



Clapping with Two Hands: Transforming Gender Relations and Zoonotic Disease Risks through Community Conversations in Rural Ethiopia

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Abstract

Gender inequalities and zoonoses are major concerns in livestock production systems worldwide. Livestock producers are at high risk of zoonotic diseases due to direct and indirect contact with their livestock and livestock products. Gender differences and inequalities in roles, access to and control over resources, decision-making, and cultural norms influence exposure to, perceptions, and management practices for zoonotic disease risks. Using participatory action research, we tested the effectiveness of community conversations in changing gender relations and practices that expose livestock keepers to zoonoses in three districts of rural Ethiopia. Our findings show that community conversations change mindsets and practices regarding gender roles, access to and control over resources, decision-making in households, handling livestock, and consumption of animal-source foods. Behavioral change happens when women and men diagnose and understand the problem, reflect on the beliefs/norms that determine their practices, make shifts in cognitive and emotional mental models, commit, and take actions. This has practical and policy implications for interventions that aim to change behavior. The process requires nurturing collaborative relations, trust-building, community-driven social learning, enhancing local capacities, breaking belief traps, and complementarity to existing interventions.

Keywords Community conversations · Behavioral change · Gender relations · Zoonoses · Livestock production · Ethiopia

Introduction

Ethiopia has one of the largest livestock populations and the second largest human population in Africa (Central Statistical Agency 2009; Leta and Mesele 2014). About 80% of the

population depends on agriculture and has direct contact with livestock or other animals, increasing risks of zoonotic diseases (Pieraccia *et al.* 2016). Zoonoses account for most infectious diseases in people and reported as “emerging” or “re-emerging” (Woolhouse 2002). Ethiopia ranks high in the health burden of zoonotic diseases including rabies, anthrax, brucellosis, leptospirosis, and echinococcosis (Pieraccia *et al.* 2016) and has a large population of poor livestock producers (Grace *et al.* 2012). Poor livestock management practices, general lack of knowledge on zoonotic diseases, and common animal-source food handling and consumption practices are high transmission risks exposing household members to zoonoses (Ameni *et al.* 2013; Kinati *et al.* 2018; Mazet *et al.* 2009; Wieland *et al.* 2016).

Differences and inequalities in the division of labor in livestock management are common with women responsible for labor-intensive activities such as feeding, watering, and cleaning barns while men are responsible for income-generating and decision-making activities (Kinati *et al.* 2018). The gender-based differences in roles and power relations disproportionately expose household members to the

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risk of zoonotic diseases (Alemu *et al.* 2019). Although women are heavily involved in livestock production, their role is culturally undervalued by men, affecting their ability to access and control resources and benefits from their labor. Community values and norms define relational patterns and influence allocation of decision making responsibilities, inter-community relations, and access to information and other resources (Flora and Flora 2008). Addressing gender-based constraints in livestock production and animal health management reduces morbidity and mortality, saves costs for disease management, and increases productivity, human health, and well-being (Zinsstag *et al.* 2007).

Participatory community engagement and social learning approaches have been used to assist communities in developing greater egalitarian cooperation to improve the quality of livelihoods. Community conversations are among the approaches through which communities work with facilitators to collectively identify and analyze areas most usefully targeted to achieve this goal (Campbell *et al.* 2013). Community conversations entail four building blocks: conversing, engaging, collaborating, and casting a vision. They allow participants to increase their knowledge on pertinent issues and encourage discussion among community members for the development of plans to make desirable changes (Born 2012). The approach has succeeded in engaging women and men in examining, questioning, and transforming restrictive gender norms, attitudes, behaviors, practices, and related imbalances of power (IGWG 2010), and has been used successfully to increase inclusiveness in schools, employment opportunities for youth and adults with intellectual and development disabilities (Carter *et al.* 2009; Trainor *et al.* 2012), and positive responses to health issues such as HIV (Campbell *et al.* 2013; UNDP 2004).

However, to date no study has empirically demonstrated how community conversations transform unequal gender relations in livestock production systems and foster change in practices that expose humans to zoonotic diseases. We address two key questions: (i) how do community conversations effect change in gender relations and practices that expose individuals to zoonotic diseases? and (ii) under what conditions does change occur? We argue that community conversations are a promising approach for stimulating change in gender relations and livestock and animal-source food handling practices in rural communities. However, while community conversations facilitate change in perceptions and practices, the effectiveness of the approach depends on social structures, institutions, facilitation skills, and complementarity with ongoing interventions that demonstrate the practical value of new knowledge and practices. We describe the approach and its core components; the implementation process; changes observed; how change happened using the self-determination theory, and transtheoretical model; and the lessons and considerations in scaling the approach.

Methods

The Study Sites

Community conversations were piloted in four villages located in three *woredas* (districts) of Ethiopia - Doyogena district in Southern Nations, Nationalities, and Peoples' Region (SNNPR), Menz Gera Midir, and Menz Mama Midir (referred to as Menz districts) in the Amhara region (Table 1). These are sites where the CGIAR (Consultative Group on International Agricultural Research) Research Program on Livestock implements livestock research interventions to improve the livelihoods of smallholder livestock producers. The sites were selected based on their livestock density, market access, and ethnicity.

The Community Conversation Approach

The community conversation approach was designed and implemented through a sequence of steps outlined below.

