



## Leveraging farmers' strategies for coping with stress: Seed aid in Ethiopia

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### ABSTRACT

Interventions to reduce farmers' vulnerability to crises rarely build on existing coping strategies. Emergency seed aid offers a unique opportunity to examine links between different types of interventions and local coping mechanisms, as such relief has been abundant and long-term. This study focuses on farmers' use and assessment of crisis assistance within Ethiopia, where seed aid delivery dates back at least 34 years. Farmers' abilities to strategize and negotiate inter-/intra-seasonal variability are not being addressed by current supply-driven approaches. Lessons derived from seed aid give insights toward more effective practice for programs aiming to bolster farmers' resilience in high-stress and uncertain contexts.

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### 1. Introduction: the limitations of 'supply-side' approaches to reducing vulnerability

Support to vulnerable farmers in the South attracts considerable, and growing interest in development research and practice. The broad goal of helping maintain viable livelihoods in the face of external stress is shared by fields as diverse as adaptation to climate change (Adger et al., 2003), social protection (Devereux, 2002), and disaster assistance (Sperling et al., 2008). Despite the existence of many studies highlighting farmers' sophisticated strategies for coping with stress (e.g., Mortimore and Adams, 2001; Corbett, 1988; Richards, 1986; Thornton et al., 2007), it is rare that interventions addressing vulnerability engage with or build upon these strategies. For instance, most efforts promoting adaptation to climate change overlook the adaptive capacity of vulnerable populations (Reid and Vogel, 2006). This effectively treats farmers as passive victims, denying their agency in responding to hazards (Tschakert, 2007). Approaches to reduce farmer vulnerability tend to be supply-driven, as they reflect what interventions are on hand, rather than the needs arising from a specific local setting (the demand side). Such a gap leads to 'one size fits all' interventions, which are not necessarily effective at reducing farmers' vulnerability, and may even have inequitable outcomes (Eriksen et al., 2005; Adger et al., 2003). There is a

growing recognition that efforts to strengthen the resilience of systems need to understand and build upon local coping strategies.

In general, there is much less known about people's coping responses to hazards (i.e., the social dimension of vulnerability) than about the external bio-physical hazards themselves (the physical dimension of vulnerability; Adger, 2006; Turner et al., 2003). This partly reflects the fact that coping needs to be understood in the context of specific local settings, and varies within communities along with the capacities and livelihood strategies of individual actors. There is a lively theoretical discussion of local coping strategies in relation to climate change (e.g., Eriksen et al., 2005; Tschakert, 2007), but as yet few interventions in this field which permit study of their direct relationship with coping. However, another area of vulnerability reduction, emergency seed aid, provides many examples for such an analysis. Seed aid is a response to external hazards and aims to improve farmers' resilience in a relatively defined area—crop production. Several different approaches are implemented. Moreover, frameworks exist to help analyze the nature of farmers' vulnerability around seeds, such as the Seed Security Framework (introduced below; Remington et al., 2002; Sperling, 2008). This makes seed aid a useful case for exploring more generally the relationship between coping strategies and interventions that address vulnerability. This paper opens several novel perspectives on seed aid, analyzing farmers' use and views about seed aid across different regions of Ethiopia, and critically assessing its effect on local coping strategies.

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## 2. Background to emergency seed aid: widely implemented, rarely analyzed

Emergency seed aid targets farmers' seed insecurity, helping them secure access to sufficient, desirable, and healthy planting material in time for sowing. Such aid follows a crisis such as drought, flood, or short-term conflict, and tries to accelerate recovery in affected agricultural systems by ensuring that farmers can continue with crop production (Sperling et al., 2008). This linking of relief and vulnerability reduction helps explain its burgeoning popularity in the past 15 years. Seed aid has occurred in many countries, particularly in sub-Saharan Africa, involving a wide range of donors, implementers (both government and non-governmental organizations—NGOs), and approaches. Hundreds of projects have been carried out, on a near-annual basis in some countries (e.g., Zimbabwe—Bramel and Remington, 2004), and incurring significant costs (e.g., US \$500 m for Ethiopia alone since 1974—Sperling et al., 2007). Yet, despite this breadth of activity, there is still little known about seed aid's effects on farmers, particularly about how well it supports farmers' strategies for coping with stress. In general, seed aid is little evaluated. As it is often conceived as a one-off emergency intervention, few implementers dedicate time or resources to evaluate seed aid impact (Sperling et al., 2006). There are some notable exceptions (e.g., Alemu and Yoseph, 2004; Longley, 2006), though these draw mainly from secondary data and interviews with implementers.

Seed aid merits critical attention. As with other interventions around vulnerability, seed aid is often supply-driven, rather than problem- or end user-driven. There is evidence that poorly conducted interventions can actually increase vulnerability in multiple ways. In the short-term, supplying maladapted crop varieties causes already vulnerable farmers to waste scarce labour and land resources. Over a number of seasons, there is evidence that providing seed aid as a routine response undermines the functioning of local markets and stifles the development of small-scale commercial seed enterprises (Rohrbach et al., 2005). Moreover, aid dependency is an abiding concern and repeated distributions may foster farmer reliance on aid for part of their routine seed procurement (Sperling et al., 2008). Finally, it bears mention that seed aid is often driven by specialist interest groups or policies which have a specific notion of what should be supplied, and by whom. For instance, seed aid may be designed to promote new crop varieties (Sperling, 2002), or to support financially a growing 'relief seed' business (Bramel and Remington, 2004). Any critical reflection on positive and negative impacts of seed aid over time will need to understand how farmers actually use aid, and how aid relates to their vulnerability.

