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Community-based breeding programs and animal health interventions in the extensive production system of Ethiopia: a political economy and stakeholder analysis

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The aim of this study was to identify potential institutions, their contributions, and linkages among them for the successful implementation of Community-Based Breeding Programs (CBBP) and Animal Health Interventions (AHI) in Ethiopia. Stakeholder analysis was done using the Institutional Analysis and Development Framework, comprising three basic stages: context, application of stakeholder analysis methods, and action. Power and interest matrix analysis was used to segregate and prioritize the stakeholders based on their interest, influence, and power in running and influencing the selected interventions. Data were generated through focus group discussions, key informant interviews, and literature review. To rate the contribution level, map the relationship, and identify their influence, stakeholders were categorized based on their type of contribution. In both interventions, 43 stakeholders were identified, of which 13 participated in both interventions. Governmental and non-governmental organizations, the private sector, and projects were identified to have a stake in both interventions. For CBBP, 17 stakeholders with 30 linkages and for animal health interventions, 15 stakeholders, with 36 potential linkages were mapped. Based on the power-interest matrix

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analysis, stakeholders such as the Ministry of Agriculture, national and regional research institutes, and projects such as the International Center for Agricultural Research in the Dry Areas and Health of Ethiopian Animals for Rural Development (HEARD), have a high level of power and interest to implement both interventions. Absence of strong and continuous monitoring and evaluation, absence of sustainable financial support, and low level of interest in stakeholders supporting the interventions technically were identified as strategic gaps to be considered. Working on the political economy and stakeholder analysis is crucial to understand the formal and informal linkages, the power and influence of actors, and the outcome attained through the joint contributions of these stakeholders. Increased collaboration in interventions could generate synergistic effects, reduce conflicts of interest, and strengthen accountability between and among stakeholders. Privatizing animal health services through graduate veterinarians could enable access to wider areas of pastoralists and small ruminant producers. Stakeholders with high power and low interest need to be approached and periodically sensitized to use their power for the sustainability of the interventions.

KEYWORDS

animal health, community-based breeding, political economy, linkage mapping, power-interest matrix

Introduction

Livestock production is a cornerstone of the agricultural economies worldwide, particularly in low-income countries where it contributes significantly to food security, livelihoods, and economic stability (FAO, 2019). In Ethiopia, the livestock sector accounts for about 45% of the total value of agricultural production and supports the livelihoods of 70% of the population (PSI, 2023). It serves as a multifaceted asset, providing food, cash income, manure for soil fertility and fuel, employment opportunities, and critical services such as transport and draught power (Bezabih et al., 2020). For many rural households engaged in mixed farming systems and pastoralists, livestock serve not only as a source of livelihood but also as a form of savings and insurance, underscoring its vital socio-economic importance (Sherif and Alemayehu, 2018; Tegegne and Feye, 2020).

Within the broader livestock sector, small ruminants—sheep and goats—hold particular significance for smallholder farmers and pastoralists (Gebremedhin et al., 2017; ILRI, 2020). They provide a range of benefits, including milk, meat, wool, manure, and immediate cash flow, while also playing a key role in social and cultural practices, and help buffer against risks-during crop failure and other agricultural setbacks (Shenkute, 2009; Wodajo et al., 2020; Mahamed and Ali, 2023). In Ethiopia, about 60% of rural households in the mixed crop-livestock systems and 90% of households in pastoral systems rear sheep and goat (Gebremedhin et al., 2017; ILRI, 2020). Nevertheless, the sector's full potential of this sector to enhance rural livelihoods remains largely untapped due to various systemic and environmental challenges. These challenges include the poor quality and seasonality of feed, high prevalence of diseases and parasites, limited access to veterinary services, and inadequate availability of inputs such as improved breeds and feed supplements (Gizaw et al., 2018; Jemberu et al., 2022). Various governmental and non-governmental organizations have undertaken initiatives to address these challenges including the implementation of breeding strategies such as crossbreeding, breed substitution, and selective breeding programs (Gizaw et al., 2013). While these approaches have demonstrated some potential, their outcomes have been limited and fragmented. This is largely attributed to a lack of integration between research institutions and extension services, minimal involvement of smallholder livestock farmers in the design and implementation of breeding programs, insufficient and unsustainable funding, and weak enabling policies and institutional support (Haile et al., 2011; Gizaw et al., 2013; Mueller et al., 2015).