We conducted a *situation analysis* in 2017 using participatory epidemiology and gender analysis techniques. The analysis followed an exploratory sequential mixed-methods approach, applying both quantitative and qualitative methods equally to triangulate data on gender dynamics in livestock management, knowledge of livestock diseases and their transmission pathways, and the impact of livestock diseases on household members (see Alemu *et al.* 2019 for details). Our results revealed differences and inequalities in the gender division of labor, time allocation, access to and control over resources and a general lack of knowledge on zoonotic diseases among women and men livestock keepers (Alemu *et al.* 2019; Kinati *et al.* 2018; Wieland *et al.* 2016).

We then developed a *research design* outlined in a community *conversation facilitation guide* (Lemma *et al.* 2018) that covers five discussion areas: (i) gender relations in livestock husbandry; (ii) women's ownership and control of livestock resources; (iii) institutions and social structures; (iv) knowledge, attitudes, and practices around zoonotic diseases; and (v) reflection, review, and closure. We also included sections on soft skills such as gaining community entry, building rapport, participant selection, facilitation, documentation, and monitoring and evaluation.

A *team of local facilitators* was formed in each site that included veterinarians and gender focal persons from regional agricultural research centers, district offices of Agriculture and Livestock Development, as well as community veterinary assistants from community-based sheep breeding cooperatives in the four villages. We trained these teams in planning, building rapport, group facilitation, notetaking, monitoring, evaluation and learning, and reflective report writing. We provided technical support to the local facilitators throughout the

Table 1 Description of the study sites

Woreda (district)	Doyogena	Menz districts	
		Menz Mama Midir	Menz Gera Midr
Region	SNNPR	Amhara	Amhara
Population features	Male	38,605	42,102
	Female	40,029	43,027
	Average household size	5	Missing
Agroecology	Midland (30%) and highland (70%), altitude of 1900–2300 masl, bimodal rainfall between 1200–1600 mm/year, temperature range of 10–16 °C	Highland with an altitude of 2500–3500 masl, bimodal rainfall between 1000–1500 mm/year, temperature range of 15–20 °C	Altitude of 2800–3100 masl; topography consists of plain (39%), mountain (25%), gorge (12.8%), undulated (23%) and water (0.2%); bimodal rainfall between 900 and 1000 mm/year, mean annual temperature of 12.3 °C
Agricultural production system	Mixed crop-livestock dominated by crops	Mixed crop-livestock	Mixed crop-livestock
Predominant livestock value chain	Sheep followed by cattle and poultry	Sheep followed by cattle and poultry	Sheep followed by cattle and poultry
Religion	Mostly Protestant followed by Ethiopian Orthodox Christians and a few Catholics and Muslims	Ethiopian Orthodox Christianity	Ethiopian Orthodox Christianity
Marriage system	Monogamous and polygamous	Monogamous	Monogamous
Ethnicity	Kambaata, Tambaro, Hadiya, Donga, and Wolayta	Amhara (99.91%)	Amhara (99.91%)
Kebeles (villages)	Hawora Awara and Ancha Sadicho	Molale	Mehal Meda

Source: Central Statistical Agency and ORC Macro (2006)

process, facilitated team reflection and learning sessions, and documented the process and findings.

After selecting the four villages, we held separate meetings with leaders at district and village levels to provide feedback on results of the situation analysis and introduce the new intervention. We also discussed *engagement of the larger community* and how participants in the pilot were to be selected. We selected about 60–70 participants and invited them to participate in our research as male household heads, female household heads, couples, leaders of women's groups, and religious leaders, among others, based on the criteria that they are livestock keepers and members of the community-based sheep breeding cooperatives. None declined the invitation.

We brought together a cross-section of community members to reflect on and discuss defined focus areas through *community conversations* to cultivate trust, aid institutionalization and scaling of the approach, and sustain change. Participants included livestock keepers, leaders/influential people from the district administration, livestock agencies, offices of agriculture, regional research centres, women and youth affairs offices, churches and district communication offices. Between June 2018 and March 2019, we conducted 16 community conversations organized into four series of discussions per village. We used tools such as pictures, posters,

questioning, and storytelling to elicit discussions around topics. Community conversations were blended with sensitization approaches to disseminate new knowledge. The participants developed action plans to execute the desirable changes agreed upon and developed change indicators. A team of five influential community members (including women) moved the agenda forward by sharing information in churches, and through community events and home visits.

We collected *data* sequentially using mixed methods of equal priority to triangulate and complement each other. Before the first community conversation session, we conducted a household baseline survey using a semi-structured questionnaire to determine knowledge, attitude, and practice of community members regarding division of labor, ownership, and control of livestock resources; institutions and structures; and management of zoonoses. We interviewed about 20 individuals from randomly sampled households in each village at the location conversations where held, yielding 83 respondents (47 men and 36 women). Participants responded to statements on a Likert scale range of agreeing, neutral, and disagreeing. Reasons for their ratings were also recorded.

At the start of each subsequent community conversation session, male and female participants were invited to reflect on how they were responding to the lessons and action plans

from previous sessions as individuals, households and/or groups; share challenges they faced; and think of ways to better support change at the household and community levels. We qualitatively documented early signs of change in knowledge, attitudes, and practices during the conversations. At the end of each session, together with the local facilitators we reflected on the activity and documented key lessons by teasing out successful and unsuccessful elements and what changes would be appropriate.

Following each community conversation session, we made home visits to the 20 randomly selected participating households in each village using a checklist to monitor changes in knowledge, attitudes, behavior, and challenges faced. Along with development agents we conducted this monitoring at an interval of 1–2 months in each village, and we visited each household about 1–3 times during the intervention. Observing and interviewing multiple household members (including children) during home visits aided verification and triangulation of changes mentioned during the conversations. We conducted an end-line survey after 1 year by interviewing individuals who participated in the baseline study to determine changes after the intervention. The chief limitation of this study is the lack of a control group. However, the different methods we used to systematically and rigorously collect data give us confidence that changes can be attributed to the intervention.