### 2.1. Understanding farmers' coping strategies in seed

For most crops, farmers' own harvests supply much of their seed: farmers select seed from prime plants in the field, store it carefully, then sort out planting material just before sowing. Having frequent shortfalls even in 'normal' times, farmers also make use of off-farm channels, and carefully discriminate among those in which they have confidence, for example, neighbours or trusted market vendors. Obtaining the right materials, on time, and on terms which farmers find acceptable partly depends on having access to a range of acceptable channels (Sperling et al., 2008).

Several studies give technical insight into how farmers respond to stress, that is, the details of their coping. Farmers may stagger sowing times, increase sowing densities, or re-sow if germination appears to be low (McGuire, 2007). In response to rapidly changing environmental conditions, labour supply, or even

market signals farmers may also alter types of crops grown, relative crop areas, or variety portfolios (Fujisaka, 1997).

Farmers also respond to stress by making proportionally greater use of off-farm channels: as harvests tumble or seed quality declines, markets and social networks may be drawn upon to fill shortfalls or to help farmers switch toward specific crops or varieties (Sperling et al., 2008). Access to channels is often compromised post-crisis by, *inter alia*, farmers' low purchasing power or weakened functioning of social networks, either because everyone has seed shortfalls (McGuire, 2008), or because neighbourly sharing has broken down (as sometimes occurs following conflicts; Sperling, 1997). So, in terms of coping strategies, ensuring farmers' access to a range of seed channels, and allowing them to appropriately manoeuvre their planting portfolio (by crop, variety, sowing date) are two broad themes which are key.

Of course, farmers in stress periods have many other non-seed-related coping mechanisms, such as livelihood diversification, wage labour, or even long-term migration. We have focused above of those which are seed-sector specific.

### 2.2. Reassessing seed aid through farmers' own experiences

Farmer perspectives on their needs during crises, and on the usefulness of aid for meeting these needs, are essential for improving the effectiveness of interventions. Seed-related responses in situations of vulnerability can involve a range of approaches. Generally, these can be grouped in two types: those which give seed directly, like direct seed distribution (DSD) and revolving seed funds where seed is brought into an affected area from outside a region; and more market-based approaches which allow farmers themselves to access seed locally, such as vouchers for seed and cash for seed. In some cases, food aid is given to protect locally adapted seed stocks from being eaten, or food swapped with seed. In theory, the specific nature of farmers' seed insecurity—or if they are seed insecure at all—should guide choice of response. However, in practice, precise constraints are rarely assessed prior to delivering aid (Sperling et al., 2006). Remington et al. (2002) suggest a Seed Security Framework for such assessments defining three broad parameters: availability—the presence of sufficient seed for sowing within the region; access—the ability of farmers to acquire seeds (reflecting their financial or social assets); and quality—the value of this seed in terms of adaptation and seed health. Use of this framework can help identify the main source of vulnerability in a given setting and the most appropriate aid responses. For instance, DSD may be best when there is no seed locally available (or when seed farmers want is not found locally). Where access is the major constraint, the Seed Security Framework recommends market-oriented approaches to seed aid. Farmers have sophisticated understandings of the stresses they face (Tschakert, 2007) and thus are key in assessing needs and designing approaches.

This brief review highlights specific questions relating to a farmer-centred perspective on seed aid. How well does seed aid address vulnerability around seed? What would help farmers cope better, and recover more swiftly? And how do farmers evaluate the strengths and weaknesses of different seed aid approaches?

## 3. Overview and context of paper: farmers and seed aid in Ethiopia

This paper explores the fit of aid with existing farmer coping strategies and adds to a growing set of observations of farmer

actions in vulnerable situations. It draws from farmer accounts of receiving seed aid over many years in Ethiopia.

Emergency seed relief has been delivered in Ethiopia since at least 1974 (Shimeles Adugna, personal communication, 2006), and every year since 1982 (Sperling et al., 2007). Such a humanitarian aid legacy makes Ethiopia a country with some of the earliest, and possibly most continuous, seed aid efforts. Seed aid implementation is poorly documented in Ethiopia: government and NGO records are fragmentary and do not always distinguish seed aid from other seed or relief activities. However, the available records (from the United Nations Emergency Unit in Ethiopia, NGOs, and government bureaux at different levels) show that most regions and agroecologies have received seed aid at some point. A wide range of crops has been supplied, including many cereals and pulses, but also horticultural and cash crops. A conservative estimate shows that US \$15 million has been spent each year on seed aid in Ethiopia over a 34 year span (Sperling et al., 2007). Unlike many other countries, Ethiopia has no strong private seed industry, so there are no exclusive ties of seed aid to commercial supply outlets. Some implementers prefer to promote modern varieties (MVs) produced by the formal sector, the parastatal Ethiopian Seed Enterprise and other certified seed producers; some seed is sourced from local markets, private traders, or, formerly, the large grain marketing enterprises. Emergency seed aid has taken many forms in Ethiopia, including DSD, revolving seed funds, vouchers for seed, cash for seed, and seed swaps.

A two-year study (2005–2007) focused on farmers as active agents, rather than passive aid recipients, seeking to understand their use of seed aid in the context of their farming systems and coping strategies. The study included specific recall of a large national-level crisis, 2004, farmer and implementer insights on smaller localized distributions, as well as more general reflections on seed aid delivered since the mid-1980s. The study thus included both periods of acute and chronic stress, as has been the norm in Ethiopia for three decades. The following sections introduce the research sites and methods used. Results of this research are then presented on farmers' experiences, uses of, and preferences around seed aid. The final sections discuss how these interventions do—and do not—support farmer strategies for coping.

#### 4. Methods: description of research sites

Sites were selected in four different areas of Ethiopia, following consultation with governmental officials, international and local aid experts. All sites have a long history of seed aid, but they encompass different farming systems and sources of stress, and fall under different regional administrations. The sites, all *woredas* (districts) are: Mieso and Chiro (neighbouring *woredas* whose data are amalgamated for this study), in West Hararge Zone, Oromiya Region; Raya Azebo, in Southern Zone, Tigray Region; Humbo, in Wolaita Zone, Southern Nations', Nationalities' and Peoples' Region; and Gera Keya in North Shoa Zone, Amhara Region.

