Seed Aid for Seed Security

ADVICE FOR PRACTITIONERS

Who are we and what do we do?

The International Center for Tropical Agriculture (CIAT), Catholic Relief Services (CRS) and CARE Norway, in collaboration with national partners in Africa, are implementing a project to increase the effectiveness of seed-based interventions in acute and chronically stressed African farming systems.

Consensus is emerging from applied research and rigorous *ex post facto* evaluations that conventional seed relief poses concerns. These include:

- Missing, inadequate or incorrect diagnosis of seed insecurity, with the problem often (mistakenly) assumed to be one of seed unavailability.
- Predominance of supply-side approaches, with a strong reliance on the commercial seed sector for relief seed.
- Lack of understanding of farmer seed systems and the important roles they have to play in agricultural relief and recovery.
- Lack of appreciation of the central importance of local markets in informal and more integrated seed systems.
- Repetitive relief interventions leading to chronic seed aid.

CIAT serves as the project coordinator with funding from USAID/Office of Foreign Disaster Assistance (OFDA). CIAT's interest in seed systems under stress dates to the Rwanda Seeds of Hope project of 1995-6, where the impact of disaster on seed systems and agrobiodiversity were both key issues. CRS, also with funding from OFDA, is actively engaged in agriculture recovery wherever there is a need in Africa, and emphasizes approaches that stimulate enhanced production and income generation. CARE Norway, with funding from the Norwegian Ministry of Foreign Affairs, has developed expertise across broad areas of agriculture recovery.

The goal of the Seed Systems Under Stress project is:

To assist disaster-affected and chronically stressed communities in recovery by strengthening seed systems used by farmers and restoring productivity and enhancing system resilience.

The project seeks to influence and enhance the knowledge, attitudes and practices of donors and practitioners as they support and undertake seed assistance. It does so by increasing understanding, firstly of the impacts of disaster and sustained stress on seed systems; and secondly of the effectiveness of varied seed-aid responses on efforts to strengthen seed systems in the short and longer term.

New knowledge, as well as synthesis of better practice is being generated by this project, and Briefs 3 to 7 share insights on different topics related to

Case studies show seed-based agricultural recovery to be more complex than is commonly assumed.

These Briefs provide practical advice on how to improve seed aid, including specific technical guidance as well as tools and checklists spanning steps from assessment to evaluation – through to new proposal design.

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seed relief. However, we recognize that providing information is not on its own sufficient because information alone does not necessarily convert to greater use of knowledge or altered practice. Therefore, the project is also providing new input on how to:

- Analyze and assess seed systems and seed security.
- Design seed-assistance interventions.
- Monitor and evaluate seed-assistance interventions.

Briefs 8 to 10 include tools and guidance for practitioners and donors.

The Project also aims to influence practices by other means. There are ongoing efforts to educate, learn with, and communicate with the range of agriculture recovery actors – from policy to field implementation. Hence we welcome comments on these briefs as people read and use them, as well as more general information exchange and dialogue (see contacts below).

For more information about the project, see http://www.ciat.cgiar.org/africa/seeds.htm

The Practice Briefs

No. 2 presents an **overview of the Country Case Studies** undertaken to guide the design of the tools presented in Briefs 8 to 10 as well as to examine the effects of different types of interventions. The case studies were undertaken in Burundi, Ethiopia, Kenya, Malawi, Mozambique, Uganda and Zimbabwe.

No. 3 introduces the general **concept of seed security** and differentiates parameters of availability, access, and seed and variety quality, as well as distinguishing chronic from acute stress.

Briefs 4 and 5 consider focused topics that cut across seed assistance and seed security. No. 4 addresses issues of **relief and agobiodiversity**: the importance of diversity in stabilizing systems and the possible effects of various relief approaches in maintaining, enhancing, or undermining such diversity. No. 5 focuses on the opportunities and risks of using seed aid to move beyond the *status quo ante* by **introducing seed of new varieties** (or indeed, new crops altogether).

Briefs 6 and 7 present short overviews of practice. No. 6 looks at the range of seed systems routinely used by small farmers in Africa and highlights the escalating **importance of local markets**. Effective interventions depend on a solid understanding of such standard seed procurement practices. No. 7 sketches the **current major seed-system based response options**, and reflects on their appropriateness in relation to the stresses on hand.

The last set of briefs focus on tools and guidance. No. 8 examines how effective interventions depend on sound and timely assessment, which requires both a **tool to assess seed system security** and the knowledge and skill to use it. No. 9 starts to bring the cycle to a close by giving guidance on **evaluating seed-aid projects**, suggesting the types of evaluation needed and their content. The final brief then looks to the future and suggests a **checklist for the development of proposals for seed assistance**. It is this last which builds on the range of lessons learned.

Acknowledgments:
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FOR FURTHER INFORMATION:			
CIAT International Center for Tropical Agriculture	www.ciat.cgiar.org	Louise Sperling	l.sperling@cgiar.org
CRS Catholic Relief Services	www.catholicrelief.org	Tom Remington	tremington@crsearo.org
USAID/OFDA United States Agency for International Development Office of Foreign Disaster Assistance	www.usaid.gov/hum_response/ofda/		
CARE Norway	www.care.no	Jon M Haugen	jon.haugen@care.no

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Overview of Seed Systems Under Stress Project: *Case Studies*

Seed relief studies, managed by CIAT, CRS, and CARE Norway, have been published in a volume entitled *Addressing Seed Security in Disaster Response: Linking Relief with Development* (see below for availability). The eight case studies were undertaken to evaluate various forms of emergency seed aid and to document how seed stress is diagnosed and how interventions are designed in concrete contexts. The objectives were to understand whether and how vulnerable farmers are being helped by the kinds of assistance they receive – and how to move forward to improve practice.

The work unfolded over a two-year period in seven countries in Africa. In each case study the seed-aid practitioners were directly engaged in the evaluations and reflections, so that lessons learned could immediately influence the next steps of practice. It is to the credit of participating national agricultural research systems (NARS) and nongovernmental organizations (NGOs) that they were willing to take a hard look at the effectiveness of their interventions. Equally, the donors, USAID/OFDA and the Ministry of Foreign Affairs Norway, are to be lauded for promoting substantive follow-up on emergency assistance, because such follow-up is rare.

