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Gendered Access to Formal and Informal Resources in Postdisaster Development in the Ecuadorian Andes

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The devastating eruptions of Mount Tungurahua in the Ecuadorian highlands in 1999 and 2006 left many communities struggling to rebuild their homes and others permanently displaced to settlements built by state and nongovernmental

organizations. For several years afterward, households diversified their economic strategies to compensate for losses, communities organized to promote local development, and the state and nongovernmental organizations sponsored many economic recovery programs in the affected communities. Our study examined the ways in which gender and gender roles were associated with different levels and paths of access to scarce resources in these communities. Specifically, this article contrasts the experiences of men and women in accessing household necessities and project assistance through formal

institutions and informal networks. We found that women and men used different types of informal social support networks, with men receiving significantly more material, emotional, and informational support than women. We also found that men and women experienced different challenges and advantages when pursuing support through local and extralocal institutions and that these institutions often coordinated in ways that reified their biases. We present a methodology that is replicable in a wide variety of disaster, resettlement, and development settings, and we advocate an inductive, evidence-based approach to policy, built upon an understanding of local gender, class, and ethnic dynamics affecting access to formal and informal resources. This evidence should be used to build more robust local institutions that can resist wider social and cultural pressures for male dominance and gendered exclusion.

Keywords: Disaster; resettlement; gender; social support; reciprocity; Andes.

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Introduction

Gender is an important factor in power relations everywhere. This is particularly true in disaster and resettlement contexts because it has implications for the distribution of scarce resources and thus for recovery and wellbeing. Cultures and social groups are often divided by class and ethnicity and are always divided in some way by gender (Nagengast 2004: 113). Gender-based inequalities contribute to vulnerability in disasters and resettlement in many ways, affecting division of labor, access to formal and informal resources, and transmission of information through gendered social networks.

Our study took place in 5 communities in the Andean highlands of Ecuador that were affected by volcanic disasters in 1999 and 2006 (Figure 1). The eruptions of Mount Tungurahua (1°28'1"S, 78°26'30"W) in those years left many communities struggling to rebuild for years and

others permanently displaced to new settlements built by state and nongovernmental organizations (NGOs). Ashfall and other eruptive events have been chronic since the reactivation of the volcano in 1999. Households have diversified their economic strategies to compensate for losses, communities have organized to promote local development, and the state and NGOs have sponsored many economic recovery programs in the new settlements and affected communities. Our study examined the ways in which gender and gender roles were associated with different levels and paths of access to scarce resources in these mountain communities.

Reciprocity, kinship, and communal labor have long been identified by anthropologists as essential domains of Andean highland productive and cultural practice. These practices are historical products of subsistence cultivation and small-scale animal husbandry that demand seasonal investments of labor beyond what

FIGURE 1 Mount Tungurahua eruption in 2011. Throughout November, Mount Tungurahua emitted a large ash column, spilling ash on the crops and on people returning from the resettlement locations to cultivate their lands. Ashfall and other eruptive events have been chronic since the reactivation of the volcano in 1999. (Photo by A. J. Faas)



individual households can provide. Moreover, mountain-specific instances of ecologically challenging events such as drought, volcanic activity, and erosion that periodically affect households' abilities to meet subsistence needs are additional incentives for the practices of delayed reciprocal exchange of consumption goods and other forms of mutual aid. Reciprocal exchanges are so pervasive throughout the Andes (Figure 2) that the Quechua terms *ayni* (dyadic reciprocal exchange) and *minga* (collective exchange labor) are invoked by peasant and indigenous movements to mobilize resistance to capitalism, state intrusions, and multinational development organizations (Mayer 2005; Colloredo-Mansfeld 2009).

Gender, disaster, and resettlement in mountain settings

Disasters and group resettlement schemes tend not only to empower social and economic elites and manipulate

allegiances but also to reify gendered hierarchies (Enarson and Morrow 1998; Koenig 2001; Gamburd 2014). There is significant evidence that women and female-headed households suffer more than men in disasters (Enarson and Morrow 1998; Fothergill 2004; Dasgupta et al 2010). New opportunities after disaster and resettlement tend to occur within preexisting restrictions of gender roles and expectations (Ferguson and Byrne 1994; Anderson and Woodrow 1998; Sommers 2001; Shepler 2002; Wisner et al 2004: 11), and gender has been identified as a key factor affecting disaster recovery (Das 1997; Dasgupta et al 2010). Several authors, some in mountainous South America, have found that gender is a central variable in explaining the distribution of stress during resettlement (Scudder and Colson 1982; Harrell-Bond 1986; Cernea 1990; Palinkas et al 1993; Sherman and Muldinwa 2002: 11), variation in family cooperation during slow-onset disasters (Shipton 1990), and the distribution of scarce resources in recovery (Watts 1991; Halvorson and Hamilton 2007: 327; Whiteford and Tobin 2009).

