

Seed Aid for Seed Security

ADVICE FOR PRACTITIONERS

Assessing Seed System Security

This brief maps the steps needed to assess seed security system and is intended for non-specialist emergency response practitioners and donors. It presents a number of insights that have evolved through recent research. The brief seeks to:

- Expose stakeholders to agriculture disaster assessment methods, with a focus on seed systems.
- Facilitate changes in knowledge, attitude and practice with regard to seed system security.
- Assist in identifying strategies for rapid and effective agricultural recovery.

Seed systems are complex and so are the impacts of interventions. Every organization approaches a situation with a unique set of values, experience and commitment. While the assessment approach presented here aims to promote a rigorous seed system security assessment (SSSA), we realize that actual practice is often rushed and based on less-than-perfect information and judgments. This tool may help practitioners to avoid some common shortfalls and promote reflection on how seed systems function.

This brief identifies the key seed security issues. Although the intention is to provide guidance to help practitioners move forward, certain institutions may, after reading this brief, decide not to do seed aid at all, but rather to leave such assistance to others with greater capacity. In general, it is probably preferable to offer seed aid only in concert with seed system security assessments.

Note that this brief is an excerpt from a larger manual (see below for full details); our aim here is simply to introduce the concept of SSSA and give an overview of process.

The State of Seed Security Assessments

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

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

The steps needed to attain seed security are quite different from those needed for food security. Explicit seed system security assessments are a prerequisite for effective action and vital for determining the strategic goals for seed-related assistance.

a paucity of methods for assessing seed security in either emergency situations (that is, rapidly) or in depth on a larger scale beyond the community level.

Below we present the basic steps for a seed system security assessment. We note first that the context for any SSSA must first be well understood before one homes in on the agricultural or seed system *per se*. The patterns and causes of the disaster, for example its timing and duration and distribution in space and across communities, have to be analyzed and mapped. Further, the broad

effects on the five capitals (natural, human, social, financial and physical) need to be well understood (see the detailed CIAT/CRS document for a set of guide questions). This brief is restricted to seed security concerns to draw attention to this relatively new area of assessment.

Basic Elements for Assessing Seed System Security

Methods for seed system security assessment are in the process of being tested and refined under the OFDA/MFA-funded Seed Systems under Stress project. A number of basic elements are integral for an accurate assessment of seed security.

Box 1 shows the five main elements in a seed system security analysis, with the subsequent text briefly highlighting key points in each. While presented sequentially, the process is iterative, going back and forth as one starts to understand what is really going on. The analysis is geared

particularly to areas of acute shock (emergency), although most elements would also be relevant for agricultural and seed systems that are more chronically stressed.

1 Carry Out Quick Farming Systems and Seed System Profile for Regions of Concern: *Normal Times*

As a first step to understanding seed security, one has to have a good grasp of how the farming system and the seed system function in normal times; that is, what was the *status quo*. Much of this information can be gathered pre-disaster, through desk-based research and by informant or focus group interviews. The agricultural and seed system basics are straightforward:

- 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?
- How do farmers' usually get seed or planting material for these crops?
- What are the sowing basics for each major crop? (Average areas sown, seed rates, multiplication rates.)
- Are there important or preferred varieties, by crop?
- Which inputs and management practices might be essential for particular crops or varieties?
- Who within the household is responsible for decision-making and actual management of the diverse crops, at various stages of production and post-production?

Some of the answers to these questions may be valid across households and socioeconomic groups, while others may not. So, repeating the analysis for distinct types of households or target groups, for example female-headed households, could be important. Some of these answers may also vary by ethnic group, and certainly will vary by agro-ecological region, so that doing an assessment in a small area will not be appropriate for country-wide interventions. We briefly elaborate on several of these items to show how decision-making can start to unfold even in routine information collection.

Important Crops (normal and stress)

Not all crops are equally important for farmers' livelihoods. A quick analysis can highlight the central ones, both for direct consumption and for income (the latter being crucial for purchase of survival

A shortfall in production does not necessarily imply a seed shortfall.

BOX 1 Assessing Seed System Security: Five Basic Elements

1. Carry out quick farming system and seed system profiles for regions of concern: normal times.
2. Determine the goals for seed relief and recovery, including farmer demand and needs: post crisis.