Table 1 gives a broad overview of the major features of the case studies: the countries in which they were undertaken, the stresses that originally triggered a decision to supply seed-related assistance, and the types of interventions that were implemented.

The eight seed relief case studies ask if and how vulnerable farm families are being helped by the emergency assistance received

TABLE 1
CIAT/CRS/CARE Norway Project: Major Descriptors

Case study descriptors	Content
Countries	Burundi, Ethiopia, Kenya, Malawi, Mozambique, Uganda, Zimbabwe
Trigger Stresses	Drought, civil strife, flood, plant disease (and crop breakdown), distorted political economy
Interventions	· Direct seed distribution · Seed vouchers and fairs · Starter packs and targeted input distribution · Community-based seed production · Introduction of new varieties
Crop foci	Maize, beans, cassava, sorghum, rice, millet, cowpeas, bananas, sweet potatoes also: wheat, barley, vanilla, cocoa, moringa

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Each case was chosen to be somewhat unique, in order to build up our body of knowledge concerning seed system relief. However, they all provide details on how the seed problem was initially assessed, the type of interventions that unfolded, and an *ex-post facto* evaluation of their effectiveness. Five of the cases address key features of specific interventions (such as introductions of new varieties), while three present overviews of the practice and evolution of seed aid on a country-wide basis.

Major features – case by case

- The eastern Kenya case compares the effectiveness of Direct Seed Distribution (DSD) and Seed Vouchers and Fairs (SV&F), funded during the same period of the 1990s. Aspects such as number of beneficiaries reached, diversity on offer, financial costs, and spin-off effects (for example possible community empowerment) are considered.

- The northern Burundi case looks closely at how small traders (generally a specialist group) have been among the primary beneficiaries of seed vouchers and seed fairs. It gives insight into the type of trader involved (gender, scale, barriers to entry), the investment of trading proceeds into the local system, and opportunities for introducing innovations (including new varieties) *via* established traders.

- The western Uganda case explores the ability of seed vouchers and fairs to supply farmers with seeds of preferred crops and varieties, and the effects of offering a wide range, even in a relief intervention. It also examines the degree to which the SV&F approach makes use of and bolsters the agrobiodiversity available in the wider farming systems, by comparing which crops and varieties are offered at the fair – and which are not.

- The western Kenya case looks at the effectiveness of different seed channels (informal seed producer groups, local seed/grain markets) for moving new bean varieties during a period of dramatic production decline. Speed and extent of diffusion, as well as the quality of seed put on offer, figure as key assessment variables.

- From northern Mozambique, the study presents the challenges of responding to crop breakdown of the vegetatively-propagated staple, cassava, which was devastated by virus. Challenges of moving plant cuttings quickly and of diversifying in areas of single crop monopoly are analyzed.

- The Malawi, Zimbabwe and Ethiopian cases analyze the longer-term patterns and effects of repeated seed aid. Lack of seed security assessments to address targeted problems, the emergence of a separate 'Relief Seed System' and the use of standard default responses (Direct Seed Distribution evolving to Community-based Seed Production) are among the trends examined.

Overview lessons: select findings

The project also synthesized findings from across the different cases. We present several of the most important results below, but refer the reader to the full volume for more elaborate insight (Sperling et al. 2004, see below for availability).

Relief organizations are generally using an 'acute' response – seed aid – to treat what are more often 'chronic' poverty-based problems.

Emergency seed system assistance was delivered in six out of the eight cases examined in response to what was characterized as an acute stress (that is, an event of short-duration). However, more in-depth analysis, in each of the six cases, showed the problems to be more chronic and systemic in nature, for example declining productivity, water-related stress, ongoing civil unrest, and misplaced political policies.

The other two cases, both of crop breakdowns (one in western Kenya with beans and the other in northern Mozambique with cassava), were the only ones in which prior assessments actually took place.

These revealed that the 'acute manifestation' was also due to more systemic pressures, including the build-up of plant disease, lack of crop rotations and declining farm sizes.

TABLE 2
Chronic Seed Aid Distribution

Country	Seed Aid Distributions
Burundi	22 seasons since 1995
Eastern Kenya	1992/93, 1995/97, 2000/02, 2004
Ethiopia	Food aid 22 years since 1983/84. Seed aid on and off much of the time
Malawi	12 seasons or more
Zimbabwe	13 years (food aid, seed aid, or both)

The result of an 'acute' response in a more chronically stressed context is that the problem is not alleviated and that seed system assistance is then needed repeatedly.

Chronic seed distribution is resulting in the emergence of a Relief Seed System.

Seed aid distribution is taking place in an alarmingly large number of countries: one season, two seasons, three seasons, and beyond. Giving seed aid is itself becoming a chronic activity. Table 2 summarizes the number of years seed aid has been given in several countries. There seem to be few checks for stopping such assistance (simply when funds dry up?) and deliberate exit strategies have not been planned.

The rise of a chronic seed aid system has been identified as a profitable business opportunity for entrepreneurs, who specialize in quick delivery of a small range of crops. It has also led to the rise of a separate Relief Seed System (see cases from Ethiopia and Zimbabwe).

No diagnosis and a mis-assumption of seed availability problems has been triggering seed-related disaster responses.

The lack of any diagnosis related to the seed system is a widespread problem (see Brief No. 7). In the absence of seed-related needs assessment, the default option has been to assume that there is a lack of available seed. Two sources of information indicate that this automatic assessment of lack of availability is often incorrect in the extreme.

- A growing number of studies have traced where farmers in disaster situations sourced the seed they planted – in areas where seed aid distribution had taken place. Table 3 indicates that in contexts where precise data were examined (and with larger sample sizes), relatively little of the seed sown came from emergency aid. Seed had been available in local channels, and particularly from local markets.

- Seed availability has also been assessed via those who may supply seed in crisis periods: the local seed and grain traders. In Burundi, where seed aid has been given since 1995, 41 traders recounted their experience with seed sourcing over the past 10 years of drought and war. Thirty-seven indicated that there had never been a problem with availability. The other four nuanced their answers, with only one trader suggesting an absolute lack at one point in time (see case study from Burundi).