Moreover, livestock diseases remain a critical bottleneck, affecting productivity and threatening livelihoods. High morbidity and mortality rates are particularly pronounced in

Abbreviations: AHI, Animal Health Interventions; ASF, Animal Source Foods; BARC, Bonga Agricultural Research Center; CAHWs, Community-Animal Health Workers; CBBP, Community-Based Breeding Programs; DBARC, Debre Birhan Agricultural Research Center; FDRE, Federal Democratic Republic of Ethiopia; FGD, Focus Group Discussion; GTP, Growth and Transformation Plans; HEARD, Health of Ethiopian Animals for Rural Development; ICARDA, International Center for Agricultural Research in the Dry Areas; KII, Key Informants Interview.

areas with higher temperatures and humidity, where livestock are more vulnerable to environmental stressors (Megersa et al., 2011; Ahmedin and Assen, 2023). These health challenges not only reduce the availability of replacement stock but also lead to significant economic losses, thereby exacerbating poverty and food insecurity (Shapiro et al., 2017). The implications of livestock diseases extend beyond economic losses. They heighten the sensitivity of animals to climate-induced stressors such as drought, creating a vicious cycle of vulnerability for rural households. Thus, reducing livestock morbidity and mortality presents an opportunity to substantially improve household livelihoods by increasing income from the sale and consumption of animal source foods (ASF) such as milk, meat, and eggs (Gemeda et al., 2016; Mekonnen et al., 2019; Wodajo et al., 2020).

Recognizing the critical role of livestock in national development, the Ethiopian Government has implemented a series of policies and strategies aimed at transforming the livestock sector. These include the Rural Development Policies and Strategies (RDPS) launched in 2003, the Plan for Accelerated and Sustained Development to Eradicate Poverty (PASDEP) in 2005, the Growth and Transformation Plans (GTP I and II), the Livestock Master Plan (2015–2020), the Climate Resilient Green Economy Strategy (2015–2030), and the more recent Food System Resilience Program (FSRP) (2022–2028). These initiatives have sought to enhance productivity, promote economic growth, reduce poverty, and mitigate climate change through climate-resilient agricultural practices (MoA and ILRI, 2013; FAO, 2019). However, the anticipated transformation of the livestock sector has fallen short of expectations. Key barriers include weak enforcement mechanisms, lack of timely updating policies that fail to adapt to evolving circumstances, a lack of accountability, inadequate monitoring and evaluation frameworks, and poor institutional coordination (Shapiro et al., 2017; Haile et al., 2019a; Bezabih et al., 2020; Tegegne and Feye, 2020).

Despite the critical role of livestock in Ethiopia's agricultural economy, research on stakeholder dynamics and the political economy of livestock interventions has been limited. Previous efforts have largely focused on issues such as natural resource conservation, water resource management, climate change adaptation, and food security, often with a focus on projects driven by non-governmental organizations (NGOs) (Zeleke et al., 2006; Aberman et al., 2011; FAO and IWMI, 2018; Bezabih et al., 2020; Mekuria et al., 2021). As a result, the institutional arrangements, political structures, and stakeholder networks specific to livestock programs—particularly community-based breeding programs (CBBPs), Animal Health Interventions (AHIs), and marketing systems for sheep and goat production system—remain poorly understood. This study aimed to address this knowledge gap by analyzing the political economy and stakeholder dynamics of these key small ruminant interventions in Ethiopia. By addressing these issues, the findings will inform the design of more inclusive, effective, and sustainable livestock policies and interventions in Ethiopia's livestock sector. Specifically, the study sought to:

- Identify and map the stakeholders, their contribution, and the linkages involved in sheep CBBPs and AHIs.
- Assess the political economy of stakeholders' engagement in these interventions using a power and interest matrix.
- Identify strategic gaps limiting the effectiveness of these interventions in improving the livelihoods of smallholders and pastoralists.

