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Background Paper

UNDERSTANDING SEED SYSTEMS AND STRENGTHENING SEED SECURITY

Prepared by

Louise Sperling
International Center for Tropical Agriculture (CIAT)

and

H. David Cooper
Seeds and Plant Genetic Resources Service
Food and Agriculture Organization (FAO)

Louise Sperling (author for correspondence)
International Center for Tropical Agriculture (CIAT)
African and Agro-biodiversity Programs
c/o 'Le Ginestre'
Lucio Volumnio 37
00178 Rome, Italy
L.Sperling@cgiar.org

H. David Cooper
(Present address)
Secretariat of the Convention on Biological Diversity, Suite 300
393 St. Jacques
Montreal, Quebec, H2Y 1N9, Canada
david.cooper@biodiv.org

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UNDERSTANDING SEED SYSTEMS AND STRENGTHENING SEED SECURITY: A BACKGROUND PAPER

I. INTRODUCTION

In recent years, the provision of seeds to strengthen the recovery of agricultural production systems following disasters has become an important activity for many relief agencies. One rationale for this is that by providing a key input to agricultural production, dependence on repeated food aid can be reduced. Now, in light of 10 or more years of experience, a number of agencies are reviewing their seed aid activities with a view to improving both the effectiveness and the sustainability of seed-based interventions. With the current crises in multiple regions of Africa, this issue has renewed urgency.

Last year, the Food and Agricultural Organization of the United Nations (FAO) carried out an evaluation of the Organization's strategic objective A3: "Preparedness for, and effective and sustainable response to, food and agricultural emergencies" (FAO, 2002a). The results of this evaluation were considered by the Programme Committee and endorsed by the FAO Council. In the specific area of seed relief, FAO's Division for Emergency Operations and Rehabilitation (TCE) has been working with the Seeds and Plant Genetic Resources Service (AGPS), as well as other relevant services. In the light of the evaluation, FAO is developing approaches for more targeted relief as well as strengthening the links between relief and rehabilitation. This work is intended to benefit both FAO's operational activities and its normative responsibilities to facilitate the development and dissemination of best practices.

These review activities are taking place at a time when the international development community is increasingly looking towards a broader combination of measures to tackle food and livelihood insecurity, including support to production, market-based measures, and provision of social "safety-nets" (for instance, through provision of cash in addition to more traditional food aid responses). There is increasing recognition of the distinction between lack of availability of a resource (food, seed, etc.) and lack of access to that resource because of poverty. This is consistent with Amartya Sen's explanation of contemporary famines in terms of lack of "entitlements" (Sen, 1981) and the framework of sustainable livelihoods, which views livelihood strategies as drawing upon different types of capital assets (Scoones, 1998).

This paper provides background information on seed systems and seed relief interventions for participants at the Workshop on Effective and Sustainable Seed Relief Activities, Rome, 26–28 May 2003. In this paper we review the rationale for and goals of seed aid (section II) and provide an overview of seed systems, with particular attention to the "local" or "informal" seed system that provides most farmers with seeds most of the time (section III). In section IV, the parameters of seed security are discussed, including the distinctions between availability, access, and utilization (or quality) attributes. Acute and chronic emergency situations are also described. In section V, lessons learned from experience in the field, particularly in Africa, are summarized and discussed, and in section VI, current response options are described and compared, focusing in particular on direct seed distribution and seed fairs and vouchers. Finally, some major challenges for moving ahead are considered in section VII.

This paper builds upon a number of earlier studies (a comprehensive bibliography is provided) as well as recent discussions among FAO staff involved in seed relief (the FAO seed relief discussion group). The paper does not necessarily reflect the views of FAO or its member states.

II. RATIONALE AND GOALS OF SEED AID

Sporadic incidents of seed provision during emergencies can be traced back many decades. US government agencies and churches provided seed domestically to devastated farmers during the worst days of the Mississippi floods and the Depression of the 1920s and '30s (Red Cross, 2001). Internationally, some of the first traceable deliveries, associated with an FAO mission, show rice seed moving into Cambodia at the turn of the 1980s (www.websitesrcg.com/border/border-history-1).

However, it is predominantly within the last decade, and particularly on the African continent, that relief agencies have engaged in seed aid as a routine complement to food aid assistance. Seed delivery has been seen as an innovative and effective step forward in helping farmers recover, reestablish, and sustain their farming systems. The logic of seed aid centers on the notion that communities affected by emergency (e.g., drought, flood, short-term civil disruption) should have basic seed and tools as quickly as possible, so as to hasten the process of producing their own food and/or making money from crop sales (ODI, 1996). To date, in general humanitarian practice, "seed aid" has been equated with "giving seed." That is, the focus has been on replacing a single capital asset, seed, as the leverage point for strengthening broader structures and processes in the seed system.

The goals of seed aid interventions have been variously expressed, and the nuances are quite important. For instance, even within the same country and during the same relief distribution effort (in Kenya, 1997), diverse seed aid goals were promoted by different implementers. These included filling a temporary seed gap so as to help farmers establish a self-help mode, supporting the commercial seed sector, supporting progressive farmers in generating income, and building political good will among a constituency (Sperling, 2000). The setting of goals, not always done explicitly or transparently, is key to shaping the specific approach used in providing seed system assistance. Goal definition affects, *inter alia,* the type of intervention chosen, the kinds of crops/varieties on offer, whether skill building approaches are promoted, and the need for and nature of beneficiary or participant targeting and inclusion.

The FAO seed discussion group has determined that the overall aim of seed relief activities should be to contribute to food and livelihood security by ensuring that farmers, especially vulnerable farmers, have access to seed (planting material) of adequate quality. Seed relief activities should (a) meet the immediate needs of farmers for access to planting material and (b) contribute to long-term restoration, rehabilitation, or improvement of agricultural systems. By supporting food production, seed relief should decrease dependence on repeated food aid. These aims are nested within the broader aims of strengthening food and livelihood security, consistent with the broader aims of FAO's Strategic Objective A3: "Preparedness for, and effective and sustainable response to, food and agricultural emergencies."

Three features might be highlighted in this statement. First, it avoids assuming that seeds should be directly supplied from outside; instead, the emphasis is on facilitating farmers' access to seeds, through direct distribution or other means. Second, even in the short term, there is recognition of the need to adopt a longer vision where possible. Third, it implies a

"systems" perspective, focusing on seed systems within the broader context of agricultural and livelihood systems.

The seed discussion group also recognized that the aims of emergency seed aid assistance might go beyond restoring existing seed systems. Depending on the context, humanitarian relief practitioners may also work to strengthen weaker seed/agricultural systems, those vulnerable to stress, and even, in some cases, to significantly change such systems. This strategy to work toward a modified or changed system may be appropriate where the stress itself has caused a changed environment or where the management of the environment has become increasingly unsustainable—in progressively drier areas, for example, where the use of drought-prone material (varieties and crops, such as maize hybrids in Kenya) has become the norm rather than the exception.

The group proposed a number of guiding principles (see box 1), several of which will be examined later in this paper.

III. OVERVIEW OF SEED SYSTEMS FARMERS USE

To strengthen seed systems, we need to have a comprehensive understanding of them. Farmers, particularly small farmers, are involved in multiple kinds of seed systems, which help them produce and obtain the seed they need. These systems can be broadly divided into two types: a formal seed system and a local system. The local system is also sometimes called the "informal," "traditional," or "farmer" seed system. As we shall see below, the formal and local seed systems are not always as distinct or separated as the two labels may imply.