TABLE 3
Importance of Relief Seed in Farmers' Overall Supply during Disaster Periods

Context	Crop	% of seed sourced via relief*
Zimbabwe: drought and political instability 2003	Pearl millet	12
Rwanda: war 1995	Beans	28**
Kenya: drought 1997	Maize	11
Somalia: drought 2000	Sorghum	10-17
Somalia: drought 2003	Maize	3

* See Sperling et al., 2004 for full data sources
** The figure of 28% came from the first seed distribution, two months after intensive fighting ceased. Relief seed was then distribution again for the next major planting in January 1996, and only 6% of the bean seed came via relief channels.

Only two types of case have been identified when availability of seed in a disaster context may be a fundamental constraint. First, where local seed on offer is no longer adapted to local growing contexts (for example in eastern Kenya, due to bean root rots, and in northern Mozambique, due to cassava brown streak). And secondly when there have been substantial shortfalls in production and local markets have never sufficiently developed to deliver seed or planting supplies. (Local markets prove particularly important as sources of seed in crisis, see Brief No. 6).

> Seed availability is not necessarily the problem during emergencies. Practitioners need to understand the real constraints and opportunities – before they respond.

In terms of implementation, there seems to be a broad default pattern, from direct seed distribution (DSD) to community-based multiplication schemes (CBMS).

At present, a relatively narrow range of responses are employed to bolster seed systems in stress. Diagnoses being minimal, the evolution of a seed-related assistance pattern is well established (see case studies from Malawi, Zimbabwe and Ethiopia). During emergencies, institutions jump to direct seed distribution (DSD). During recovery, they move to community-based multiplication schemes (CBMS) schemes. So seed system assistance tends to be characterized by people doing what they already know, rather than what might be best under the particular circumstances.

Misplaced seed-quality parameters in emergency response result in overemphasis on seed health to the detriment of genetic quality.

Issues of seed quality shape the types of seed assistance that can unfold. Quality issues most often focus on whether the seed is certified or not (as many donors require formal verification as a prerequisite for emergency seed procurement). Stereotypes typically equate certified and formal sector seed as being of high germination and good seed health, while farmer seed (home-produced and procured from the market) is typically judged to be of poor quality. Case studies show that such labels can be deceptive. The quality of formal-sector seed may not be as advertised (as in the case from western Kenya), while emergency-grade seed overall is of highly variable health and genetic quality (the case from eastern Kenya). Farmer seed and market seed has also proven to be of good quality, as assessed in laboratory analyses (western Kenya).

The focus on seed health has diverted attention from what is probably the more important quality issue for seed: at the very least, the seed on offer must be adapted to the environmental conditions at hand. Genetic quality, in practice, has been given second priority in emergency responses. Varieties emerging from formal research sectors or on offer from commercial companies are assumed 'good enough', whether or not they have been selected for use in the regions of stress or for growing under the recipients' management conditions.

For full documentation see:

Sperling, L., Remington, T., Haugen, J.M., and Nagoda, S., eds. 2004, Addressing seed security in disaster response: linking relief with development. Cali, Colombia: International Center for Tropical Agriculture. Available for download from http://www.ciat.cgiar.org/africa/pdf/emergency_seed_aid_case_studies.pdf

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Understanding Seed Security

Inherent in the decision that seed aid is needed is an assumption that farmers themselves are not able to secure seed for their normal planting periods. Farmers' ability to secure seed is described by the concept of seed security.

The concept of seed security (and its inverse, insecurity) is often nuanced by two broad sets of parameters: duration (are the problems short or longer-term?) and the different features needed to ensure security (if there are concerns, what types of diverse problems might farmers encounter?). We discuss both in this introduction to the concept of seed security.

Seed insecurity comes in many guises. Chronic insecurity differs from acute insecurity and the elements of seed availability, access and quality need to be examined independently. Understanding seed systems and seed security properly will lead to more effective seed-related assistance

Distinguishing between Acute and Chronic Seed Security

To understand seed security it is important first to distinguish between acute (short-term, transitory) and chronic (longer-term, long-lasting) seed security issues.

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 spurred by the failure to plant in a single season, the loss of a harvest, or by high levels of infestation of stored seed stocks. While during normal times households may variously be identified as seed secure, semi-secure, or always seed-short, all may be affected during an acute event such as a flood or short civil disturbance. Those farmers who recover quickly, with or without one-off seed-related assistance, are often those who have suffered only acute stress. Note that acute food stress (and the need for food aid) is not necessarily followed by seed stress (and the need for some form of seed aid). Seed systems can be very resilient, and, for some crops (e.g. sorghum), small amounts will satisfy farmers' practical sowing needs.

Chronic Seed Insecurity

Chronic seed insecurity is independent of acute stress or disaster, although it may be exacerbated by it. Chronic seed insecurity may be found among populations who have been marginalized in different ways: economically (for example, poor, little land, little labor); ecologically (for example, repeated drought, degraded land); or politically (in insecure areas, or on land with uncertain tenure arrangements). Populations that suffer chronic seed insecurity may be characterized by:

- Continual shortage of adequate seed to plant.
- Difficulties in acquiring seed off farm due to lack of funds.
- The routine use of low quality seed and unwanted varieties.

The result is households with a built-in vulnerability to seed system calamities.

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Reflections on the relationship between acute and chronic insecurity

Acute and chronic seed insecurity will very often exist together during an emergency. Indeed, in cases where emergencies are recurrent events, for example in drought-prone areas, acute situations are nearly always superimposed on chronic problems that are rooted in poverty. Figure 1 aims to show conceptually the relationship between acute and chronic seed insecurity. At any given normal time a portion of the agricultural population, usually the majority, are seed-secure, with the poorest being those who fall below the theoretical security line. In a disaster, all may be affected to some degree, as harvests may decline overall and some seed stocks may be lost.

However, those just above the margins of security may fall into chronic seed stress if alleviating actions are not sufficient. Similarly, those already in chronic stress may not recover above the line into seed security if they are simply assisted with one-off injections of seed aid.

Analysis of seed insecurity in the field reveals two trends in the relationship between acute and chronic contexts.

