

Hum Ecol (2008) 36:217–229
DOI 10.1007/s10745-007-9143-4

Securing Access to Seed: Social Relations and Sorghum Seed Exchange in Eastern Ethiopia

Shawn J. McGuire

Published online: 25 October 2007
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Abstract Access to seed is crucial for farming, though few studies investigate household-level access in the informal ‘farmer seed systems’ which still supply most seed in poor countries. This paper uses empirical data of seed exchange practices for sorghum in eastern Ethiopia to analyze how social relationships influence access to off-farm seed for a major crop. Seed shortfalls are common, and farmer–farmer exchange is important for providing locally-adapted seed to fill this gap, but access varies considerably among households, also affecting quantities supplied and terms of exchange. Preferred sources for off-farm seed (neighbors, government, market) also vary among farmers, reflecting agroecology and asset-ownership, but also differing access to these sources. Social network theories highlight the importance of reciprocal ties, and the cultural norms underpinning them, in accessing seed. These cultural norms are contested, with some claiming that commercial transactions are increasingly common. Implications for interventions supporting farmer seed systems, particularly emergency seed aid, are discussed in relation to the socially-mediated nature of seed access.

Keywords Social networks · Resource access · Mutual aid · Seed systems · Emergency seed aid · Ethiopia · Sorghum

Introduction

As the fundamental input for agriculture, seed is a key resource. The physical health and genetic traits embodied in seed affect crop performance throughout the season. Thus, secure access to seed is a key concern for farmers. Despite

considerable investment,¹ formal-sector seed supply has had little impact in most developing countries due to market failure or inappropriate policies (Cromwell 1996; Tripp 2001). In most countries, the vast majority of seed still comes from farmers themselves and other informal channels used by farmers (Sperling and Cooper 2003). These ‘farmer seed systems’ have received increased attention in the past decade, especially as potential partners for more farmer-participatory approaches to seed supply (Almekinders and Louwaars 1999) or crop breeding (Cleveland and Soleri 2002; McGuire *et al.* 1999). Increasingly, emergency assistance also seeks to support farmer seed systems in order to assist agricultural recovery following a crisis (Sperling *et al.* 2004). Thus, farmer seed systems are at the centre of a range of contemporary relief and development interventions.

However, effective support has been hampered by poor understanding of these seed systems. Limited knowledge of how farmers learn about and access seed can mean that useful crop varieties do not reach all farmers (McGuire *et al.* 1999), or that emergency seed relief efforts are misdirected (Jones *et al.* 2002). Most studies of farmer seed systems focus on technical aspects, such as farmers’ knowledge and practices for maintaining seed physical or genetic quality. However, seed systems are also *social* systems, where key practices, particularly seed exchange among farmers, are affected by local norms and social relationships. Few studies consider these social dimensions, and most of these describe aggregated practices or general norms. In contrast, this paper analyzes actual seed exchange events and individual opinions, using empirical detail to show how access varies among households, and how social relationships can diverge from normative ideals. This

S. J. McGuire (✉)
School of Development Studies, University of East Anglia,
Norwich NR4 7TJ, UK
e-mail: s.mcguire@uea.ac.uk

¹ For instance, the FAO supported seed system development projects 60 countries, while the World Bank spent US \$80 million on seed supply reforms in 40 sub-Saharan African countries (Scowcroft and Polack Scowcroft 1999).

develops a richer and more disaggregated account of seed access than more generalized approaches.

This study examines practices around sorghum (*Sorghum bicolor* [L.] Moench.), the major crop in two contrasting agroecological zones in a chronically-stressed region of eastern Ethiopia. Repeated sowing of sorghum is a key strategy for coping with variable rainfall, leading to a large and somewhat unpredictable seed demand. Seed saved by a household does not always meet this demand, so off-farm seed is important in filling this gap; in the 1998 season, for instance, at least a third of farmers obtained seed from elsewhere (McGuire 2007). This paper considers how social relationships mediate access to this key resource, using social network theories to explore these relationships. Access to seed varies considerably between households, and greater awareness of how this affects transaction costs (and other costs) around seed exchange can assist interventions in supporting farmer seed systems. Moreover, analyzing social networks helps to understand whether changing seed exchange practices reflect exogenous factors, such as repeated environmental stress, or more general shifts in cultural norms of support.

The next section highlights why access to seed is important for understanding seed dissemination in farmer seed systems, and briefly reviews social network theories on reciprocal support. Methods are summarized following a description of the study sites. Empirical data on household-level seed management, exchange, and preferred sources of off-farm seed are used to ground a discussion of social relationships and their influence on access to seed. These relationships highlight the role of culture in access to this key resource, showing how a household's access varies according to its ties to potential donors and its social standing. The discussion explores implications for interventions supporting farmer seed systems, particularly emergency seed aid.

Social Relations in Seed Supply

Social relationships can shed important light on seed exchange, which affects the movement and use of diversity in farmer seed systems, as well as farmers' access to off-farm seed following loss. Regarding the utilization of crop genetic diversity, a predominant view is that the range of crop varieties found on farms—whether Modern Varieties (MVs) produced by formal breeding, or Farmer Varieties (FVs) developed or maintained within the farmer seed system—mainly reflects farmers' *demand* for different traits (agronomic, maturity, food quality, etc.) found in these varieties (Teshome *et al.* 1999; Bellon 1996). This assumes that there are few barriers to exchange, and that farmers have easy access to a wide range of diversity when building variety portfolios. However, this assumption is rarely tested. A review for East and Central Africa identified numerous

examples where social barriers constrained farmer–farmer exchange of bean seed, hindering the spread of new cultivars (David and Sperling 1999). Bellon (2004) suggests that weakening of social ties among farmers can increase their transaction costs for learning about and obtaining new diversity, and argues that in some instances diversity use can be shaped by *supply* rather than demand. Thus, social ties among farmers may influence the dissemination of seed, and the distribution of diversity (FV or MV) more generally.