We conducted on-site *analysis of qualitative data* at the end of each community conversation session during team reflection/debriefing. We reviewed and summarized discussions and reports of change from each session, and categorized findings into key emerging themes, and compiled findings of all discussions and home visits in each district into session reports. Our final step was to look through the reports, summaries, and transcripts to establish emerging themes and key findings and illustrate these with direct quotes from community members. During analysis, we considered a variety of factors including gender, other factors that intersect with gender to shape life experiences, geographical location, culture, and proximity.

We used SPSS version 24 to analyze data for descriptive statistics, and Stata software version 14 (Texas, USA) for analytical statistics. A single composite trait (latent variable) called theta (θ) was derived to quantify perceptions of men and women towards zoonoses and practices of safe handling of livestock and animal-source foods before and after the intervention. Theta (θ) provides an overall estimate of the quality being measured (desirable perception of respondents towards zoonoses and practice of safe handling of livestock and animal-source foods). It considers the difficult and discriminant values for each item/question and overall, it is a more reliable measure than a simple sum of the individual items in the scale. We computed predicted values of theta for each respondent based on their aggregate response to the

perception and practice questions. The perception questions were on a 3-point Likert scale—“agree,” “neutral,” and “disagree.” We grouped the scale; when a respondent indicated “agree” with a negative or “undesirable” statement, we classified the response as an “undesirable” perception, and vice versa. We always included responses of “neutral” as “undesirable” since our focus was to ensure that the specificity of the “desirable” statement is high. The response to questions regarding practices was also on a 3-point Likert scale with “often,” “sometimes,” and “never” dichotomized as “desirable” versus “undesirable” practices. We coded our data by assigning 1 to correct or desirable answers and 0 to wrong or undesirable responses. We used Mann–Whitney U test to compare the mean values of the predicted thetas before and after the intervention, taking a p value of <0.05 as significant.

Results

Participation in the Community Conversation Sessions

Between 50 and 65 community members participated in each community conversation (Table 2), for a total of 928 (339 females, 37%) participants who attended as couples or individuals representing male-headed or female-headed households.

Changes in Gender Relations

Division of Labor

In all study sites, there were distinct roles for women, girls, men, and boys before the intervention. According to both men and women participants in Doyogena and Menz, men are culturally responsible for tilling the land, treating sick animals, herding, and marketing farm produce. They are rarely involved in domestic chores. However, in Menz, cultural norms do not prevent men from engaging in domestic activities, but their engagement is an individual choice. However, men in Doyogena, particularly in Ancha Sadicho, were ridiculed if they undertook “feminine” tasks like cooking, fetching water, processing *enset* (false banana), milking, or cleaning the barn. Community conversation participants in Ancha Sadicho explained that: ‘when a man does domestic work, women pity him and ask him what happened to his wife,’ and men also ridicule him as ‘... womanish; he does women’s work allowing his wife to sit.’

After the community conversation, changes in gender division of labor in Doyogena and Menz were notable; men started participating in cooking, fetching water, milking, and cleaning barns. This was more notable in Menz, where cultural norms are relatively less constraining. One of the female

Table 2 Participants in the series of community conversations

Community conversation sessions	Discussion area	Number of participants by site and gender			
		Doyogena district		Menz districts	
		Male	Female	Male	Female
1st session	Gender division of labor	61	44	75	34
2nd session	Human-livestock interactions and zoonoses	66	56	80	32
3rd session	Access to and control over livestock resources and social structures	53	45	81	33
4th session	Reflection: sharing lessons and end-line evaluation	55	50	118	45
Total		235	195	354	144

participants in Menz Mama said that after the conversation she taught her husband how to make *watt* (sauce) and *enjera* (unleavened bread): “he now knows how to cook and helps make the fire when I am cooking.” Men in Doyogena are also gradually participating in traditionally women’s roles without attracting ridicule or being called *korkoranco* (greedy or selfish) (Table 3).

Regarding livestock management practices, our quantitative analysis reveals increased recognition of women’s roles and men’s active involvement in milking and barn cleaning previously assigned to women and girls (Fig. 1). For instance, before the intervention 34 of 83 participants agreed that “men equally participate in routine milking and barn cleaning activities,” which changed to 69 of 83 following the intervention. Second, before the intervention, 49 of 83 participants agreed that “men equally participate in caring for weak/sick animals at home,” which became 70 of 83 afterwards.

In both Doyogena and Menz, women participants described a reduction in workload as men increasingly share domestic activities after the intervention:

The community conversations made me realize my thinking was right. I used to do household chores but not regularly. I clean the barn, milk the cow, cook sauce, and others. After the community conversations, I’ve started doing these activities more often. When you lead

a household, you have to do it in a more collaborative and consultative manner. If you think you are the head and can do everything or decide alone, then you are most likely to fail. You cannot clap with one hand. The community conversations make us rethink and question what we do and why we do it. (Male participant in Menz Gera)

After the community conversation, women became more actively involved in marketing sheep and started learning how to plow with oxen—previously men’s tasks. One of the male participants in Menz Mama described how he taught a widow in the community to plow to minimize her expenses on hired labor and plant on time:

During our village savings group meeting, I talked about role sharing with members. After the meeting, a woman approached me and asked if I can teach her how to use an ox-plow. The woman came to my farm and I showed her how to use the ox-plow. She did not turn the plow properly, so it tripped her and she fell. But she continued learning. She also asked me to show her how to assemble the plow and I have agreed. In return, I asked her to teach me how to bake *Injera*.