FIGURE 2 Resettlers in a collective work party (*minga*) rebuilding an irrigation network in the high-risk zone at the foot of the volcano. *Minga* is one of many forms of cooperation and reciprocity practiced in the area. (Photo by A. J. Faas)



Gendered paths to institutional support

In development contexts, people generally exert power not only on their own behalf but also through unique ties to outsiders such as NGO workers, state officials, and patrons (Mosse 2005; Gamburd 2014: 198), and these ties are often gendered. As noted by several authors working in the Andean highlands (Rivera Cusicanqui 1994; Choque and Mamani 2001; Colloredo-Mansfeld 2009), Andean traditions of social organization, cooperation, and reciprocity are part of contemporary social movements and form a critical nexus of indigenous and peasant engagements with the modern state and NGOs. These authors have also noted the ways in which gendered exclusion has persisted in these indigenous institutions since colonization (Rivera Cusicanqui 1994; M. León 1997; Choque 1998; Choque and Mamani 2001). While some have found that the transition to democracy in Ecuador in the late 1970s empowered women and marginalized ethnic groups to successfully demand their corporatist

inclusion through social movements (J. León 1997; de la Torre 2002, 2003, 2006; Santana 2004), others have noted that recent trends have marginalized women in local politics (Colloredo-Mansfeld 2009). In his study of village politics in Otavalo, Ecuador, Colloredo-Mansfeld (2009) observed a trend of village councils being increasingly dominated by men, which he attributed to greater interaction between international donors, NGOs, and village councils reinforcing one another's power in ways that have favored men's participation and voice over women's. The recessions of the 1980s resulted in the return of many men from urban centers to their native villages, and many sought increased political influence by serving on village councils, which afforded them privileged access to development projects (Colloredo-Mansfeld 2009: 102).

Though gender-based approaches are increasingly a part of disaster relief, gender remains a core variable in the historical and social production of vulnerability

(National Research Council 2006; Hamilton and Halvorson 2007; UNISDR, UNDP and IUCN 2009), and development initiatives in postdisaster recovery often fail to address women's issues (Enarson and Morrow 1998; Enarson et al 2003). Postdisaster development aid programs tend to provide compensation for lost land and wages (male-dominated economic strategies), but not for paid, home-based economic activities, such as childcare, sewing, and laundering (female-dominated economic strategies) (Enarson 2001). In their research on Hurricane Andrew, Beggs et al (1996) and Hurlbert et al (2001) found that individuals whose personal networks reliably provided informal support (primarily women—see below) were constrained from receiving information and support, especially formal support, from outside the core group (Hurlbert et al 2001). Men and higher-status individuals were more likely than women and lower-status individuals to have access to unique sources of information that might result in access to formal institutional support (Beggs et al 1996: 206). Throughout Latin America, disaster response is a paramilitary function, and response and evacuation strategies frequently separate groups by age and gender, often significantly disrupting family networks (Macías and Aguirre 2006: 45). Researchers in highland Ecuador have found that during the long period of recovery from the Mount Tungurahua eruptions, women were less likely than men to have adequate food (Whiteford and Tobin 2009: 162).