Formal and local seed systems

The formal seed system is the easier to characterize, as it is a deliberately constructed system, which involves a chain of activities leading to clear products: certified seed of verified varieties (Louwaars, 1994). The chain usually starts with plant breeding and selection, resulting in different types of varieties, including hybrids, and promotes materials leading to formal variety release and maintenance. Guiding principles in the formal system are to maintain varietal identity and purity and to produce seed of optimal physical, physiological, and sanitary quality. Certified seed marketing and distribution take place through a limited number of officially recognized seed outlets, usually for financial sale (Louwaars, 1994:28). The central premise of the formal system is that there is a clear distinction between "seed" and "grain." This distinction is less clear in the local, farmer seed system.

A local seed system is basically what the formal system is not. Activities tend to be integrated and locally organized, and the local system embraces most of the other ways in which farmers themselves produce, disseminate, and access seed: directly from their own harvest; through exchange and barter among friends, neighbors, and relatives; and through local grain markets. Encompassing a wider range of seed system variations, what characterizes the local system most is its flexibility. Varieties may be landraces or mixed races and may be heterogeneous (modified through breeding and use). In addition, the seed is of variable quality (of different purity, physical, and physiological quality) (Almekinders and Louwaars, 1999). The same general steps or processes take place in the local system as in the formal sector (variety choice, variety testing, introduction, seed multiplication, selection, dissemination, and storage) but they take place as integral parts of farmers' production systems rather than as discrete activities. While some farmers treat "seed" specially, there is not always necessarily a distinction between "seed" and "grain." The steps do not flow in a linear

sequence, and they are not monitored or controlled by government policies and regulations. Rather, they are guided by local technical knowledge and standards and by local social structures and norms (McGuire, 2001).

Box 1. Basic Guiding Principles for Seed Relief

1. A needs assessment should underpin any decisions to undertake seed relief and should guide the choice among possible interventions. This needs assessment should be holistic, putting seed security in the context of livelihood security.

2. Seed relief interventions have to be clearly matched to the context (for example, a crisis caused by drought may require very different actions from a crisis caused by war). By supporting food production, seed relief should decrease dependence on repeated food aid.

3. Seed relief activities should aim to both:
   - be effective with the immediate objective of facilitating access to appropriate planting material
   - contribute to the restoration, rehabilitation, or improvement of agricultural systems in the longer term

4. Ideally, considerations of seed system sustainability should be built into seed interventions from the beginning. As a minimum, seed aid should do no harm to farming systems. Thus, emergency relief activities should support local seed system development, ideally by integrating long-term needs in the design of the project.

5. Seed relief activities should be built upon a solid understanding of all the seed systems farmers use and the role they have in supporting livelihoods. The local system is usually more important in farmers' seed security and has been shown to be quite resilient. Depending on the context, the focus in an emergency should normally be on keeping the local seed system operational. One practical problem is that seed systems are often not sufficiently understood, especially in emergency situations. Hence, there is a need for more emphasis on understanding seed systems and their role in supporting livelihoods, and on needs assessment.

6. Seed relief interventions should facilitate farmers' choices of crops and varieties. Seed relief interventions should aim to improve, or at least maintain, seed quality and aim to facilitate access to varieties that are adapted to environmental conditions and farmers' needs, including nutritional needs.

7. Monitoring and evaluation should be built into all seed relief interventions, to facilitate learning by doing and thereby to improve interventions.

8. An information system should be put in place to improve institutional learning and as a repository of information gained from cumulative experience. Such information systems should be institutionalized at national levels, to the greatest extent possible.

9. A strategy to move from the acute emergency response to a capacity building or development phase should be included in the design of the intervention.

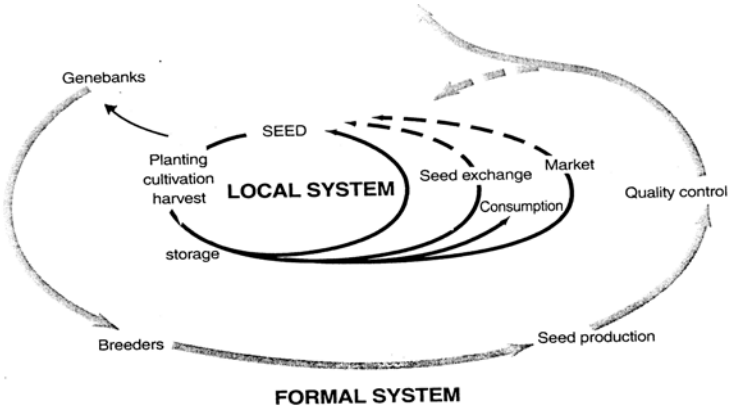
These guiding principles were endorsed by the FAO Emergency Coordination Group (Rome, 20 June 2003), based on the recommendations of a stakeholders' workshop "Improving the Effectiveness and Sustainability of Seed Relief" (Rome, 26–28 May 2003). The initial draft was prepared by the FAO seed relief discussion group.

Despite, or perhaps because of, their variability and local specificity to needs and preferences, local channels (e.g., household stocks, markets, social exchange networks) provide most of the seed that most small farmers use. Common figures suggest that somewhere between 80% and 90% of the seed farmers access comes from the local seed system (DANAGRO, 1988;

Cooper, 1993; Rabobank, 1994; FAO, 1998), although this varies greatly by crop and region. (For example, the figure is much lower where hybrid maize is grown in Southern Africa or, generally, where formal seed is subsidized.) In studies of seed systems, much has been made of the notion that small farmers, especially in vulnerable regions, strive at all costs to save their own seed, and that they get the bulk of what they sow from previous harvests. While this is broadly true, especially in remote or marginal areas, studies that actually quantify seed-source use find increasingly that, within the local seed system, local grain markets are also crucial in meeting seed needs, especially for poor farmers and in difficult times. Again, this varies greatly by crop (see summary of work in Uganda; Rwanda; South Kivu, Zaire; and select regions of Burundi in David and Sperling [1999]). For many farmers, local markets are the second best bet (after home stocks) as they put on offer the same varieties farmers routinely sow (Sperling and Loevinsohn, 1993). One study in southern Somalia demonstrates that where grain traders invest in obtaining good-quality "seed" (making a distinction from bulk grain), local markets can be a preferred source of replacement seed (Longley et al., 2001).

Looking at the seed system interfaces

One of the most oft-cited and useful figures diagramming seed system components appears below. It shows formal and local seed systems as distinct but intersecting.



Source: Almekinders and Louwaars (1999).

Figure 1: **The local system of farmers' seed supply and the formal system: two parallel functioning systems with relatively little interaction**

It is perhaps this melding of the formal and the local that is of prime interest for those striving to create stable, resilient, and dynamic seed systems—systems on which farmers can actually rely. Three aspects of the intersections between the formal and local systems are of note:

1. **Materials themselves flow between the two systems—and create something new and potentially useful:** Varietal identities frequently become blurred through several processes (McGuire et al., 1999). For example, many successful so-called "modern varieties" from the formal system may be pure line selections from local landraces or may be incorporated as components of farmers' mixtures. Further, farmers may recognize that modern varieties cross with local materials, such as *criollo* maize in Mexico. Farmers also may come to consider the modern introductions as "local" and eventually group them within the local genetic heritage (McGuire et al., 1999, drawing from Budelman, 1993; Scheidegger, 1993; Bellon and Brush, 1994; Smale et

al., 1995; and Richards, 1997). All those processes, frequent and ongoing, serve to muddle the divide between what is new and old, what is pure or not, what is local and what is modern.

2. **Farmers themselves often draw seed from both systems for different kinds of crops:** What is sometimes called the "maize craziness" of the Southern African region (van Oosterhout, 1997) serves to show how the same small farmers may routinely access seed from very different seed channels. The maize hybrids, sometimes renewed yearly, have to be accessed, directly or indirectly, through formal seed systems (stockists, commercial cooperatives, government parastatals, and, sometimes, relief aid). Beans, however, may come from the farmer's own harvest or local grain markets, and the local sorghum seed may be passed neighbor to neighbor. In some societies, in contrast, vegetatively propagated crops, like banana, never move through formal channels, and even the hint that they might be sold or bartered for profit may constitute a local social offence.