- First, there is increasing evidence of a general transition from acute to chronic seed insecurity, rather than the presumed goal of recovery. This occurs because various forms of quick relief, such as the free distribution of improved varieties, can undermine the functioning of local seed systems, alter more robust crop profiles, and create marked dependencies. Thus, it is alarming – but not surprising – that in the year 2000 farmers in the Tana Region of Kenya routinely listed 'seed relief' as one of the basic channels by which they count on accessing seed season after season.

- Secondly, closer analysis is showing that many of the aid cases originally considered acute exhibit aspects of more chronic stress. Six out of the eight seed intervention cases we examined in this project (see Brief No. 2) show acute aid being implemented in situations that are primarily chronically-stressed, with such seed aid being delivered not as a one-off intervention, but repeatedly. Acute emergency measures are being implemented in lieu of possibly more effective and more long-term support. This is not a new insight – but it is one that has yet to change practical responses to major seed emergencies.

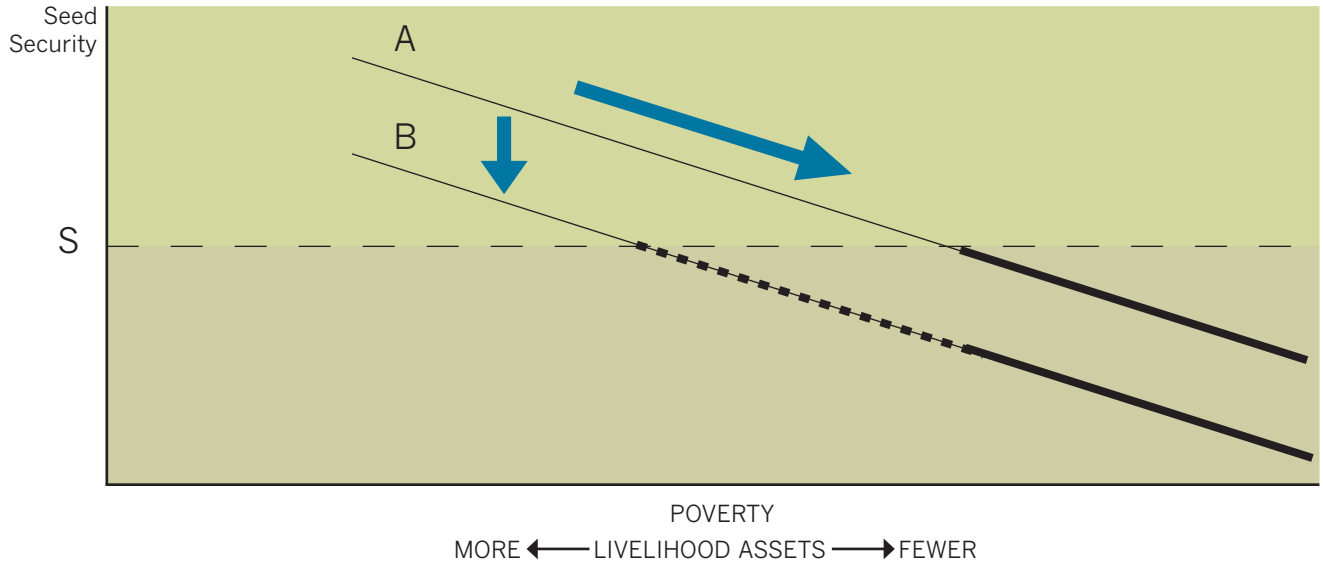

FIGURE 1: The relationship between seed security and poverty, in times of acute and chronic stress.
Line A represents a stylized relationship between poverty (x axis; expressed in terms of assets) and seed security (y axis). The point S represents an arbitrary seed security threshold: above the broken line is seed security, below it seed insecurity. In locales for most interventions, in normal times, a proportion of the population, represented by the thicker portion of line A, is chronically seed insecure. In an emergency, two things may happen: (1) livelihood assets may decrease, so the entire population will move down the line, such that more of the population will be seed insecure by virtue of their increased poverty; (2) there may be a shift downwards of the entire line to B, perhaps due to short-term problems of seed availability or access. Either way, a larger proportion of the poor, the vulnerable population, will become seed insecure, as represented by the additional, dashed part of line B.

Distinguishing among the Dimensions of Seed Security: The Seed Security Framework

The concept of seed security embodies several diverse aspects: differentiating among these is crucial to promote those features that foster seed security as well as to anticipate the varied ways in which such security might be threatened.

The Seed Security Framework in Table 1 outlines the fundamental elements of seed security: seed has to be available, farmers need to be able to access to it, and the seed quality must be sufficient to promote healthy seed system functioning.

TABLE 1
Seed Security Framework: Basic Elements

Parameter	Seed Security
Availability	Sufficient quantity 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.
Quality	Seed is of acceptable quality and of desired varieties (seed health, physiological quality, and variety integrity).

Availability is defined narrowly as whether sufficient quantity of seed of target crops is present within reasonable proximity (spatial availability) and in time for critical sowing periods (temporal availability). It is essentially a geographically-based parameter, and so is independent of the socio-economic status of farmers.

Seed **access** is a parameter specific to farmers or communities. It largely depends upon the assets of the farmer or household in question: whether they have the cash (financial capital) or social networks (social capital) to purchase or barter seed.

Seed **quality** includes two broad aspects: seed quality per se, and variety quality. Seed quality consists of physical, physiological and sanitary attributes (such as the germination rate, and the absence or presence of disease, stones, sand, broken seed or weeds). Variety quality consists of genetic attributes, such as plant type, duration of growth cycle, seed color and shape, palatability and so on (see Brief No. 6).

In using the framework, it is important to emphasize that the distinction between availability and access is dependent on scale. At some level, if one is willing to pay enough to transport seed from far enough away, seed is always available. Likewise, the concepts of availability and quality are interrelated. If seed is available which will grow and mature to harvest, but which is of otherwise low quality or of unwanted crops or varieties, this constraint would usually be considered under the quality parameter, but one could question whether appropriate seed is available at all.