Mieso/Chiro and Raya Azebo represent 'classic' seed aid scenarios, where many households are vulnerable due to periodic drought and limited agricultural production, and receive food aid on a regular basis. Densely populated Humbo is prone to 'green famine', where, despite the presence of maturing enset, many holdings are too small to ensure food needs, especially in dry seasons (Tadesse, 2002). Food aid occurs regularly in Humbo and officials are concerned with dependency. Gera Keya is a mainly highland *woreda*, unlike the other mostly lowland/mid-altitude sites. Frost, hail, and waterlogging can lead to harvest failure here,

**Table 1**  
Salient characteristics of research sites

<p>Chiro and Mieso (Oromiya Region)</p> <ul style="list-style-type: none"> <li>• Drought</li> <li>• Seed aid at least since 1984</li> <li>• Sorghum, maize, haricot bean main crops</li> <li>• Implementers: BoARD<sup>a</sup>, CARE, IRC, HCS, ERCS, GOAL</li> <li>• DSD, vouchers, seed vouchers and fairs</li> </ul>	<p>Raya Azebo (Tigray Region)</p> <ul style="list-style-type: none"> <li>• Drought</li> <li>• Seed aid since mid-1980s</li> <li>• Teff, maize main crops</li> <li>• Implementers: BoARD, REST</li> <li>• DSD, cash for seed (revolving fund)</li> </ul>
<p>Humbo (Southern Region)</p> <ul style="list-style-type: none"> <li>• 'Green famine' small land size, drought</li> <li>• Seed aid at least since early 1990s</li> <li>• Maize, beans, sweet potatoes main crops</li> <li>• Implementers: BoARD, WVE, IMC, Concern, CRDA</li> <li>• DSD, seed vouchers and fairs.</li> </ul>	<p>Gera Keya (Amhara Region)</p> <ul style="list-style-type: none"> <li>• Land degradation, frost, hail, some drought</li> <li>• Seed aid since at least 1985</li> <li>• Barley, wheat, beans main crops</li> <li>• Implementers: BoARD, FAO, WVE</li> <li>• DSD only</li> </ul>

<sup>a</sup> BoARD, Bureau of Agriculture and Rural Development (regional administration); CRDA, Christian Relief and Development Association; ERCS, Ethiopian Red Cross Society; FAO, Food and Agriculture Organization; HCS, Hararge Catholic Secretariat; IMC, International Medical Corps; IRC, International Rescue Committee; REST, Relief Society of Tigray; WVE, World Vision Ethiopia.

and soil degradation is a chronic challenge. Though not a dryland area, Gera Keya is vulnerable to rainfall variability, particularly with the *Belg* rains, those falling within the February–May period (as opposed to the main *Meher* season, from June to October.) All aid in Gera Keya involved a single aid response, DSD, though other sites were exposed to multiple seed aid approaches. Table 1 summarizes key features of these sites, and Fig. 1 indicates their locations.

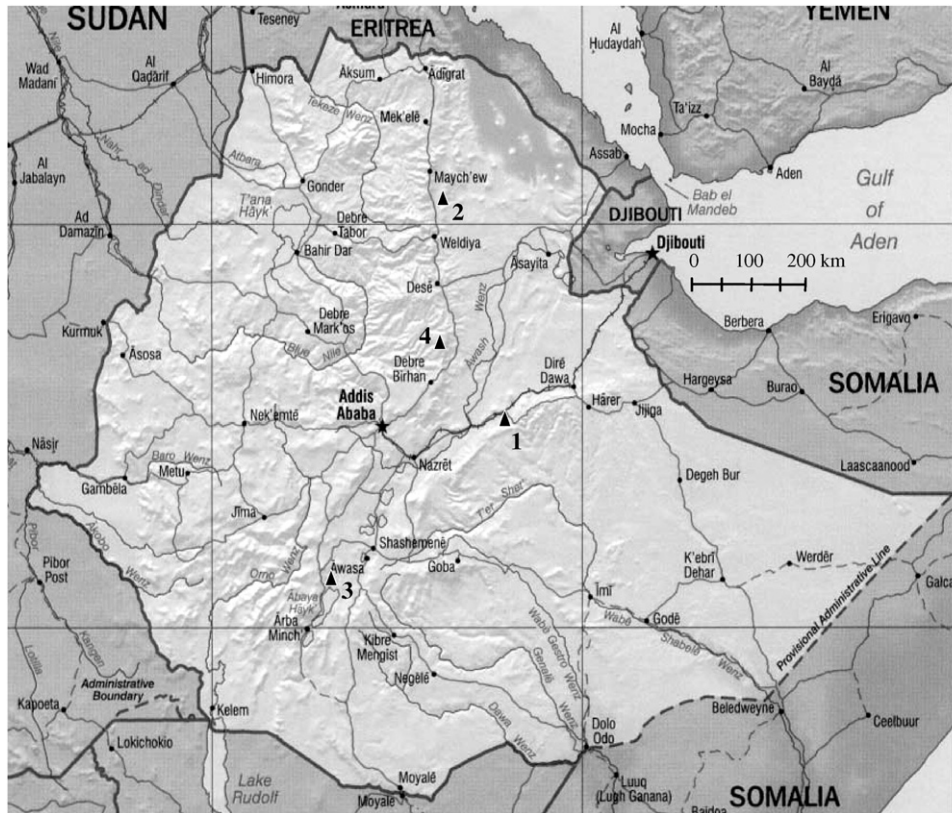
Within these sites, information was drawn from surveys of 399 farmers, purposively sampling households which had received repeated seed aid (two times or greater). The surveys gathered information about every seed aid event respondents recalled, and traced details of the most recent seed aid events, including quantities of seed received via aid versus seed procured via non-aid sources. The surveys also sought farmers' opinions on different aspects of seed aid, strengths/weaknesses in immediate implementation, and comparisons across seed aid events and diverse approaches. Focus-group discussions were held with farmers and interviews with a broad set of key informants, e.g., humanitarian practitioners, regional government officials, and domestic and international experts in the seed sector and emergency relief. Relevant seed, development and emergency policies and informal seed/grain market chains were also analyzed as part of a larger study (Sperling et al., 2007).