Gender in cooperation and reciprocity

Women often engage in more reciprocal exchange relations than men (Komter 1996; Yan 2005). However, studies of informal social support exchanges in disaster contexts tend to find that men give and receive more support outside their kin networks than do women (Drabek 1986; Hurlbert et al 2001). In a study of social support exchanges among nonrelatives in the postdisaster resettlement community of Penipe Nuevo, Ecuador (one of the sites of this study), Burke (2010) found that men both gave and received more social support than women. Beggs and colleagues' (1996) research among American survivors of Hurricane Andrew also found that higher proportions of men in personal networks produced greater access to informal support; like Drabek (1986), they also found that men were more likely to provide informal support and less likely to receive it. In their research on earthquake impacts in mountainous Central Asia, Halvorson and Hamilton (2007: 327) found that postdisaster diversification of household economic strategies (men's transition to off-farm work) had a number of effects. Women found themselves with added household and agricultural responsibilities and less capacity to engage in community organizing and disaster preparedness activities, and, because of their spatial isolation from the migrating men, women were more cut

off from vital networks of access to emergency services and risk-management information. Given these findings, we would expect that, in these new postdisaster settlements, men and women would have different kinds of support networks—specifically, that men would receive and give more support (both formal and informal) than women. However, resettlement does disrupt social networks of both men and women, thus leading to the possibility of greater parity or even the inverse of expected relationships.

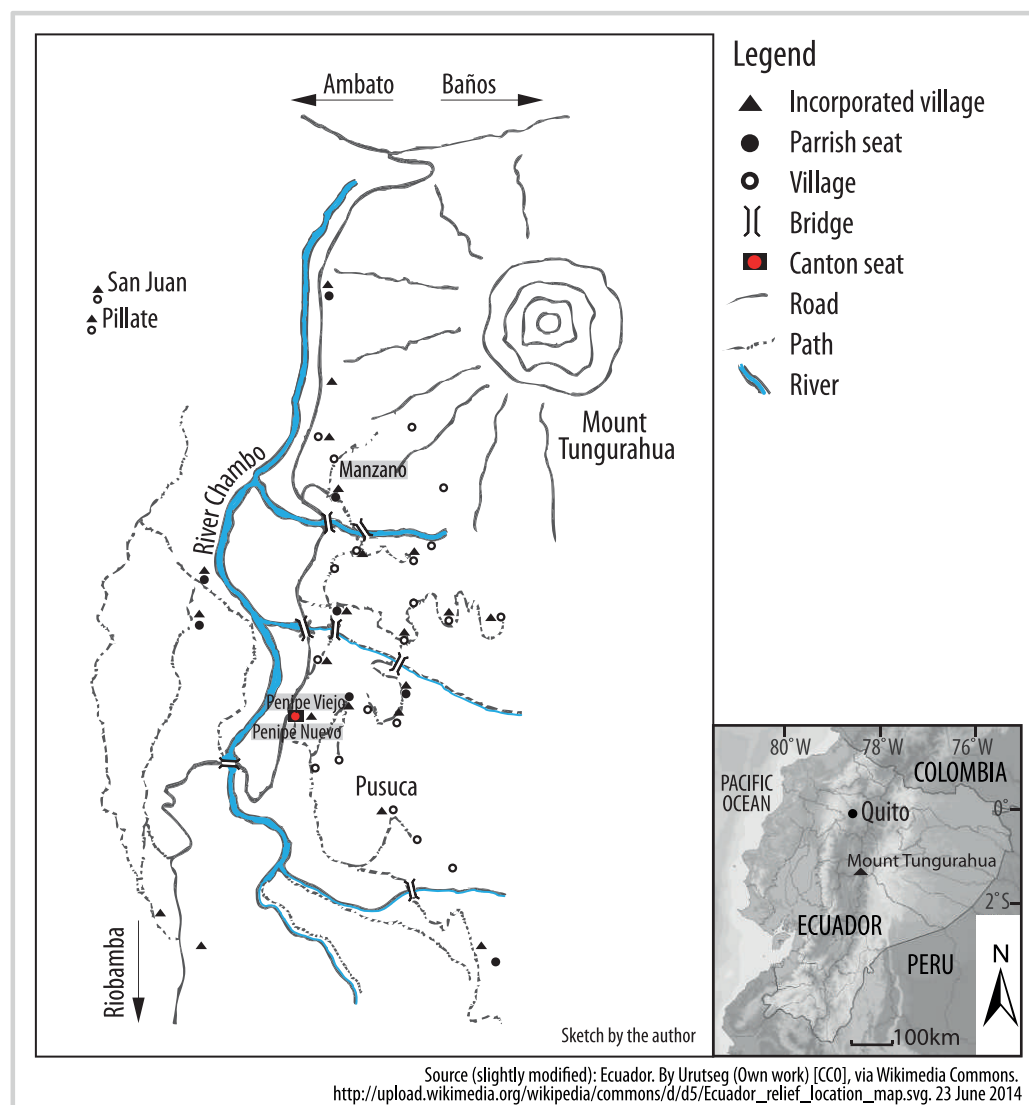
Fieldwork sites: villages and new settlements around Mount Tungurahua