In a similar vein, recent studies highlight the significance of access to seed for recovery from an environmental or conflict-related emergency. Though emergency seed aid often assumes that seed is locally unavailable following a crisis, recent evidence indicates that sufficient seed actually is locally-available in most situations. Rather, the main problem farmers face is gaining access to this seed (Sperling *et al.* 2003; Remington *et al.* 2002; Jones *et al.* 2002). Again, social ties likely affect farmers' access to various sources, which has important implications for post-disaster assistance. However, the social dimensions of seed access have received little empirical study.

Seed system studies often highlight the importance of farmer–farmer seed exchange for supporting household seed security and fostering innovation (e.g. Sperling and Loevinsohn 1993; Louette *et al.* 1997). Such exchange often falls under mutual-aid, associated with local norms for supporting neighbors and kin. However, beyond these norms, who actually has access to seed is poorly-understood in most contexts. Only a few studies have examined access to seed (e.g. Badstue *et al.* 2006; Cleveland and Murray 1997; Dhamotharan *et al.* 1997), though these generally do not focus on details of specific seed exchange events. Commentators have often noted that those frequently needing off-farm seed (the 'chronically seed-insecure') tend to be the poorest and most vulnerable farmers, while regular seed donors often include better-off farmers (Richards 1990; Cromwell 1996; Dhamotharan *et al.* 1997). Such social segmentation suggests that seed exchange may sometimes fit in with other structural relations of power, which may influence who is able to receive seed. Besides the ability to obtain seed, other important aspects of access include quantities, timing of supply, physical health, genetic quality, and terms of supply (e.g. as a gift, or in exchange for cash or other future services). Finally, norms underpinning seed exchange are not fixed but may be altered by other social changes. For instance, conflict in Sierra Leone and Rwanda disrupted social ties, meaning that farmers are now less willing to exchange seed than in the past (Sperling 1997; Richards *et al.* 1997), and diversification away from agriculture leaves Mexican farmers less time to invest in building social ties with other farmers, consequently limiting their access to seed via farmer–farmer exchange (Bellon 2004). Though harmoni-

ous representations of ‘community’ norms may persist (particularly in the populist assumptions of outsiders; Cooke and Kothari 2001), current norms of support may be rather different in practice.

The above review raises a number of questions for seed systems analysis. Does seed exchange reflect other relationships between supplier and recipient? Might cultural changes, arising from other changes such as the (albeit modest) expansion of the cash economy in rural Ethiopia, affect norms and practices around such exchanges? And what are the implications of (shifting) social relations on the accessibility of different seed sources, particularly for the poorest farmers? Social network theories can help explore questions around informal market relationships. These are reviewed briefly below, in order to frame the analysis of seed exchange, cultural norms of support, and access to seed.

Social Network Theories

A range of theories address exchanges within social networks, and how these exchanges relate to relationships of power. These theories offer useful lenses for understanding seed exchange as part of a wider set of relationships. Goran Hyden (1980) describes an ‘Economy of Affection,’ where enduring reciprocal ties bind society together. These ties redistribute resources to some degree, but also trade material support for status or clients. A recent update argues that these ties are “fluid and opportunistic” (2006: 77) rather than rigid and principled, and suggests that powerful actors derive more benefit from these ties. The absence of formal rules or institutions around reciprocal aid allow for unequal exchange relationships, as the party with more structural power sometimes is able to withhold rewards. Sara Berry (1989, 1992, 1993) also emphasizes structural power in analyzing social exchange networks. She argues that farmers invest in mutual aid to strengthen relationships and raise their status to help gain favorable access to factors of production. This is especially important for accessing land, she argues, since complex and changing rules around the control of land mean that rights to land are often

debated; support from social networks can help build a claim. James Scott’s (1976) ‘Moral Economy’ posits that poorer households depend on support of patrons even if the overall arrangement is unfavorable to them, since patronage can help guarantee a basic level of subsistence. He argues that where support from patrons has declined (for instance where patrons could depend on markets or the state for support, and thus have less need of support from their poorer neighbors), the poor have resisted these changes with moral appeals to a tradition of reciprocal aid. Thus, in contrast to Hyden or Berry, he emphasizes cultural norms rather than structure, and suggests that the poor have the greatest interest in maintaining these norms.

Hyden and Berry are useful reminders that unequal power relationships may underlie social exchange, despite norms of mutual aid. However, their framings focus largely on structure, suggesting that agency lies largely with wealthier individuals and that reciprocal exchange mainly relates to accumulation. Scott’s Moral Economy approach brings culture more to the fore, though critics question the centrality of norms, and argue that his account is too static (Haggis *et al.* 1986; Popkin 1979). Scott’s later study (1985) of a Malaysian rice-farming community responded to these critiques, showing that appeals to norms of exchange were at the heart of an intense intra-community struggle over the degree and terms of reciprocal support. The advantage of this later framing is that it highlights cultural agency within social exchange. Culture can influence behavior in its own right, though it is a dynamic and contested terrain, where different groups press their own visions of socially just relations (Bailey 1991).

Materials and Methods

The study took place over 12 months of the 1998–1999 cropping season in the West Harerghe Zone of the Oromiya Region in eastern Ethiopia. Two adjacent districts (*Woredas*) were compared, representing distinct agroecologies. Chiro, in the mountainous highlands, has generally reliable rainfall

Table 1 Key Characteristics of Miesso and Chiro Districts (*Woredas*)

Characteristic	District	
	Chiro	Miesso
Elevation (masl)	1,500–2,500	1,300–1,500
Topography	Steep slopes and wide valley bottoms	Flat to undulating
Temperature (°C)	15–25 ^a	23–31 ^b
Population ha ⁻¹	2.16 ^a	0.47 ^a
Mean farm size (ha)	0.64 (0.04) ^c	1.27 (0.11) ^c
Households with 0/1/2 oxen (%)	39/26/34 ^c	40/32/28 ^c
Rainfall (mm)	650–1,000 ^a	420–960 ^b
Rainfall onset	More certain	Less certain

^a ICRA 1996; ^b Climate Data at Miesso Station (Both Covering Early 1980s to Mid-1990s); and ^c Survey in 1998 (With Standard Errors)

with long growing seasons, though population densities are high and soil fertility problems common. Miesso, on a lowland plain, has more variable rainfall onset and shorter seasons; drought and pests are the main constraints (Table 1).