AFTER DYNAMIC DEMANDS AND NEEDS HAVE BEEN DETERMINED:

3. Analyze seed channel functioning post-crisis (framed in relation to demands and needs set).
4. Probe for more chronic (versus acute) stress manifestations as well as for emerging development opportunities – so as to distinguish between immediate and longer-term needs and strategies.
5. Match possible responses to priority constraints, opportunities and demands.

items in times of stress). Note that the profile of crops will change by season. The general profile of crops might also alter in stress periods – and these minor crop variations can usually be anticipated. Finally, as crops critical for poorer farmers may not be the same as for the better off, it is often useful to focus on the more vulnerable population segments immediately.

TABLE 1
Most important crops, theoretical example for East Africa

CROP	For Consumption	For Income	Other (Specify)
Beans	+		
Sorghum	+	+ (beer)	
Maize	+		

How (through which channels) farmers normally obtain seed for these most important crops

Farmers normally get seed from a range of channels, even for the same crop. For example, a farmer might get some of her bean seed from own stocks, and some from local markets to top up inadequate home harvest or storage conditions. The use of multiple seed channels for the same crop is important because a failure of one channel can be compensated for by using another.

Seed for different crops, for example maize and sorghum, may also routinely be accessed through quite different channels. For example, hybrid maize might need to be accessed from the formal sector or commercial sellers, while seed for sorghum can easily be obtained from home harvests because its multiplication rate is high and the harvest can be directly used for seed.

Through time, the range of channels from which farmers access seed may change, as more integrated seed suppliers emerge, such as informal traders who move higher quality (but still not certified) seed. Similarly, with increasingly poverty, relief seed is becoming routine in many contexts. Hence it is

TABLE 2
Seed sources (percent from different sources) for most important crops, theoretical example for East Africa

CROP	Own Production	Social Networks, Neighbors & Friends	Local markets	Formal Sector	Other (Specify)
Beans	50	5	45		
Sorghum	95	5			
Maize	20			80	

important to be aware of the full range of channels that farmers use and to keep up-to-date on changes over time.

Are there important or preferred varieties (by crop)?

Different varieties may serve different purposes in a single household. While certain varieties may be preferred for home consumption, others may be preferred for sale. Elements of post-harvest processing, such as ease of threshing, may cause women to prefer different varieties from men. The role of different varieties may vary across households, reflecting, *inter alia*, differences in agro-ecological and socio-economic conditions. For example, households with easy access to markets may access fertilizers and pesticides, thereby making a variety with traits such as tolerance to local production constraints (for example pests and poor soils) less relevant. Note also that the relevance of different varieties may change through time, even within a household, for example as socio-economic conditions change.

For many crops, small farmers are increasingly obtaining their seed off-farm through local vendors and markets.

STEP 2 Determine the Goals for Seed Relief and Recovery, Including Farmer Demand and Needs: Post Crisis

One of the early steps to shaping a seed system security assessment centers on weighing the objectives for relief and recovery. It is only with this strategic reflection that practitioners increase their chance of meeting the needs of populations in stress. Strategic reflection is vitally important and should replace the simple response of merely delivering inputs such as seed, which may or may

A response may do a disservice to stressed populations if it restores a system that is gradually deteriorating.

not be appropriate for the context and, even if appropriate, may not be used for other reasons.

In considering objectives, practitioners may either elect to restore the system to the *status quo ante* (as it was before) or actively aim to promote a different and

presumably improved crop and agricultural system. In planning either thrust, it is necessary to ensure that the response addresses immediate needs and demand. The rationale for this Step 2 is that the aims of the relief and recovery should be considered explicitly – so that the SSSA is shaped to maximize

understanding of the dynamics (constraints and opportunities) in the systems.

Several points merit consideration. First, farming systems are not static: rather they are dynamic and change in positive as well as negative ways. Secondly, one cannot intervene in the full farming system, across all crops; choices have to be made as to whether the crop focus should promote quick recovery or maximize return on investment. Third is the principle of ‘Do No Harm’. A response may do a disservice to stressed populations – reinforcing vulnerability – if it restores a system that is gradually deteriorating. Finally, it has to be made clear from the outset to which groups the SSSA gives priority (Farmers? Seed companies? Traders? Others?)

Box 2 suggests the kinds of guiding questions needed to frame the setting of aims.

BOX 2

Defining a Strategy for Relief and Recovery: *Guide Questions*

The following presents guidance as to whether the goal of the intervention should be to restore the agricultural system to its pre-crisis status quo, or if it should aim at promoting a different (and presumably improved) system.

