RESEARCH PROGRAM ON Livestock

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Evaluating the impacts of community conversation on farmers knowledge, attitudes, and practices for animal health management improvement

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Contents

Tables iv

Figures v

Acknowledgements vi

Introduction 1

Methodology and study areas 2

- Study area description 2
- Identification and selection of participants 3
- Pre- and post-assessment data collection 3
- Data management and analysis 3

Results and discussion 4

- Socio-economic variables 4
- Animal health management intervention outcomes 5
- Farmer's knowledge about animal health management indicators 8
- Farmer's attitudes about animal health management 9
- Farmers practices in animal health management systems 10

Conclusion and recommendations 12

- Conclusions 12
- Recommendations 12

References 13

Annex: Survey questionnaire 14

Tables

Table 1. Descriptions of the study area 2

Table 2. Household relations and sex of respondents 4

Table 3. Membership of participants in the CBBP cooperative 4

Table 4. Marital status of respondents 5

Table 5. Level of education of the respondents 5

Table 6. Socio-economic variables and livestock holding per household 5

Table 7. Summary of collective action for animal health management responses 6

Table 8. Animal health management knowledge change before and after community conversation (%) 8

Table 9. Animal health mamnagement attitude changes after community conversation (%) 9

Table 10. Practice changes on animal health management after community conversations (%) 11

Figures

Figure 1. Summary of community conversation changes on animal health management. 7

Figure 2. Knowledge changes on animal health management for participant farmers. 8

Figure 3. Knowledge changes on animal health management for non-participant farmers. 9

Figure 4. Summary graph of participants farmers attitudes on animal health management (%). 10

Figure 5. Summary graph of non-participants farmers attitudes on animal health management (%). 10

Figure 6. Summary graph of participants farmers practices on animal health management (%). 11

Figure 7. Summary graph of non-participants farmers practices on collective actions (%). 11

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Introduction

Ethiopia is a home for diverse livestock including small ruminants (Gizaw et al. 2010) and has the largest population of livestock in Africa (Central Statistical Agency 2009; Leta and Mesele 2014). Livestock is kept for export earnings, food security, economic growth, poverty reduction and employment opportunities (NBE 2018). Small ruminants are an important resource for livelihood and food security improvement serving as sources of food, income, risk mitigation, property security, monetary saving, investment, and providing other social and cultural benefits (Shenkute 2009; Gizaw et al. 2010).

In Ethiopia, lack of quality breeds, inadequate veterinary service, shortage of feed supply, and marketing are the main small-ruminant production challenges. Livestock production and product development are hampered by various constraints such as diseases, poor nutrition, traditional husbandry, and marketing problems (Abebe 2003).

The prevalence of animal diseases is high and access to animal health services is very low like in other developing countries (Mekonnen et al. 2021). Management of herd health is an important and integral part of small-ruminant farming to increase the efficiency and productivity of the animals. Good feeding and breeding will not result in maximum production if sheep and goats are not maintained in good health.

The CGIAR Research Program on Livestock (CRP Livestock) in Ethiopia works to address livestock production and marketing challenges and to improve the livelihoods of rural communities through the implementation of production improvement innovations and capacity development interventions. The CRP Livestock team has used the ‘community conversation’ approach to facilitate the implementation of integrated innovation practices at the community level. This community-based collaborative learning and action approach brings together community members and local partners to discuss a range of livestock management issues and act in an integrated way (Lemma et al. 2021). The objective of this study was to evaluate the effects of community conversation on the knowledge, attitudes, and practices (KAP) of small-ruminant keepers on integrated animal health management.

Methodology and study areas

We facilitated community conversations in three Livestock CRP (priority country) sites in Menz Mama, Adiyo Kaka, and Doyogena districts. The community conversations were about integrated animal health management. The villages of the community conversations interventions are the communities of Zeram in Menz Mama, Limu Suticho in Doyogena, and Shena in Adiyo Kaka districts.

The baseline survey data was collected before the community conversation actions to identify the gaps of the community for the animal health management component. The baseline data was collected from participant and non-participant farmers.

An end-line survey was conducted from the previous respondents of both participant and non-participant farmers. This was done after six months of community conversations and monitoring and follow-up of the community action identified in the community conversations and baseline survey to fill the gaps of the knowledge, attitude, and practices (KAP).

Study area description

The Zeram area is characterized as a dry highland; a cold air and frost-prone area with long coverage of dry periods. On the other hand, Limu Suticho is characterized as a wet highland area conducive to adopting different feed resources with very constrained land availability to grow different feed resources. The Shena site has a rich diversity of plantations with long rainy seasons and has relatively better feed resources (Table 1).

Table 1. Descriptions of the study area

District	Menz Mama	Doyogena	Adiyo Kaka
Population: Male	52,880	62,593	73,279
Female	53,925	66,943	76,270
Administrative region	Amara	SNNP	SNNP
Average family size	5.14	6.74	6.35
Agricultural production system	Mixed crop and livestock	Mixed crop and livestock	Mixed crop and livestock
Agroecology	Dry highland	Highland	Wet mid-altitude
Predominant livestock types	Sheep	Sheep	Sheep
Village/kebele	Zeram/04	Limu Suticho	Shena
Average sheep holding per household	14	2.4	7.3
Dominant religion	Orthodox	Protestant	Orthodox
Ethnicity	Amara	Kambata	Kafficho

Source: Respective district livestock and fishery development offices

Identification and selection of participants

Due to COVID 19 during the study periods, a limited number of participants were selected from each study site. The community conversations and pre-and post-data collection were employed with the application of safety precautions against the disease. A total of 120 (n=40 from Menz, n=40 from Doyogena, and n=40 from Adiyo Kaka) participant farmers were involved in community conversation out of whom 61 participant farmers were selected for impact survey data collection and an additional 43 non-participant farmers were selected as control farmers to compare the impacts of a community conversation on farmers KAP on participatory animal health.