Cultivation has dominated West Harerghe since the introduction of the ox-plough in the 16th Century (McCann 1995), and most farmers there are Oromo Muslims. A minority (<10%) are Amhara Orthodox Christians, descendants of migrants from northern Ethiopia in the last century. Few Amhara farmers are associated with the now-defunct landlord class, and all are well-integrated into local institutions along with their Oromo neighbors (e.g. *edir*, for labor-sharing). There are no obvious wealth differences between Oromo and Amhara farmers, though the latter appear to have better ties to relatives in urban employment.

Research focused on a single Farmers' Association (FA, smallest administrative unit, roughly 1,000 households) in each district. Semi-structured interviews with 57 Chiro and 84 Miesso farmers helped develop a picture of seed exchange, pursued in more depth with focus group discussions in each community—some held separately for well-off and poorer farmers. A subset of contact farmers (ten in Chiro, ten in Miesso), representing different wealth levels, were regularly visited. Finally, a formal survey of 41 Chiro and 53 Miesso farmers from wider areas of both districts sought quantitative detail on seed access and exchange, placing FA-based work in a wider context. For simplicity, data are referred to by source—interviews, surveys, contact farmers, or focus group discussions. Sample sizes for some quantitative results were modest, since these reflected seed exchange events for a single season, and some questions (e.g. 'least preferred seed source') did not have full response rates. Relating these results to qualitative data from other sources helped extrapolate findings and draw more robust conclusions. Inquiry focused on household heads, who claim responsibility for seed security. Between six and ten percent of households are female-headed (ICRA 1996), and all sample sets included female-headed households. Details of women's particular roles in seed security (e.g. seed storage and management in the home), or of intra-household negotiation over decisions—while clearly important—were beyond the scope of this study. Statistical analysis used SPSS to compare means, using t-tests, ANOVAs, and Tukey *post-hoc* tests. Other key informants included agricultural researchers, Ministry of Agriculture personnel, and Non-Governmental Organization (NGO) staff working in the region.

Seed Management and Seed Security

Emergency seed aid has occurred in Ethiopia virtually every year since 1974, with NGO and government agencies request-

ing US\$15m in 2003 (Mburathi *et al.* 2003). West Harerghe is considered highly vulnerable to poor harvests and seed insecurity (e.g. Piguet 2003), and seed assistance has been implemented in this region in at least eight of the past 10 years (T. Shiferew, personal communication, 2005). Seed assistance, however, is based on food security assessments rather than on an understanding of how farmers maintain seed security. This section summarizes some key aspects of seed management.

Mixed farming systems predominate in West Harerghe, using oxen for tillage. Rainfall is bimodal, with a short period (*belg*) in March–April followed by more substantial rain between June and September (*kremt*). Use of external inputs is very limited, sorghum MV adoption is low (<3%), and a diverse array of FVs (usually landraces) dominate in the region (McGuire 2005). Sorghum is sown with the *belg* rains and matures 8–9 months later. Deep planting (10–15 cm with ox-ploughs; Goe 1999), heavy soils, moisture stress and pest attack can constrain seedling development, so sowing rates are high (15 kg ha⁻¹ or more) to increase the chance of establishing an even stand. In addition, rainfall onset is often uncertain, so many farmers sow repeatedly at the start of the season, to increase their chance of establishing their sorghum crop. Despite these practices, early sowings can still fail completely if *belg* rains are very poor, or pest attack severe—which occurs frequently in the lowlands. When this happens, many farmers seek fast-maturing sorghum varieties for the main *kremt* rains. Few Ethiopian FVs mature quickly, so farmers generally need to obtain MVs or material derived from MVs for late sowings.

The farming system raises several issues for seed security. Firstly, sowing practices demand a sizeable quantity. Households vary considerably in the amount of seed saved: a few farmers regularly save 100 kg or more, though others save as little as 2 kg, prioritizing consumption or immediate sale. Those saving little seed are more likely to be regularly seed insecure, as they have little scope for resowing should problems arise. However, erratic rainfall or other problems can consume the seed stocks of a wide range of farmers: a third of all respondents needed off-farm seed in 1998. Secondly, lowland farmers face greater challenges in meeting seed needs, as plots are significantly larger, yields lower, and rainfall more unpredictable. Thirdly, farmers often need to obtain off-farm seed at short notice to be able to sow when rains (whether *belg* or *kremt*) resume. Formal supply of sorghum seed is limited and generally late, so other farmers and informal markets fill this gap. Finally, households saving large amounts of seed are important seed sources, as they are more likely to have spare seed for neighbors in need. For instance, among the contact farmers, those who supplied seed to others saved significantly more than others (Table 2). Many of those saving very large amounts (100 or even 200 kg of seed) stated

Table 2 Mean Amounts (With Standard Errors) of Sorghum Seed Saved by Contact Farmers at the End of the 1998/99 Season, in Relation to Sorghum Area Farmed

Category of farmers	Chiro		Miesso	
	<i>n</i>	Kg ha ⁻¹	<i>n</i>	kg ha ⁻¹
All contact farmers	11	55.3 (11.7)	10	48.6 (12.4)
Farmers supplying seed in 1998	5	75.4 (21.2)*	3	78.9 (10.6)*
Farmers not supplying seed in 1998	6	38.5 (10.9)*	6	24.9 (12.2)*

*Differences Between Those Supplying Seed or Not Significant at $p < 0.05$

they intended to give any surplus seed to neighbors—once their own plots were established.

Farmer–farmer exchange was the most frequent source of off-farm seed, though markets were used for larger individual amounts (>15 kg). Most farmer–farmer exchange was between unrelated farmers: only in three of 23 cases mentioned in interviews was seed supplied from a relative (data not shown).