OVERVIEW

- What are the strengths and weaknesses of the pre-crisis cropping and seed system practices?
- Are the crops and varieties that people can access generally appropriate?
- Do people have access to markets for inputs and produce?
- Are there social networks and institutions that function to diffuse knowledge and planting material?
- Is there a culture of experimentation and evaluation with new seed?
- Are people eager to explore new niches such as seed trading?
- What opportunities exist that can be exploited?
- What changes are already taking place that shape crop and variety profiles, and with what effects?

If strengths and opportunities exist and predominate, an overall aim for any intervention should be to ‘do no harm’. Changing a system may put existing strengths at risk. However, if sound changes are already going on, these changes may be undermined by interventions that aim to restore the pre-crisis status.

GUIDING QUESTIONS FOR RESTORING THE SYSTEM TO THE STATUS QUO ANTE

- If the aim is to restore, should the focus of intervention be on the income-generating crops, the staple crops, or crops that are key for system resilience, and why?
- Which crops have been affected most by the crisis? Should the focus be on these? Why? Why not?

- Are the crops affected critical for immediate food security? Are there no substitutes (or other opportunities) locally to fill the gap?

GUIDING QUESTIONS FOR IMPROVING THE CROP, SEED OR AGRICULTURAL SYSTEM

- What evidence is there that change is needed? What types of change?
- What should the level of effort on strengthening be in relation to efforts on system restoration? What strengths and opportunities exist in the surviving system that can be exploited? (See above)
- Should the crops of intervention focus be the same as before? Why? Should there be a partial combination of old and new crops? Note that the introduction of a new crop implies the identification of a new market.
- Should crop diversification be promoted as an explicit strategy?
- Should the priority varieties of intervention focus be the same as before? Why? Should there be a partial combination of old and new varieties?
- Is there evidence of seed quality concerns? How might these be addressed?
- Is there evidence of accessibility of novel crops and varieties? Bottlenecks, or otherwise, in formal sector, local seed/grain markets and exchange networks?
- What are the risks involved in the strengthening strategy? How might they be anticipated and responded to?

RESPONDING TO IMMEDIATE FARMER DEMAND

Focusing on farmers and local economy trends, is there evidence for shifts in immediate demand and needs?

TABLE 3
Rating the parameters, bean example.

Crop	Availability (high to low)	Access (easy to difficult)	Variety & Physiological Quality (acceptable or not)
Own production and home stocks	low	easy	acceptable
Local grain/seed markets	high	difficult (high price)	moderately acceptable: variety is adapted but seed is of medium physiological quality
Formal Sector	low	difficult	moderately acceptable: variety is not totally suited to marginal zones, but seed is of high physiological quality

STEP

Analyze Seed Channel Functioning: *Post-Crisis*

This step provides the core of the seed system security assessment. Some channels may be more resilient to different kinds of stress than others, and one should not assume that a breakdown in one channel means a breakdown in all. So, for instance, in times of bureaucratic upheaval such as civil war, when government services may halt, formal channels like seed parastatals often cease to function, while local ones, such as the seed/grain markets, often continue to operate.

In assessing seed channel functioning, three basic dimensions of seed security need to be evaluated to understand seed system functioning (see Brief No. 3 and Table 3 above).

Seed availability: Is seed available in the area?

Access to seed: Can farmers access the seed, particularly in terms of price and distance?

Seed quality: Is seed of the right variety? Is it sufficiently clean and healthy? Will use of this seed introduce unwarranted risk?

A channel is functioning (or can be helped to function) only when all three features can be managed to farmers' satisfaction. Very often during a crisis one may have to think hard about how to weigh each of these features. Minimally, enough seed has to be made accessible for basic sowing. The issues often most hotly debated include 'of which crops and varieties', and 'of what quality'.

Key Insights for Assessing Seed Channel Functioning

In the majority of cases, for poorer farmers, two channels in particular merit focus in stress periods: seed sourced from home production and from local seed/grain markets.

Home Production

The important message concerning home production (that is seed derived from own harvests) is that a production shortfall does not necessarily imply a seed shortfall. Crops have different seeding rates (that is, the amount of seed required to sow a given area) and different multiplication rates (that is, the amount of seed harvested in relation to the amount of seed sown). As an example, in East Africa for some of the basic staples, like beans or sorghum, farmers can lose most of the harvest (for beans 88% and for sorghum even 99%) and still have enough seed to sow – assuming all crop harvested can be saved for actual planting. But note that saving seed is not always easy, particularly in areas with only one agricultural season per year.