Pre- and post-assessment data collection

The knowledge, attitudes, and practices on animal health management were assessed using questionnaires, considering the purposes of the community conversation content (Annex 1). The questionnaire was administered in a separate face-to-face interview for each selected participant for about 15-20 minutes for each interview.

The data was collected from 104 (35% female) respondents. Of these respondents, 41% were non-participant farmers and the remaining were community conversation learning participants. The post-survey data was collected from the same farmers after six months of community conversation implementation.

Data management and analysis

The quantitative data was collected using designed questionnaires having basic socio-economics variables and livestock holding capacities and animal health management KAP indicators. The qualitative data was collected using community conversations. The pre-and post-community conversation quantitative assessment of health management data was collected using individual interviews and recorded in SPSS 25 and transferred to STATA 14 for statistical analysis.

The responses to the knowledge, attitude, and practices questions were recorded in five categories using Likert scale methods and coded 1 = strongly disagree (SD), 2 =disagree (D), 3=neutral (N), 4=Agree(A), and 5=strongly agree (SA) for data collection purposes and summary analysis of mean and standard deviations.

After the data collection observations of the responses, we looked at the two extreme responses (strongly disagree and strongly agree), which were few. Based on this the responses were grouped into three categories to ease complexity and evaluate the data with good weight. Thus, 1 and 2 were merged to disagree and 4 and 5 to agree but 3 remained neutral.

The team used mixed (quantitative and qualitative) data analysis techniques. The result was reported concurrently based on the quantitative data and supported by the qualitative data in explanatory methods. The analysis of collective action issues was explained mainly based on the agreement and disagreement changes and either changed negatively or positively.

The demographic and livestock keeping characteristics of the study were summarized using mean and standard deviations for continuous variables and percentage for categorical variables. The socio-economic variables of gender, membership of the local institutions, marital status, leadership participation, and level of education were analysed using frequency and percentage.

Results and discussion

Socio-economic variables

The majority (70%) of the respondent were household heads (HHs) followed by the spouse and very few respondents were children who have knowledge and contribute to animal health management activities. More than half (66%) of the respondents were male, and their balance was female. About 40% of the respondents have leadership experience in various formal and informal community organizations (Table 2).

Table 2. Household relations and sex of respondents

Respondents' relationship to HH head	Frequency	Per cent
Head	73	70.19
Spouse	26	25.00
Child	5	4.81
Sex of respondents		
Male	68	66.42
Female	36	33.58
Do you have a leadership role in the community?		
Yes	42	40.38
No	62	59.62

From the participant (61) respondents, the membership of the community-based breeding program (CBBP) cooperative was weighted (72%) for male-headed household and the female-headed household shared 23% and the remaining, which were very few was both (husband and wife) membership (Table 3).

Table 3. Membership of participants in the CBBP cooperative

Membership of sheep breeding cooperative in the household (frequency)	Study sites			
	Menz	Doyogena	Adiyo-Kaka	Total
Male household head	16	12	16	44 (72%)
Female household head	6	5	3	14 (23%)
Both husband and wives	0	3	0	3 (5%)
Control farmers	13	15	15	43
Total	35	35	34	104

The marital status and leadership experiences of the respondents indicated that 85% of the respondents were married and living with their spouses and the remaining were single as widowed, unmarried, and divorced (Table 4).

Table 4. Marital status of respondents

Marital status	Frequency	Per cent
Never married	6	5.77
Married	88	84.62
Divorced	2	1.92
Widowed	8	7.69

The level of education for the respondents showed that the majority (42%) of them had enrolled in grades 5-8 and very few (7.69%) of them had completed grade 10 and above. And the other majority (26.92% and 23.1%) were unable to read and write and had enrolled at the first cycle of primary school level, respectively (Table 5).

Table 5. Level of education of the respondents

Level of education	Frequency	Per cent
Do not write and read	28	26.92
Grade 1–4	24	23.08
Grade 5–8	44	42.31
Grade 10 and above	8	7.69
Total	104	100.00

The other important socio-economic variables evaluated in the study are listed below. All respondents keep sheep and most of the respondents reared other livestock for various purposes. The average age of the respondent indicated an economically active labour force. The average family size is not far from the national average and all respondents has experience in small ruminant production (Table 6).

Table 6. Socio-economic variables and livestock holding per household

Variable	Observation	Mean	Std. Dev.	Min	Max
Age	104	40.32	12.06	18	67
Family size	104	6.07	2.31	1	16
Years of experience	104	20.97	12.15	1	50
Cattle size	102	4.52	6.38	1	65
Sheep size	104	7.88	7.27	1	40
Goat size	19	2.47	1.5	1	5
Equine size	79	1.62	0.83	1	4
Poultry size	87	4.01	2.21	1	16

Animal health management intervention outcomes

Animal health and productivity were a priority concern of community members who had active discussions during the conversations. Both Table 7 and Figure 1 indicated the changes in the KAP of animal health management actions.

After the implementation of community conversations, the overall response variables of the animal health management statements showed mixed results in farmers' knowledge, attitudes, and practices. The community conversation aimed to correct communities' wrong perceptions and practices by improving their knowledge and attitudes of animal health management actions.

There is a positive change in farmers' health management statements based on their statements that highlighted the importance of regular vaccinations and deworming of animals to prevent their illness, separation of newly introduced animals and animals returned from the market or quarantine to check the

animal's health status, the need to properly dispose dead animals' bodies to prevent new infections, cleaning of their animals' barns and sheds and consulting health professionals when animals become sick.