3. **Farmers themselves sometimes use different channels for the same crop:** It is not all unusual for a farming household to meet their single-crop needs from varied seed channels. For instance, well-documented studies show that, during a single season, bean farmers throughout Eastern and Central Africa obtain some of their bean seed from their own stocks, some from markets, and some from neighbors, and may obtain a handful of new material (to try) from the extension agent or research station. Broad strategies also frequently vary by wealth (Sperling, 1993; David and Sperling, 1999).

Some of the key attributes that need to be monitored and addressed in assessments of seed systems are indicated below (box 2).

Box 2: Some Basic Elements to Describe Seed Sources

For major crops:

- From which channels (where) is seed accessed?
  - Farmers' own production
  - Social networks
  - Local grain markets
  - Public sector (government, research center)
  - Seed companies

- How eed accessed?
- Which varieties are most prevalent?

- . . . And how do these vary between better-off and poorer households?

Source: FAO seed relief discussion group synthesis, May 2003.

The aim of this brief overview of seed systems is to try to "demystify" them. They are complex and dynamic, but the principal unifying trends can usually be understood relatively rapidly. One system is not necessarily "better" or more effective than another; they meet different kinds of needs, sometimes for different environmental niches, and for different types of farmers. Moreover, there are no clear or absolute divides between the formal and local systems: seed and varieties can flow between them; farmers draw upon one or the other

depending on need. Seed-related interventions, whether for "relief," "rehabilitation," or "development," need to be based on an appreciation of the strengths and weaknesses of each. As several seed specialists advocate, we need to develop proactive strategies to integrate the strengths of the two (Almekinders and Hardon, 2000).

IV. THINKING ABOUT SEED SECURITY IN EMERGENCY SITUATIONS: SOME CONCEPTUAL AIDS

Seed systems comprise both material entities (crops/varieties) and institutional ones (i.e., those interwoven by social networks, markets, companies, seed parastatals). Their complexity and dynamism have been noted—yet so has the possibility of understanding the main characteristics fairly rapidly.

Here we present some of the newly emerging conceptual frameworks that are helping implementers of relief aid to think practically about how to diagnose and assess seed security and farmers' seed needs. The tailoring of the support responses to specific constraints should lead to higher cost-effectiveness of interventions, as well as shorter- and longer-term gains for beneficiaries themselves (CIAT/CRS, 2001).

Two broad types of concepts and tools are presented below: a seed security framework (SSF) and distinctions among acutely stressed, repeatedly acutely stressed, and chronically stressed seed systems.[1]

Seed security framework

Humanitarian agencies working to provide food have long used the food security framework as a tool for thinking about issues related to food security. While the definitions of food security are many and varied (reckoned by some as being many as 200 definitions with some 450 indicators [Hoddinott, 2001]), aspects of availability, access, and utilization (the last associated particularly with quality) often figure as central elements. Formal definitions of seed security are fairly recent, yet these same three basic elements are central to its characterization. Interestingly, all of these definitions identify, explicitly or implicitly, "access" as the main determinant of seed security.

Seed security: Some definitions

- Access by farming households (men and women) to adequate quantities of good-quality seeds and planting materials of adapted crop varieties at all times—good and bad (FAO, 1998)
- Access by farmers to adequate, good-quality seed of the desired types at the right time (Scowcroft and Polak Scowcroft, 1997)
- Sustained ability of all farmers to have sufficient quantities of the desired types of seed at the right time (Louwaars and Tripp, 1999)

1 These were published first as linked and complementary concepts in a meeting in Tashkent, Uzbekistan, 20-21 January 2002, strategies for reconstructing seed systems in Afghanistan were debated (Remington , Sperling, and Bramel, 2002). The seed security framework and its description draw heavily from Remington (1998) and Remington et al. (2002), where the SSF was first developed and presented. The section on the distinctions between acute, repeated acute, and chronic—and their interactions with the SSF—draws from the work of Sperling (2000, 2001b, and 2002a).

- Access by all farmers to sufficient quantities of seed of adequate genetic and physical quality, at the right moment, year after year (van der Burg, 1998)

The first detailed seed security framework, inspired by the United States Agency for International Development (USAID) Food Security Framework (Policy Determination 19, 1995), was developed in 1998, and formally published in 2002 (Remington, 1998; CIAT/CRS, 2001; ICRISAT, 2001; Remington et al., 2002). The framework distinguishes among the different types of constraints embodied in the concept of seed security: overall seed availability, farmers' access to seed, and seed utilization features (that is, the appropriateness of genetic and seed quality). These elements are briefly discussed further below.

Box 3: Seed Security Framework: Basic Parameters

Parameter	Seed Security
Availability	Sufficient quantities of seed of adapted crops are within reasonable proximity (spatial availability) and in time for critical sowing periods (temporal availability)
Access	People have adequate income or other resources to purchase or barter for appropriate seeds
Utilization	Seed is of acceptable quality and of desired varieties (seed health, physiological quality, and varietal integrity)

Source: Remington (1998) and Remington et al. (2002).

Seed availability

Availability is defined narrowly as whether or not seed of the target crops is present in the geographical area in question. Availability assessments need to be separated from issues of the quality of the seed or the desirability of the varieties. If seed that will grow and mature to harvest, but which is of otherwise low quality or of unwanted varieties, is available, this constraint would fall into the utilization diagnosis. Seed *unavailability* means just that: there is little/no/insufficient seed to plant within a well-defined zone of action. As a basically geographically based parameter, it is independent of the socioeconomic status of farmers.

Seed access

Seed *access* is specific to farmers or farmer groups/communities. It largely depends upon the assets of the farmer in question: whether or not the farmer has the cash (financial capital) or social networks (social capital) to access seed. (Arguably, land and physical assets may also be considered as determinants of access: if a farmer has sufficient land to guarantee self-sufficiency, and adequate storage infrastructure, he/she is likely to have sufficient access under most conditions.) A diagnosis of a lack of access to seed indicates that traditional methods of obtaining seed have been disrupted and that alternative means are very difficult to employ. Access could be disrupted, for example, if social networks that facilitate seed exchange collapse, local grain markets cease to function adequately, or farmers lose so many assets that they can no longer afford to buy or barter for seed.

Seed utilization

The category of *utilization* comprises issues of seed quality, including physical, physiological, and genetic or varietal characteristics (box 4).

In terms of the issues of physical, physiological, and sanitary seed quality, many implementers define quality according to the formal sector definition (see Chemonics, 1996) and thereby equate quality with certified seed (Remington et al., 2002). This tendency stems

from the requirements of donors and procurement departments to show evidence of formal sector seed certification (and often to furnish a seed grower's certificate) when purchasing seed for aid distribution (Chemonics, 1996).

Box 4: Seed Quality Attributes

Physiological, physical, and sanitary parameters:

- Good germination and vigor
- Low moisture content
- Well-filled grain
- High physical purity: i.e., near absence of inert matter (stones, sand) and of broken seed
- Absence of noxious weeds and low presence of other weeds
- Absence of visible fungi/disease and living insects

Varietal or genetic parameters:

- Must be adapted varieties
- Varietal characteristics should be described and meet farmers' requirements. Typically, they should be of good yield potential under farmers' conditions and ideally would be pest/disease-resistant/tolerant
- May be a pure variety, or a population or mixture, depending on farmers' needs
- May be a traditional or newly introduced variety, depending on farmers' needs and capacity to "experiment" and the presence or absence of reliable mechanisms to deliver new varieties
- Presence of genetically modified organisms (GMOs) must be declared; GMOs should only be provided after prior informed consent

Source: FAO seed relief working group reflections 2003.