Table 3 compares traits from surveyed households according to whether they supplied or received seed in 1998. Those who received seed in Miesso expect significantly less yield or production in poor years, compared with other Miesso farmers. In contrast, Chiro recipients did not appear to be distinct in any clear manner, though this may be because late rains in the 1997 harvest spoiled seed for a wide cross-section of farmers in the highlands. Seed suppliers in both districts reached 4–5 others on average in 1998, and expected significantly higher production in

both good and bad years. Miesso suppliers had significantly more land and oxen. The different level of harvest security between suppliers and recipients suggests that these are distinct groups that endure over time, in part due to differences in levels of assets. The ‘age’ of seed stocks in Table 3 supports this interpretation, indicating significant differences in seed security between donors and recipients. The survey asked when farmers last had to replace the seed stock for each sorghum variety with off-farm seed (or, if they claimed they never replaced this seed stock, when that variety was introduced to the farm). The ‘age’ of seed stocks averages the time since replacement for all varieties grown on a farm (mean was 1.4 varieties). This approach estimates the frequency of involuntary loss and subsequent replacement of a seed stock, rather than partial refreshing. Recipients of off-farm seed in 1998 had significantly ‘younger’ seed stocks, and donors ‘older’ stocks, indicating different rates of seed stock turnover. These findings suggest that roles in seed exchange are somewhat stable, with one group regularly needing seed, and another group often having seed to give to others. The implications of recurrent donor-recipient relationships are discussed in the section on ‘seed exchange and social networks.’

Seed Source Preferences

Farmers were asked in the survey to indicate which seed source (from other farmers, local merchants, or government) they preferred the most and the least, if their own stocks were exhausted. Responses diverged by agroecology, reflecting different concerns between the highlands and lowlands

Table 3 Means of Some Characteristics of Farmers in West Hareghe Who Stated in Surveys that They Had Supplied or Had Received Seed Off-farm in 1998

Farmer Characteristic	Chiro				Miesso			
	Received in 1998		Gave/sold in 1998		Received in 1998		Gave/sold in 1998	
	Yes	No	Yes	No	Yes	No	Yes	No
Number responding	6	47	19	34	9	32	9	32
Amount given / received (kg)	13.0	–	32.4	–	18.5	–	35.3	–
Number given to	–	–	5.8	–	–	–	4.7	–
Age of farmer	35.83	37.62	41.68**	35.03**	36.44	35.34	39.33	34.53
Family size	5.00	6.72	6.89	6.32	7.11	6.50	7.33	6.44
Number of oxen	0.83*	1.35*	1.39	1.24	1.89**	1.16**	2.33**	1.03**
Area farmed (<i>Timad</i>) ^a	5.17	5.13	5.42	4.97	9.22	10.41	13.78**	9.12**
Area planted to sorghum (<i>Timad</i>) ^a	4.67	4.24	4.76	4.03	7.44	7.09	10.00**	6.38**
Seed saved/area to sorghum (kg ha ⁻¹)	24.00	30.93	30.88	32.91	36.78	31.26	27.37	31.71
Expected production, good year (t)	1.27	1.28	1.71**	1.03**	1.30	1.93	2.86**	1.49**
Expected production, bad year (t)	0.41	0.39	0.53**	0.32**	0.17**	0.30**	0.44**	0.22**
Expected yield, good year (t/ha)	2.13	2.64	3.02**	2.33**	1.42**	2.36**	2.28	2.12
Expected yield, bad year (t ha ⁻¹)	0.71	0.84	0.95	0.75	0.22*	0.38*	0.41	0.33
‘Age’ of seed stocks on-farm (yrs)	7.67**	12.98**	14.5**	10.9**	4.11**	11.30**	15.00**	8.23**

^a *Timad* is a Local Unit of Area, Roughly 1/8 of a Hectare; Means of ‘Yes’ and ‘No’ Responses Different at * $p < 0.1$ and ** $p < 0.05$

around timing, quantity, and adaptability. Preferences also diverged with some farmer characteristics, suggesting that structural factors affect access to seed from different sources. Reasons given for these preferences broaden our view of accessibility, and raise practical issues for seed system interventions or emergency seed relief.

Most Preferred Sources

Table 4 lists responses. For both the most- and least-preferred sources, proportions differed significantly ($p < 0.05$) between locations. Other farmers were a more popular source in the highlands than the lowlands, while merchants were less popular in the highlands. Those preferring farmers as sources highlighted favorable terms (especially in Chiro), or adaptation to local conditions (mainly in Mieso) as reasons for this. Some others, particularly in Chiro, stressed values around reciprocity and trust (“we know them”, “we give to each other”).

Most of those preferring merchants cited the ease and speed of obtaining seed, provided one has cash. The implication, explicitly made by some Mieso farmers, is that requesting seed from neighbors is slow and cumbersome, with supply by no means certain. Transaction costs for seeking seed from neighbors is itself a significant barrier for some, though poor seed availability may also be an issue. Those preferring government-supplied seed highlighted the government’s role in seed provision or the (physical) quality of the seed provided.

Least Preferred Sources

A higher proportion of Mieso farmers disliked the government as a source, while farmers in Chiro were relatively more negative about merchants. The formal sector does not produce much sorghum seed, and has virtually no capacity for multiplying lowland sorghum types. Late delivery was the most common complaint given about government supply (e.g. “We will be starving a year before getting seed.”). Some, mainly in Mieso, complained that requirements for channeling requests and delivery through FA councils increased stress and delays.

The most common reason for disliking other farmers related to unreliability. A number complained that neighbors would

promise to provide seed, but then fail to do so (i.e. maintaining the form of local norms, but not the content). Several of those who disliked merchants cited high prices, though five Chiro farmers highlighted the immorality of selling seed in general, something not raised by Mieso farmers.

