ varietal attributes). Can also be used a) as a short-term response to significant crop or variety breakdowns, due to disease or pest pressures, or b) in a more developmental mode, to familiarize farmers with new varieties, via small, test-size samples.
Food aid *'Seed aid protection ration'*	Often supplied during emergencies alongside seed aid so that the farm family does not need to consume the seed provided. Where local seed systems are functioning, but the previous harvest was poor, food aid can similarly protect farmers' own seed stocks.	Short-term response accompanying direct seed distribution to address problems of seed availability.
Market-based approaches		
Vouchers/cash to farmers	A way to give poorer farmers access to seed where it is available, from local markets or the commercial sector. Enables farmers to access crops and varieties of their choice.	Short-term response to address problems of seed access, especially during local seed shortages and where farmers normally acquire seed in local markets or through bartering with other farmers.
Seed fairs	An ad hoc marketplace to facilitate access to seed (or specific crops and varieties) from other farmers, traders, and the formal sector. Usually used in conjunction with vouchers to give poorer farmers purchasing power.	Short- or medium-term response to address problems of seed access, especially for subsistence crops and where local markets are a normal source of seed.

Source: modified from Sperling et al. 2008

Checklist for Step 7: Checklist to confirm the validity of the selected responses

Questions	Yes	No
Does the proposed solution truly address the seed system constraint(s) identified?		
Can the proposed solution be implemented in the current situation?		
Can the proposed activity be implemented on the required scale (meeting population requirements and, possibly, across large geographic expanses and agroecological zones)?		
Will the proposed solution reach the full range of needy groups, including the most disadvantaged?		
Will the proposed solution create other major problems – for example, corruption stimulated by large seed tenders or household conflicts relating to small cash grants?		
Proceed with the planned intervention only if you have been able to answer yes to the first four questions and no to the last one.		

Abbreviations

CMD	cassava mosaic disease
CRS	Catholic Relief Services
DSD	direct seed distribution
FAO	Food and Agriculture Organization of the United Nations
IDP	internally displaced person
NARO	National Agricultural Research Organization, Uganda
NGO	nongovernmental organization
SSSA	seed system security assessment
SVF	seed vouchers and fairs
USAID/OFDA	United States Agency for International Development/Office of Foreign Disaster Assistance
WVE	World Vision Ethiopia

Glossary

Certified seed. Seed of a known variety produced under strict, formally regulated seed standards to maintain varietal purity and high degrees of seed health. Seed lots must also be free of inert matter and weed seeds. All certified seed must pass field inspection, be conditioned by an approved seed conditioning plant, and then be sampled and pass laboratory testing before it can be sold as certified seed.
Clean seed. A general term for seed that is healthy (free of disease) and from which inert matter (dirt, sand, and twigs) has been removed.

Collector. A person who travels to or works within farming communities to collect seed from rural producers and who then delivers stocks, through sales or on contract, to middlemen or retailers, often located in towns.

Direct seed distribution (DSD). A form of relief aid in which seed is procured outside the region for delivery to farmers because seed is assumed to be unavailable locally. It is the most widely used approach to seed relief.

Formal seed system. Production and supply of seed of modern varieties and certified seed through an organized chain including specialized plant breeders, regulated seed producers, and specialized commercial outlets or government extension agencies.

Informal seed system, local seed system, traditional seed system. Terms sometimes used interchangeably to describe the main ways farmers acquire and disseminate seed: their own harvests; exchanges with relatives, friends, and neighbors; and local markets. These seed systems, which can diffuse local or modern varieties (which are recycled), tend to be governed by local norms of practice rather than official or government standards. Seed is not backed by formal certification. Worldwide, small-scale farmers source about 80% of their seed from these systems.

Local seed system. See informal seed system.

Modern variety. A variety developed by formal plant breeders which is distinct, uniform, and stable. While the term is sometimes used interchangeably with the terms 'high-yielding variety' and 'improved variety', it may in reality possess neither of these characteristics, especially when used under actual farming conditions.

Seed. Anything used as planting material.

Seed health. The extent to which seed is free from or carries pests and diseases. The term is sometimes used to refer to the germination rate (proportion of planted seed that begins to grow in a given period) and vigor (how well the plants grow).

Seed vouchers and fairs (SVF). A form of relief aid whereby aid agencies give farmers vouchers that can be redeemed for seed at organized events (fairs). Fairs serve as an ad hoc market place where farmers can procure different crops/varieties from sellers, who may be other farmers, traders, or formal sector representatives (from government seed agencies or private companies). SVF assumes that lack of access is the main seed problem farmers face.

Traditional seed system. See informal seed system.

Variety quality. Plant genetic attributes such as plant type, duration of growth cycle, and seed color and shape.

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Editing	Gerry Toomey
Design	Jeff Walker
Production	Anne Downes
Printing	Pragati, Hyderabad, India
Photos	Louise Sperling, CIAT, page 1
	Jean Claude Rubyogo, CIAT, page 5
	Steve Walsh, CRS, page 10

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When Disaster Strikes: A Guide to Assessing Seed System Security

Droughts, floods, locusts, civil war, tsunamis. . . . When disaster strikes, threatening lives and livelihoods, humanitarian agencies must respond swiftly and decisively. Making sure people have enough to eat is usually at the top of the list of emergency measures. But that task invariably raises the important issue of seed supplies. Will farmers in the stricken area have enough seed to plant during the next growing season?

When Disaster Strikes: A Guide to Assessing Seed System Security is a practical assessment tool. It will help emergency relief agencies and their field workers to decide whether a seed-related intervention is warranted in the first place, and if so, to design the best strategy to help farmers. The method is laid out in seven steps. Each includes how-to notes, guiding questions, and action checklists. Besides helping agencies understand and cope with acute stresses on seed systems, the guide also tackles the issue of longer-term stresses and how to take advantage of development opportunities.

"Intervening in seed systems is serious business," writes the author, Louise Sperling. "Even short-term interventions in the seed system may have significant effects over years."

An expert in farm livelihoods and seed systems, with long experience in sub-Saharan Africa, Dr Sperling is a researcher with the International Center for Tropical Agriculture (CIAT) (www.ciat.cgiar.org).

International Center for Tropical Agriculture (CIAT) Africa Program

P.O. Box 6247
Kampala, Uganda
Tel: +256 414 567670
Email: L.Sperling@cgiar.org
Web site: www.ciat.cgiar.org/africa/seeds.htm

Catholic Relief Services

228 W. Lexington St.
Baltimore MD 21201, USA
Tel: +1 888 277 7575
Email: info@crs.org
Web site: www.crs.org