More Refined Analyses of Seed Security Leading to More Targeted Appropriate Responses

Formal definitions of seed security are fairly recent, as is the notion that seed security assessments need to be distinct from those that focus on food security. In standard field practice, food security assessments inevitably assume that food insecurity means seed insecurity. The cause of this seed insecurity is also invariably diagnosed as a problem of availability;

TABLE 2
Seed System Problems and Broadly Appropriate Responses

Parameter of the problem	Acute (short-term)	Chronic (longer-term)
Unavailability of seed	Direct distribution of seed (possibly for sale)	Support development of seed production, including commercial enterprise, where viable
Poor and vulnerable farmers do not have access to seed	Cash disbursement Seed Fairs with vouchers or cash Local procurement and distribution	Poverty-reduction programs: e.g. support development of • Income-generating activities • Agro-enterprises

that is, there are not enough seeds in a region. A better understanding of the seed security concept, along with informed used of a seed system security assessment tool (see Brief No. 7), should help lead to more targeted diagnoses of problems at hand as well as to more targeted responses.

Using the two aspects of seed security outlined above, Table 2 gives examples of more targeted responses to seed insecurity, to address explicit constraints in seed availability, access and quality in the short-term (acute) and long term (chronic). (See also Brief No. 7 for a more extensive analysis.) So, for example, if 'seed availability' is assessed as the problem, seed-based interventions, such as seed importation (for acute shocks) or development of community-based seed production enterprises (for chronic stress), may be appropriate. However, a diagnosis of 'seed access' might wisely trigger a more holistic analysis of livelihood strategies. In the acute phase, providing farmers with cash or vouchers to get their desired seed might be on the mark to address short-term problems of access. However, an identification of chronic access problems should lead practitioners to look well beyond seed and seed security constraints. The inability to access a certain necessary good on a repeated basis is usually equated with problems of basic poverty. Initiatives to help farmers generate income and strengthen their livelihood base would be essential here.

Finally, we emphasize that lack of use of a Seed Security Framework (availability, access, utilization) and an acute *vs* chronic perspective has generally resulted in few explicit assessments of seed security to date. Getting a better handle on the concept of seed security is but a first important step toward designing seed security related interventions that effectively address the real problems at hand.

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Agrobiodiversity and Seed Relief

Disaster, as well as subsequent relief and recovery activities, can have significant impacts on agrobiodiversity. In this context, by agrobiodiversity we mean the full diversity of crops and their varieties that may exist in a farming system. We are not specifically addressing livestock, nor other unmanaged components of systems (such as bees or wild plants).

In terms of disaster effects and humanitarian aid, the issue of agrobiodiversity is important for three groups of stakeholders:

- For those focusing on quick recovery; greater agrobiodiversity contributes to production stability. It helps farmers to avoid and mitigate different risks, because different crops and varieties resist different diseases, insect attacks and environmental stresses such as drought better than others. A range of agrobiodiversity can also help farmers to stagger their harvest of incoming food supplies and labor needs, which is important when resources are few and far between.
- For those focusing on plant genetic resources, maintaining the diversity of crops and varieties is important in itself because this genetic diversity provides the raw material for agriculture's future adaptations as well as the genetic traits for crop improvement programs.
- For those focusing on longer-term system strengthening, the introduction of new varieties potentially increases productivity, and captures market opportunities – but also may affect agrobiodiversity negatively and positively.

This brief examines the more immediate and practical dimensions of agrobiodiversity in farming systems.

Agrobiodiversity enables farmers to spread risk and increase resilience to shock. These stabilizing features of agrobiodiversity become more important during emergency stress periods.

During normal times, a range of agrobiodiversity allows farmers to spread risk, increases their resilience to shock, and often translates into more nutritious diets. These are key issues when people live from what they sow. During emergency stress times the stabilizing features of agrobiodiversity become potentially even more important. So what features of agrobiodiversity should be considered in responding to emergencies? And what impact do different kinds of activity have on agrobiodiversity? This brief explores those questions.

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Why Agrobiodiversity is a Central Concern in Emergency Response

Issues of agrobiodiversity need to inform emergency response in several ways. First, relief efforts should not compromise functioning systems of agrobiodiversity; that is, they should not undermine the use of a wide range of adapted crops and varieties that remain productive and in wide use. Secondly, if supply-side interventions are deemed necessary, the interventions should embrace principles associated with the maintenance of agrobiodiversity. These principles include:

- Attention to local adaptedness of crops and varieties.
- Focus on crops and varieties that meet local preferences, putting multiple options on offer.
- Treating farmers as customers and giving them choice.

There is scant evidence to date that disasters (such as civil war, drought or flood) significantly alter profiles of agrobiodiversity. When loss does occur, it often proves to be only temporary. (The exceptions are cases where crops or varieties break down, usually as a result of disease or declining soil fertility.) By contrast, there are several examples where conflict-induced displacements have exposed farmers to new crops and new varieties that they then bring back with them when they return home, resulting in a gain – not a loss – of agrobiodiversity.

> There is scant evidence to date that disasters themselves significantly alter agrobiodiversity profiles. It is rather the subsequent humanitarian responses which often have negative consequences.

However, an increasing number of field cases show that seed relief interventions, the humanitarian responses themselves, alter agrobiodiversity profiles and management negatively. The delivery of repeated seed aid changes farmers' seed procurement strategies away from actively sourcing several, often traditional, varieties *via* the local seed systems towards passively receiving hand outs of a small number (often only one) of modern varieties. Direct Seed Distribution, when it is of a limited number of crops (and especially with a concentration on maize), can also skew patterns of plant use towards crops that may hold up less well under the stresses that farmers routinely encounter, particularly drought.

The central need to look at agrobiodiversity within emergency responses has been formally recognized in recent guidelines issued by the United Nations agency responsible for agriculture, The Food and Agriculture Organization. FAO's *Guiding Principles for Seed Relief* asserts, *inter alia*, that:

- Depending on the context, the focus in an emergency should normally be on keeping the local seed system operational…
- Seed relief interventions should facilitate farmers' choices of crops and varieties … that are adapted to environmental conditions and farmers' needs… (See Sperling et al, 2004, full details below.)

In terms of agrobiodiversity, perhaps it is fortunate that seed aid has a circumscribed role in an emergency response. Seed aid is never provided to all farm community members – and often the better-off and less-affected farmers receive nothing.