Materials and methods

Ethics statements

The study involving human participants was approved by the Research Ethics Review Committee of the College of Agriculture and Environmental Sciences, Bahir Dar University (Approval No. 011/8/2017). All procedures were carried out in accordance with relevant local regulations and institutional guidelines. Informed consent was obtained from all participants prior to their involvement in the study.

Description of the study sites

This study was conducted in three purposively selected sites in Ethiopia, where CBBPs for sheep and Animal Health Interventions (AHI) are implemented. Each site represents a distinct agro-ecological zone and livestock production systems (Figure 1). Two of these sites focused on CBBPs for Menz and Bonga sheep, both situated within mixed crop-livestock production systems. The third site represents a pastoral livestock production system, where AHIs are implemented under the Health of Ethiopian Animals for Rural Development (HEARD) project, where the production system is pastoralist. The first site, the Menz CBBP site, is in the Menz Mama Mider district of the North Shewa Zone in the Amhara Region. This highland area, situated at altitudes between 2,800 and 3,300 m above sea level, is known for its rugged terrain and temperate climate. The region experiences cool weather, with annual rainfall ranging from 900 to 1,200 mm, mostly occurring during the main rainy season from June to September. The indigenous Menz sheep, highly valued for their resilience to the harsh climate, play a vital role in the livelihoods of smallholder farmers by providing meat, wool, and a source of cash income (Mwema et al., 2021; Besufkad et al., 2024).

The second site, the Bonga CBBP site, is located in the Adeyo and Telo Districts of the Kaffa Zone in the South West Ethiopia