Our study design called for the comparison of multiple highland communities affected by disasters in distinct ways. In late 1999 and mid-2006, the Andean provinces of Tungurahua and Chimborazo, Ecuador, suffered the devastating impacts of the eruption of the Tungurahua volcano, and many communities experienced serious social and economic damage. The communities in the high-risk zone (the areas closest to the volcano) in the 2 provinces were the most severely affected by the eruptions and were subjected to several mandatory evacuations. Ashfall damaged and obstructed roads, schools, and health centers as well as crops, animals, and irrigation systems. In addition to the devastating effects the volcano had on household and regional health and economies, these eruptions also resulted in the permanent displacement and resettlement of thousands of former residents of the high risk zone around the Tungurahua volcano.

Our aim was to explore the relationship between gender and different forms of institutional and social support in communities on or near Mount Tungurahua, some of which survived the volcanic eruptions (in 2 cases, with temporary evacuations) and some of which were built to resettle survivors whose villages were no longer viable (Figure 3):

1. *Penipe Viejo* (affected but not evacuated) is a small urban township that serves as the administrative seat (*cabecera cantonal*) of Penipe canton in Chimborazo province. Located 10 km south of the volcano, Penipe Viejo sustained moderate ashfall during the 1999 and 2006 eruptions and light ashfall in the interim and since. It was never evacuated, but it did serve as a base of emergency operations.
2. *Penipe Nuevo* (new) is a resettlement community built as an extension of Penipe Viejo. It consists of 285 houses constructed by the Ministry of Housing and Urban Development and a multinational, faith-based NGO, Samaritan's Purse. It is an urban settlement populated by smallholding rural agriculturalists displaced from the northern parishes (*parroquias*) of Bilbao, Puela, and El Altar after the 1999 and 2006 eruptions of Mount Tungurahua.

FIGURE 3 Map of research sites. (Map sketched by A. J. Faas; composition by Sarah-Kay Schotte)



3. *Pusuca* (new—full name La Victoria de Pusuca) is a small, land-based agricultural resettlement community, largely built by the Ecuadorian NGO Fundación Esquel. The hilltop settlement consists of 45 houses occupied by smallholding rural agriculturalists, most of them displaced from Puela, with a few from Bilbao and El Altar. It is 5 km south of Penipe.
4. *Manzano* (evacuated, displaced) is a disaster-affected village at the foot of the volcano. The entire community was displaced by the 1999 and 2006 eruptions, and nearly all villagers relocated to Penipe Nuevo, where they had no land or productive resources. Four households also relocated to Pusuca, while others migrated to nearby cities. Many resettlers from Manzano returned daily to their land in the high-risk zone to tend to their crops and animals, although

volcanic ash had degraded the soil and regularly falling ash continued to present health and safety risks to people and animals. Erstwhile residents maintained a village council and other committees, and several households resumed part-time residence in the community after 2010.

5. *Pillate* and *San Juan* (evacuated and later reoccupied) are 2 adjacent villages in Cotalo parroquia, Pelileo canton, Tungurahua province, just west of the northern extent of Bilbao in Penipe canton, across the Chambo River, 3 km west of the volcano and within the high-risk zone. The villages have about 35 households each. They were evacuated in 1999 and 2006 and suffered damage from ashfall, burning material, and landslides, but three-fourths of the residents returned.

Methodology: social network analysis of access to institutional and informal support

In order to measure variation in reciprocal exchange relations, types of support, and access to institutional aid, we conducted social network surveys in 2 phases—one in 2009, focusing on personal networks (the people in one's life), and another in 2011, focusing on community networks (the ties between all households in a village). This relatively novel combination allowed us to examine reciprocity from the individual perspective as well as across a network.