Patterns of Preferences

Farmer views on seed sources are complex, with no clear consensus on good or bad sources. However, some patterns are discernable. For instance, some Chiro farmers highlighted the accessibility and adaptability of farmer-supplied seed, while Mieso emphasized the speed and ease of obtaining seed from merchants. Different views on neighbors and markets to some degree reflect agroecological factors. For instance, highly-localized rain failure in the lowlands can affect seed availability for a locality, undermining farmers’ capacity to supply their neighbors. However, some farmers also emphasized more ‘social’ reasons for their preferences. For instance, while Chiro farmers’ ambivalence about merchants may involve a number of issues, several justified their hostility with normative statements about the value of community solidarity, or the moral dubiousness of commercial transactions with seed. Markets are important sources of seed in the lowlands, and attracted less opprobrium. Rather, Mieso farmers were relatively less positive about farmer–farmer seed exchange, complaining of delays or tedious social entanglements.

Characteristics of farmers were compared by preference. Those preferring government in Chiro expected significantly higher harvests, saved more seed, and had more oxen, suggesting this group is more productive and better-off than average (Table 5). This echoes the ‘progressive’ farmers sought by extension package promotion. Indeed, the wealthier focus group in Chiro felt confident in approaching the Ministry of Agriculture for seed, while a group of their poorer neighbors stated that farmers like them did not have access to the government for seed, and they would do better to go to market. Moreover, highland farmers preferring merchants appear poorer in terms of oxen-ownership. New technologies, or emergency seed assistance, are often delivered through formal supply channels, so it is a concern if poorer farmers actually do have restricted access to these channels.

Table 4 Farmers’ Views of the Best and Worst Sources for Off-farm Sorghum Seed, From Survey

Seed source	Best source				Worst source			
	Chiro		Mieso		Chiro		Mieso	
	Count	%	Count	%	Count	%	Count	%
Other farmers	28	53.8	14	38.9	7	18.4	3	12.0
Merchants	8	15.4	14	38.9	19	50.0	6	24.0
Government	16	30.8	8	22.2	12	31.6	16	64.0

Table 5 Some Characteristics of Surveyed Farmers in Chiro, According to Their Preferences for Off-farm Seed

Farmer characteristic	Most preferred source				Least preferred source			
	Other farmer	Merchant	Government	p^a	Other farmer	Merchant	Government	p^a
Number responding	28	8	16		7	19	12	
Number of oxen	1.15AB	0.50B	1.38A	*	1.43	1.28	0.67	NS
Seed saved/ sorghum area (kg ha ⁻¹)	23.96AB	21.50B	46.44A	**	45.86	21.67	18.67	NS
Expected production, good year (t)	1.09B	1.19AB	1.63A	**	1.46	1.39	1.12	NS

^a Means of all three sources different at * $p < 0.1$ and ** $p < 0.05$, different letters indicating differences between individual sources

In contrast to Chiro, Mieso farmers preferring government seed had fewer oxen, smaller sorghum fields, and lower production expectations in poor years than others, highlighting the vulnerability of this group (Table 6). The poor are more likely to need large quantities of seed on a regular basis, which would be costly for many farmers to meet. Those who considered merchants the worst source also appeared poorer according to the measures, suggesting problems of access to cash. However, poorer farmers preferring government supply may be expressing more hope than expectation, given the government's poor record here, and its bias towards better-off farmers in developmental programs. The view of the state as supplier of last resort is also supported by the fact that those preferring it the least had more available resources than other farmers. Comments in focus groups and interviews suggest that significant transaction costs are involved in obtaining seed from a neighbor. In light of this, it is interesting that Mieso farmers who viewed neighbors as the best source had significantly more oxen; sharing oxen with others can cement close (though possibly unequal) ties, and this may help these farmers secure access to seed from neighbors. Patterns of preferences differ between highland and lowland, but the evidence suggests that different preferences reflect differences in socially-mediated access to seed. The following section explores the link between seed exchange, social networks, and norms in more detail.

Seed Exchange and Social Networks

Several facts support the notion that seed exchange is closely linked to social networks and to norms of

reciprocity. First, publicly-expressed norms encourage unconditional assistance to neighbors, especially those lacking basic inputs. As one farmer exclaimed, he provided seed to many others because, "Our father said that seed and oxen should go to those who ask." Others cited Islamic values of charity.

Secondly, Oromo society encourages strong associative ties. Links between neighbors and friends have as much of a role in social organization as networks based solely on kinship, which facilitates the incorporation of outsiders into Oromo society (Lewis 1975; Bulcha 1996; Blackhurst 1996). The main form of governance used to be via *gada*, an age-grade system where a cohort takes on leadership roles around the age of 40, passing to the next cohort every eight years (Blackhurst 1978). Though the *gada* system has declined, the egalitarian principles it symbolized remain important in Oromo societies (Bulcha 1996; Bassi 1994).

Thirdly, mutual-aid institutions are common. These take many forms, such as *edir* for labor-sharing, *inyi* for oxen-sharing, or *gosa*, which originate in clans (Ta'a 1996; Tesfaye 1961). Work teams are common for tasks such as weeding or harvest, where the host generally supplies food and *chat* (*Catha edulis*, a local stimulant) in exchange for a day's unpaid work.

Relationships of mutual support also exist in West Harerge in the form of patron-client ties. The 1975 land reform removed extreme wealth differences among rural households (Rahmato 1985), and did away with feudal powers, though structural differences persist. For instance, many lack oxen and so must work for someone owning an oxen team to be able to plow their land (generally five days' labor for every day of the team; ICRA 1996). While

Table 6 Some Characteristics of Surveyed Farmers in Mieso, According to Their Preferences for Off-farm Seed

Farmer characteristic	Most preferred source				Least preferred source			
	Other farmer	Merchant	Government	p^a	Other farmer	Merchant	Government	p^a
Number responding	14	14	8		3	6	16	
Number of oxen	2.15A	1.07B	0.63B	**	0.67	0.67	1.63	NS
Area planted to sorghum (<i>Timad</i>)	7.21AB	8.43A	4.50B	**	6.00AB	4.00B	8.56A	**
Expected production, bad year (t)	0.30AB	0.34A	0.12B	*	0.27AB	0.08B	0.38A	*

^a Means of all three sources different at * $p < 0.1$ and ** $p < 0.05$, different letters indicating differences between individual sources

this arrangement allows them to farm, they inevitably sow late in the planting window (with a tired team), and crop yield suffers. Land cannot be sold, so land rental and share-cropping are common arrangements; while informal, these often involve contractual relationships. These examples alert us to the fact that patron–client relationships can be inequitable, involving coercion as well as cooperation. Patrons may offer support, but in turn benefit from clients' labor, or support in their projects. The local FA administration, its committees, and mass organizations wield considerable local power, for instance deciding on the (re) allocation of plots to households, identifying aid beneficiaries, and administering collective public works. FA leaders are local farmers, and having a broad base of support can help appointment; socially prominent farmers (sometimes with honorific titles such as “*Hajji*”) were often known for giving seed to neighbors. At a higher level of government, a Federal Member of Parliament living a few km from the Chiro study site was renowned for his generosity with seed, and many traveled to him to seek assistance.