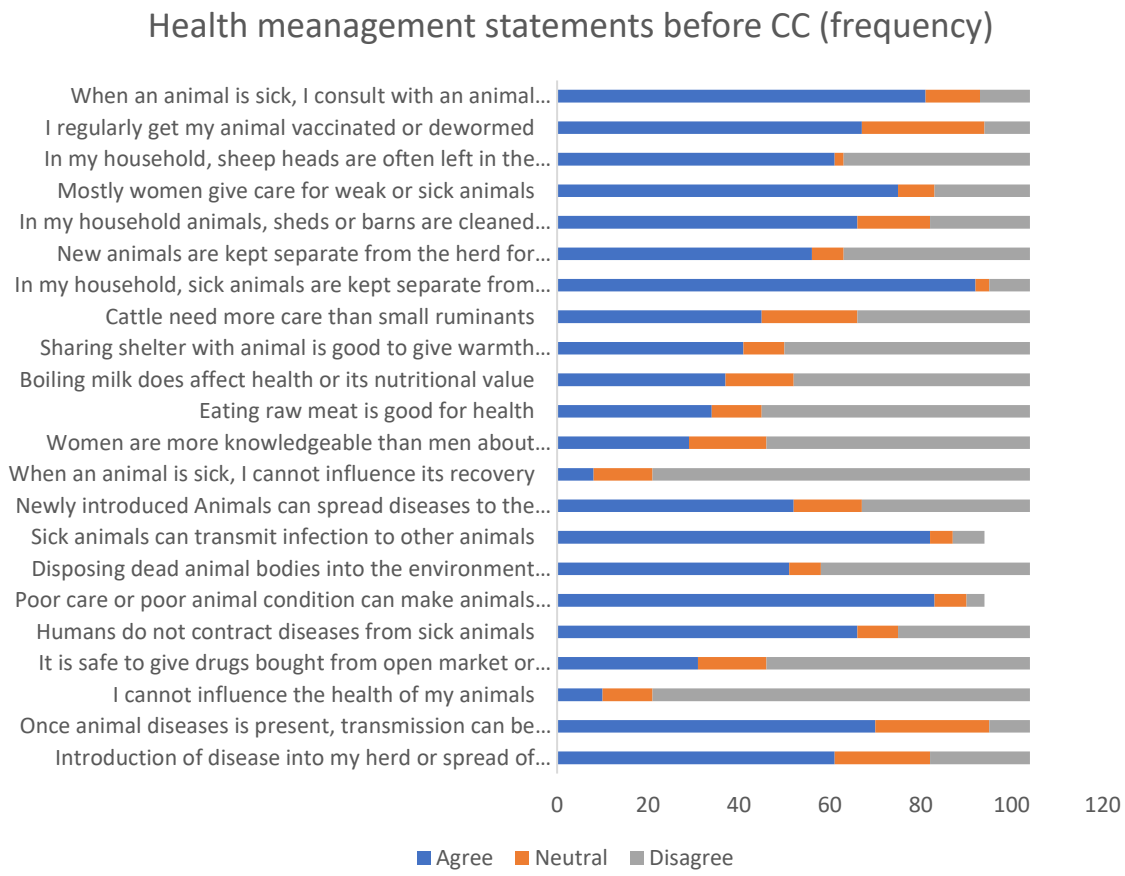
There is also a correcting of wrong perceptions and practices regarding disease transmission from animals to humans, zoonoses and disease management (e.g. prohibiting eating raw meat and drinking raw milk), and the practice of leaving sheep heads in the field after slaughter or giving them to dogs has also reduced after the community conversation.

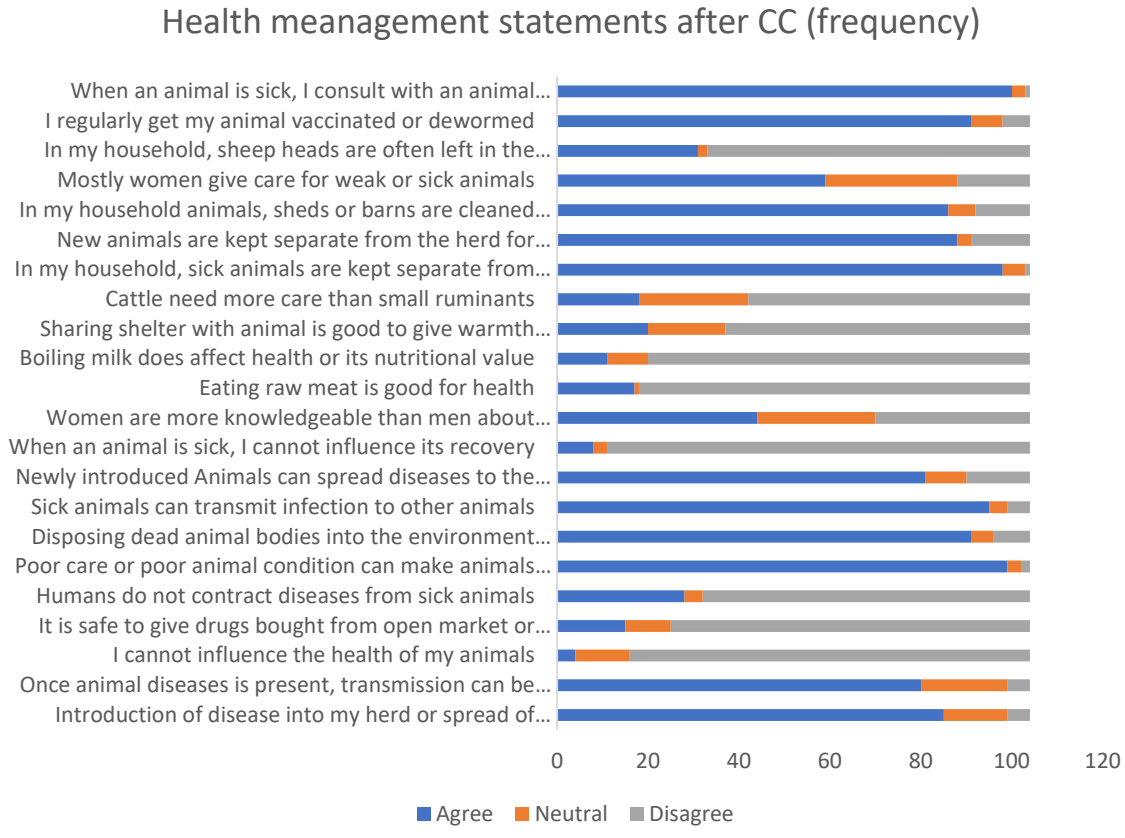
Table 7. Summary of collective action for animal health management responses