#### 5. Farmers' experience of seed aid: major findings

##### 5.1. Approaches vary considerably within and between sites

Each location had an extensive and diverse history of seed aid, with distinct approaches implemented by different aid organizations. Brief descriptions of a recent aid season (2004) in all sites give a sense of this diversity.

In Mieso/Chiro, government agencies provided aid seed through DSD, mostly of MVs of maize, wheat, and haricot beans. In contrast, CARE, an NGO, gave farmers in the same districts vouchers to purchase the types of seed they wanted in 2004; vouchers were valid for 2 months, and could be redeemed from CARE-approved traders located in market towns. These traders tended to be large, sourcing seed both locally and from other regions in Ethiopia. The International Rescue Committee provided



**Fig. 1.** Map of Ethiopia showing location of research sites (▲): 1—Mieso/Chiro, West Hararghe (Oromiya); 2—Raya Azebo, South Tigray; 3—Humbo, Wolaita (Southern Region); 4—Gera Keya, North Shoa (Amhara).

yet a different approach in Mieso/Chiro, giving vouchers that were valid only for one-day seed fairs, where a range of vendors—large and small—sold within community-based fair events. This region, in particular has witnessed variation in the seed voucher approach. For instance, sometimes vouchers are coupled with fairs, the length of voucher validity varies, voucher use may be tied to specific merchants or to a range of farmer sellers, and vouchers may be linked to MVs, farmer varieties (FVs), or both.

In Raya Azebo, the government supplied chickpeas via DSD in 2004. However, the main approach used in the region was promoted by the NGO REST (the Relief Society of Tigray): giving farmers cash so that they could purchase seeds (and other inputs) on the local market themselves. Such direct cash transfers appear less common in other regions, as implementers or donors worry about accountability of funds.

In Humbo, the government provided a wide range of crops via DSD, including cash crops and MVs. NGOs in Humbo also use DSD, though in 2004 World Vision Ethiopia (WVE) promoted vouchers and seed fairs. Practitioners in Humbo fear that seed aid is misused, so both government and WVE require farmers to sign an agreement that they will plant the seed, and not sell vouchers on to someone else. This meant that a sense of control or regulation around seed aid was stronger in Humbo than elsewhere.

Finally, as mentioned, only DSD has been used in Gera Keya. The sole NGO operating in the *woreda*, WVE works closely with the government to provide seed aid, which is dominated by MVs of wheat, produced by the formal sector or by local production cooperatives.

These descriptions provide a snapshot of how seed aid projects vary, even within a single location. Besides approaches (DSD, vouchers, seed fairs, or cash), seed aid can vary by scale, or by the type of variety (MV or FV) or crop promoted (mainly for food or

for cash). Organizations tend to specialize in a particular approach, with few modifying practices over time. Such highly idiosyncratic approaches to delivery are strongly shaped by institutional philosophy. For instance, the government favours DSD, which allows for centralized planning and large-scale operations. WVE promotes agricultural intensification as its main rural development strategy and so works closely with the government, emphasizing MVs and commercial crops in its emergency work. With CARE, the voucher approach fits with their rights-based agenda as vouchers maximize farmers choice. REST highlights empowerment and sees dispensing cash as a way of promoting farmers' choice, and personal accountability for use of the cash. While these are general tendencies, they highlight how built-in preferences of implementers, rather than the nature and context of farmers' vulnerability, influence the approaches used.

## 5.2. Seed aid occurs frequently

Farmers in the sample received seed aid frequently, many so often that they could not recall every individual event. Individual households in Mieso/Chiro and Humbo described as many as ten distinct events, while 27% of farmers in Humbo received seed aid at least five times (Table 2). It was not uncommon for households to receive seed aid more than once in a single season, including from different implementers. Across all sites, households received seed aid on average 3.35 times within the period of recall (generally spanning 5–7 years, or roughly once every two seasons).

Seed aid was highly repetitive, with some farmers receiving seed of the same crops, with the same approach, from the same implementers, year after year. For instance, many Gera Keya farmers received wheat via DSD several seasons in a row, with the

**Table 2**

The maximum and mean number of seasons respondents recalled receiving seed aid

Measure	Research site				All regions
	Miesso/Chiro (Oromiya)	Raya Azebo (Tigray)	Humbo (Southern)	Gera Keya (Amhara)	
No. of farmers surveyed	117	108	113	61	399
Maximum number of times seed aid	10	7	10	7	10
Mean number of times seed aid	3.08	3.02	3.59	3.15	3.35

**Table 3**

Proportion of farmers for whom aid supplied all seed sowed for two crops in a specific aid season

Measure	Research site				All regions
	Miesso/Chiro (Oromiya)	Raya Azebo (Tigray)	Humbo (Southern)	Gera Keya (Amhara)	
No. of farmers	117	108	113	61	399
Cases where aid supplied all seed	9	12	16	19 <sup>a</sup>	56
% of total	7.7	11.1	14.2	31.1 <sup>a</sup>	14.0

<sup>a</sup> Seed aid in Gera Keya provided only one crop per season, so figures here represent a single crop.

highest recorded cases receiving aid for five consecutive seasons. This stagnation of practice highlights the lack of any assessment of vulnerability on the ground and underscores concerns about aid dependency. Farmers and officials in these sites have come to expect that an ‘emergency’ intervention will occur most years. As one aid official noted: “Humbo never misses any aid, including seed aid, but no significant change is observed [in farmers’ vulnerability]”, while a Miesso official lamented that “Now farmers want vouchers in every season.” Chronic stress particularly affects Miesso/Chiro, Raya Azebo, and Humbo, generally leading to erosion of assets in vulnerable households. The seed aid interventions monitored focus on the acute stress, a seasonal loss, and were not directed to address chronic causes of asset depletion.