Finally, Table 3 suggests that seed suppliers and recipients are distinct groups, with the latter being considerably more vulnerable (vulnerability is explored in more detail in McGuire 2007). Taken together, social norms stipulating that nobody should be denied seed, traditions of mutual aid, patron–client relationships, and the links between seed insecurity and vulnerability suggest that seed exchange is closely linked to social networks. Thus access to seed, and the precise nature of this access (e.g. quantity or terms of supply) is embedded in a wider set of social relationships between actors. This has important implications for seed security—and ultimately the well-being—of the poorest. The following sections explore details of access and relationships.

Amount of Seed Exchanged

Farmers seeking seed often require 10 kg or more to (re)sow their plots. Many farmers would not find this a trivial amount to provide. Most would only be certain they could spare seed once their own fields were established. This may be too late for others, particularly in the lowlands where the window for sowing is small. Grain could be given, but generally is not suitable for use as seed. Thus, if a needy farmer desires a substantial amount of seed on short notice, only those who had saved large amounts (100 kg or more) would be certain of having spare seed. Such individuals generally include the most successful farmers and prominent individuals.

Terms of Exchange

Terms of supply influence accessibility. While family members usually provide seed as a free gift, markets

generally require cash. The terms of supply from other farmers vary: while one kg (e.g. to try a new variety) is usually free, cash or grain (at 1:1 exchange) may be requested for larger amounts, depending upon the nature of the relationship and transaction. Poorer farmers in focus groups indicated that cash payment would be difficult for them, something confirmed by socially-disaggregated studies in other regions (e.g. David and Sperling 1999). Exchanging grain is another possibility, but the chronic seed insecure usually have little grain remaining by sowing time. Thus, the poorest farmers rely on getting seed for free.

In public settings, farmers usually held to normative ideals, pronouncing that seed exchange among them was free and unconditional. However, terms are portrayed differently, depending on the speaker. For example, a focus group of wealthier farmers in Chiro insisted that older farmers still gave out seed for free, though they acknowledged that younger farmers now seek cash. In a separate session, their poorer neighbors disagreed, insisting that most exchanges required cash, and not only from younger farmers. An example in Miesso supports the latter view. One farmer, placed in the wealthiest category by his neighbors in two separate wealth-ranking exercises, was one of the very few in the area who had saved seed of a fast-maturing variety. Thus his seed was in great demand when the *belg* rains failed in 1998; rather than give it away, he sold 100 kg at the market rate of 2 Birr/kg (≈US\$0.25).

Though it would be difficult to establish how terms have changed for every transaction, two points are raised here. One is that portrayals of generosity differ between public and private settings, and between wealthier and poorer farmers. There are strategic incentives for exaggerating: suppliers can play up their patron credentials by overstating their generosity, while the seed needy may bolster their claims to support by pointing to others' stinginess. As Scott (1985) showed, representations of wealth or generosity lie at the heart of debates within cultures of exchange, used strategically to press norm-based claims (e.g. “you can afford to give me seed”, or “you can afford to buy your own”). The second point is that norms may be in transition, away from gifts towards more transaction-based exchanges. Publicly-expressed norms may simply be residual politeness, covering a changing situation underneath. Seed exchange elsewhere has moved from gift-based to more commercial transactions (e.g. Sperling and Loevinsohn 1993), which raises the question for West Harerghe: since many farmers agree that the extent of free gifts is declining, is the culture of mutual aid also in decline?

Acute vs. Chronic Need

Emergency aid distinguishes acute emergencies from more chronic vulnerability due to poverty (Sperling and Cooper

2003). This distinction is also relevant with farmer–farmer exchanges. Acute problems, such as widespread germination failure due to late rains may spur a relatively unconditional response from those able to assist. Yet chronically insecure households tend to need seed even during normal seasons, and may not be able to count upon automatic support. For example, a chronically seed-insecure farmer, whose *belg* sowing had failed, claimed he would not continue with sorghum that season, as he could not borrow or purchase seed. A (wealthier) neighbor who was also present chided him for not selling his last goat to raise cash for seed purchase. Some farmers hesitated approaching their neighbors for seed assistance, perhaps fearing being branded ‘lazy’ or ‘poor farmers’ for always needing seed. Some poorer farmers in India (Dhamotharan *et al.* 1997) and Honduras (C. Almekinders, personal communication, 2001) prefer the market to asking neighbors, to avoid such moral stigma.

Chronic stress also affects the capacity for social support. Mutual aid may increase in the early phases of a crisis, but if it persists over time, support tends to become more constrained and short-term in nature as assets are steadily depleted (Dirks 1980). This may be occurring in West Harerge, as we now know that the 1998–1999 season was part of the build-up to the ‘slow onset’ food and seed crises of 1999–2000 (Hammond and Maxwell 2002) and 2002–2003. However, normative elements may also be at play, since the poorest tended to diversify into off-farm activities to cope with uncertainty, which often meant neglecting their own farms’ management. Several prominent seed donors spoke disparagingly of such ‘part-time farmers’ and their weed-riddled plots, suggesting they saw them as less worthy of assistance.