Also, even when a family does receive seed aid, it rarely covers all of their seed requirements. So giving farmers less than their total seed needs in an emergency distribution can actually be beneficial for keeping local varieties in production.

Local crops and seed often remain in circulation and can be accessed *via* markets or exchange channels to complement the free (and often 'exotic') emergency seed assistance.

Seed Relief Approaches that Bolster and Strengthen Agrobiodiversity

Not all relief approaches are equally effective in bolstering and stabilizing seed and farming systems. We comment below on those that practitioners assert may do 'less harm' and that, in select cases, may actually support and enhance the range of crops and varieties in use.

Food Aid – Including Seed Protection Rations (SPR)

Food aid is underrated as a seed relief strategy. Delivery of such aid can allow remaining seed stocks and variety diversity to be maintained (and not eaten). The rationale for the SPR is that food aid is given particularly for the months prior to sowing time, during the 'lean times'.

A note of caution is important here in lauding the virtues of food aid as a seed rescuing (or maintaining) strategy. In farmers' minds, food aid and seed aid may not be separate entities – and gifts of food may subsequently be planted. Hence, in several countries of southern Africa, genetically-modified food aid from the US has not been accepted in recent drought years because of fears that it would find its way into the fields. Consideration also needs to be given to food aid from in-country purchases: large procurements may impact on the overall availability of grain and local prices of seed grain.

Direct Seed Distribution that Procures from Local Seed Systems

Direct Seed Distribution takes many forms – some of which can damage local seed (and economic) systems. Bringing seed in from outside can undermine functioning markets and introduce cultivars that are not well adapted to local conditions. In terms of agrobiodiversity, however, one variant of DSD seems to minimize damage to crops and varieties. When seed procurement draws from local markets, or regional traders, and when it distributes varieties from similar agro-ecological zones, farmers may get access to varieties they know and have used and that are well adapted. In variants of this local procurement strategy, implementers have *distributed variety mixes* (where these are routinely sown), and have tried to *distribute local varieties*. An inherent weakness in seed procurement is that the implementing agency must act as a competent broker for farmer clients and must know and understand seed quality and the specific preferences of farmers. Further, it is well known that local middlemen sometimes buy seed from small farmers to sell to NGOs who then distribute the seed back to the same or similar small farmers. One has to wonder whether the small farmers or the middlemen benefit most from this kind of intervention.

Seed Vouchers, Usually Combined with Fairs (SV&F)

Seed vouchers permit farmers themselves to select among the crops and varieties available within a region. These may be local (sourced from local markets or traders) or improved (sourced from commercial companies or specialized outlets). The point is that farmers themselves can choose and manage the crops and varieties they desire. Advertised seed fairs, which bring farmer buyers and sellers together in dedicated events, provide a range of seed from which farmers can choose. While fairs cannot put on offer the full set of diversity available in a farming system, the profile of crops (often 5-15) and varieties (20 upwards) available in one place is relatively broad. Of course, putting diversity on offer does not guarantee that farmers will access it. Recipients often focus on one or two crops, and choose the more popular varieties of these.

Introduction of New Varieties in Forms of Seed Relief (Under Select Circumstances)

Under select circumstances, new varieties can help to broaden the diversity available in an area (although specialists in plant genetic resources routinely assert that new varieties push out the old). Key aspects to consider if introducing new varieties in seed relief include:

- That farmers need to be given a choice on whether to use these varieties or not (i.e. that new varieties be one among several options on offer).
- That seed be given in 'test' sizes, to mitigate farmer risk.
- That sufficient information accompany the seed so that farmers can make informed use and management decisions for integrating (or not) these new elements into existing farming systems.
- That there is research involvement to learn from farmer evaluations of the new materials.
- In cases where the intervention is not needed immediately, that demonstration plots (or other field stages) are used to help farmers assess the products they may decide to sow for themselves. (See also Brief No. 5.)

> Food aid is an underrated strategy for seed-related assistance. It can allow people to save their remaining seed stocks and variety diversity, rather than be forced to sell or eat them.

Viewing emergency relief through an agrobiodiversity lens includes several basic principles (see Box 1)

In brief, the use of agrobiodiversity, that is the use of a range of crops and varieties, is a proven risk mitigation strategy that works in all sorts of situations, from drought to conflict.

BOX 1

Principles for sustaining and promoting agrobiodiversity in seed relief response

- **Do not engage in seed relief that undermines functioning systems or that may compromise already stressed ones.**
- **Do not base the seed response on a large scale transfer of seed of varieties not currently used by farmers.**
- **Think hard before importing seed into a region and never provide a single variety of just one crop for all farmers: vary crops and varieties.**
- **Build on what is working: strive to stabilize seed systems through use of the channels farmers routinely use. Keep normal flows of crops and varieties moving.**
- **If supply-side seed interventions are necessary, consider those that may maintain or add agrobiodiversity.**
- **In all cases, give farmers crop and variety options, and the leverage (as well as the information) to strategize about what does or does not fit into their agrobiodiversity planning.**
- **If new variety introductions are on offer, monitor their performance, feed back to research and the formal seed sector, and actively consider effects on agrobiodiversity.**

High levels of agrobiodiversity can also aid farmers nutritionally and economically. Seed aid should never dramatically alter such diversity either by adding or removing substantial amounts of diversity. Agrobiodiversity profiles can be dynamic, but the process has to be planned, and with farmers having the knowledge, skills and tools to make informed decisions about the crops and varieties they sow.

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

Seed Aid for Seed Security

ADVICE FOR PRACTITIONERS

Using Seed Aid to Give Farmers Access to Seed of New Varieties

Farmers are keen to obtain and evaluate new crop varieties. This process of experimentation and subsequent introduction of adapted and accepted varieties can potentially strengthen farmers' cropping systems by increasing yields, improving drought resilience, boosting resistance to pests and diseases and also by capturing new market opportunities.

Introducing new varieties can also play a role in restoring food security at times of crisis. Crises may alter preferences, for instance when populations relocate, or crisis may even be caused by crop and variety breakdowns (for example spurred by plant disease or sharply declining soil fertility). Both situations leave farmers in want of appropriate planting material. Crises may also be seen as an opportunity to introduce new varieties, *via* the extensive seed aid channels, in order to promote what are considered more 'modern' practices and thus to strengthen systems plagued by low production.