Women have also trained children to become more involved with non-traditional tasks:

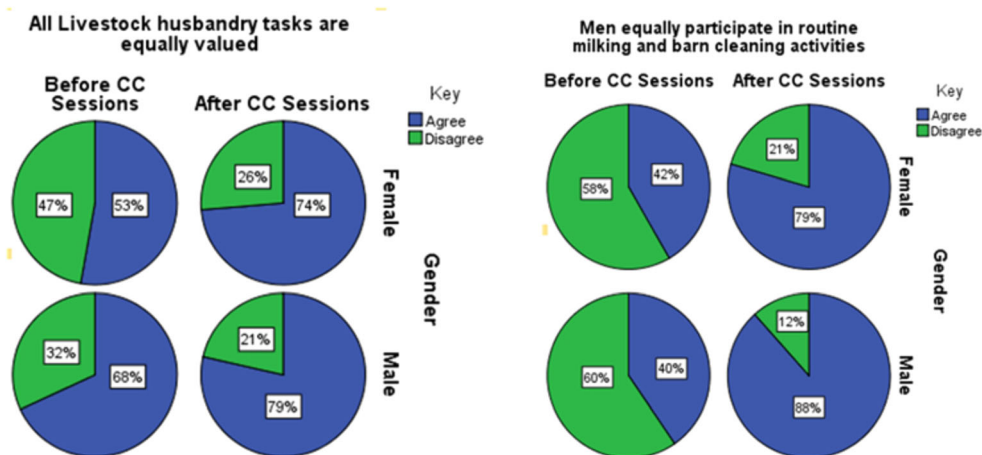
Previously, when children came from school, the boys did men’s work and girls did women’s work. Since the conversations, we hold household discussions and share roles. The boys carry out roles normally done by girls, such as cleaning barns, milking, and feeding animals. We are teaching them to share tasks despite their sex. It was a taboo for a boy to milk a cow, but we are teaching them not to wait for girls to milk the cows. Cooking was the role of women and girls but now I am teaching my sons to cook (Female participant in Doyogena).

Table 3 Understanding and practice about gender division of labor before and after the intervention

Over	N	Mean theta *	Std. Err.	[95% Conf. Interval]
About gender division of labor				
Before intervention	83	-.46	.08	-.62 – .3
After intervention	82	.47	.07	.33 .6

* Significantly different mean theta at $p < 0.01$ level (Mann-Whitney test)

Fig. 1 Changes in perceptions of women’s roles and division of labour among men and women participants



Ownership and Control of Livestock and Income

In Menz, it is common that both husband and wife own livestock jointly. Both the bride and groom bring livestock to their new household and both have a say over livestock management. However, if one or the other fails or is unable to contribute livestock, the partner who does has sole control of their livestock for the first 6 months of the marriage, but this diminishes over the years. As the couple accumulate livestock through births, purchases, or gifts, it increasingly becomes joint property. In the event of divorce, ownership of the original livestock reverts to the person who brought it into the marriage, while livestock acquired during marriage is shared equally. Men generally sell cattle and sheep, and while decisions to allocate income are mostly made jointly, expenditure is mainly controlled by men. Women have limited possibilities to also sell sheep, but control income from poultry and butter, although with rising prices for poultry and poultry products, men are increasingly getting involved in decisions about poultry.

In Doyogena, although there were discrepancies regarding livestock ownership and control across households, men have full control over livestock in most households regardless of the source of the animals or length of marriage. In Ancha Sadicho both men and women agreed that men have full control over livestock, even if ownership is joint. Women control poultry and vegetable and *enset* gardens. One male participant observed:

When a woman brings livestock from her relatives to the marriage, the man will automatically sell it. Women cannot claim they own it. There is a saying that any property from the woman is not good, so the man sells it.

Women agreed with this statement, conceding that they cannot claim ownership or control of any livestock and expressed no desire to do so. Control of income from sale of livestock

also varies across households. In some, women have no say over income from the sale of livestock, whereas in others, men consult their wives and they make a joint decision.

The community conversations have created shifts in perceptions about livestock ownership and control. In Menz and Doyogena, women are gradually having more voice over the sale of sheep and cattle, getting involved in markets to sell sheep, and deciding over expenditures. In Menz, a woman heard about joint decision-making from a male community conversation participant and stopped her husband from selling sheep without her consent. Another woman nullified the selling agreement and brought the sheep back home (Table 4; Fig. 2).

Access to Livestock Information

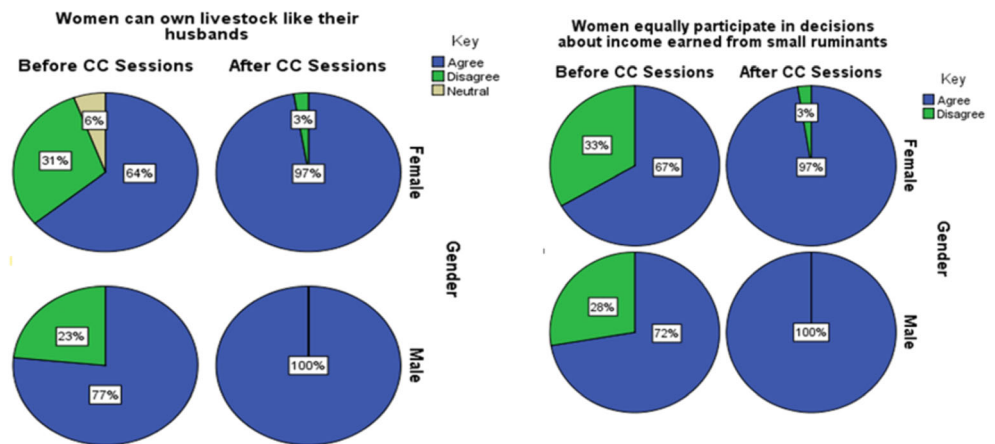
Our results showed that women had limited access to information and knowledge on livestock, markets, and human health. This was aggravated by women’s lack of membership in agriculture-based community groups through which agricultural information is mostly communicated. Generally, men had more access to information since they are the first point of contact to service providers (as household heads), are more mobile and have extended networks. Women’s relatively limited mobility attributed to their reproductive roles, lack of education, cultural norms preventing contact with male