Seed might also be sourced from the local foodgrain markets—and then cleaned and sorted. The quality of this seed can be highly variable, and relatively few studies have actually analyzed farmer seed quality parameters (viz., Scheidegger and Buruchara, 1991; Tripp, 1997a; KARI/CIAT, forthcoming). Farmers, themselves, and grain traders may, in some cases, exert considerable effort to distinguishing between grain and seed, sorting in the field, in storage, and again at sowing time (Longley et al., 2001; S. David, personal communication). Farmers' own standards and indicators, however, tend to be different from those of formal sector producers, suggesting that quality assessments themselves may be relative.

Concerning varietal or genetic parameters, formal sector standards tend to aim for varietal purity as being among the more important defining quality characteristics. However, farmers often self-consume the harvest, sell it locally, or sow in a risk-prone and variable environment, which may encourage a certain degree of varietal heterogeneity—rather than purity—as the preferred strategy. So again, assessments of desired quality vary according to the assessor.

It is around the issue of seed quality that the FAO Seed Group had some of its more extensive discussions. There is a fundamental concern among implementers, including FAO, that they are accountable for the product they deliver—to both donors and beneficiaries—and that, at the minimum, the product has to do no harm. Several practical recommendations on seed quality emerged from the FAO seed relief working group analyses: there should be minimal quality standards adhered to—no matter what the intervention context—and it may be possible to introduce simple methods to control for these. The group also suggested a move away from stereotyping: some supposedly certified seed is *not* of good quality (at least once it reaches the farmer), and some farmer-saved seed definitely is. In addition, good-quality

seed can be rendered near useless by poor storage or transport conditions. One basic notion put forward merits further discussion: it is not necessary or appropriate to insist on higher quality than that which farmers would normally be accustomed to in non-emergency situations. The group outlined its recommendations for guiding seed quality parameters in an emergency (box 5).

Box 5: Application of Seed Quality Standards in Emergencies

For each of the parameters mentioned above, a certain standard may be used, depending on the situation (as described below) and the crop.

If the seed is obtained through formal channels (which can be the case, for example, for most vegetable seed and for hybrid maize), it would preferably meet standards of certification (e.g., national seed certification standards or those under the OECD seed schemes) or of quality-declared seed (QDS).

If the seed is obtained from farmers or local markets (for example, as bulk grain) (which is often the case for staple crops, such as sorghum and millet), it should be cleaned and tested to ensure that it meets certain minimum standards for the parameters listed above.

If seed is not directly supplied, but rather access to seed is facilitated through mechanisms such as seed fairs, then other approaches to quality assurance are needed, for example:

- Formal suppliers may be required to meet formal certification or QDS requirements.
- Seed of all suppliers should be subject to visual examination by farmers and other experts.
- Samples of seed should be tested for germination and physical purity by a qualified expert (some simple tests are available for these purposes).
- We need to learn further from experience in respect of these mechanisms.

Note that good and bad seed can be found in both farmers' own saved seed and so-called "certified seed." Seed may be of good quality when produced but be poor once it reaches the farmer, if there is inadequate attention to conditions during storage and transport.

Significant seed suppliers that provide seed of poor quality may be barred from providing seed in the future, whatever the seed delivery mechanism.

In all cases, rigorous ex post evaluations of seed performance should be made, after planting and emergence and after harvest.

Source: FAO seed relief discussion group synthesis, May 2003.

Reflections on the seed security framework

A framework is only useful so long as it stimulates reflection and facilitates appropriate action. One of the accomplishments of the SSF thus far is that it has drawn attention to some of the basic assumptions, conscious or not, on which much of current seed aid implementation is designed. Much of the seed aid response is now based on the premise that seed is not available locally--- and that the intervention should aim to physically bring seed in from elsewhere to the stressed region. This diagnosis of "lack of availability" (which may be explicit or implicit) has increasingly been questioned.

As with all tools, the SSF is also only as useful as the capabilities of those using it. Parameters of seed security are not static, and the lines between them are not always clear. For instance, the distinction between *availability* and *access* is dependent on scale. At some level, if one is willing to pay enough or to transport seed from far enough away, seed is always available. Likewise, the dividing line between the concepts of availability and utilization has to be considered in subtle terms. If seed is not really adapted, can we call it

seed at all? That is, should seed be considered available if that which is on offer has little possibility of sprouting, and yielding, and being acceptable to farmers? The SSF tool has been an important advance in providing analytical concepts by which to start to analyze seed systems, but its use needs to be context-specific.

Acute and chronic seed security contexts

Much of emergency seed aid to date has been implemented in what are assumed, explicitly or implicitly, to be contexts of acute stress. That is, some outside agent (e.g., a flood) has severely disrupted a livelihood system, including its seed system, and caused a seed intervention to become necessary. Increasingly, however, seed aid is being delivered not as a "one-off" intervention, but on a repetitive basis. In the 1990s, Kenya witnessed at least 10 seasons of seed aid distribution, seemingly due to "repeated acute" disasters, mostly drought, with the odd 1998 staccato of the El Nino floods (Sperling, 2000; Omanga et al., 2003). Similarly, Ethiopia, Rwanda, Malawi, and Burundi (among others) have been the scenes of seed aid assistance nearly every season—for 5–10 years. Such examples of repetitive seed aid should stimulate reflection and re-examination of the underlying problems.

There are multiple ways to try to characterize the emergency and rehabilitation contexts in which practitioners intervene. Key aspects of disasters have been described through sets of contrasting parameters, which have helped link the context with the planning of reconstructive measures (manmade/natural, single/complex, rapid/slow-onset, short/long duration; heterogeneous/ homogenous). Here, for the sake of discussion, we distinguish between two broad categories "acute" and "chronic." This distinction is not always a clear one, even conceptually, but it can be a useful tool in informing appropriate seed system interventions.

Acute seed insecurity

Acute seed insecurity is brought on *by distinct, short-duration events* that often affect a broad range of the population. It may be caused by the failure to plant a single season, loss of a harvest, or one-time loss of seed stocks in storage. While in "normal times" one might identify the seed-secure, the semi-secure, and the "always seed-short" households (i.e., chronically seed insecure, as per Cromwell, 1996), all may be affected during an acute event, such as a flood or short civil disturbance. Those communities and farmers who recover quickly, with or without one-off seed-distribution assistance, are often those who suffered only from acute stress.

Chronic seed insecurity

Chronic seed insecurity is independent of an acute stress or disaster, although it may be exacerbated by it. Chronic seed insecurity may be found among populations that have been marginalized in different ways:

- economically/socially (poverty, little land, little labor)
- ecologically (repeated drought, degraded land)
- politically (insecure areas, on land with uncertain tenure)

Chronically seed-insecure populations may be characterized by (1) continual shortage of adequate seed to plant, (2) difficulties in acquiring off-farm seed because of poverty, or (3) the utilization of low-quality seed and poorly-adapted varieties on a routine basis. The result is households with a built-in vulnerability to seed system calamities.

Reflections on the relationship between acute and chronic insecurity

Acute and chronic seed insecurity will very often exist together in an emergency situation. Indeed, in cases where emergencies recur, in drought-prone areas, for example, acute situations are nearly always superimposed on a chronic problem that is rooted in poverty.

An analysis of situations of seed insecurity reveals two trends in the relationship between acute and chronic contexts. First, there is increasing evidence of a transition from acute to chronic seed insecurity rather than recovery, as various forms of "quick relief" (e.g., free distribution of improved varieties) may undermine the function of local seed systems and alter more robust crop profiles (van Oosterhout, 1997). Thus, it may be alarming, but not surprising, that farmers in the Tana Region of Kenya routinely list "seed relief" as one of the basic channels on which they count to access seed, season after season (T.Remington, personal communication).