TABLE 4
The relation between harvests (home production) and seed needed for sowing, theoretical example for East Africa.

Crop	Beans	Sorghum
Surface Area per household	1/4 ha	1/4 ha
Seeding Rates (kg/ha)	100	10
Sowing Needs	25 kg	2.5 kg
Multiplication Rates	8	100
Harvest	200 kg	250 kg
% of harvest needed to meet basic sowing needs	12.5	1.0

Local Markets

Analyses that show how farmers actually obtain seed, both in normal and stress times, also deliver an important message about local markets. For many crops, small farmers are increasingly obtaining their seed through local vendors and markets, either to top up their home supplies, or to obtain the bulk of their seed, because they felt forced (or chose) to eat their household stocks. This trend toward market purchase is being documented again and again as land holdings become smaller and more fragmented, and as soil fertility progressively declines, particularly in East, Central and Southern Africa. The key question for understanding seed security thus shifts from 'do farmers produce enough seed' to 'can farmers access seed elsewhere'. Assessing how markets function involves tracing the locations of seeds and the paths along which seed moves in a stressed region, the availability of seed at important markets, transport and time costs, and the price at which seed is ultimately put on offer locally. Interviews with key regional traders can be especially useful for understanding the position of seed stocks

and price margins (and this can be done quickly). Again, case studies are showing that for most basic crops it is rare that seed is not available within reasonable trading vicinity – even in time of crisis.

STEP 4 Probe for More Chronic (versus Acute) Stress Manifestations as well as for Emerging Development Opportunities

The last key step – before analyzing possible responses – centers on looking at the longer-term, so as to understand what is actually happening at the present moment. If the focus remains on the acute or short-term, SSSA may fail to grasp ongoing processes and dynamism in the system, and subsequently may misdiagnose the real set of local strengths and weaknesses. An SSSA has to systematically probe for longer-term patterns and key signals, which enlighten seed system functioning.

BOX 3

Guide Questions for Looking at the Longer-Term: Chronic Stress? Developmental Opportunities?

SEED AVAILABILITY

- Do farmers lament a general shortage of any seed or planting material of a specific crop, which forces them to plant smaller areas than they wish?
- If so, do they cite reasons for these crops and varieties not being available locally? Marketing problems perhaps? Poor transport? (If farmers complain of high price, or not having funds to buy what is on offer, this reflects a problem of access.)

SEED ACCESSIBILITY

- Do farmers complain of high seed prices, or cost of seed in general, which has forced significant changes in their agricultural strategy, such as planting smaller areas, using non-preferred seed or changing the area planted to different crops?
- Do farmers mention decline of seed bartering networks that gave them access to seed and no local market mechanism to fill the gap and deliver the seed they want?

SEED QUALITY

- Are farmers planting what they consider unadapted (or 'inferior') crop varieties because they cannot find anything better (crops with low yields, wrong cycles, poor taste, poor marketing qualities)?
- Are farmers planting what they consider low quality seed because they cannot find anything better?

- Do farmers continually have to resow fields because of germination or emergence failures?

GENERAL CONCERNS

- Do farmers comment on a decline of seed quantity, quality or accessibility over the longer-term? (Maybe take a 5 to 10 season view.) If so, why? Are these problems they feel they cannot solve?
- Have the farmers been the recipients of seed aid on a repeated and relatively regular basis (say 1 in 3 seasons)? If so, why?
- Are there farmers who exhibit 'positive deviancy'? That is, who always have seed available, who never have a problem accessing seed and who are satisfied with the varieties and the quality of their seed? Why are these farmers seed secure and what can one learn from them?

LOOKING TO THE FUTURE

- Do promising new varieties exist for the agro-ecosystems in question, and do farmers have access to them? (Aim to understand how farmers use new varieties and under what 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 further?
- Have agro-enterprises been developed regionally? If so, what were the salient features for start up and success? (Try to analyze also those that may have failed.)

Threshold or trigger indicators that might signal chronic stress include:

- Aid is being given season after season, in absence of acute outside stress such as floods.
- Crop failure, and purported lack of seed, becomes cyclical, say every 2 to 3 years.
- Lack of seed stored in houses and communities where it is normally maintained in quantity.
- Dramatic declines in seed quality and viability, or farmers sowing seed that they know to be of significantly inferior quality for germination rate or plant health.
- Changing crop profiles because of a lack of a particular seed or crop.
- Sharp increases in use of non-preferred or disliked varieties.