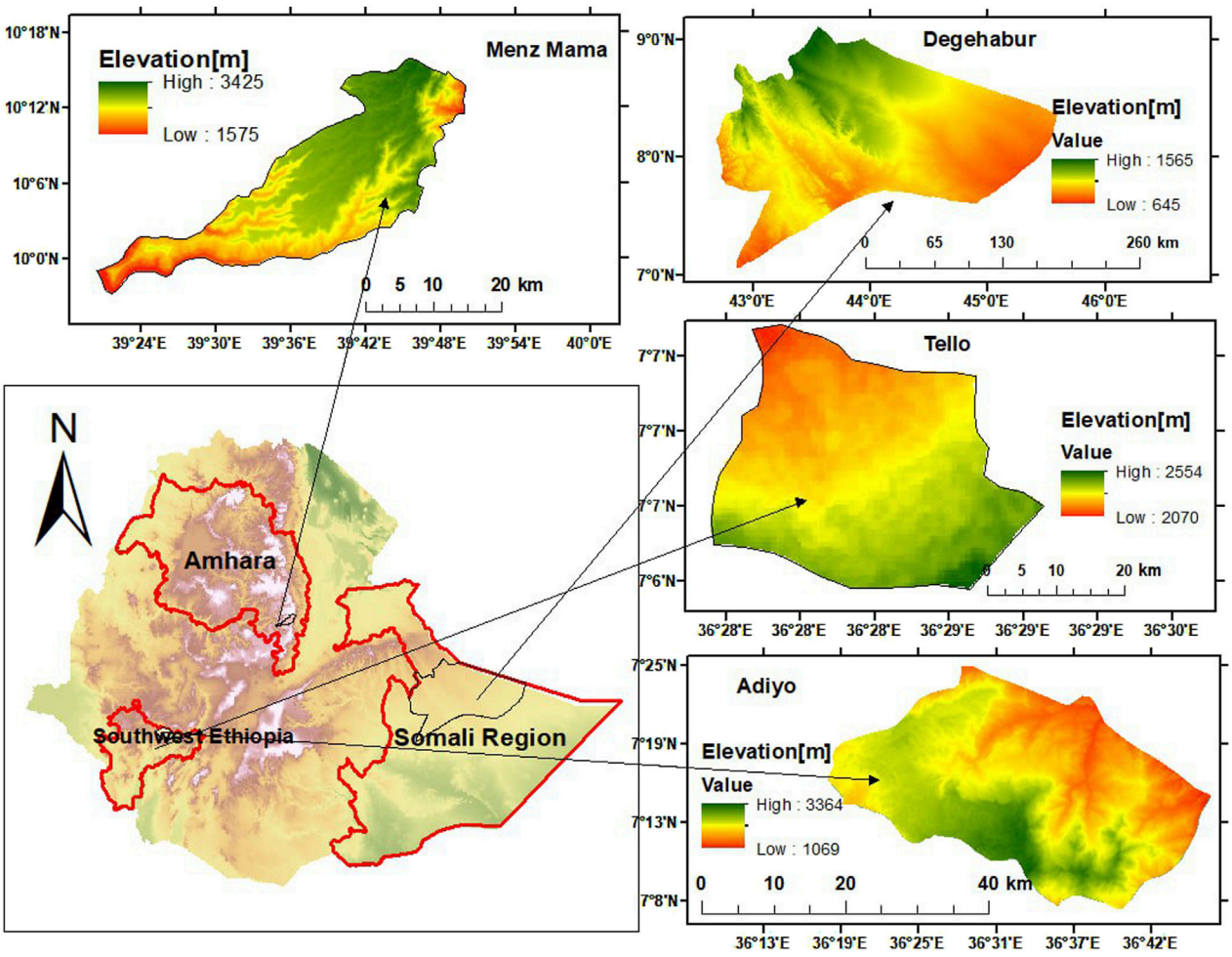


FIGURE 1
Location map of the study sites (Source: Unique land use, Ethiopia).

Peoples' Region. This mid-highland area is characterized by its lush vegetation, dominant mixed crop-livestock production system with abundant rainfall ranging from 1,079–2032 mm annually, with an average temperature of 24°C, and a humid climate that supports diverse agricultural activities, including livestock production (Areb et al., 2021).

The third site is the Degehabur District. It is located in the Jerrer Zone of the Somali Region. This lowland area is characterized by an arid and semi-arid climate, with an altitude of 1,044 m above sea level and annual rainfall averaging between 300 and 400 mm, making it prone to recurrent droughts. The district is located between 8°13′ North longitude and 43°34′ East latitude. Livestock production in this district is predominantly pastoral, with communities relying heavily on livestock such as cattle, camels, goats, and sheep for their livelihoods (Omar, 2018). The Degehabur site was selected as part of the HEARD project, which aims to address critical animal health challenges in pastoral and agro-pastoral systems (Figure 1).

Study design

This study adopted a case study research design with a qualitative approach, which is particularly effective for exploring complex social phenomena in real-world settings (Bunkar et al., 2024). Given the multi-level institutional nature of the interventions, the Institutional Analysis and Development (IAD) framework was employed to guide the investigation. This approach enabled a detailed examination of multiple units of analysis across various institutional levels, capturing the intricacies of stakeholder relationships and institutional dynamics.

Data collection

Data collection methods included stakeholder workshop, key informant interviews (KII) and focus group discussions (FGD)

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TABLE 1 Number of focus group discussions (FGD) and key informant interviews (KII).

Interventions	Districts	Stakeholder meeting participants	Number of FGDs	Number of participants in FGD			Number of KII
				Male	Female	Total	
Menz CBBP	Menz Mama	27	2	13	8	21	19
Bonga CBBP	Adiyo and Telo	-	2	11	14	25	28
HEARD	Degehabur	-	2	7	13	20	8
Total		27	6	31	35	66	55

with stakeholders spanning from the national to the kebele (the lowest administrative level). The participants were selected based on representativeness of organizations having a stake in CBBP and AHI, including implementer farmers and pastoralists (Table 1). These methods were chosen to ensure diverse perspectives were captured, enabling a thorough institutional analysis and a review of gaps in the design and implementation of the selected interventions. The study was conducted between July to September 2024.