Second, analysis is showing that many of the aid cases that were originally considered acute situations, on closer examination, exhibit aspects of more chronically stressed populations. Seven of the eight seed intervention cases being examined under a current CIAT/CRS/CN project (funded by OFDA and MFA/Norway, 2002 onwards) were seen, after assessment, to be primarily chronic situations where acute aid was being implemented. For example, in the Nampula region of Mozambique, provision of clean cuttings of new cassava varieties has helped to address the problem of brown streak virus, which has devastated the local cassava staple crop. However, to strengthen food and seed security over the longer term, efforts might need to focus on broad strategies for crop diversification. Fortunately, the local government is moving in this direction (Berg, 2002).

Certainly, populations are heterogeneous and in every community one might find some seed-insecure households. However, this is different from general community-wide stress. Case studies are showing how, too often, acute emergency measures are being implemented in lieu of possibly more effective—and longer-term—support. This is not a new insight but it is one that has yet to change major emergency seed intervention practices.

Chronic seed insecurity will nearly always manifest itself as a problem of seed access; lack of the ability to access a good is usually equated with problems of basic poverty. A consequence of this is that the scope of the assessment needs to go well beyond any seed system diagnosis, towards a set of approaches that will support and strengthen basic livelihood strategies and which will help communities become more resilient in the face of real system adversity.

Use of conceptual frameworks to guide the selection of appropriate interventions

In box 6 we briefly suggest how the seed security framework and categorization of acute/ chronic seed security can help practitioners reflect among the more effective assistance strategies. If seed availability is assessed as the problem (whether acute or chronic), seed-based interventions, such as seed importation or development of community-based seed production enterprises, may be appropriate. However, a diagnosis of "seed access" might wisely trigger a more holistic analysis of livelihood strategies. In the acute phase, interventions based on seed systems may still largely be appropriate for an access problem—particularly those that can also stimulate the local economy. However, identification of chronic access problems should lead practitioners to reflect on the need for approaches that address livelihood security more broadly. Either individually, as a sub-population, or as a community, beneficiaries may require rather broad-based poverty-alleviation assistance. Again, seed-based interventions may help but, in themselves, are unlikely to be sufficient to put stressed populations on a real road to recovery. The box below is intended not to

prescribe response options, but to stimulate reflection among them. Sperling (2002a) and ICRISAT/ INIA (n.d.) provide further tools for identifying appropriate responses. Options are discussed further in section VI, below.

Box 6: Seed System Problems and Broadly Appropriate Responses		
Parameter of the problem	**Acute (short-term response)**	**Chronic (long-term response)**
Unavailability of seed	Direct distribution of seed	Development of local seed production and trading enterprises
Poor and vulnerable farmers do not have access to seed	Vouchers and seed fairs	Income-generating activities Vouchers and seed fairs, or vouchers alone, combined with local market development Agro-enterprise development, more generally
Seed of poor quality and/or lack of appropriate varieties	Direct distribution of quality seed; Seed fairs with quality controls	Programs to improve seed quality Participatory varietal selection Participatory plant breeding

V. SEED SYSTEMS IN STRESS: INITIAL LESSONS FROM EXPERIENCE

Rigorous studies of the seed systems that farmers use are relatively new, with most studies effected in the last 10 years (Sperling, 1993; Wierema et al., 1993; Bellon and Brush 1994; Louette 1994; Teshome, 1996; Louette et al. 1997; Meitzner 1998; McGuire 2000; Longley et al 2001; Christinck 2002).

Studies focused on seed systems in emergency contexts are still fewer in number, being limited to a handful of cases (in Honduras: de Barbentane Nagoda and Fowler, 2003; Haugen and Fowler, 2003; in Rwanda: Sperling, 1997a,b, 2001a, 2002b; in Sierra Leone, Longley, 1997, 2000, and Richards and Ruivenkamp, 1997; in Kenya: Sperling, 2000, 2002a; some initial work in Mozambique on genetic diversity: Ferguson, 2003). In-depth accounts by practitioners themselves can also provide valuable lessons (e.g., Archibald and Richards, 2002), but these are also the exception rather than the rule.

This relative lack of analysis is disturbing given the level of seed aid. Emergency programs normally do not build in a diagnostic or assessment component, and at the other end of the project cycle, evaluations beyond the harvest are rare. This gap means that interventions aimed at rehabilitation normally cannot profit from what has been recently learned on the ground. The problem is compounded as institutional memory tends to be divided between those involved in "relief" and those involved in "rehabilitation" and "development."

Despite their paucity, a number of findings are emerging from this body of evidence:

1. **Farmers who have the conditions to sow (e.g., who are not displaced or landless) generally find ways to obtain seed of at least some key crop during crises.** In both

acute and more chronic contexts, the resilience of the local seed system has been documented as remarkable. For example, in Rwanda in 1994, just three months after widespread killing and displacement, with violent events peaking near harvest time, farmers managed to plant their staple crop, beans, in areas comparable to those during the pre-war period. They sourced seed from a range of channels, including their own stocks and local markets (Sperling, 1997a,b). Similarly, data from Sierra Leone, documenting a period of four years of civil strife, showed farmers in a war zone actually increasing their production of grain staples (Longley, 1997).

2. **To date, in contexts of emergency seed delivery, where total seed sown has been monitored, analyses have shown that aid does contribute to seed needs, but not in a major way.** In Kenya during the 1997 drought, despite massive distributions of maize seed, over 85% of the seed sown came from local channels (Sperling, 2002a). There were similar findings in regard to bean seed in Honduras after Hurricane Mitch in 1999 (Haugen and Fowler, 2003) and sorghum in drought-stricken Somalia (Longley et al., 2001). This does not mean that farmers do not value or need the emergency distribution, but, rather, they also value, very much, the seed they can source themselves—of known varieties and from known channels. Emergency aid adds support to a seed system that may be weak—but which still has much to offer. The major exception to this finding concerns situations where the seed on offer is of a crop that is relatively new for the farmers.

3. **Local grain markets are of central importance as sources of seed.** This is one of the real surprises arising from the studies of emergency seed systems. As home stocks of self-saved seed go down, it is the local markets that primarily fill in the gaps, at least in areas where local markets have had some prior importance (Longley, 1997; Sperling, 1997a, 2000; KARI/CIAT, forthcoming; CRS, 2003) (viz. not for sorghum in Southern Sudan, see Jones et al., 2002). From social exchange networks, farmers may get a handful of seed to show "good will," but rarely the quantities needed to sow significant areas.

4. **Different seed channels may be affected by the crisis to different extents and in different ways.** Some are more durable than others. One salient example comes from the Rwanda war and genocide crisis. Farmers, particularly in the north, had come to rely on formal sources for potato seed, as well as for accessing new varieties. The war disrupted this supply as early as 1991–92, as the parastatal responsible for bulking up was located in one of the war's first fronts. Development projects, also standard sources for certified seed and improved varieties, phased out activities early (1993) as insecurity grew. Local markets, in contrast, the main sources for bean seed, continued to diffuse local grain used as seed (and sometimes emergency seed as grain) during some of the worst of the events. So while potato production virtually collapsed (relying on the formal sector for improved varieties and clean seed), bean seed channels—and production—which were based on local farmers' systems, continued largely on course (Sperling, 1997a).

It is important to analyze each crisis on a somewhat case-by-case basis: the agro-ecological and political context, the crop exigencies, and the principles on which the seed system normally functions all vary from situation to situation. In many war contexts, social relationships may be so severely strained that the routine networks of barter and exchange by which seed is passed are irreparably damaged (Richards and Ruivenkamp, 1997). The local seed

system in Rwanda did not particularly suffer from this problem—as it was never firmly grounded on an ethic of gift giving.

The information to-date does suggest that one widespread assumption—that of seed not being available in a crisis—frequently does not hold under closer scrutiny. Seed can be found, if one has the means. Seed access, in contrast, does tend to be a problem again and again. Victims of a disaster may have lost considerable assets (houses, doors, windows, livestock, seed stocks—and social assets, like support networks), may simply not have the margin to re-access seeds (from markets), or may simply have priorities other than buying seed (e.g., an urgent need to hire labor or pay for badly need healthcare).