Repetitive seed aid (delivered year after year, sometimes even two seasons per year) also raises concerns about institutionalization, and the emergence of a ‘relief seed system’ where seed suppliers forge close links with implementers. For instance, the wheat seed supplied in Gera Keya mostly came from local farmer co-operatives, while CARE in Miesso/Chiro developed ongoing relationships with a small number of large-scale merchants who redeemed seed vouchers. In Humbo, the FAO supported repeated large-scale emergency distributions of sweet potato, purchasing millions of cuttings from a single commercial enterprise whose quality control was at best uneven; dried out cuttings were delivered in 2004, which failed to produce (Anon., personal communication, 2005). In these and other examples, ties to suppliers appear to constrain criticism of them or consideration of other approaches to seed aid. Seed may be procured from a specific source, for instance a farmer co-operative, not because it meets farmer needs, but rather because the implementer wants to support the commercial enterprise.

### 5.3. Seed aid makes a modest contribution to seed security

The work quantified the importance of seed received from aid in relation to other seed sources. Accurate data on seed sourcing are difficult to obtain, particularly in Ethiopia where farmers have been repeatedly surveyed for decades by research, development and emergency aid organizations, and where they are acutely

aware of how ‘needy’ they have to be to qualify for assistance. Farmers thus are prone to claim all their own seed was lost, exaggerating the actual usefulness of seed aid. Though care was taken to encourage frank responses, some farmers may still have strategically over-stated aid’s contribution.

Even in a crisis season, the vast majority of seed aid recipients used other seed sources as well. Table 3 shows that only 14% of all farmers used no other seed sources in the aid season for the two crops generally given, with only 7.7% of Miesso/Chiro farmers doing so. Seed aid in Gera Keya only supplied single crops to farmers, so figures are elevated there. Across all sites, most cases where aid was farmers’ sole seed source either involved new crops being promoted through aid (e.g., cotton in Humbo, triticale in Gera Keya), or involved crops that farmers normally choose not to grow (e.g., chickpea in all sites). Farmers typically would not have seed for such crops, so seed aid may seem disproportionately important in those cases.

Practitioners often assume that seed aid is the major, if not the only, source of seed for crisis-affected farmers. Funding requests for seed aid commonly state that “vulnerable farmers have no seed to sow”, but rarely assess if this is the case. Table 3 shows that this assumption is usually false; very few recipients lacked other sources of seed, even though these are supposedly the most seed-insecure households. This hints at the resilience of farmer seed systems.

Implementers made clear that the amount of seed they provided depended on the funds they received, rather than the amounts farmers might need. Seed aid gave—or helped farmers purchase—slightly over 10 kg of seed per crop in three of the four sites (Table 4). While farmers’ actual seed needs depend in part on the area and seeding rate for the crop in question, 10 kg would be a conservative amount for a staple crop in stressed areas. High sowing rates, and repeated sowing, are typical strategies to insure against uncertain rainfall, as seen in Miesso/Chiro, where some individuals save over 100 kg of sorghum seed, the main crop (McGuire, 2007). Even the average of 50 kg supplied in Gera Keya seems modest, when considering that this is mostly wheat, which has a sowing rate over 150 kg ha<sup>-1</sup>. For many crops, therefore, seed aid delivers only a fraction of the seed farmers would use. Farmers’ own strategies, rather than external interventions, played the most important role in coping with stress, a finding

**Table 4**  
Summary details of seed aid events recorded in surveys

Measure	Research site				All regions
	Mieso/Chiro (Oromiya)	Raya Azebo (Tigray)	Humbo (Southern)	Gera Keya (Amhara)	
No. of seed aid events measured <sup>a</sup>	201	176	139	62	578
Total seed aid received in sample (kg)	2384.0	4019.1	1483.7	3163.5	11050.2
Mean amount received per crop (kg)	11.9	10.7	10.7	51.3	19.0

<sup>a</sup> Sample size here is greater than the number of individual farmers surveyed, as most farmers detailed two separate instances of seed aid.

**Table 5**  
For crops given in seed aid, the proportion of all seed planted in the aid season from different sources

Seed source for aid crop	Research site				All regions (n = 578)
	Mieso/Chiro (Oromiya) (n = 201)	Raya Azebo (Tigray) (n = 176)	Humbo (Southern) (n = 139)	Gera Keya (Amhara) (n = 62)	
Seed aid (%)	49.3	62.3	59.9	52.4	55.4
Home stocks (%)	32.2	24.5	17.2	37.9	30.1
Local market (%)	15.7	13.1	17.7	8.8	12.8
Gifts (%)	2.1	0.0	1.8	0.9	1.0
Exchange (%)	0.3	0.2	0.7	0.0	0.5
Extension (%)	0.0	0.0	2.8	0.0	0.4
Other sources (%)	0.1	0.0	0.0	0.0	0.0
Total (%)	100.0	100.0	100.0	100.0	100.0

echoing related research around climate change (Eriksen et al., 2005).

#### 5.4. Multiple seed sources actually used following a crisis

To evaluate the contribution of seed aid in relation to total seed supply, farmers detailed amounts of seed obtained from all sources during the emergency season. For a number of reasons, this exaggerated the actual contribution of seed aid to seed security. First, aid often supplied a new variety or even a new crop, so parallel local stocks may not have been available in the local system. Second, aid often arrived late and frequently could only provide crops like chickpea that use residual moisture. Most farmers only sow such crops when cereals fail, so would not have prior seed stocks. Third, seed aid generally provided one or two crops, with a wide range of crop species grown not being covered by seed aid. Fourth, vouchers or cash were widely used, and may simply have financed actions farmers would have undertaken anyway.