A stakeholders meeting was held for the Menz sheep CBBP, involving 27 participants purposively selected for their direct role in sheep breeding, animal health, and prior engagement with the program. The meeting aimed to verify key stakeholder identification, discuss planned evaluation activities, and document the type and level of stakeholder contributions. After discussions, six participants were excluded due to limited relevance or interest. These individuals were respectfully excluded from further involvement in the study. The remaining 21 stakeholders were subsequently divided in to two FGD categories to facilitate more targeted analysis. The first group, comprising 12 participants, consisted of stakeholders primarily engaged in the breeding program activities. The second group included nine individuals whose roles entered on animal health service delivery. This strategic categorization enabled targeted analysis of stakeholder contribution in genetic improvement and health service delivery within the CBBP framework.

In the case of the Bonga sheep CBBP, stakeholder analysis was conducted separately for two distinct breeding initiatives to capture variation in group composition and gender dynamics. Participants were purposively selected based on their active involvement in sheep breeding and animal health, as well as their previous participation in the CBBP at the designated implementation sites. The first FGD was held with a mixed-gender CBBP group in Boka village, and included 14 participants. The second FGD involved 11 participants from a women-only CBBP group in Sheda village. This dual-group approach allowed the study to identify and compare gender-specific roles, challenges, and contributions within the CBBP framework.

For the AHI under the HEARD project, a stakeholder analysis was conducted through two FGDs, each involving 10 participants. Stakeholders were purposively identified based on their involvement in animal health service delivery and prior experience with the HEARD project at the selected implementation site. The participants mix included district-level livestock experts, kebele-based development agents, animal health post experts, HEARD project staff, model pastoralists, and community elders. These discussions provided critical insights into the implementation of health interventions, focusing on identifying challenges, addressing gaps, and refining institutional processes to improve outcomes.

Participants in the KIIs included experts and practitioners from zonal, district, and kebele government offices in agriculture, cooperatives, trade, and finance. Additionally, private sector stakeholders such as input suppliers, private veterinarians, and operators of veterinary drug shops were interviewed to gain a comprehensive understanding of the institutional ecosystem surrounding the interventions.

Through this participatory and multi-level research design, the study aimed to uncover the institutional arrangements, stakeholder interactions, and systemic challenges influencing the success and sustainability of the CBBP and AHI interventions, offering insights that can inform future improvements.

Description of the case study programs

This study examined two well-established livestock interventions in Ethiopia: the CBBPs for Menz and Bonga sheep and the HEARD project. These interventions were selected based on their longevity, scalability, and documented impact on productivity and resilience of small ruminants in smallholder systems.

Community-based breeding programs (CBBPs)

Menz and Bonga sheep CBBPs were selected as a case studies representing participatory genetic improvement models. These programs applied a bottom-up, farmer-centric approach to breed

selection, integrating local knowledge and preferences into formal breeding frameworks. Key traits targeted included growth rate, reproductive performance, and adaptability (Kosgey and Okeyo, 2007; Haile et al., 2023). Farmers actively participated in setting breeding objectives and in selecting superior animals, supported by researchers and trained enumerators.

The breeding programs were implemented through multi-stakeholder collaboration involving national research institutes, extension agents, and breeders' cooperatives. Data collection was carried out by local enumerators using standardized performance recording tools. Genetic selection decisions were informed by continuous data analysis and supported by technical backstopping from scientists. The programs also incorporated animal health interventions such as strategic deworming, vaccination against endemic diseases, and improved veterinary drug access via community-managed cooperatives.

CBBPs in the study areas served as representative models due to their success in scaling to over 150 villages and their role in validating livestock technologies and building farmer capacity. The scaling of CBBPs was done by government initiatives (Belay et al., 2022; Mueller et al., 2023).

The health of Ethiopian animals for rural development (HEARD) project

The HEARD project was included to capture systemic livestock health interventions. This project was implemented from March 2019 to December 2023 in the Somali, Amhara, and Oromia regions. The study focused on project activities in the Somali region, particularly those related to small ruminants. Interventions included zoonotic disease control, establishment of animal health clinics, and training of local veterinary personnel (Yusuf, 2019; Gizaw et al., 2023; Tadele, 2024).

HEARD was implemented through a public-private partnership model involving the Ministry of Agriculture and Livestock Resources, regional governments, and international development partners. Data on intervention implementation and outcomes were collected through document reviews, field visits, and interviews with key stakeholders, including community members, veterinary staff, and project coordinators.