Regardless of the potential for improving smallholder productivity through the introduction of new varieties, it is important to start by questioning the legitimacy of such introductions during crises. In periods of emergency and prolonged stress, small farmers are already at levels of increased risk. They are generally poorer, having lost household assets, livestock or crops in the field, and they cannot afford to waste further often scarce land or labor resources. Further, they need to have some confidence that the next planting season will yield better than the present, stressed, one. Outside aid, minimally, should put on offer products or processes at least as good as those already in farmers' hands. While formal sector varieties are referred to as 'improved' and the quality of the seed is certified, these varieties often yield poorly in many smallholder cropping systems. Such new varieties may not be adapted to the local agro-ecological conditions and farmers may not possess the management inputs (for example fertilizers and pesticides) crucial for their growth. So an 'improved variety' does not mean that performance is guaranteed.

This brief suggests 'better practice' for introducing (or not) new varieties in situations of acute and chronic stress. It presents a series of technical guidelines that need to be considered prior to any variety introductions. The brief is also framed by a set of precautionary notes: if humanitarian assistance involves crop or variety introductions, even 'emergency' short-term interventions should be programmed within a longer-term plan of action.

New varieties can increase food security in the wake of disasters, but only if practitioners work with farm communities and other informed personnel to minimize risk. Introducing new crops and varieties, especially after crisis, also requires a multi-year vision and commitment.

Introducing Varieties in Acute Stress Periods

Seed aid that is considering the possible introduction of crops or varieties has to be programmed to embrace a well-planned set of steps. These are summarized in Box 1 and elaborated in the text that follows.

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BOX 1

Introducing New Varieties in Acute Stress Periods: Key Steps

- **Conduct a Seed System Security Assessment.**
  - **What are the current seed system weaknesses and strengths?**
  - **Would new varieties open up promising opportunities: why, how, for whom?**
  - **What are the potential risks?**
- **Work with farm communities and other informed personnel to choose possible new varieties.**
  Is there sufficient prior evidence that varieties:
  - **Are adapted to the specific agro-ecological zones?**
  - **Meet farmers' acceptability criteria (harvest and post harvest for subsistence and market use)?**
  - **Can be successfully used under farmers' own management conditions (e.g. without fertilizer)?**
- **Design introductions so as to minimize risk and maximize farmers' informed choice.**
  - **Offer 'test size' packets: introductions should be small-scale.**
  - **Give farmers choices: to use the variety or not. And if possible, put several varieties on offer.**
  - **Provide sufficient accompanying information to allow farmers to make variety choices and management decisions (planting time, levels of input use, crop associations).**
- **Build in explicit monitoring and evaluation of new varieties: are they performing? For whom? Where?**
- **Count on a multi-year process.**
  - **Can the new introductions be successfully integrated into stressed farming systems?**
  - **If yes, is further fine-tuning needed?**

Conduct a Seed System Security Assessment

Often, a disaster and its ensuing seed aid are viewed as an opportunity for large scale distribution of seed of modern varieties. An assumption may be made that farmers have experienced crisis in part due to a weakness in their crop systems – which would include under-performing crops and varieties.

Before contemplating any introduction, implementers should conduct rigorous seed system security assessments (see Brief No. 7). This should be done with the recipient communities and with informed research and development personnel who know the local agro-ecological systems well. It is important to get an overview of the strengths and weaknesses of current agricultural and seed systems. Teams also need to have an in-depth understanding of the root causes for any stress to the seed system.

Small test packets and plenty of information will enable farmers to decide whether and how to incorporate a new variety or crop into their system.

Fundamentally, a decision to introduce new varieties needs to be founded on sufficient evidence that new varieties offer promising opportunities, and, equally, that their introduction will not expose farmers further to increased risk.

Initial prior assessments must also provide good insight into farmers' awareness of, access to and use of new varieties. Answers to key questions (Box 2) will help guide further strategy – and may be particularly important for ensuring that the right farmers (i.e. the vulnerable) are well-served by the intervention.

Work with Farm Communities and Other Informed Personnel to Choose Possible New Varieties

A Seed System Security Assessment for any given region should result in an inventory of varieties by crop, including varieties currently used by farmers, as well as new varieties not yet available to farmers for testing. New varieties of potential interest to farmers usually come from the formal sector; international research centers, national research organizations and commercial seed companies. Institutions proposing candidate varieties for use in specific farming regions should submit documentation detailing performance of the new materials to those considering the distribution of such entries (e.g. NGOs). Such documentation might also be usefully reviewed by knowledgeable local extension agents as well as key farmers (depending, of course, on its language and format).

The suitability of new materials for use in a particular zone and for a well-defined client group needs to be assessed. Not everything new is good. Appropriate varieties should have:

- Evidence of adaptability to cropping system and prevailing agro-ecological conditions.
- Evidence of acceptability according to the preferences and experiences of farmers who are most affected by the stress. If, traditionally, farmers produce for domestic consumption, varieties should be acceptable for these standards.
- Evidence that they can be used under the management regimes in routine practice, including by the vulnerable (i.e. not be highly dependent on inputs such as fertilizers that the poorest farmers often cannot access).

BOX 2 Farmers' Awareness of, Access to and Use of New Varieties: Guide Questions

- **Do farmers currently have access to formal sector seed (of improved varieties)? If not, why not?**
  - **Is it a question of purchasing power? It is often the wealthier who seek out new varieties *via* certified seed.**
  - **Might there be a lack of varieties useful for the farmers' specific agro-ecological zones? Note that many new varieties are screened particularly for higher potential areas.**
  - **Is the constraint related to lack of nearby distributors or distribution points? Formal seed stockists may tend to cluster in larger town centers.**
- **Have farmers already experimented with new varieties?**
  - **If so, with what results?**
  - **If not, why not?**
- **Are farmers aware that there are new varieties that may improve productivity or provide new market opportunities?**

Note that maize hybrids, in particular, are often promoted as new items on offer in stress contexts. However, their performance under low-input, high stress farming has been uneven, and has often failed almost completely (see Ethiopia, Kenya, Malawi and Zimbabwe cases in Brief No. 2). Simply, hybrids usually demand inputs and better soils. Furthermore, the seed supply needs to be 'bought' the next season because hybrids cannot be resown and retain their productive vigor.