In brief, the current body of seed system analyses steers us to avoid assuming that "disaster" equates with "need for seed aid." Some sort of seed system support may be warranted, but the response needs to be more clearly matched with the constraints and opportunities at hand.

VI. CURRENT MAJOR RESPONSE OPTIONS BEING USED IN EMERGENCIES

Possibly because of its roots in food aid, the two major approaches currently being used to support seed systems in an emergency (acute stress) involve getting seed itself to farmers; that is, they involve asset transfers. Seed distribution, often coupled with tool distribution ("seed and tools") and the seed voucher and fair (SVF) approaches are described below. Additional strategies for supporting seed systems in stress are then briefly introduced.

Direct seed distribution

Direct distribution of seed seems to have been the earliest approach to seed-based humanitarian relief. As mentioned in the introduction, above, while it dates back some 80 years domestically and perhaps 20 internationally, direct seed distribution has only come into maturity as a routine emergency response in the last 10–15 years.

Seed distribution is based on the assumption that, because of a disaster, farming communities do not have enough seed. As seed is often brought in from outside the region, a less explicit assumption, guiding procurement in these cases, is that sufficient seed is not available locally. In its classic form, "seed aid" involves the importation of seed, usually from certified seed sources that have become suppliers because of the requirements of donor and procurement departments. Because of this, the content of seed aid distribution has generally been limited to a narrow range of crops and varieties, those produced by government or commercial sectors and, hence, widely adapted to larger areas. For example, we find much of the relief in Southern Africa to be maize based—and often hybrid-maize based. Vegetable seed, imported from outside Africa has also proven to be a prime input into classic seed relief operations. Certified seed of cabbage, kales, onions, etc., are assessed as being useful for stimulating local agro-enterprise, as well as improving local diets.

A number of guidelines have been written to inform better practice for seed provision during emergencies. Some of these aim to be holistic, discussing the rationale for and varied approaches to seed aid in the short and longer term (ODI, 1996). Some restrict themselves to the day-to-day how-to of getting seeds to beneficiaries (Johnson, 1998; Concern, n.d.). Still others are tailored to a specific crop or disaster-prone area (Chemonics, 1996; Preston, 1999). The FAO guidelines resulting from its first emergency seed intervention workshop in 1998 (FAO, 1999) specifically focused only on direct seed distribution, as that was the basic seed relief paradigm in use at the time.

Since then, extensive experience in seed aid implementation has allowed refinements to be made in the approach, enhancing both its shorter- and longer-term effectiveness. Among other changes, there have been moves towards procuring locally appropriate crops and varieties (steered by specific agro-ecosystem assessments) and towards somewhat greater flexibility in seed sourcing (D. Burgeon, personal communication). Seed companies are sometimes asked to recondition food grains of crops not easily available through commercial channels (such as cowpeas), and local markets themselves might provide a chunk of emergency seed provisions, after it has passed some of the standard seed-quality tests.

Evaluating the process of planning and implementing seed aid, itself, has also become more common and seems to be leading to more efficient operations (see ODI, 1996, for the "Data Checklist for Planning and Implementing Emergency Seed Provision" and "Data Checklist for Evaluating Emergency Seed Provision"). While the two major (and routine) complaints of those supporting the approach persist—that crop and variety choice are not sufficiently wide and/or adapted and that seed often arrives late at the farm level—humanitarian practice here is clearly becoming more refined through time.

Ironically, despite a long and widespread history, there are relatively few real evaluations of the effects of seed aid (viz. Friis-Hansen and Rohrbach, 1993; Sperling, 2000), and virtually none have been truly independent. Little is known about the impact of the relief seed, itself, in helping farmers truly get back on their feet and in promoting system stability. Nor have the longer-term effects of repeated delivery been sufficiently analyzed. Recently, however, an edited collection of papers questioning the effectiveness of conventional approaches and proposing alternatives has been published (Longley and Sperling, 2002). The various studies in this collection show that the nature of the seed system problem is rarely assessed, and local capacity is usually not built upon in any meaningful way. Additionally, the international agricultural research centers have developed a consensus view that some seed relief, although well intentioned, may actually undermine the operation of local seed markets, stifle the potential development of commercial supplies, and create marked dependencies among the beneficiary population (Future Harvest Centers, 2001). Recognizing the major shortage of rigorous evaluations, these issues are now in the process of serious examination.2

Seed fairs and vouchers

The approach using seed vouchers and fairs in an emergency context is a relatively new aid option, dating from about 2000. Neither seed fairs nor vouchers, however, are totally novel, and the seed fair antecedent, in particular, bears some mention.

Seed fairs within agricultural development have a history of being associated with concerns for biodiversity and cultural heritage. Particularly in the Andean Region (Tapia and Rosas, 1993; Scurrah et al., 1999) and throughout South and Southeast Asia (Sperling and Loevinsohn, 1996; Jarvis et al., 2000; V. Jardhari, personal communication), seed fairs have been promoted to help farmers maintain their seed diversity, raise awareness of its value, and encourage associated knowledge to be maintained. More recently, seed fairs have been held in Africa (Zimbabwe, Mali) mainly to promote on-farm conservation of plant genetic resources, although in limited instances they have also been used to promote new varieties

2 The International Development Research Centre (IDRC) is considering support for two types of proposals to assess seed relief: one that promotes a broad overview of lessons learned in both seed aid intervention and its complement, germplasm restoration work; and one that funds intensive fieldwork analysis of the effects of repeated seed distribution (over 5–10 systems: biological, social, and economic) on farmers' own seed and agricultural and livelihood systems.

(specifically in Tanzania, see Nathaniels and Mwijage [2000]; Such market-oriented approaches are now being more widely applied in Mozambique and Zimbabwe as well). Within such biodiversity-focused fairs, many varieties are generally exchanged, but with small quantities of seed passing hands (Guerette et al., in preparation). The aim is not provision of seed, per se, but rather transfer of genetic material, with key associated knowledge.

Vouchers have long been a standard practice within the realm of food aid—and beyond. The first suggestion for their use in seed aid assistance emerged in the mid-1990s. As shown above, ground-truthing research after the Rwandan civil war found that seed had generally been available within local seed systems, but farmers had few resources to access it. Selective distribution of seed vouchers was recommended as a way for impoverished farmers to get seed through these local channels (Sperling, 1997a).

This voucher recommendation, together with the assessment of the access problem, led one NGO (Catholic Relief Services, CRS) to make a conceptual leap—and test voucher use in an emergency context (first in northern Uganda in 2000) (Remington et al., 2002). The voucher methodology was subsequently combined with fairs to bring potential seed sellers together at the same place, in order to simplify logistics and minimize possible misuse of vouchers. Seed vouchers, coupled with fairs, were first implemented in Kenya in 2000 by CRS through an FAO-supported project with financial assistance from SIDA.

The premise of the seed voucher approach is that seed is generally available in a region after a crisis (although this assumption should be continually verified through field assessment). Farmers' constraints hinge on their not being able to access the seed, usually because of sharply depleted finances, sometimes combined with collapse of social networks. The notion of seed fairs draws on the premise that farmers are eager, willing, and capable of selecting for themselves the crops and varieties they require for sowing, *especially* in difficult periods. Seed vouchers and fairs are generally organized for a period of one to two days and are held in multiple local locations.

To date, seed vouchers and fairs have been organized in about 10 countries (Ethiopia, Zimbabwe, Burundi, Sudan, Kenya, Uganda, Mozambique, Zimbabwe, Eritrea, Sierra Leone) and are being implemented or supported by a range of agencies (CRS, FAO, DFID, ICRISAT, SIDA, and, the newest, World Vision). They have been tested for use in both natural (flood and drought) and manmade disasters (conflicts).