Personal networks

We surveyed 261 respondents at 5 sites in Ecuador in 2009 and conducted follow-up interviews ($n = 92$) and ethnographic research in 2011. In 2009 we administered a personal network analysis survey to a randomly selected adult in each household in our sample. Respondents were asked to name 45 people whom they knew by sight or by name and with whom they had interacted or could have interacted in the past 2 years, similar to the approach by McCarty (2002). We then randomly selected 25 of the 45 people named for further analysis in order to reduce respondent burden (McCarty et al 2007). For those 25 people, respondents were asked to give their gender and say whether, in the past 2 years, each of them had invited the respondent to work or provided material, informational, or emotional support to the respondent or received these supports from the respondent.

Community networks

We returned in 2011 to conduct follow-up surveys with a smaller subset of our original sample, conducting interviews and participant observation in the resettlement sites of Pusuca ($n = 40$) and Penipe Nuevo; in the latter, we focused on former residents of the village of Manzano ($n = 52$). We asked a random adult from each household to name 3 people he or she would go to for information about outside institutional support. Ethnographic observations in 2009 and 2011 informed our interpretations of these data. We overlapped the people named in common to create a whole-village network for each of the 2 villages.

The findings described below are based on 2 relatively simple analyses. For institutional support, we simply describe the frequency and ratio of nominations by gender in the 2 sites in which we studied this variable. We used one-way analysis of variance (ANOVA) to test the association between the gender of exchange partners and the types of reciprocal exchange in which they engaged.

Findings

In this section, we present our key findings regarding gendered paths to institutional support and the gendered

dynamics of 4 kinds of reciprocal exchange—work invitations, material support, informational support, and emotional support—focusing on both giving and receiving. Because several findings may be related, we reserve our interpretation of the findings for the following discussion section.

Institutional support

Our expectation was that men would have greater access to institutional support. For the question about whom they would ask about opportunities for support, 50 respondents from Penipe Nuevo (all relocated from the village of Manzano) and 40 respondents from Pusuca (relocated from various villages) named up to 3 people they would turn to for such advice or connections. Former Manzano residents named men 118 times and women only 16 times, for a ratio of slightly more than 7:1. In Pusuca, men were named 84 times and women 47 times, for a ratio of nearly 2:1.

Informal support

The gender of exchange partners was significantly associated with work invitations in the low-impact site of Penipe Viejo and the 2 new settlements, but not in the high-impact (evacuated but later reoccupied) sites of Pillate and San Juan (Table 1). In all 3 sites where variation was significant, men received significantly more work invitations than women, regardless of the inviter's gender; in Pusuca, men were more likely to invite others to work than were women.

Exchanges of material support (including prepared food, raw harvest, and loans) varied significantly by gender of exchange partners in Penipe Nuevo and the 2 high-impact sites of Pillate and San Juan (Table 2). Again, men were generally more likely to receive material support than were women, though the differences were somewhat less pronounced in the high-impact sites than in the new settlement. There was less variation in the gender of the giver.

Informational support exchanges only varied significantly by gender in Penipe Nuevo (Table 3), where men were again more likely than women to receive information. Interestingly, women appeared to be more likely to provide information than men.

Exchanges of emotional support only varied significantly by gender in the resettlement communities of Penipe Nuevo and Pusuca (Table 4). Again, men were more likely to receive emotional support; women were more likely to provide this type of support to women, and men were more likely to provide it to men.

Gendered access to resources

Table 5 displays variation in gendered paths to resources by site and site type. In most cases, men gave and received more support than did women, and both men and women were more likely to provide support to men, with some

TABLE 1 Invitations to work.

Site	Average woman receives		Average man receives	
	from (% of women in her network)	from (% of men in her network)	from (% of women in his network)	from (% of men in his network)
Penipe Viejo ^{a)}	15	14	22	20
Penipe Nuevo ^{a)}	25	24	33	34
Pusuca ^{a)}	31	34	33	47
Pillate	33	27	22	28
San Juan	26	31	21	32

^{a)}Statistically significant ($P < 0.05$), per ANOVA.

exceptions. Men were more likely to invite other men to work in the 3 sites where this exchange category varied significantly by gender. Women were also more likely to invite men to work than they were to invite other women. This could be a result of male labor being preferred in agriculture and domestic chores and childcare being less likely to be considered work. There was little difference in the mean rate of work invitation by gender of the inviter in the more urban sites of Penipe Viejo and Penipe Nuevo, but there was a difference in the relocation site of Pusuca; in this more agricultural settlement, men were much more likely to invite others to work, regardless of the gender of the invitee.