It is important for implementers to be very clear about the objective of introducing new varieties. In an agricultural recovery project, introductions should give farmers access to seed of new and desired varieties, so that they can experiment with them and add them to their systems if they choose to. The objective should not be to satisfy 100% of a farmer's seed needs with commercial seed (nor, as a hidden objective, to expand the customer base for the commercial sector). It should also not be to replace local varieties that may be seen by outsiders as inferior.

Design Introductions so as to Minimize Risk and Maximize Farmers' *Informed* Choice

Even use of 'best bet' varieties (that is, those pre-screened for potential adaptability, acceptability and usability) is not risk free. In an acute crisis, farmers need access to test packets of seeds, a basket of variety choices among which to select test candidates and enough information to make informed decisions about the varieties offered.

Packets

Seed delivered in small quantities will enable farmers to learn about the new materials without compromising their production stability. Sizes should be small enough that any production loss will not dent harvests. Farmers in many African regions are used to the format of such 'peanut-sized packages' and have favorably received new varieties this way in the East, Central and Southern African regions.

Variety Basket – and Choices

Farmers should always have a choice as to whether they want to accept a new variety or not. In addition, experiences drawn from actual field practice suggest that a basket of varieties should be on offer to contribute to crop and variety diversity and to potentially increase resilience.

Sufficient Information

Farmers need solid accompanying information to make knowledgeable choices and management decisions. Written information sheets (preferably in local languages) have proved useful, as have pictures and diagrams for the less literate. Information leaflets should communicate to farmers the existence of new varieties that may be of interest, describe the attributes of the new materials and give guidance on how to manage them (including signaling management practices that may differ from farmers' norms).

Build in Explicit Monitoring and Evaluation of New Varieties

All too often seed aid is an extension of food aid: monitoring and evaluation focus on logistics and subsequent reports are administrative and perfunctory. Increasingly, however, seed aid is seen as very different from food aid. Better, more nuanced assessments of seed systems and seed security are resulting in recommendations of more complex and integrated responses. Especially when an objective of variety introduction is included, it is important to monitor and evaluate – with farmer participation – the performance of the new varieties and to report on results and recommend next steps and changes to improve the process. It is important to signal if the varieties are yielding – but for whom, and where, and under which management conditions.

An 'improved' variety does not guarantee better performance. Practitioners and farmers will want to be sure that the variety is adapted to the conditions on the ground.

BOX 3

Introducing New Varieties in Conditions of Chronic Stress: Key Steps

- **Conduct an analysis of the existing seed security situation with target communities and explore alternative solutions for solving well-defined seed security constraints – and opportunities.**
- **Expose farmers to a wide range of promising varieties of the target crops and do the testing under farmers' own management conditions.**
- **Help target communities to select varieties of their choice and to communicate back to extension and research the reasons for their preferences and selections. (Such feedback should also help to fine-tune the breeding process.)**
- **Support the multiplication of start-up materials. These include the foundation or basic seeds that are the origin stock of pure and clean varieties.**
- **Encourage and support decentralized production and distribution of preferred varieties, for example through local traders and community-based seed multipliers. (Local seed producers might demonstrate and promote their products so as to create a sustained demand for preferred varieties.)**
- **Enhance farmer capacity to produce seed for own use and for sale. (Such agro-enterprise skills can provide a real bridge toward income generation.)**
- **Eventually, ensure diffusion of seed by building on existing seed channels, agro-enterprise initiatives, but also non-seed channels such as health and nutritional centers or soft drink kiosks etc.**

Count on a Multi-Year Process even for Interventions Spurred by Acute Stress

Clearly, the introduction of new varieties cannot be a one year, one-off activity. It is essential that the performance under farmer management of the new varieties informs subsequent recovery steps and that the response to future disasters also takes this information into account. Assuming that the objective is to strengthen and integrate farmers' own seed systems, investment needs to be made to determine how to maintain the variety at least cost to farmers and how the seeds themselves can be made available and accessible on a continuing basis.

Introducing New Varieties in Contexts of Chronic or Prolonged Stress

Chronic and prolonged stress affects farmers who are subject to repeated 'disaster' situations such as frequent drought, or who experience slower stress build-ups, such as increases in pests and diseases over time. Many of these populations are also economically marginalized, trapped, and often facing destitution. Although introductions of improved varieties alone may not be enough to solve the underlying problems faced by these farm families, they can be both an effective addition and a useful entry point for more ambitious interventions to ensure longer-term development. Access by all farmers to adapted and appropriate plant material (including new variety introductions) is vital in these contexts. However, given the longer-term stress and the likelihood of such stresses recurring, the process for variety selection and introduction requires sustained and continuous commitment by scientists and farming communities alike.

Chronically-stressed farmers are not economically attractive clients for seed companies (farmers just don't have the needed cash) so the onus of maintaining varieties often rests with the communities themselves.

A number of key steps can help to make the introduction of new varieties in conditions of chronic stress an effective process and decrease the chances of failure. Note that the focus of Box 3 is a solidly developmental one.

Enabling Innovation

Marginal farmers in chronically-stressed areas are not commercially attractive clients. Therefore communities themselves have to be linked to research programs and should have access to research products. These links might be direct or through intermediary organizations such as NGOs and development organizations. In all cases, these links have to be made explicit – and institutionalized. Exposure to innovation needs to be continuous, not one-off.

- Keep farmers, local seed producers, and agro-entrepreneurs abreast of advances in breeding and give them access to a dynamic supply of promising new varieties.
- In the particularly 'hard case' areas, where the adaptation stress is high (such as regions where soils are scarce or very poor) involve farmers in sustained participatory plant breeding and selection programs to ensure that the material is adapted on site and to secure a tradition of experimentation and direct client evaluation.

Support for the decentralized selection by farmers of preferred varieties (as well as their production and marketing) should be seen as part of a wider set of interventions to decentralize service delivery to farmers. The ultimate goal goes beyond varieties and seed. The aim is to enhance the capacity of communities to implement their own recovery and development in ways that mitigate the effects of cyclical and prolonged stress periods.