Manuals have recently been issued to describe the overall philosophy behind fairs and to provide specific implementation procedures (CRS, 2002; ICRISAT/INIA, 2003). Experience has also refined operational logistics: for instance, more vouchers are now issued in smaller units to allow farmers to "purchase" a greater number of crops and varieties (in small quantities) as well as to give them greater leverage for bargaining with sellers. Further, the obligation of those sponsoring seed vouchers and fairs to conduct an exit interview has proved key for building in a quick and reiterative learning process for fair improvement (see CRS, 2002, for a range of specific exit evaluation forms for buyers and sellers, both during and after the fair).

Those involved or interested in the seed voucher and fair approach underscore its range of advantages. It not only gets farmers seed, but seed for the crops and varieties they desire (whether local, improved, or a basket of both). It fundamentally supports two types of beneficiaries: the buyers or seed recipients, themselves, as well as the many small traders (up to 500 at an event) who may put on offer some of their own seed, along with that of the

family business. The approach seems broadly empowering (allowing even poor housewives to sell), while at the same time, giving economic support to local seed system entrepreneurs —and private seed company interests willing to compete on the level playing field. It is particularly the benefits to the regional economy that are now spurring implementers to broaden the use of fairs for chronic stress contexts (65%–80% of aid resources go back to the local system during a fair) (S. Walsh, and D. Leege, personal communication; R. Jones and D Rohrbach, personal communication). Seed Fairs will soon be designed specifically to stimulate local agro-enterprise and to bring entrepreneurs (seed and otherwise) together for an "innovation" event. Given such flexibility, seed vouchers and fairs could help promote a seamless link from a relief to a rehabilitation to a development perspective.

The seed voucher and fair approach is not without its critics, and the approach does raise a number of basic concerns, two of which are consistently voiced. First is the quality of the seed. Given that sellers from broad venues can offer their wares, how can agencies guarantee that even minimal seed-quality standards are met—and that the beneficiary is not being cheated in the process? The second basic issue revolves around logistics and scale. Seed vouchers and fairs are basically a decentralized form of relief implementation. As they have to be organized locally, the scale of impact is circumscribed—say 30,000 families for any one event. Scaling up implies that multiple fairs would have to be organized in order to have an impact on a range of agro-ecological zones and to reach a sizable number of communities.

Reflections side by side: Direct seed distribution and seed vouchers and fairs

Both approaches—seed distribution and seed vouchers and fairs—are presently in use. Even now, both are being implemented by the same donors/agencies (e.g., FAO, CRS). Both are sometimes programmed within a single country (e.g., the Kenya case study presented in this workshop). In initial evaluations comparing/contrasting both have started (FAO, 2002b). Without determining that one approach is "better" than the other, we might consider the appropriateness of each under different contexts and conditions. The FAO seed relief discussion group recently embarked on a reflection comparing and contrasting these approaches. The boxes below sketch a first round of observations, comments, and concerns.

The boxes below illustrate different concerns associated with the two approaches. One set of issues is centered around how or whether the approaches are technically, economically, and socially effective. A second set of concerns question the ability of an aid agency to implement the approaches. A third hinges on "acceptance": will donors or special-interest groups be willing to promote implementation to gain experience and allow for critical evaluation?

Other interventions to support seed systems

We end this section by acknowledging that other approaches to support small farmer seed systems—in stress and in the transition out of stress—have been tested. Our space limitations mean that we can only cite them here, but all merit further analysis and possible promotion, depending on site-specific constraints, opportunities, and capacities. Further examples, and comments on the suitability of various approaches are provided in ODI (1996) and ICRISAT/INIA (n.d., Module 3).

Vouchers alone

Voucher distribution has been used as a form of aid in a large range of contexts, for services as well as goods, and variously for medicines, tools, food, and seed, and other items that vulnerable populations might need. A recent evaluation of particular interest compares the use of vouchers in delivering seed system and livelihood support in Malawi. The

effectiveness of three distribution systems were assessed: the starter-pack program (delivering high-yielding, modern seed and fertilizer), the starter-pack voucher (allowing farmers to access seed of choice at local retailers), and the flexi-voucher (permitting recipients to cash in for a range of household items, from seed and fertilizer to soap, salt, pots, pans, blankets, and the like) (Gough, Gladwin, and Hildebrand, 2002). The authors conclude that the flex-vouchers were the "most economically enhancing tool for smallholders"(p.15) among the options on offer. Clearly, more comparative work—and similar field-based evaluations—would be welcome, especially as seed-based approaches need to be situated among the gamut of possible assistance options. These initiatives parallel those using vouchers or cash to facilitate farmers' access to food (Peppiatt, Mitchell, and Holzmann, 2003).

Box 7: Direct Distribution of Seed

Potential Strengths:

- Cost-effective in relation to food aid and supports production; therefore, potentially more sustainable; gives people dignity to produce food themselves
- Familiar to donors, beneficiaries, and implementers; easily quantifiable
- Conceptually simple
- Introduces cash-equivalent into the system
- Easier to reach large populations
- Potential to introduce new varieties
- Can control quality of seed

Potential Weaknesses:

- May undermine local seed system and long-term system resilience
- May erode local diversity (crop or variety)
- Need to have outside control of quality because farmers have no clear of what they are given
- May not benefit most needy; targeting can be difficult and is potentially divisive
- Suitable varieties of acceptable quality are not always available
- Potential for donors/governments to push varieties/seed of special-interest groups and for special-interest groups—such as particular seed companies; potential for corruption

Contexts:

- Where seed economy is predominately formal (introduced crops; improved seed and varieties regularly provided from outside farming system)
- Where there is total crop failure (and seed not available) e.g., drought/disease
- Major emergences (where large numbers of people are affected)
- Where there is long-term displacement of populations
- Where insecurity prevents operation of markets
- Where there is a tradition of seed giving (that is, where people are used to producing their own seed or exchanging it)

Source: FAO relief seed discussion group synthesis, May 2003.

Food aid

Food aid is often supplied in emergency situations alongside seed aid as a "seed protection ration" to provide food so that the farming 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. For example, in the Rwandan war and genocide, food aid was crucial in allowing seed stocks and varietal diversity to be maintained, particularly in the case of the staple bean crop (Sperling, 2001a).

Support to small-scale traders

As noted earlier, small-scale grain traders provide a crucial source of seed for farmers, especially in emergencies. Credit, or other support to such traders, could enable them to source more widely for better varieties and better-quality seed, hold larger stocks, and improve seed storage (in Eritrea, for example; T. Remington and P. Bramel, personal communication).

Box 8: Seed Vouchers and Fairs

Potential Strengths:

- Provide farmers with choice of crops and varieties (including improved or local varieties)
- Utilize and support local diversity
- Both suppliers and recipients of seed may benefit (thus, may be somewhat self-targeting); also support small seed traders
- Might increase incentive for farmers and traders to distinguish between seed and grain and to store more seed, more carefully
- Link relief to development; encourage a competitive market; may stimulate development of agro-enterprises; thus, may be attractive for donors
- Greater proportion of cash input goes to community, strengthening local economy
- Implicit monitoring of quality control because farmers buy largely from people they know
- Provide an excellent venue for gathering information on seed system (etc.)

Potential Weaknesses:

- Risk of undermining community solidarity of giving seed
- Capacity presently limited to a small number of organizations
- Costs uncertain; appear to be higher pilot costs (for personnel, training, capacity building)
- Logistically complex: different types of people have to be able to congregate together (men/women, different castes)
- More difficult to have formal seed quality control
- Require movement of large amounts of cash
- Possibilities for "leakage" (vouchers cashed in)
- Farmers can access seed on only a limited number of days
- Unfamiliar to many donors, agencies, and beneficiaries

Contexts:

- Can be used for acute and chronic contexts (can also be designed as "innovation fairs")
- Where "access" to seed is main problem (versus availability)
- Where the normal seed economy uses local markets (partially monetized)
- Easiest for subsistence grain crops
- Requires local capacity to implement
- Requires certain level of security

Source: FAO relief seed discussion group synthesis, May 2003.