Men consistently received more material support than women, from both men and women. Differences were negligible in the relocation site of Penipe Nuevo and the high-impact (evacuated, but later reoccupied) site of Pillate. In the high-impact (evacuated/reoccupied) site of San Juan, men were generally more likely to provide material support to men than to women, and women were generally more likely to provide support to women, by margins of 6% and 7%, respectively.

Informational support exchanges only exhibited significant variation by gender in the relocation site of Penipe Nuevo, where both men and women were more likely to provide informational support to men than to women.

The exchange of emotional support varied significantly by the gender of the exchange partners in the 2 resettlement sites. Men and women were more likely to provide emotional support to men than to women in Penipe. In Pusuca, men more frequently provided support to men than to women, as did women. The difference in mean rate of exchange by gender of support provider overall was relatively narrow in Penipe Nuevo, where women provided emotional support slightly more often than men overall, regardless of the gender of the recipient; the difference was even less pronounced in Pusuca.

Discussion

We found that men dominated access to institutional support in Manzano—the residents of which had mostly been relocated to urban Penipe Nuevo, but who continued to work in their mountain fields in the volcanic high-risk zone. The same was true to a lesser extent in Pusuca, the residents of which had relocated from several sites but traveled less to their former lands since they had some agricultural land in the new location. The difference was far starker in Manzano (7:1) than it was in Pusuca (2:1). This is similar to findings by Halvorson and Hamilton (2007: 327) that women in chronic earthquake

TABLE 2 Material support.

Site	Average woman receives		Average man receives	
	from (% of women in her network)	from (% of men in her network)	from (% of women in his network)	from (% of men in his network)
Penipe Viejo	25	25	33	25
Penipe Nuevo ^{a)}	29	29	36	35
Pusuca	35	32	37	39
Pillate ^{a)}	36	36	38	36
San Juan ^{a)}	38	35	38	42

^{a)}Statistically significant ($P < 0.05$), per ANOVA.

TABLE 3 Informational support.

Site	Average woman receives		Average man receives	
	from (% of women in her network)	from (% of men in her network)	from (% of women in his network)	from (% of men in his network)
Penipe Viejo	33	36	33	34
Penipe Nuevo ^{a)}	43	37	48	39
Pusuca	45	44	43	44
Pillate	42	37	35	35
San Juan	49	42	43	51

^{a)}Statistically significant ($P < 0.05$), per ANOVA.

zones in mountainous Central Asia were often cut off from crucial access to institutions due to the absence of migrating men, who generally had unique access to these resources. To interpret this, we note the difference in the gendered leadership in the 2 sites. In Manzano, the only leadership positions held by women from 1999–2011 were as secretaries for the village council and insurance cooperative. In Pusuca, women had held various leadership positions since the community's inception in late 2008. The first president of the community was a woman, and women served in several capacities on all village bodies (village council, savings and loan cooperative, and irrigation and potable water committees). Men outnumbered women in leadership roles in Pusuca, but the difference was marginal (11:9 in 2011). Consistent with Hamilton and Halvorson's (2007) findings in postearthquake Kashmir, the difference in Pusuca can partially be attributed to the influence of the Esquel Foundation, whose community liaisons and coordinators actively promoted women's inclusion in leadership and development programs.

Other Andean researchers have noted that empowerment is problematic and is rarely, if ever, truly granted in development (M. León 1997). In the case of Pusuca, where empowerment efforts by the NGO

promoted women to leadership, women experienced some degree of power to create and produce, but this was in many ways enabled by the somewhat paternalistic facilitation of Esquel. It remains to be seen if women have gained any power that in any way might signal a change in gender relations within local society. The building of new organizations during resettlement takes place in a context with deeply rooted unequal gender relations, and the creation of one or two institutions alone cannot overcome that inequality, as gendered relations are often deeply embedded in Andean indigenous institutions (Choque 1998; see also Rivera Cusicanqui 1994: 38).

Informal support exchanges are often adaptations to exclusion and marginalization by development processes. In sites where the gender of exchange partners was significant, we found that men were more likely to be both givers and receivers of almost every type of support. That men were more commonly givers is somewhat inconsistent with cross-cultural findings on reciprocity (Komter 1996; Yan 2005). We were especially surprised to find that, while men received more information, women were more likely to provide information in the one community where gender was significant for this trend. In light of the finding that men were far more likely than women to have access to formal support and information

TABLE 4 Emotional support.