Table 4 Understanding and practice of respondents about ownership and control of livestock and income before and after the intervention

Over	N	Mean theta *	Std. Err.	[95% Conf. Interval]
Ownership and control of livestock and income				
Before intervention	83	-.36	.08	-.53 – .18
After intervention	82	.42	.04	.35 – .49

* significantly different mean theta at $p < 0.01$ level (Mann-Whitney test)

Fig. 2 Changes in women's and men's perceptions over control of livestock and income



extension agents in the absence of their husbands, men's pre-conception that women cannot comprehend technical information, and men's perceived loss of control over women all also contribute to their limited access to information, engagement in livestock management and participation in markets. For instance, a female participant in Menz Gera noted:

Women are constrained in accessing opportunities in the community. When an extension worker comes home, he calls for the head of the household and speaks to him. The wife is not involved in the conversation. When there is training, the men attend. When I ask my husband if I can attend a training and he says no, I don't go because I never know what might happen when I return.

Male participants in Doyogena confirmed this:

The experts first approach the man and talk to the man even about issues concerning women. We (men) order our wives to make coffee and don't invite them to the discussion. From now on, I will make sure that I engage my wife. She can join the discussion when outsiders come.

The community conversations have helped men and women realize the importance of greater access to agricultural information for women. Before the intervention, 55.4% (46 of 83) participants replied "a woman can go for training instead of her husband in search of livestock services," which became 75.9% (63 of 83) afterwards. The men also challenged their pre-conceived attitude that information passed on by extension workers is too complex for women to comprehend and pledged to engage women in discussions with service providers, allow them to participate in information and knowledge sharing forums, support them to develop the confidence to participate, and share domestic chores to make time for women to participate in training and meetings.

Couples attending community conversations were approved although some remain hampered by the lack of childcare and labor.

Increased Harmony, Trust, and Collaboration in Households

There was a reported increase in harmony within households as husbands increasingly engage their spouses in decision-making (especially in Doyogena) and support them in carrying out household chores, and household conversations now often include children, which has improved intra-household collaboration, knowledge-sharing, and decision-making. Increase in trust has opened avenues for women to access knowledge and information and participate in community meetings and markets. A male participant in Doyogena remarked: 'Men used to make decisions alone but now we have started consulting the household and it brings in more trust and cooperation.' This was reiterated by both male and female participants, although mostly men. A male participant in Ancha Sadicho, Doyogena, described changes in his household:

I was the only one who took livestock and crop products to the market. But now, my wife participates in the market. She sells potatoes and wheat. We now discuss with each other and make joint savings and are planning to open a joint bank account. Before the community conversations, she [wife] did not trust me but now, she knows the market and trusts me. Our relationship at home has improved and we discuss more openly. Now we understand and appreciate one another. If I need money for socialization, I ask her and she gives me. I help my wife in ensilage processing, and my wife also helps me in plowing. I did not clean the barn and help with household chores before. Now we discuss how to share roles.

This account was validated by his spouse and other participants.

Another male participant in Doyogena said:

I realized there was a lot of workload on my wife. When I finished plowing, I would relax with my friends and my wife would still have domestic responsibilities after working on the farm. Now, I ask the children to assist their mother. Men do not fetch water but now, I fetch water with my children to help my wife. I am asking my children to take on more responsibilities. Now, I also let my wife take sheep to the market. We've become the talk of the community. Men are now sharing barn cleaning increasingly. A man did not go into the backyard garden with onset but now, men are sharing women's work.

And another added:

I did not fetch water before but now, I fetch water during the day or evening. I am learning how to milk a cow. Even my wife used to encourage me to learn how to milk a cow but I did not take it seriously. I have realized that what my wife used to tell me was right. So now, I am ready to learn because it's to the benefit of my household and I am happy to do it. We now share tasks with my wife. I used to plow and my wife would stay at home. But now she helps me with farm work. When we come home, we also share tasks. We are happy and there is a change in my house.

Changes in Managing Zoonotic Disease Risks

Before the intervention, a considerable proportion of participants interviewed (the majority women) believed that drinking raw milk was good and that humans do not get diseases from animals. Barn cleaning is critical to control respiratory diseases and it was women's sole responsibility. Most women are overburdened by reproductive and productive roles and cleaned the barns once or twice a month, exposing themselves to diseases. Handling meat and milk for home consumption was the sole responsibility of women and girls. Community members did not bury dead animals and live animals interacted freely with carcasses (mostly in Menz).

The community conversation shifted participants' perceptions, knowledge, and practices regarding animal handling. A male participant in Doyogena expressed his ignorance about zoonoses and committed to change his practice:

Thank God I am still alive. I was not aware of the consequences of drinking raw milk. I will stop drinking raw milk. When my cow or sheep give birth, I hold the calf

close to my chest. I didn't know this could expose me to diseases. I will now use gloves when I assist in births. I will buy and use gloves, boots, and masks when cleaning barns and handling sick animals.