Form vs. Content

An outward form of assistance may differ from the content actually provided (Scott 1985). Content for seed exchange may relate to amounts, quality, or even attitudes around seed exchange. Gifts of very small quantities are quite common: in 1998, three of the poorest contact farmers had received 1 kg from six or more different sources each. These may be token gifts to maintain appearances, or reflect requests limited to quantities usually given as free gifts. Seed is rarely completely unavailable, so such strategic restraint from petitioners or donors highlights the social nature of this transaction.

Farmers know that sorghum stored as grain makes poor quality, low-germination seed. Thus, receiving ‘seed’ that was actually stored grain is considered unfair dealing. A few farmers voiced complaints to this effect, though not open accusations. Wealthier highland farmers, in a focus group, downplayed this possibility, arguing that everyone

should be able to distinguish sorghum seed from stored grain. Even if true, there remains the issue of the ability of poor farmers to protest against low quality seed, especially when received as a gift. Richards (1986) noted that indebted rice farmers in Sierra Leone often received seed contaminated with undesirable, semi-weedy seed. Again, behind the rhetoric of universal support, actual practice may be somewhat different.

Finally, there are normative expectations of form around attitude and behavior. Farmers publicly claim they would supply to any needy neighbor, but some talk privately of ‘deserving’ as opposed to ‘lazy’ poor. Making every effort to obtain seed by their own means (such as selling their last goat), or working on their farms throughout the season is seen as a virtue. This chimes with government interest in promoting self-reliance, and in restricting development programmes (including the provision of scarce MV seed) to ‘full-time farmers.’ So-called ‘part-time’ farmers are generally pursuing off-farm livelihood activities to limit their vulnerability to crop failure, yet are castigated as ‘lazy’ by officials, such as the coordinator of agricultural development in Mieso *woreda*. Thus moral judgments also come to bear on a household’s farming practices, with disputes affecting access to seed.

Social Relationships

Seed access is influenced by ties to potential donors. In terms of frequency of use for seed exchange, family members appear less important than unrelated farmers. Cooperative activities in other spheres, such as labor- or oxen-sharing, or shared membership in local institutions such as *edir*, can help cement strong ties between farmers for seed exchange, though relationships may still be unequal. Elsewhere in Ethiopia, local institutions have been used as a conduit for seed distribution (Pratten 1997). The small Amhara minority in Chiro offers an example of how seed exchange follows social networks. The interview sample included four Amharas who supplied seed to others in 1998: all nine of their named recipients were also Amhara. For four Amhara seed recipients, two of their six suppliers were Amhara. This is not to stress ethnic divisions (Amhara farmers have very friendly ties with their Oromo neighbors) but shows how seed exchange follows other social networks—in this case, reflecting ethnic and religious ties. These social networks clearly affect patterns of dissemination.

The survey did not inquire whether seed recipients had the same supplier from year to year, so it is not possible to assess how common stable patronage is with seed. However, evidence reveals some close associations between donors and recipients. For instance, one informant gave 3–5 kg to the same three chronically seed-insecure

farmers every year. In several other cases, seed donors named individual recipients of their seed who were visiting them at the time of the interview, and chewing their *chat* during a work break. *Chat* has luxury status, since nearly all farmers would like to chew it during breaks, but few can afford its regular purchase. Sharing *chat* with others can help cement ties, for instance lowering transaction costs for obtaining reliable labor. Thus the fact that some recipients are receiving *chat* as well as seed from a donor is an indicator of close social ties—though these ties likely involve expectations from the recipients (such as providing labor on short notice). Share-cropping, another example of a potentially unequal relationship, also sometimes bundles seed loans along with other obligations between parties. These instances show how seed exchange can be embedded in other social relationships.

Following from this is the question of social exclusion. Elsewhere, those not participating in collective work activities, or whose contributions were seen as indifferent, were effectively shut out from mutual support in times of need (Adams 1993; Richards 1986). In West Harerghe, some households allocate very little time to collective work activities, due to poverty, age, illness, or simply inclination (Wilbaux 1986). This group tends to also include the ‘part-time farmers’ mentioned above. Might these households be less likely to obtain seed or receive favorable terms? Normative comments about undeserving farmers suggests this is a possibility.

Discussion

Seed access is a critical feature of farmer systems, yet there has been little study of how access may vary within a community. Timely access to sufficient amounts of good quality off-farm seed is important for many farmers’ livelihoods, since unpredictable environmental conditions mean that many frequently need seed. Access to seed through exchange also affects the movement of new varieties (and associated information) through the farmer system (Bellon 2004; Badstue 2006). This study shows how access is embedded in wider social relationships. Social networks involving local labor-exchange institutions such as *edir* or *gosa*, as well as the multifaceted ties among households involved in share-cropping or in loaning oxen, influence who has access to seed, and access conditions.

Social exchange theories offer a useful framework for analyzing seed exchange by placing transactions in a wider context. Gaining status through providing material support appears to motivate some of the larger donors, for instance. Also, the moral economy concept usefully draws attention to cultural norms around assistance, especially between households that regularly have surplus seed, and those that

are chronically seed-insecure. Social networks can help us understand how seed access varies between individuals, as well as over time. However, social networks and reciprocal ties do not guarantee access for all needy farmers, possibly because the culture of assistance is changing. This challenges the uncritical assumption, held by many researchers and officials in Ethiopia, that mutual-aid is as generous and unconditional as farmers publicly proclaim.

Farmer preferences for off-farm seed sources show how access to seed integrates a number of different concerns. Financial cost, timing, quantity, and adaptation to agro-ecological conditions are all important for rating one source over another. As Tables 4, 5 and 6 show, preferences differ according to district, as well as other household characteristics. For instance, drought stress in the lowlands partly explains why more farmers prefer merchants in Miesso; the government has little capacity for supplying MV seed for the lowlands, and few farmers can spare the quantities needed to re-sow an entire plot. Chiro farmers preferring government owned more oxen and had more secure harvests; their preferences may reflect better access due to higher social standing. While ecology and social structure are important influences on farmers’ preferences for seed exchange, farmers continue to supply the majority of off-farm seed (McGuire 2007). Thus, membership in social networks matters a great deal for seed dissemination. A number of farmers referred to the ease or difficulty of social transactions with other farmers as a reason for preferring neighbors or market sources, respectively. Seed is a limited resource, and the quality of social ties affect the nature of access to seed.