On the more developmental side, similarly, key

signals can serve to stimulate reflections. Note that possible seed system strengthening might be framed both to respond to existing problems and to explore novel opportunities. In terms of opportunities, trigger signals on the more developmental side might include:

- Lack of farmer awareness of, access to, or use of new varieties (see also Brief No. 5).
- Heavy reliance on a narrow range of subsistence crops.
- Lack of agro-enterprise in general (with most crop production for local consumption and sale).

Box 3 (opposite) suggests guide questions to help assess whether seed systems are stressed on a more chronic basis and to suggest ways to start to explore more developmental options that go beyond short-term responses to emergencies.

TABLE 5
Seed problems and broadly appropriate responses

Parameter of the problem	Short-term response (acute)	Long-term response (chronic)
Unavailability of seed	<p><i>Where farmers source seed predominately through informal seed channels:</i></p> <p>Enhance immediate operation of local and regional markets (e.g. offer inventory credit to traders, facilitate improved access to market information, including advance notice of demand subsidies or of purchase).</p>	<p><i>Where farmers source seed predominately through informal seed channels:</i></p> <p>Support development of local and regional markets (e.g. encourage more access to credit, better established market information channels, perhaps more effective transport and seed storage support).</p>
	<p><i>Where farmers source seed predominately through formal seed channels:</i></p> <p>Direct distribution of seed.</p>	<p><i>Where farmers source seed predominately through formal seed channels:</i></p> <p>Support development of quality assured seed production or supply chains, including commercial enterprises where viable.</p>
Poor and vulnerable farmers do not have access to seed	<p>Cash disbursement.</p> <p>Seed Fairs with vouchers or cash.</p> <p>Local procurement and distribution (if the disaster rendered the communities dysfunctional).</p>	<p>Poverty reduction programs.</p>
Seed of poor quality and lack of appropriate varieties	<p>Seed fairs with quality controls.</p> <p>Direct distribution of test samples of quality seed or sale of subsidized test samples.</p> <p>Distribution of foundation seed to a limited number of farmers, making use of informal seed channels to diffuse the seed to others.</p>	<p>Programs to improve seed quality (on farm and in seed/grain markets).</p> <p>Participatory variety selection.</p> <p>Participatory plant breeding.</p>

STE. 5 Match Possible Responses to Priority Constraints, Opportunities and Demand

Finally, the strength of the assessment (its accuracy, comprehensiveness and scope) must be double-checked *via* the reflective process of linking problem definitions and concrete action on the ground. The SSSA should be sufficient to guide subsequent field action and to help weigh among a variety (or cluster) of options. The process of pondering responses will reveal the extent to which information is sufficient, and whether the dynamics of seed system function are truly understood.

Without prescribing a scenario such as 'If A is found, then B response is appropriate', we suggest in Table 5 below the broad overview of possible seed system-related problems and how they may link to possible alleviating actions (see CIAT/CRS ms. for

an in-depth table). For instance, during an acute crisis such as a flood, an assessment that shows a 'lack of seed available' (a rare case) might be immediately linked to actions to import seed from elsewhere, whereas an assessment that diagnoses 'lack of access' as the problem (perhaps due to a drop in ability to purchase or to barter) might focus on supplying vouchers (perhaps coupled with seed fairs). Assessments that show the stress to be a chronic one, spanning many seasons, might recommend a move away from seed-based interventions altogether. In the case of chronic access problems, the development of income-generating activities or agro-enterprises might better help alleviate the poverty problems at hand.

Conclusions

New insights on seed aid and an appreciation of the resilience and complexity of seed systems are emerging. This has resulted in a significant 'raising of the bar' in how seed system security is assessed and analyzed and how seed interventions are designed.

A seed system security assessment, not surprisingly, focuses on seed systems. It therefore does not replace disaster and food security assessments, but rather it complements them. SSSA itself also goes well beyond a seed focus *per se* and beyond reductionist calculations of seed needs. SSSA is an iterative process – part desk-based, part field analysis – with reflections on short- as well as long-term trends in the seed, farming and livelihood systems.

This brief introduces a tool that practitioners can use to assist farming communities recover from disaster. It provides concrete guidance for understanding problems and identifying opportunities for strengthening and integrating the different seed systems on which farm families rely.

References

CIAT/CRS, ms Seed System Security Assessment: A Thinking Guide. Version February, 2006.