With these caveats in mind, Table 5 compares quantities of seed from aid versus other sources. For the crops supplied by aid, roughly half the seed came from aid. Across all four sites, home stocks supplied 30% and markets almost 13% of the seed planted. However, the use of vouchers or cash meant that local markets actually played a much larger role in seed supply. For instance, much of the aid in Raya Azebo was cash, meaning that local markets actually supplied over 60% of the seed during the period of aid delivery. The surveys showed that markets were important in supplying seed after a crisis in all sites, except for a handful of crops/varieties that were unavailable via local commerce, such as MV wheat in Gera Keya, or sweet potato cuttings in Humbo. While the climate change literature recognizes how multiple actors contribute to adaptive capacity in a system (Reid and Vogel, 2006), seed aid has only started to widen its focus beyond farmers. Clearly, local markets merit more attention in analyzing resilience.

#### 5.5. Crops and varieties supplied vary by approach and implementer

Across the interventions monitored, seed aid was dominated by fast-maturing crops such as maize, haricot beans, teff, and chickpea (Table 6). Such crops are chosen because they still produce if supplied late in the season (as seed aid often is), rather than because farmers prefer them. Crop choice might also be determined by what the traders contracted can quickly obtain from one place and in large quantities, such as occurred when a Mieso/Chiro trader purchased beans for CARE's voucher scheme from the Rift Valley in 2004. Though this region was 250 km away, he found it easier to use a single supplier in a higher-potential area, rather than dispersed local smallholders. In the latter case, he would have higher transaction costs going from trader to trader in regions with difficult roads, and possibly have to contend with multiple varieties and uneven seed quality.

Table 6 also shows the proportion of seed aid given as MVs or FVs. This clearly shows how closely seed aid is linked to MV promotion, with the latter appearing to be a primary goal in Humbo and Gera Keya. Humbo often promoted maize hybrids over open-pollinated varieties, and supplied MVs of cash crops not normally associated with emergency relief, such as cotton, fruit, vegetables, and sesame. Almost all seed aid in Gera Keya was MV, mostly wheat. However, nearly all farmers in the *woreda* also cultivate a range of different wheat FVs (Molla, 2006). MV promotion in these sites reflected a desire to address development goals rather than farmers' vulnerability around seeds. Moreover, the different FV/MV proportions between sites for the same crop show how the institutional context shapes choices; for instance, government agencies, WVE, and formal producers all influence preferences for MVs in Humbo and Gera Keya. While MVs may be useful, they may not always be ideally suited to crisis-affected or chronically stressed situations.

When farmers themselves can select which crops and varieties they receive, their choices differ considerably from what they receive via DSD. Using vouchers/cash to purchase seed, farmers choose different crops, a more diverse range of crops, and a higher

**Table 6**  
Number of instances of delivery of specific crops, broken down by whether these were modern varieties (MV) or farmer varieties (FV)

Crop	Research site								All regions	
	Mieso/Chiro (Oromiya)		Raya Azebo (Tigray)		Humbo (Southern)		Gera Keya (Amhara)		MV	FV
	MV	FV	MV	FV	MV	FV	MV	FV		
Maize	46	42	1	0	62	0	–	–	109	42
Teff	0	1	55	76	7	6	1	0	63	83
Chickpea	0	3	21	26	11	17	13	1	45	47
Haricot bean	50	8	1	1	2	8	–	–	53	17
Sorghum	13	19	0	4	2	2	–	–	15	25
Wheat	–	–	–	–	–	–	40	0	40	0
Sweet Potato	–	–	–	–	10	3	–	–	10	3
Barley	0	8	0	1	–	–	1	0	1	9
Lentil	4	2	–	–	–	–	1	0	5	2
Total <sup>a</sup>	114	87	78	108	94	36	60	1	346	232
% for site	57	43	42	58	72	23	98	2	60	40

<sup>a</sup> Total include crops not shown here, such as triticale (Amhara), and groundnut (Oromiya).

proportion of FVs, than provided by DSD in the same sites. For example, in Raya Azebo, 10% of seed supplied by DSD was FVs, though with cash for seed 83% was FVs.

Greater choice also helps farmers strategize. Rather than meet immediate sowing needs for the aid season, some in Mieso/Chiro used vouchers to obtain crops for the following season, such as barley, or the long-maturing sorghum FVs 'Abdelota' and 'Masugi'. In Raya Azebo, some aid beneficiaries delayed seed purchase until the rains were established, in order to select the teff FV if rains are late. Such flexibility is an important role for farmers' coping, especially under uncertain conditions (Fujisaka, 1997; Eriksen et al., 2005).

### 5.6. Farmer views on seed aid approach tied to implementation process

A wide range of seed aid responses are practiced in Ethiopia, including DSD, seed vouchers (with or without fairs), and cash for seed. Practitioners tend to fall into particular 'camps' around the approaches they favour. DSD proponents praise its ability to access 'good quality' (i.e., certified, MV) seed, its simple logistics of procurement and delivery, and its potential for implementation across a wide scale. In contrast, cash or voucher proponents cite enhanced farmer choice, easier monitoring, or greater circulation of project money within local economies (Remington et al., 2002).

The view from farmers', however, is a much more nuanced one. Comparing hundreds of responses, it becomes clear that one approach is not *a priori* better than another (see sample of farmer comments Box 1). A great deal depends on *how the approach is operationalized*, and how this process of implementation related to three broad farmer concerns.