Site	Average woman receives		Average man receives	
	from (% of women in her network)	from (% of men in her network)	from (% of women in his network)	from (% of men in his network)
Penipe Viejo	41	41	43	43
Penipe Nuevo ^{a)}	47	39	51	52
Pusuca ^{a)}	43	40	54	50
Pillate	49	51	54	53
San Juan	52	41	42	54

^{a)}Statistically significant ($P < 0.05$), per ANOVA.

from institutions, this finding is even more unexpected, although certain contextual factors help explain this. As mentioned above, and quite similar to the findings of Halvorson and Hamilton (2007), men were frequently absent from Penipe Nuevo, leaving it primarily occupied by women, children, and the elderly. Because there were no productive resources (land or employment opportunities), the primary economic strategy of settlers was to return to their lands in the high-risk zone around the volcano (also affected by ashfall) to tend to crops and animals, while others migrated to cities in search of work. However, Penipe Nuevo was on an urban grid in the administrative seat of the canton. The site received regular visits from local and regional authorities and NGO representatives throughout the day and week, which could explain why women there became important sources of unique information.

With members of many families making daily trips to their former lands, it makes sense that women would engage in more exchanges and prefer male exchange partners, who could assist not only with agricultural labor but also with institutional resources and influence. Also, we know from studies of reciprocity (eg Komter 1996) that this would likely bind women to giving more than they receive, in order to sustain privileged exchange relations with key interlocutors.

Another important exchange involves a form of cooperative labor practiced throughout the highland Andes, known as *minga*. *Minga* participation is an obligation in both Pusuca and the disaster-affected communities, though it has not been practiced in Penipe Nuevo due to the lack of commons (see Faas in press). Women might not meet the labor demands of *mingas* in their communities (Figure 4). In Pusuca, as elsewhere, *minga* participation is a condition of inclusion in development projects and their benefits. Working through *mingas* is also a preferred development strategy for NGOs throughout the study sites and the broader Andean region. Also, women might gain access to scarce material and political resources via relationships brokered through reciprocal exchanges, while simultaneously being implicated in the reification of stratified gender roles (eg women as caregivers or domestic servants).

Conclusions and implications

New settlements and disaster-affected communities are special development contexts that present aspects of ecological, political, economic, social, and cultural trauma, often from sudden events, while also exhibiting historically produced inequalities and relational dynamics that themselves generate uneven abilities to recover from disaster. Our work contributes to the study of social life in development contexts where access to aid resources is crucial to recovery and development and is a key element

in social and political competition. In these contexts, informal exchanges do not only complement or serve as alternatives to aid, but also facilitate the distribution of aid. Cernea (1996: 310) advised the World Bank that the core of the development package in resettlement should be based on either land-based or employment-based strategies and that, especially with rural peoples, land-based strategies are usually the most effective. Our findings support this strategy and call for revision of sustainable livelihood strategies with attention to gender as a core component of all postdisaster recovery.

This study identified important gendered dynamics affecting access to formal and informal support in disaster-affected communities and new settlements in highland Ecuador. Women generally fared more poorly than men in the exchange (both giving and receiving) of scarce resources. We also identified some degree of gender parity in one new settlement (Pusuca) and the counterintuitive pattern of women's greater access to information in another new settlement (Penipe Nuevo).

While considering the wider pressures against local improvements in gendered access to recovery resources, policy should be sufficiently attuned to local variations in gendered access to support, in ways such as the following:

- In some communities, women give more and men receive more support of various kinds, such as in urban, landless new settlements inhabited by former farmers (Penipe Nuevo).
- In other communities, men give and receive more of a specific kind of support, such as in landed new settlements where men develop new relations of reciprocity (Pusuca), and in fragmented agricultural communities that predate the disaster that rely on male-male relations for distribution of resources (San Juan).
- Other communities show few differences by gender in access to support, such as highly organized or socially cohesive agricultural communities that predate the disaster (Pillate), and long-established urban communities where women might predictably employ men for various kinds of labor (Penipe Viejo).
- In some communities experiencing development instability—such as Manzano, whose residents resettled far from their fields, and Pusuca—men receive more institutional support because of male ties to organizations and external contacts.