Small-scale seed production (including strengthening farmers' seed production)

"Small scale seed provision," "community-based seed production," and "local-level seed production" are but a few of the terms used to embrace the varied approaches aimed at modifying how seed is locally produced. Some approaches focus on improving quality attributes, others are designed specifically to facilitate the movement of new improved varieties into local systems, and still others are conceived as basically profit-making enterprises. Practitioner activity in this realm has been astutely commented on by a range of

analysts (e.g., Cromwell, 1997 Tripp, 1997b; Almekinders and Louwaars, 1999; Rohrbach et al., 2001), and how-to handbooks have multiplied in number, especially in the last five years (e.g., Kugbei, Turner, and Witthaut, 2000; David and Oliver 2002). What still remains to be assessed is the extent to which such enterprises are sustainable, bring direct economic benefits to those involved, and can actually stabilize and strengthen seed system functioning.

Improving seed quality and availability of varieties

As has been noted earlier, the quality of seed produced by farmers as part of their normal crop production varies considerably. Improvements in the physical, physiological, and sanitary quality of "below-average" seed through the wider dissemination of best practice could make a significant contribution to productivity and seed security. Improved seed treatments and storage methods could contribute. Additionally, there are many options for improving farmer access to new varieties, including participatory varietal selection and participatory plant breeding.

VII. MAJOR CHALLENGES—MOVING FORWARD

What next? A background paper is only as useful as it helps to set an agenda, and we end by looking toward the future. The FAO seed relief discussion group has identified a number of areas where progress is needed, particularly in terms of guidelines and tool development (see box 9). Here we focus on priority areas for action for improving the effectiveness of seed system relief within the next three to five years.

Box 9: Seed System-Related Tools to Be Developed

- Guidelines for baseline assessments or "seed system profiles" for all disaster-prone countries as part of emergency preparedness
- Typology of the contexts in which FAO actually intervenes in emergency situations
- Inventory of possible seed system approaches
- Guidelines for assessing seed security needs in emergency situations
- Methods for targeting beneficiaries
- Guidelines for implementing various approaches, including, in particular:
    - Appropriate procedures for procurement
    - Appropriate procedures for seed quality assurance
- Methods for evaluating seed relief interventions
- An information system to gather experiences related seed systems

Source: FAO relief seed discussion group synthesis, May 2003.

Development of seed security assessments (at varied scales)

We need practical, usable tools for understanding what happens to seed systems in stressed situations. Tools have to be sufficiently honed—so as to guide targeted action—but need not necessarily encompass the totality of seed system attributes (both social and technical). While

they need to be based on sound analysis, these tools should be practical and not overly academic.

At this point, multiple survey formats exist for understanding seed security at the level of the individual farming household. These, however, are not practical for quick use, nor for use on a larger scale when quick decisions have to be made.

Based on broad notions of a seed security framework (Remington et al., 2002) at present we know of two more fully developed tools for assessing seed security in periods of stress:

- For emergencies with rapid onset, CIAT, CRS, and Care Norway have developed a seed system security-assessment tool that is presently being tested in the field in West and East African contexts (e.g., successfully in Senegal, May 2003; T. Remington and C. Droeven, personal communication). It is basically a project-level tool, initially desk-based (for emergency preparedness), in which only a subset is field-based—to assess evolving seed system parameters (e.g., the precise function of local grain markets). It is designed to be executed by a multidisciplinary team in about a one-week period, and its scope is a regional system (the interface between an agro-ecological system, its market base, and specific cultural/ethnic populations) (CIAT/CRS/CN, 2002).

- For locally based assessments, ICRISAT and the National Agronomique Instituto in Mozambique have recently issued a manual (available in English and Portuguese) to work with communities and district officials in assessing both short- and longer-term seed system concerns—and in helping to identify possible solutions (ICRISAT/INIA, n.d.). It is premised around the divides of access/availability/quality parameters—and whether the context seems to be acute or more chronic/systemic. The drawings and formatting make this manual particularly user-friendly.

The latter includes guidance for developing a "seed system profile" as a baseline assessment to guide seed-based interventions. At the time of this writing, FAO is also planning the development of a broader approach, which could determine seed system security, possibly at a national level (R. China and D. Cooper, personal communication).

Evaluation of the impact of current interventions

The continued paucity of evaluations on the effects of different types of seed system relief is inexplicable. This observation is made particularly in light of the scale of operations across countries (large numbers of countries/sites) and repeated delivery in single sites/countries (that is, the giving of seed aid again and again).

There is an urgent need to understand the range of effects of seed aid—both positive and negative. Does a given approach solve well-defined problems or not? Does it create new problems?

We envision the need for different types of evaluations. As shown below in box 10, these embrace evaluations effected at different time periods, conducted from the perspective of different actors (minimally, that of implementer and beneficiaries), and addressing increasingly holistic sets of evaluation parameters.

Longer-term evaluations, in particular, are not likely to take place unless they are required by donors and are given specific budgets by which they can be effected.

Active exploration of targeted approaches and willingness to compare/contrast

Nothing tried, nothing gained—and potentially many an opportunity lost. The humanitarian practice field has a good grasp on the how-to of seed and tools and, to a lesser extent, of community-based approaches to seed production. It is time to venture forward and add to what is our (inadequate) repertoire. Seed vouchers and fairs is one fairly new approach—designed particularly to deal with concerns about access and possibly capable of spurring on local innovation. While not a magic bullet, the bounds of its usefulness in stressed contexts deserve to be explored, as has been recommended in FAO's evaluation of its emergency relief work (FAO, 2002a). Similarly, there may be other seed-based and nonseed-based strategies emerging on the horizon, which can make a real, positive difference to shoring up seed and agricultural systems. Active experimentation, with different intervention approaches, of course, has to be accompanied by close, built-in monitoring to allow site-specific modification, as well as to encourage a dynamic "learning by doing" process. Active experimentation also has to be facilitated by donors ready to fund something novel, and by program managers prepared to embrace the creative and longer-term capacity building essential for rendering seed system relief progressively more effective.

Box 10: An Evaluation Overview for Seed System Relief

Time of year	Agency's viewpoint on:	Users' viewpoint on:	Timing after intervention
Right after intervention (e.g., S&T or SVF)	Logistics of intervention (e.g., timing, targeting, scale, and distribution of delivery)		Within approximately one month after intervention
After first season	Performance, immediate effects of intervention (e.g., yield of seed on-farm, importance of seed aid in relation to other seed sourced)		Six months to one year
After several seasons	Impact of intervention on: Stability of Production Varietal diversity Income . . . Food security Local grain market functioning . . .		After three to five complete agricultural cycles

Source: Modified from ODI (1996).

More systemic, poverty-related, approaches to bolstering particularly vulnerable populations: moving from seed-related relief—to agricultural development and livelihood support

This paper draws to a close with caveats reaching well beyond approaches to seed-based and seed system-based assistance. Many of the constraints related to the functioning of seed systems during periods of acute and chronic stress center squarely on problems of access. Seed may be available, even available next door, but poor farmers, as well as those made more vulnerable by a specific disastrous event, simply may not have the means to exchange the seed or purchase it outright. Seed system problems tend to be linked to the basic problem of poverty: the two need to be addressed as a unit. Vouchers, or even cash handouts, might best serve as stopgap measures during acute disruptions. In the longer term, a focus on income-generating activities and/or agro-enterprise development may be among the better ways to strengthen disturbed, weakened, and generally vulnerable seed systems.

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