Health management statements	Agree		Neutral		Disagree		Mean		SD	
	B	A	B	A	B	A	B	A	B	A
Introduction of disease into my herd or spread of animal disease can be prevented	61	85	21	14	22	5	2.59	2.77	1.93	2.27
Once animal diseases is present, transmission can be controlled	70	80	25	19	9	5	2.67	2.72	2.11	2.23
I cannot influence the health of my animals	10	4	11	12	83	88	2.1	1.19	Null	0.68
It is safe to give drugs bought from open markets or shops to sick animals	31	15	15	10	58	79	2.3	1.39	1.23	1.03
Humans do not contract diseases from sick animals	66	28	9	4	29	72	2.64	1.58	1.92	1.3
Poor care or poor animal condition can make animals susceptible to diseases	83	99	7	3	4	2	2.61	2.93	2.21	2.4
Disposing dead animal bodies into the environment can cause new infections	51	91	7	5	46	8	2.49	2.8	1.62	2.31
Sick animals can transmit infection to other animals	82	95	5	4	7	5	2.6	2.87	2.18	2.36
Newly introduced Animals can spread diseases to the herd	52	81	15	9	37	14	2.5	2.64	1.71	2.2
When an animal is sick, I cannot influence its recovery	8	8	13	3	83	93	2.1	1.18	Null	0.72
Women are more knowledgeable than men about animal diseases	29	44	17	26	58	34	2.28	1.74	1.2	1.74
Eating raw meat is good for health	34	17	11	1	59	86	2.33	1.34	2.33	1
Boiling milk does affect health or its nutritional value	37	11	15	9	52	84	2.34	1.3	1.39	0.9
Sharing shelter with an animal is good to give warmth both for animals and human	41	20	9	17	54	67	2.39	1.55	1.42	1.22
Cattle need more care than small ruminants	45	18	21	24	38	62	2.43	1.58	1.62	1.23
In my household, sick animals are kept separate from the	92	98	3	5	9	1	2.89	2.93	2.3	2.4
New animals are kept separate from the herd for some time	56	88	7	3	41	13	2.54	2.72	1.72	2.27
In my household animals, sheds or barns are cleaned ever day	66	86	16	6	22	12	2.64	2.71	2	2.25
Mostly women give care for weak or sick animals	75	59	8	29	21	16	2.72	2.41	2.1	1.99
In my household, sheep heads are often left in the environment or for dogs	61	31	2	2	41	71	2.59	1.62	1.78	1.35
I regularly get my animal vaccinated or dewormed	67	91	27	7	10	6	2.64	2.82	2.1	2.32
When an animal is sick, I consult with an animal health professional	81	100	12	3	11	1	2.78	2.95	2.19	2.41

Note: B= Before CC, A= After CC

Figure 1. Summary of community conversation changes on animal health management.





Farmer's knowledge about animal health management indicators

Both Figure 2 and 3 and Table 8 indicate that there are positive and negative changes in the knowledge of animal health management. After the implementation of the community conversation, the farmers' knowledge on the possibility of the introduction of animal disease and controlling of the spread of animal disease changed positively by 38% and 18% for the participant farmers but, very low (2%) and remained the same for the non-participant farmers, respectively.

The knowledge of farmers on new infection causes resulting from disposing of dead animals' bodies in the environment surprisingly achieved 100% agreement for the participants but only improved by 18% for their counterparts. There are also changes in other health management knowledge indicator statements for the participant farmers like poor care of animals can make animals susceptible to diseases and it is unsafe to purchase drugs from the market or traders. The misunderstanding of farmers on disease contaminations from animals to humans changed negatively by 60% for participants but only 14% for non-participants.

Table 8. Animal health management knowledge change before and after community conversation (%)

Animal health management knowledge indicator statements	Status	Disagree		Agree		Neutral	
		Before	After	Before	After	Before	After
Introduction of disease or spread of animal disease can be prevented	Participants	20	0	57	95	23	5
	Non-participants	23	12	61	63	16	25
Once animal diseases are present, transmission can be controlled	Participants	6	0	79	95	15	5
	Non-participants	12	12	51	51	37	37
I cannot influence the health of my animals	Participants	82	95	5	5	13	5
	Non-participants	77	77	16	2	7	21
It is safe to give drugs bought from open markets or shops to sick animals	Participants	61	90	28	7	11	3
	Non-participants	49	56	32	25	19	19
Humans do not contract diseases from sick animals	Participants	30	90	57	8	13	2
	Non-participants	26	40	72	53	2	7
Poor care or poor animal condition can make animals susceptible to diseases.	Participants	5	0	93	100	2	0
	Non-participants	2	5	84	88	14	7
Disposing dead animal bodies into the environment can cause new infections	Participants	44	0	49	100	7	0
	Non-participants	44.2	14	48.8	67	7	19

Figure 2. Knowledge changes on animal health management for participant farmers.