The first set of farmer concerns relates to fairness, and the degree of perceived manipulation. This manipulation could come from the implementer, through biased processes for targeting beneficiaries, or through favouring particular seed suppliers. Traders potentially can manipulate seed price, scale accuracy, seed quality, or range of crops on offer. Manipulation can also come from within farming communities. Insights from Mieso/Chiro show that this can even occur in the purportedly more farmer-driven voucher approach. There, seed aid recipients (particularly women) reported that elders or community leaders collect vouchers from everyone, purchase seed in bulk from a nearby trading centre, and return to distribute this seed to

#### Box 1—Farmers' views on seed aid approaches (sample of quotes).

"Poor farmers prefer vouchers. I prefer vouchers. You know my daughters and sons may see money in my hand, and we have problems. So better I get the voucher so I do not spend money."

"With vouchers, you are tied to 1 or 2 traders—with cash you can select the seed you really need."

"I like DSD, if it is crops and varieties I know."

"The seed of our ancestors was very good, but this new seed [DSD] we just don't have confidence in it."

"Seed aid helps us get new varieties. That is a good thing."

"A good farmer, even in the very worst year, will have seed. I do not need to go to the market, and I do not need seed aid."

"[On revolving funds] 'Why should I pay for varieties I don't know? I am already taking a risk.'"

beneficiaries. Farmers often did not receive the quantity of seed, or variety, or even crop requested. The potential for manipulation here is more affected by governance in formal and informal institutions than by the approach used, and is a particular concern for women-headed households and other marginalized groups.

A second concern relates to the scope aid gives for farmers' strategizing. Actual examples showed how select types of aid (and especially cash) increased farmers' room for manoeuvre, in varied ways. Even under an aid umbrella, farmers may use assistance to: choose their crops and mix of MVs and FVs (rather than having implementers make this choice), obtain seed for the following season, use some aid money to purchase assets other than seed, wait to obtain the correct varieties based on last-minute observation of rainfall patterns, explore new crops/varieties, or obtain specific adapted crop types no longer available locally.

A third concern for farmers is whether seed aid provides them with a product they want. This could be a particular crop or variety, or a set of products, such as seed and cash left over after seed purchase, as seen in Raya Azebo. In some places, DSD offered

**Table 7**  
Farmers' preferred means to obtain seed aid in each study region

Preferred means of getting seed	Research site				All regions
	Mieso/Chiro (Oromiya)	Raya Azebo (Tigray)	Humbo (Southern)	Gera Keya (Amhara)	
DSD (%)	56.4	21.5	55.0	91.8 <sup>a</sup>	183
Buy own (cash/vouchers) (%)	43.6	78.5	45.0	8.2	171
N responding	117	107	69	61	354

<sup>a</sup> Farmers in Gera Keya only had experience of DSD.

very special advantages. It is largely through DSD that farmers get access to MVs (and free!). So, DSD may compensate for extension failures which prevent farmers from otherwise obtaining novel products. Government officials in Mieso used DSD as the *main* way of accessing MV seed to give to farmers, even inflating their calculations of seed needs in order to increase the amounts they could distribute (Sperling et al., 2007).

These nuanced concerns highlight how farmers weigh the pros and cons of different seed aid approaches. Given its supposed emphasis on farmer decision-making, one might expect a clear preference for vouchers/cash, so it appears surprising that a sizeable proportion prefer DSD (Table 7). There is little choice with DSD—but possibly also little expectation loaded on it. Ironically, more 'empowering' market-based approaches may cause greater farmer dissatisfaction if they fail to meet their needs, or provide increased opportunities for manipulation. Summary statistics obscure specific details of implementation that lie behind farmers' views.

Farmers preferring vouchers or cash tended to highlight choice or flexibility. For instance, one Humbo farmer, having received aid five times since 1996, felt he only really benefited when he procured a specific teff variety through a voucher, as this teff could withstand moisture stress.

Those preferring DSD cited various reasons. Some found travelling to, or bargaining with, traders arduous, and would rather have seed brought to them. Some liked receiving the new varieties. Some complained of manipulation by elders or community leaders. This latter concern was not mentioned in Raya Azebo, however, where most preferred purchase over DSD (Table 7). Local-level governance in Tigray is well known for the strong ties among villagers, and between villagers and their political representatives; clear expectations of accountability are a legacy of the recent political and military struggle in the region (Keeley and Scoones, 2000). Thus, Alemu and Yoseph (2004, p. 16) highlight the social control in Tigrayan villages, where "each member of the community knew" who had received money for seed, and "could easily observe whether or not beneficiaries planted their fields." However, Tigray appears a special case of transparent governance, as concerns about manipulation were raised by farmers in other sites.

Though implementers typically justify choosing DSD on the basis that no seed is available locally, it is interesting that no farmer gave that as his or her reason for preferring DSD. Even in the 'classic' chronically drought-prone sites (Mieso/Chiro and Raya Azebo), over 95% of farmers ( $n = 225$ ) felt that seed would be available if they had been given the means to purchase it.

Finally, the issue of preference for cash versus vouchers was raised, if seed aid is to help farmers purchase seed. While the majority, 80%, preferred cash over vouchers (given only these market-based options), a hefty minority, 20% expressed strong concerns about having money in the pocket. Simply, given their extreme levels of poverty or imbalanced intra-household control over funds, they feared the cash would be spent for other purposes.

## 6. Discussion—building on farmers' strategies

Farmers' experiences with seed aid across different regions of Ethiopia, and over many years, show that aid implementers rarely take explicit account of actual needs: assessments on the ground do not guide the choice of aid approach used, or quantity of aid supplied. Rather, these decisions are largely determined by available funds and implementer philosophy. Different institutions clearly favour quite distinct approaches.

While DSD is common (and dominant in some places, such as Gera Keya and Humbo), there is usually ample seed available through local channels, such as markets. Markets provide a second core for farmers' seed security in times of stress (beyond home stocks). The importance of markets is shown both through farmers' direct purchase in stress periods and through the increasing use of cash and vouchers as an aid mechanism, which again steer farmers to local purchase. The lack of specific analysis of markets in emergencies is a gap that urgently needs to be filled.