Concomitantly, our results also revealed that at the end of the intervention, community members were more aware of zoonoses and associated risk factors. There were notable changes in perceptions regarding human-livestock interactions and the consumption of animal products (Table 5).

Some of the notable changes in practice to manage zoonotic risks factors were isolation of sick animals, using plastic bags to cover hands (due to lack of access to gloves) when handling sick animals, cleaning barns regularly (once a week or daily in some households), separating shelter for different livestock species, separating human-animal shelters, burying animals that die of disease, burying soil contaminated with the blood of a sick animal, burying sheep heads, washing hands with soap, cleaning the udder before milking, and being vigilant and seeking veterinary services.

Regarding animal-source food handling, reduced consumption of raw meat and milk were notable changes in Doyogena where the practice was prevalent. The consumption of raw meat and milk is gradually decreasing after understanding that it exposes humans to brucellosis, bovine tuberculosis, tapeworms, and other pathogens, although it still occurs at social events.

A female participant in Doyogena explained:

Before the community conversation, we gave raw milk to the children thinking it gives them strength but now we give them boiled milk because of the diseases passed on from animals to humans. If we boil the milk, those diseases die. Before the community conversation, we used to eat raw meat; it's the culture here. If you don't eat raw meat, it feels like you have eaten nothing. But now our perception has changed. We cook the meat and boil milk. Whenever we ate raw meat, we experienced stomach upsets. Immediately after eating, we would run to the clinic to buy medicine; but now we don't.

A male participant in Ancha Sadicho, Doyogena, also commented:

During Meskel holiday [the Finding of the True Cross], we slaughtered an ox and shared it amongst households. I requested my son to go and collect my share. I told the men not to give my son raw meat. When he returned home, I asked him if he had eaten raw meat and he replied no, the men were eating roasted meat. During the festive season, households ate boiled meat and noted a reduction in health problems.

Table 5 Perceptions towards zoonoses before and after the intervention

Statement	Gender	Before intervention			After intervention		
		Agree (%)	Neutral (%)	Disagree (%)	Agree (%)	Neutral (%)	Disagree (%)
Drinking raw milk is not a health risk for the consumer	Female	63.9	2.8	33.3	5.1	0.0	94.9
	Male	50.0	6.5	43.5	4.8	0.0	95.2
Boiled milk is bad and raw milk is good	Female	61.1	0.0	38.9	10.3	0.0	89.7
	Male	54.3	2.2	43.5	11.9	0.0	88.1
Fresh milk is medicine and recommended for patients	Female	79.4	2.9	17.6	5.1	0.0	94.9
	Male	64.4	0.0	35.6	4.8	0.0	95.2
If milk is boiled, vitamins are destroyed	Female	55.6	0.0	44.4	10.3	5.1	84.6
	Male	44.4	6.7	48.9	4.8	0.0	95.2
The reason for boiling milk for children is to prevent milk-borne diseases	Female	66.7	5.6	27.8	94.9	0.0	5.1
	Male	63.0	4.3	32.6	95.2	0.0	4.8
Humans do not get diseases from animals	Female	38.9	16.7	44.4	20.5	0.0	79.5
	Male	30.4	4.3	65.2	19.0	0.0	81.0
Sharing shelter with animals is not a health risk	Female	47.2	0.0	52.8	0.0	5.1	94.9
	Male	32.6	0.0	67.4	11.9	0.0	88.1
Drinking raw blood is good for strength and does not have health risks	Female	25.0	22.2	52.8	2.6	0.0	97.4
	Male	17.5	5.0	77.5	4.8	0.0	95.2
Souring milk helps prevent disease transmission from animals to humans	Female	72.2	8.3	19.4	23.1	5.1	71.8
	Male	56.5	6.5	37.0	4.8	2.4	92.9
When animals die of disease, the carcass should always be buried/burned	Female	65.7	0.0	34.3	100.0	0.0	0.0
	Male	62.8	0.0	37.2	90.5	2.4	7.1
Use of protective equipment reduces disease transmission risks	Female	72.2	8.3	19.4	100.0	0.0	0.0
	Male	63.0	4.3	32.6	97.6	2.4	0.0

Survey results also showed a reduction in unsafe handling and utilization of animal-source foods in half of the women and a quarter of men. Knowledge of practices that expose humans to zoonotic diseases, such as consumption of raw animal products and lack of protection when in contact with sick animals, increased (Table 6).

For each respondent, a theta (θ) score for ‘desirable perception of respondents towards zoonoses and practice of safe handling of livestock and animal-source food’ was computed and the mean theta of respondent groups before and after the intervention compared. Significant high means after the intervention indicated a respondent’s better understanding of zoonoses and practices of safe handling of livestock and animal-source foods than before the intervention (Table 7).

Changes in Local Institutions and Structures

Gebeta Dingay nursery was established in Key Afer village, Menz Mama district, as a forage nursery in 2008 with the support of the Amhara regional government. In the same year,

a fishpond was constructed adjacent to the nursery to create employment opportunities for landless youth in the community. Six male youths organized themselves into a group and started fish farming. The community conversations allowed the group to understand the need to include female members. The male leader explained: “While attending the first round of the community conversation session, I started challenging our group. We were not gender sensitive as a group. If we included women in our group, gender balance would improve our productivity and benefit us all.” Another male member added: “... the community conversation sessions created the desire to discuss among ourselves and as a result, we went a step further and decided to take action by including six women to address gender inequality in our group.”