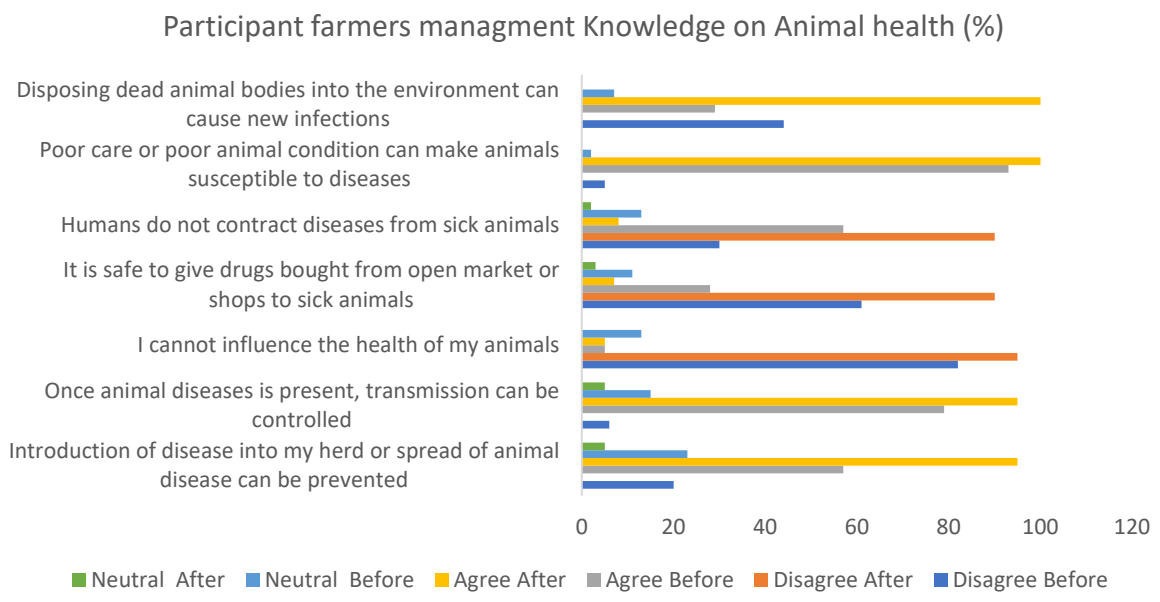
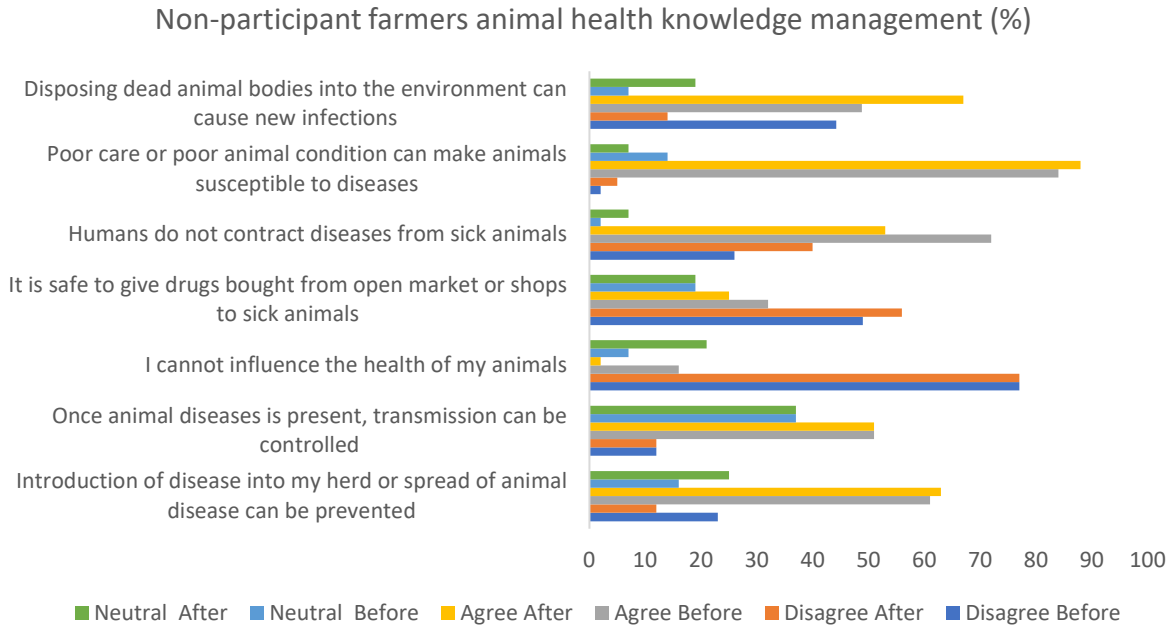


Figure 3. Knowledge changes on animal health management for non-participant farmers.



Farmer's attitudes about animal health management

The attitudes of both participant and non-participant farmers changed in different magnitudes. The farmers' views on animal health management on disease transmission through newly introduced animals statement changed by 39% and 11% for the participant and non-participant farmers, respectively, after the CC implementation. Their disagreement on 'Eating raw meat good for health' changed by 35% for participants and 14% for non-participants. On the other hand, the response on the effect of boiling milk affects nutritional value declined by 39% for participants and 18% for non-participants after community conversation (Table 9).