DSD seems to persist for reasons other than local unavailability of seed. Figures show relatively modest amounts of seed of staple crops being supplied by seed aid. DSD particularly serves non-emergency goals, i.e., high-profile development agendas, such as the promotion of new crops and technological packages (Keeley and Scoones, 2000), or efforts to promote enterprises and farmer co-operatives in specialized seed supply.

Farmers are active in strategizing, changing crops/varieties in response to changing conditions, and using multiple sources to ensure seed availability. Even some of the seed aid use (gearing choice of varieties to last-minute analysis of rainfall conditions) suggests that farmers do strategize even during 'crisis times'.

The question remains, does seed aid help or hinder farmers' immediate coping strategies? Seed aid can support coping strategies in a number of ways by treating farmers as active agents. It can ensure farmers have a choice of crops and varieties, including both FVs and MVs where these are adapted, as this allows them to meet their most urgent gaps, respond to current seasonal conditions, anticipate future season needs, as well as try new options. Seed aid could also assist coping strategies by enabling farmers to be more flexible: market-based approaches should allow farmers to purchase seed over a broad stretch of time and market locations, so that they have the option to respond to seasonal changes as they occur. Additionally, allowing farmers to buy assets besides seed with vouchers or cash can also help their strategizing. Flexibility is also enhanced by timeliness: seed aid should not be last minute. While DSD does not emphasize choice or flexible modes of delivery, it may still have strategic value for farmers if it allows them to re-deploy resources that they otherwise would have used to buy seed (Sperling, 1997). DSD also can be useful, and may be the only way to provide crops/varieties that are unavailable in the local system and may be appropriate to stressed conditions, as seen with drought-tolerant teff in Humbo. However, the bottom line is that seed aid is rarely *designed* to help



farmers cope better with stress, which misses an opportunity to build synergistically upon what many farmers already do.

Did seed aid also have longer term effects on farmers' ability to cope? Long-term monitoring of livelihoods would be needed to answer this question fully, though even this shorter term study gave insight into possible impacts on farmer coping. Anecdotal evidence showed that immediate aid did help protect household assets, even if there are other sources of seed. As one farmer in Mieso stated: "I usually have a small amount of stored seed and the government adds. If I do not get seed, I can sell a goat or hen [to buy more]. So with seed aid, I now have livestock offspring." Emergency aid also proved the only vehicle by which farmers received access to new varieties (which presumably would be better placed as an extension activity). However, whether new varieties, mainly of sorghum, chickpea, maize and wheat, have helped to strengthen stressed systems, again requires a separate analysis. The available evidence suggests rather mixed effects. For instance, Gera Keya farmers found new wheat varieties performed well, though mainly when conditions were favourable. Mieso farmers seldom retained the 'new' sorghum varieties they repeatedly received from aid beyond the emergency season (Sperling et al., 2007).

## 7. Conclusions

Though focused on seed-security, this study contributes to wider discussions of interventions around vulnerability. First, it compares diverse seed aid interventions across different regions, implementers, and approaches. Second, it emphasizes farmers' actual practices, their use of and views about seed aid, in order to stimulate critical reflection on whether interventions support farmers or not.

The institutions implementing seed aid are the single most important influence on practice. Institutional norms and institutional capacity affected the approaches used, crops/varieties supplied, and partnerships sought far more than any assessment of vulnerability on the ground. The repeated, almost ritualistic, implementation of seed aid in some sites is a testament to the limitations of supply-side approaches.

Supply-driven seed aid risks causing real harm to farmers, for instance through supplying inappropriate seed (both maladapted crops and maladapted varieties, as frequently noted by farmers, NGOs, and extension agents). However, results clearly show concerns about aid dependency may over-state the distorting effect of seed aid, since it makes only a modest contribution to farmers' overall use of seed. For most, seed aid is generally one source among several used following a crisis.

Farmers' varied and nuanced views about the effectiveness of seed aid approaches demonstrate that declaring a single approach to be the 'best' one is overly simplistic. This also calls into question the value of using constraint-focused vulnerability assessments (e.g., to determine if availability or if access is the main constraint; Remington et al., 2002) as the sole basis for determining appropriate seed aid responses. Many contextual factors affect seed aid's impact on vulnerability of a household, including particularly the process of implementation, and relationships with local institutions. Arid discussions only of the technical aspects of vulnerability, without also considering social dimensions, such as governance, risk misrepresenting what really shapes coping ability.

In situations where governance institutions are weak or contested, where there is no diversity among seed traders, or where relationships with them are poor, DSD may be better. Market-based approaches will only be more enabling if they really offer beneficiaries choice, but they can be disempowering if they

burden marginalized farmers with high transaction costs. In light of this, seed aid (whatever the approach) must ensure fair dealing with farmers through better communication among all parties, informing beneficiaries of procedures and content well in advance, and establishing mechanisms to receive feedback and address grievances. Competition among seed suppliers can help ensure fair prices and good seed quality. Farmers should also have the right to refuse seed, especially of varieties that are new to them.

For interventions to be effective at lessening vulnerability, they will also need to support farmers as active strategizers. There is no excuse, even in an acute disaster, for practitioners' near-total blindness to farmers' agency in crises. As seen with climate change (Tschakert, 2007), specific coping strategies may vary considerably between individual farmers; so the most beneficial interventions will be those that more generally enhance farmers' real choice and flexibility, such as timely provision of a diverse range of crops, or vouchers/cash to allow farmers to obtain seed and possibly other items. However, the above discussion shows that the process of implementation matters as much in this as the approach itself. Farmer seed systems are complex, and generally are resilient to stresses, including to poorly designed seed aid. Aid approaches need to be cognizant of the local governance and institutional strengths and need to be designed to work with farmers' practices.

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