No community exists in isolation, separated from external dynamics. Nonetheless, these differences suggest that distinctions between communities—such as rural versus urban, resettlement community versus community predating the disaster, and high versus low disaster impact—can have substantially different implications for policies related to gender and development. Broader forces indeed limit the opportunities for change, but policies must be flexible and accommodate local variation

TABLE 5 Gender variation in reciprocal exchange and institutional support across sites. ^{a)} (Table extended on next page.)

Site (characteristics)	Who gives and receives more support			
	Institutional support	Work invitations		Material support
		Receives	Gives	
Penipe Viejo (not evacuated)	NA	Women	Men	
Penipe Nuevo (new settlement)	NA (see Manzano)		Men	Women
Pusuca (new settlement)	Men	Men	Men	
Pillate (evacuated but later reoccupied)	NA			Women
San Juan (evacuated but later reoccupied)	NA			Men
Manzano (evacuated, resettled, partially reoccupied)	Men	NA	NA	NA

^{a)}Only statistically significant differences confirmed by ANOVA ($P < 0.05$) are displayed.

in gender relations and gendered access to resources. Additionally, mountain communities experience great variation in gendered postdisaster development due to the impact of the disaster on local transportation, production, labor, information flows, and existing social relationships. While these issues may be present in a variety of contexts, they are often more pronounced in mountain communities, as topography presents

challenges to transportation (especially in areas disrupted by volcanic eruptions) and the mobility of labor and information flows, in addition to the often pronounced challenges of high-altitude and hillside agricultural production (Mitchell 1994).

The findings from this study can inform mountain development and disaster resettlement and recovery strategies elsewhere, though they do not point to any

FIGURE 4 Two women in a *minga* work party take a break from repairing an irrigation canal. Mount Tungurahua can be seen partially obscured by clouds behind them. (Photo by A. J. Faas)



TABLE 5 Extended. (First part of Table 5 on previous page.)

Site (characteristics)	Who gives and receives more support				
	Receives	Informational support		Emotional support	
		Gives	Receives	Gives	Receives
Penipe Viejo (not evacuated)					
Penipe Nuevo (new settlement)	Men	Women	Men	Women	Men
Pusuca (new settlement)				Women	Men
Pillate (evacuated but later reoccupied)	Men				
San Juan (evacuated but later reoccupied)	Men				
Manzano (evacuated, resettled, partially reoccupied)	NA	NA	NA	NA	NA

one-size-fits-all set of policy recommendations. Although gendered dynamics are of fundamental importance to development and disaster recovery, they present themselves in very different ways across contexts, even within our own study sample. In general, our findings call for targeted strategies to promote increased access to formal support for women and female-headed households, and for development strategies that avoid either reifying gendered hierarchies or disrupting existing informal exchange practices that are critical to survival.

It is common for resettlement and development agencies to attempt to work through existing local institutions, and yet our examination of exchange practices in these communities suggests that there are significant gender biases embedded in local practices and institutions. In the one new settlement where formal institutions have promoted women to positions of leadership, Pusuca, wider social structures of reciprocity, outside labor recruitment, and informal social support remained unchanged. The creation of new institutions in Pusuca has only narrowly avoided the reification of power relations; as Esquel stepped back and began to withdraw its community coordinators in 2012, it was hard not to get the impression that these unequal power relations would return to the forefront and have important consequences for future distributions of resources in the new

settlement. Potential disagreements or conflicts generated from ensuing shifts in power, nonetheless, are likely to provide opportunities for new discussions and solutions.

What we present is a methodology that should be replicable in a wide variety of disaster, resettlement, and development settings (for more details, see Faas et al in press). We therefore advocate an inductive, evidence-based approach to gendered facets of mountain development and disaster recovery and resettlement. The best policies we can conceive of for these contexts would be those built upon an understanding of local gender, class, and ethnic dynamics affecting access to formal and informal resources. This evidence should be used to build more robust local institutions that can resist wider social and cultural pressures for male dominance and gendered exclusion.

Since this was not an applied project with specified interventions, more research is needed to carefully delineate how to build upon local gendered institutions to promote development in postdisaster and resettlement contexts. Furthermore, we were not able to compare the effect of time since resettlement, because we purposely chose 2 new (postdisaster) settlements of very similar age. Future studies could examine if and how the relationship of networks to gendered resource access changes over time following resettlement.

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