Table 9. Animal health management attitude changes after community conversation (%)

Animal health attitude statements	Status	Disagree		Agree		Neutral	
		Before	After	Before	After	Before	After
Sick animals can transmit infection to other animals	Participants	3	0	90	92	7	8
	Non-participants	12	4.65	86	90.7	2	4.65
Newly introduced animals can spread diseases to the herd	Participants	34	5	51	90	15	5
	Non-participants	37	26	49	60	14	14
When an animal is sick, I cannot influence its recovery	Participants	89	93.4	3	3.3	8	3.3
	Non-participants	67	84	14	14	19	2
Women are more knowledgeable than men about animal diseases	Participants	52	26	33	51	15	23
	Non-participants	60	42	21	30	19	28
Eating raw meat is good for health	Participants	57	92	33	8	10	0
	Non-participants	56	70	32	28	12	2
Boiling milk does affect health or its nutritional value	Participants	53	92	44	5	3	3
	Non-participants	47	65	23	19	30	16
Sharing shelter with an animal is good to give warmth for both animals and human	Participants	56	77	38	13	6	10
	Non-participants	46	58	42	26	12	16
Cattle need more care than small ruminants	Participants	43	64	41	11	16	25
	Non-participants	23	53	51	26	26	21

Figure 4. Summary graph of participants farmers attitudes on animal health management (%).

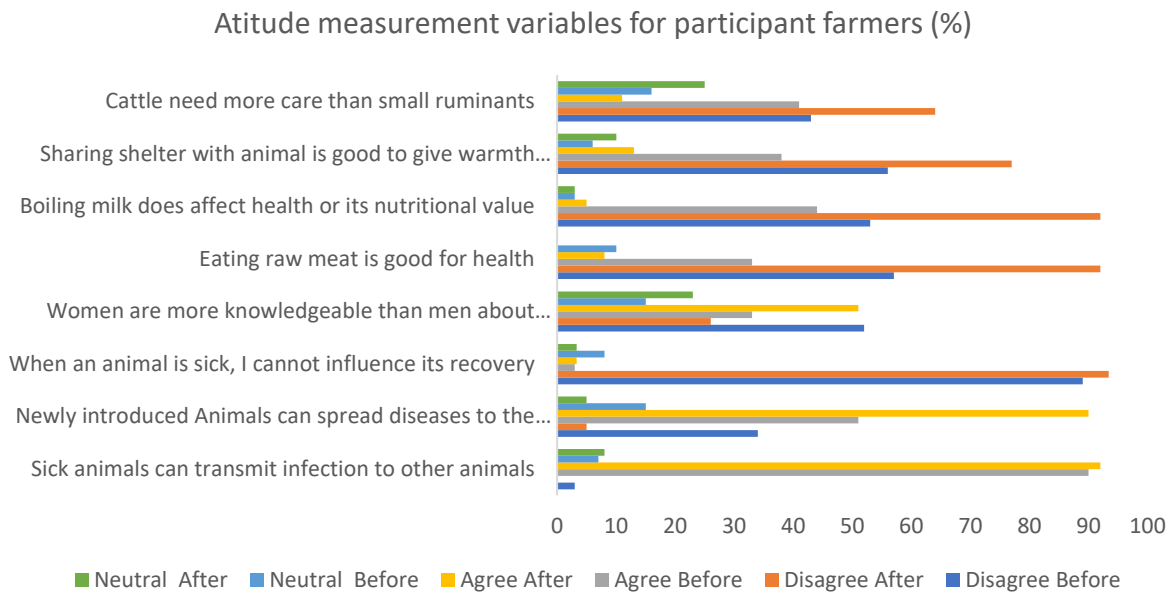
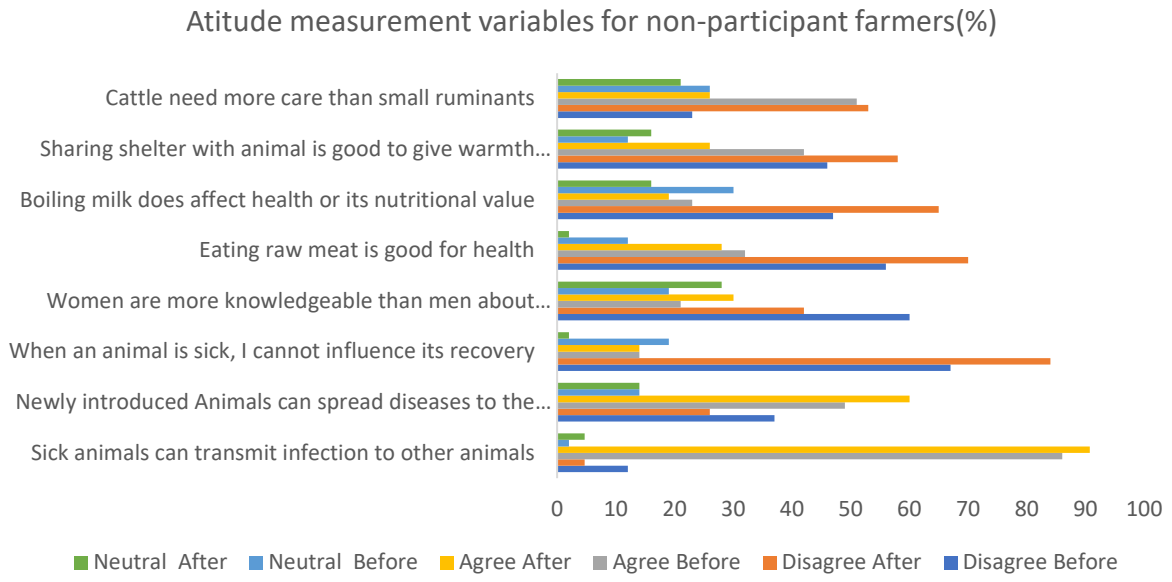


Figure 5. Summary graph of non-participants farmers attitudes on animal health management (%).