Does support with seed help the poorest to cope with difficult conditions, or does it bind them to fundamentally disempowering relationships? Richards (1986) in Sierra Leone, and Watts (1983) in Nigeria drew rather different conclusions about seed loans from wealthy farmers. Watts argued that these exchanges further marginalized the poor, since they repaid seed loans with labor to the detriment of their own livelihoods. Richards took a more benign view of patronage around seed, as he considered that these loans enabled, rather than constrained, production (1990). This study shares the latter view, as land reform and blocks on land sales make Ethiopian rural society less stratified than Sierra Leone’s or Nigeria’s, and weak market development means that better-off farmers cannot enrich themselves to a point where they could break free of local social networks. Even high-profile farmers need their neighbors’ goodwill and support. Social networks are not necessarily egalitarian, but seed assistance does not appear to be linked to crude exploitation in this study area. However, Hyden (2006) points out that structural power can mean the better-off can sometime renege on a commitment to offer assistance. Farmers certainly did report being denied seed from

potential donors, but the latter always claimed their own stock was already exhausted. Whether or not such excuses are genuine, assistance often is denied; giving material or non-material assistance to a potential donor may increase the chance of receiving seed in the future, but access is not necessarily guaranteed.

Cultural norms and morals infuse social networks. Poorer households tend to engage more in off-farm activities to secure their livelihoods (Sharp and Devereux 2004), leaving less time to maintain reciprocal ties through participation in labor-sharing groups or other activities. Such households risk being seen as less deserving of charity, especially since a farm-centric view of livelihoods held by many farmers (and officials) also casts a negative light over part-time farmers. The tendency for the poorest to prefer seed sources other than their neighbors suggests a measure of social exclusion. Social marginalization is also an issue with emergency seed assistance, since in Ethiopia FA councils often identify beneficiaries and distribute aid (Bramel *et al.* 2004). Households lacking strong links to social networks are less likely to be nominated for assistance by their neighbors. Thus poor households that are also socially-marginalized are especially vulnerable.

Local markets play an important role in seed exchange. This is especially the case in the lowlands when widespread rain failure reduces the availability of seed from other farmers. Some farmers claim that markets are growing in importance in seed supply, while amounts supplied for free from other farmers are decreasing. Such changes could be because chronic environmental stress has reduced farmers' capacity, but not their desire, to offer generous support (Hammond and Maxwell 2002; Dirks 1980). Indeed, many farmers, as well as government and NGO officials, claim that the culture of mutual assistance remains strong. However, static portrayals of culture deny subjects' agency in shaping, and changing, norms around resources (Agrawal 2003; Brosius 1997). Cultural changes may also be causing support networks to narrow, or even break down in West Harerghe, increasing the role of merchants and non-gift exchanges. The greater level of hostility towards merchants and non-gift exchange in the highlands (Table 4), and the couching of this hostility in moral terms, could indicate that the culture of mutual aid remains robust in the highlands. However, it could be that these views reflect resistance to this culture's decline, something which the focus group of poorer farmers in Chiro claimed was happening. Clearly, cultural norms around mutual aid are a site of contestation and debate, which influences how more commercial transactions are viewed.

This study underscores the centrality of seed access to farmers' livelihoods. This has important lessons for interventions that wish to work with or support farmer seed systems. For instance, the emerging view in emergen-

cy seed relief is that seed is usually available locally following a crisis, and that farmers' main constraint is accessing this seed (Remington *et al.* 2002; Sperling *et al.* 2006). This study concurs that access is a significant challenge to poor farmers, but cautions against assuming that a single intervention can improve access for all. Preferences for off-farm seed sources vary considerably within communities and between agroecologies, and a single channel, such as local markets, may not be acceptable to all. Where the cash economy and formal seed supply channels are weak, such as in West Harerghe, farmer-farmer exchange will remain important for household seed security. An emergency intervention that gives vouchers or cash to vulnerable households, so that they can purchase the seed they desire, will likely only address access in the short term.² Close ties to suppliers, possibly involving exchange in other areas (e.g. land, labor, oxen), will still be needed to secure access to farmer-farmer exchange. Poor households unable or unwilling to invest in building social ties, or deemed unworthy of assistance due to their livelihood (e.g. part-time farmers), risk being marginalized from social support networks. Emergency interventions are unlikely to make much of an impact on farmers here; targeted assistance to vulnerable households will be needed, and possibly more direct engagement with exchange relations and norms.

Farmer seed systems play a central role in agricultural livelihoods. This article argues that the social dimensions of seed systems are as important as the biophysical aspects, and that access to seed merits greater attention in seed system analyses. This study uses empirical study of seed exchange to shed light on how access to seed varies within and between communities. Structure is important, as households with more resources tend to supply seed to neighbors in need, but so are cultural norms, as they serve as a backdrop to the social networks and reciprocal aid relationships which play an important role in seed dissemination. Thus, despite exogenous forces, such as environmental stress or government programs, social networks continue to matter. Norms are areas of contestation, used by different actors to press claims on resources. This means norms are dynamic, and there is evidence that non-gift exchange is growing in importance in West Harerghe. Greater understanding how farmers secure access, and which aspects of access matter, can aid interventions with farmer seed systems.

Acknowledgements This study was made possible by research scholarships from Canada's Natural Sciences and Engineering

² Supplying farmers with the means to access local seed (vouchers or cash) is generally seen as an alternate approach to distributing seed from outside the affected region. There is a growing literature on the merits of these different approaches; see Sperling *et al.* (2004, 2006).

Research Council, and the O'Brien Foundation. The support of the Ethiopian Agricultural Research Organization, and of the Technology and Agrarian Development Research Group in Wageningen University is also appreciated. Incisive comments from Christine Okali, Cecile Jackson, and three anonymous reviewers are gratefully acknowledged.

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