The group members acknowledged improvement in the innovativeness and effectiveness of the group due to the inclusion of women:

When women joined our group, we have observed better feed management and fish feeding. Women came up

Table 6 Proportion of participants practicing safe handling of livestock and animal source food

Parameters of interest	Gender	Before intervention			After intervention		
		Often (%)	Sometimes (%)	Never (%)	Often (%)	Sometimes (%)	Never (%)
Eat raw meat	Female	13.9	58.3	27.8	2.6	10.3	87.2
	Male	17.0	63.8	19.1	0.0	4.7	95.3
Drink raw milk	Female	34.3	51.4	14.3	2.6	5.1	92.3
	Male	34.0	42.6	23.4	0.0	2.3	97.7
Feed your pets raw animal products	Female	42.9	37.1	20.0	33.3	15.4	51.3
	Male	60.0	20.0	20.0	30.2	20.9	48.8
Cull sick animals for consumption	Female	5.7	25.7	68.6	0.0	10.3	89.7
	Male	10.6	19.1	70.2	0.0	4.9	95.1
Eat animals that died of disease	Female	0.0	8.3	91.7	0.0	5.1	94.9
	Male	0.0	10.6	89.4	0.0	0.0	100.0
Wash hands with soap after handling animals	Female	47.2	36.1	16.7	94.9	2.6	2.6
	Male	51.1	34.0	14.9	95.3	4.7	0.0
Bury or burn animal carcasses	Female	16.7	22.2	61.1	74.4	20.5	5.1
	Male	25.5	23.4	51.1	79.1	14.0	7.0
Slaughter domestic animals with protective equipment	Female	13.9	25.0	61.1	48.7	23.1	28.2
	Male	14.9	12.8	72.3	48.8	20.9	30.2

with alternative fish feeding options such as using household leftovers and maize flour replacing concentrate feeds, which are usually expensive and difficult to access. Fish production and productivity are improving over time and the cost of production has reduced, leading to increased income for the group.

With technical support from local partners, the group processed fish to feed their households, especially children, and marketed fish in nearby markets to earn extra income. A 3.5 kg and 2 kg fish cost up to 80 and 40 ETB (about \$2 and \$1), respectively. The group is sharing its experience with neighbouring villages where the district is undertaking similar efforts to organize unemployed youth into fish farming groups and to establish a similar fishpond. The group is serving as an example and learning site for the district and beyond.

Table 7 Comparison of ability to give a desirable response before and after the intervention for perception and practice questions

Over	N	Mean theta *	Std. Err.	[95% Conf. Interval]
Perceptions towards zoonoses				
Before intervention	82	-0.66	0.07	-0.79 -0.51
After intervention	81	0.67	0.05	0.56 0.78
The practice of safe handling of livestock and animal source food				
Before intervention	83	-0.69	0.06	-0.81 -0.57
After intervention	82	0.71	0.05	0.60 0.81

* Significantly different mean theta at $p < 0.01$ level (Mann-Whitney test)

Discussion

We found that community conversations are an effective approach to foster more egalitarian gender relations in four villages in rural Ethiopia. Men and women participants subsequently practiced more equitable labor sharing and joint decision-making over livestock and income in addition to other important household decisions. Men have begun to acknowledge women's workloads, valuing women's roles and their position in the household and community. The community conversations helped facilitate changes in knowledge, attitudes, and practices that expose humans to zoonotic diseases. Overall, in the four villages of Doyogena and Menz, there were noticeable changes in attitude and practices among men and women regarding unsafe handling of animals and consumption of animal-source foods. The conversations also influenced local structures and institutions.

Self Determination Theory (SDT) postulates that people are motivated to change undesired behavior to more desirable behavior if it is perceived to be valuable for effective functioning. The theory suggests that internalization of new behaviors progresses most effectively toward self-determined forms of regulation if the personal utility of the activity is understood. When people are provided with choices about the activity with minimum pressure, and their feelings and perspectives are acknowledged, they are more likely to adopt changes (Deci *et al.* 1991). This would suggest that our community conversation participants understood the personal utility of the behavioral changes they adopted as a consequence of their

own choices. Spouses began to acknowledge and value each other's engagement in the activities, and both men and women came to understand the importance of controlling zoonotic diseases through improved sanitary practices and avoidance of consumption of raw milk or meat.

The Transtheoretical Model, a widely applied cognitive model, subdivides the levels of motivational readiness to change into five stages that represent progression along a continuum of behavior change: (1) precontemplation, prior to awareness of the problem and intention to change future behavior; (2) contemplation, awareness of the problem and consideration of changed future behavior; (3) preparation to take action, committing and choosing how and when to act or belief in the ability to change; (4) action, modification of behavior, belief and/or environment to overcome the problem; and (5) maintenance, prevention of relapse and consolidation of gains (Heimlich and Ardoin 2008; Prochaska *et al.* 1992; Webb *et al.* 2010).

During the community conversations, participants reflected on the problem in light of their actions, beliefs, and values. The dialogues engaged participants at both cognitive and emotional levels to foster an understanding of the benefits of change. When participants understood the problem and the benefits, they developed an action plan. Monitoring helps individuals to identify discrepancies between their goals and their actual behavior thereby guard against relapse (Helzer *et al.* 2002; Quinn *et al.* 2010).

The cultural norms and values were challenged first by individual participants, then at the household level, and ultimately diffused to the community level. Changes at a larger scale reduce norm-based constraints that affect women's triple burden, mobility, access and control over resources. The critical reflection on cultural norms and traditions of handling animals and animal-source foods contributed to changes in norms and practices that expose community members to zoonoses.