Farmers practices in animal health management systems

After the implementation of the community conversation, the farmers' practices on animal health management changed as expected for the participant farmers. The farmers' health management practice changed by 24% for participants and 9% for non-participants, after the community conversations included consultations of animal health professionals. Regularly vaccinating and deworming of animals improved by 35% and 4% for the participant and non-participant farmers, respectively. The cleaning practices of barns and sheds of animals changed by 30% and 2% for the CC participants and non-participants, respectively. The quarantine practices also changed by 44% and 2% for those participants and non-participants, respectively. The leaving of sheep heads in the environment for dogs also declined by 48% and 2% for the participants and non-participants, respectively. (Table 10).

Table 10. Practice changes on animal health management after community conversations (%)

Animal health practice statements	Status	Disagree		Agree		Neutral	
		Before	After	Before	After	Before	After
In my household, sick animals are kept separate from the herd	Participants	6	0	92	100	2	0
	Non-participants	11	2	84	86	5	12
New animals are kept separate from the herd for some time	Participants	41	3.3	49	93.3	10	3.3
	Non-participants	37	30	61	63	2	7
In my household animals, sheds or barns are cleaned every day	Participants	21.3	5	62.3	93	16.4	2
	Non-participants	21	21	65	67	14	12
Mostly women give care for weak or sick animals	Participants	16.4	7	80.3	52	3.3	41
	Non-participants	26	18.6	60	62.8	14	18.6
In my household, sheep heads are often left in the environment or for dogs	Participants	42	90	56	10	2	0
	Non-participants	35	37	63	58	2	5
I regularly get my animal vaccinated or dewormed	Participants	6.6	2	60.6	96	32.8	2
	Non-participants	14	12	70	74	16	14
When an animal is sick, I consult with an animal health professional	Participants	11	1.6	74	98.4	15	0
	Non-participants	9	0	84	93	7	7

Figure 6. Summary graph of participants farmers practices on animal health management (%).

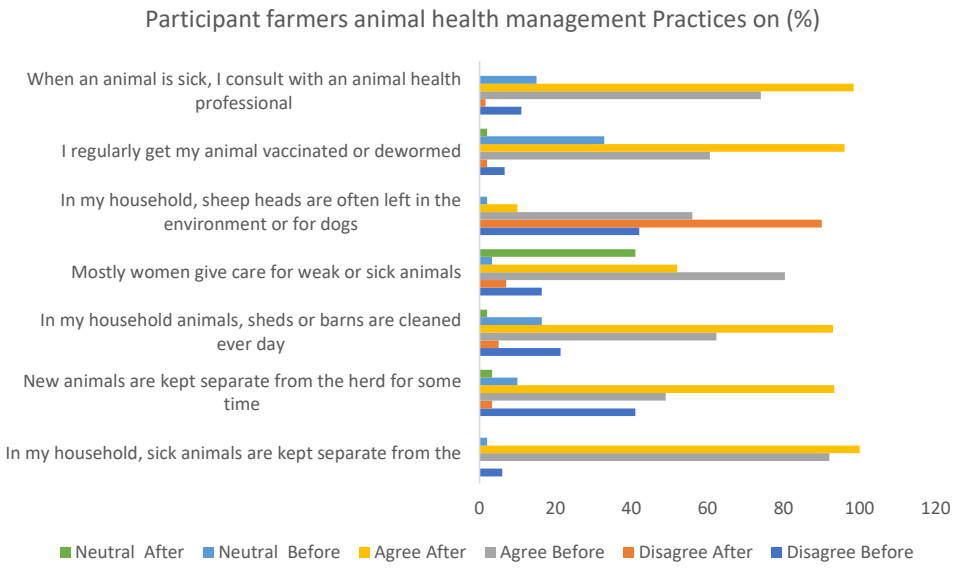
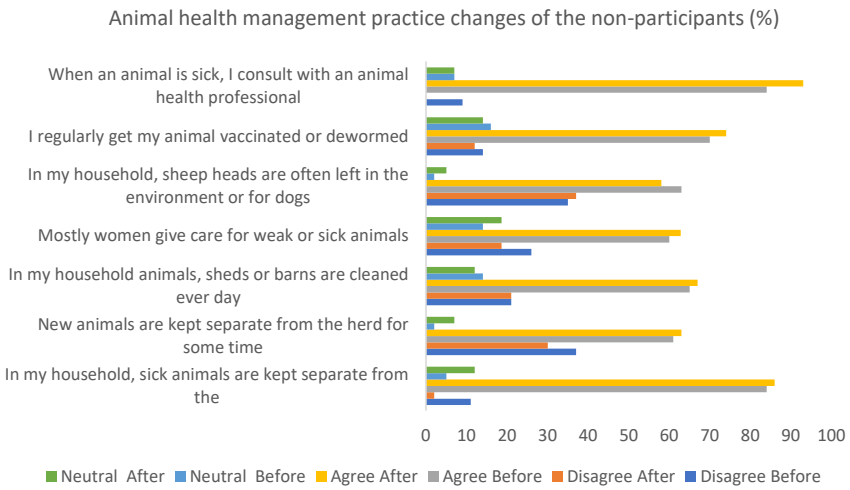


Figure 7. Summary graph of non-participants farmers practices on collective actions (%).



Conclusion and recommendations

Conclusions

Farmers' decisions are influenced by their attitudes, knowledge, values and perceptions. Limited awareness and knowledge of community members about animal disease causes, disease transmission and control measures influence their livestock health management practices. Changing the knowledge, attitudes, and practices (KAP) of community members in livestock health management is complex and challenging. Effective integrated animal health management requires community-based engagement and actions.

Community engagement approaches such as community conversation, which is a participatory learning method, facilitated collaborative learning and joint action among community members and changes in knowledge and practices of community members in this study.

The results demonstrated that the community engagement facilitated effective changes in KAP of animal health management actions. This approach brought immediate changes since it created a chance for peer-to-peer learning between the community conversation participants. The study showed that community conversation is an effective learning approach.

The pre-and post-of community conversation study results revealed that farmers' knowledge and practices have changed significantly due to the community conversations. Significant changes were demonstrated in the areas of quarantine of new animals, disposing of animal carcasses to manage recurrent disease, disease transmission, zoonosis disease management, and regular deworming and vaccinating animals.

The changes in the KAP of farmers demonstrated that the community conversation approach is a promising and useful research and training method for animal health management knowledge and practice in farming communities.

Open dialogues using mixed and single-sex group discussions facilitated changes in gender relations, empowered women to access new information and knowledge, and improved household decision-making practices at the household level for effective animal health management actions.

Recommendations

To sustain the outcomes of these community conversations, integration of the approach in research and extension systems is needed. Capacity development of research and development partners in participatory and inclusive engagement approaches is also needed to implement effective intervention and facilitation.

Women's knowledge and capacity development in animal health management need special considerations because of its significant contribution to improving the production and productivity of small ruminants.

The application of community conversation in animal health management is promising to change the behaviour of farmers and pastoralists. Further studies on using the community conversation approach are needed in different region and production systems to confirm its benefits.

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Annex: Survey questionnaire

Pre- and post-CC KAP survey questionnaire on animal feeds, animal health and collective livestock marketing

Introduction

I/We are from ILRI/ICARDA. The institution(s) work on the development of sheep/goat value chain in your area with the purpose of improving the wellbeing of smallholder households through improved income and nutrition. Animal feed, animal health and collective marketing are the main constraints to small ruminant production improvement. We are planning to conduct community conversations to raise awareness and identify community actions to address these challenges.

To measure the effect of community conversations on the knowledge and practice change of community members, we want to establish a baseline before the intervention. For this purpose, we are interviewing selected male and female community members who were randomly selected from the list of community members who will be participating in the conversations. We will do the same interviews with these sample community members after the end of the intervention. Your household is one of the selected households for the interview. The interview will take about 30 minutes. The information will remain strictly confidential and your responses will never be shared with anyone other than our team.

Do you agree to participate in this study? If so, please sign here

……..

(if not possible to give signature, interviewers to confirm that oral consent has been obtained)

May I start now? Thank you very much.

Did the household consent to the interview? (1=YES 2= No) *If no, Why? (use code a)*	*If YES, record the starting time and proceed with the interview.*

Code a. No Consent: 1. Respondent refuses to participate 2. Respondent does not have the time

3. Other: (specify)

District: _____ Name of village/kebele: _____ Name of interviewer:

Date: _____ Time of interview: Start_____ End _____

Background Information

Household characteristics (*circle/or write****)***				
Name of respondent:	Relationship to HH head:	Age:	Gender: 1. Male 2. Female	Marital status: 1. Single 2. Married 3. Divorced 4. Widowed
Family size (#):	Years of farm experience:	Level of education: Do not write and read Grade 1-4 Grade 5-8 Grade 10 or above	Average flock size (in #): Cattle: _____ Sheep: _____ Goats: _____ Equines: ____ Poultry: _____	10. Membership of sheep breeding cooperative: Male household head Female household head Both spouse
Do you have any leadership role in the community? Yes No				

Animal health management

N*o*	***Knowledge statements***	***Before and after intervention*** Physical Likert scale: 5 seeds/rocks assigned for each question. If you truly believe the statement, give 5. If you truly disagree with the statement, do not give any. If you agree a little, give a little. In the early stages of the questions, encourage reflections – 'how do you feel about this answer compared to the previous one? Do you agree more or less?' Encourage re-evaluation to make sure respondents understand the concept of the 5-level score.	***Comments***
12	Introduction of disease into my herd or spread of animal diseases can be prevented.		
13	Once animal disease is present, transmission can be controlled.		
14	I cannot influence the health of my animals.		
15	It is safe to give drugs bought from open market or shops to sick animals.		
16	Humans do not contract diseases from sick animals.		
17	Poor care or poor animal condition can make animals susceptible to diseases.		
18	Disposing dead animal bodies into the environment can cause new infections.		
. **Attitude statements**			
19	Sick animals can transmit infections to other animals		
20	Animals newly introduced to the herd can spread diseases.		
21	When an animal is sick, I cannot influence its recovery.		
22	Women are more knowledgeable than men about animal diseases.		
23	Eating raw meat is good for health.		

24	Boiling milk does affect its health or nutritional value.		
25	Sharing shelter with animals is good to give warmth both for animals and humans.		
26	Cattle need more care than small ruminants.		
Practice statements			
27	In my household, sick animals are kept separate from the herd until they fully recover.		
28	New animals are kept separate from the herd for some time.		
29	In my household, animal sheds or barns are cleaned every day.		
30	Mostly women give care for weak or sick animals.		
31	In my household, sheep heads are often left in the environment or for dogs.		
32	I regularly get my animals vaccinated or dewormed.		
33	When an animal is sick, I consult with an animal health professional.		