These changes also resulted in greater household cooperation, trust, harmony, and social cohesion. Participants committed to making changes as a household by also including children, with whom they shared information, trained to carry out many tasks, and facilitated changes in attitudes. Continuous effort is required to sustain sufficient levels of trust. Gender Transformative Approaches (GTAs) demand both women and men to be engaged in social change to avoid the burden of change falling solely on women (Wong *et al.* 2019). Discussions around social relations provide space for reconsidering not only productive but also reproductive and community roles, fostering change in individual capacities, gendered expectations embedded within social relations at household and community levels, and institutional rules and practices (*ibid.*). GTAs trigger interest in change by raising awareness of the causal effects of gender norms and relations on family goals or wellbeing (Cornwall 2016).

Lessons Learned from Using Community Conversations

We found that continuous reflection before and after the community conversation sessions was important as it helped facilitators analyze what was working well, what was not, what needed to be done differently, emerging issues, new insights, and action points, and helped researchers, district administrators, and development agents to question their usual top-down and unidirectional approaches, and to appreciate bottom-up and multidirectional approaches. Under normal circumstances, government researchers and development agents give instructions/command to community members and rarely solicit their opinions, which causes resistance to change. The reflection process helped local facilitators appreciate the importance of listening to communities and understanding them before enforcing something. Community members appreciated being listened to and this motivated them to engage in dialogue, open-up, and enforce action plans.

Over time, we found that change was likely to happen when both husband and wife participated in the community conversation as they appreciated what transpired and committed to implementing the proposed action plans together.

Group facilitation skills are also critical to manage gender and power dynamics among diverse participants and to coordinate the entire process. Facilitators need to have skills to engage women in discussions, especially in communities where women are not generally encouraged to voice their opinions. They also need techniques to help participants build trust, communicate freely, and critically discuss issues. We found that at the start of the community conversations, community members found this difficult: they described ideal situations and conformed to the opinions of influential people. It usually took one participant to turn the conversation around, and this generally happened in a span of 30 min to 1 h into the conversation. Community conversations also require detailed descriptions of context, processes, emerging issues, reactions, debates, agreements, and decisions of community members to track change. It is important to track attendance to follow-up on dropouts or newcomers and record how the number of participants is changing.

While having great potential for helping communities realize their potential to make changes individually and collectively, community conversation alone may not yield changes at scale in the long run. Community conversations must be implemented along with other development and learning interventions to achieve long term and effective results. It is important to note that the sites used to test the community conversation approach had been targeted with livestock interventions since 2012, which may have provided a more conducive environment to facilitate change since trust between the researchers, service providers and community members had been established. The involvement of influential

community members, leaders, and government officials helped to cultivate interest, trust, enforcement of action plans and scaling of the approach. Action plans from community conversations must be linked to local interventions and supported by local service providers so that community groups continue learning, sharing, and influencing other groups. Facilitators sought to influence the wider community through religious leaders, self-help group leaders, and other community leaders. Efforts were made to replicate community conversations in household discussions, self-help group meetings, religious meetings, and other social gatherings. This requires effective management of partnerships for action and scale. Capacity development of partners was thus a central objective in the design and implementation of community conversations.

Conclusions

Our research has showed that community conversations is a potential behavioral change approach in livestock-based farming households, stimulating changes in relationships among household members and how they interact with livestock/livestock products to minimize zoonotic risks. Change in behavior requires change in both cognitive and emotional mental models. Bringing community members together for dialogue helps them reflect and develop greater self and social awareness. When community members appreciate the problem and associated consequences, they change their interpretive frame of reference, which triggers shifts in both cognitive and emotional mental models. Community conversations expose people to alternative experiences and ways of thinking and doing, which cause shifts in mental models, building trust, and encouraging collective action. The community conversation approach empowers community members and helps them discover their ability to facilitate change. Change cannot be achieved through a top-down training approach. Community members need to feel the need and capacity to change.

Risky animal-source food handling and consumption practices and deep-rooted gender inequalities demand novel and effective approaches for cultivating desired behaviors and address constraining gender relations that define the gender and livestock landscape. In this case, change in knowledge, attitudes, and practices was influenced by context, including social structures (family, friends, and groups), institutions (cultural norms, beliefs and organizations), other existing interventions, and facilitation skills. Where cultural norms are very stringent, change happened at a slow rate.

In Doyogena cultural norms were very constraining to women's physical and social mobility, designated areas of responsibility, ownership and control of livestock, and access to extension services. In addition, the belief that consuming raw meat and milk did not have health problems was very

strongly held, especially by women. This led to a much slower rate of change than in Menz, where the communities were more open to change because of prior government and NGO interventions that had exposed community members to gender relations, women's rights, and empowerment. There was also commitment from leaders. Behavior change is context-specific and scaling of the approach requires an understanding of variations in context. Although change happened in high livestock potential areas of Ethiopia, the situation might be different in pastoral communities. Further studies are needed to understand the trade-offs, participation, sustainability of change and institutionalization of the approach in the national extension system. The approach is promising to address other issues related to livestock welfare, antimicrobial resistance, or agricultural topics where behavioral changes are needed.

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Data Availability Statement The datasets generated for this study are available on request to the corresponding author.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethics Statement This research involving human participants was reviewed and approved by the International Livestock Research Institute (ILRI)'s Institutional Research Ethics Committee (ILRI IREC). ILRI IREC is accredited by the National Commission for Science, Technology, and Innovation (NACOSTI) in Kenya.

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