These two case studies provided complementary perspectives on genetic improvement and animal health service delivery, forming the empirical foundation for assessing the broader impact of livestock development interventions on rural livelihoods.

Research framework: the institutional analysis and development

This study adopted the Institutional Analysis and Development (IAD) framework to investigate the institutional dynamics underpinning the implementation and sustainability of the CBBP and AHI. The IAD framework, developed by Ostrom (2011) offers a structured approach to examine the contributions of key actors, the institutional arrangements guiding their behavior, and the interactions that shape outcomes. By applying this framework, the study sought to identify how different stakeholders contribute to and influence livestock development interventions and to uncover governance challenges affecting their effectiveness.

To operationalize the IAD framework, a stakeholder analysis was employed following the three-stage approach proposed by Reed et al. (2009) (Figure 2). In the first stage, the team defined the context and system boundaries of the selected interventions. This involved defining the scope of action based on criteria such as the duration of the projects, representativeness of the sites, the targeted livestock breeds, and the interventions' contribution to the livelihoods of smallholder farmers. By setting clear boundaries, this stage ensures that the research focuses on relevant and impactful aspects of the interventions.

The second stage emphasized stakeholder identification and relationship mapping. Here, stakeholders were categorized based on their contributions, and levels of influence within the CBBP and AHI initiatives. The analysis included government bodies, research institutions, NGOs, private veterinary service providers, input suppliers, market actors, and cooperative offices. The analysis explores power dynamics, stakeholder interests, and the nature and direction of relationships among actors. This mapping exercise provided a comprehensive view of the institutional landscape, highlighting the strengths and challenges in stakeholder collaboration and governance.

In the final stage, the study examined gaps, challenges, and recommendations to enhance the sustainability of the interventions. Drawing from both qualitative insights and stakeholder feedback, the study identified weaknesses in stakeholder engagement, coordination mechanisms, and institutional support structures. Based on these findings, actionable recommendations and additional activities were proposed to address identified gaps and improve the long-term viability of the programs. The outcomes of this stage are crucial for developing strategies to foster effective collaboration and strengthen governance frameworks (Reed et al., 2009; Demir et al., 2015; Mekuria et al., 2021).

To implement the three stages of the IAD framework, KIIs and FGDs were conducted with stakeholders at various institutional levels. Initial KIIs involved actors from breeding and animal health programs at the national level, such as the Ministry of Agriculture, ICARDA, and HEARD, to clarify the intervention context, objectives, coverage, and operational modalities. These sessions informed the subsequent identification of stakeholder institutions involved in implementation. These included actors from the livestock development sector, cooperative unions, veterinary input suppliers, trade and industry offices, and

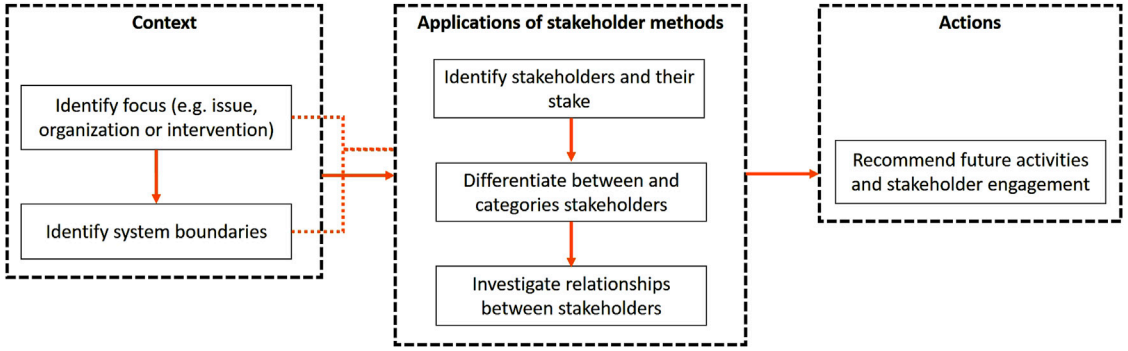


FIGURE 2
Stages used in conducting stakeholder analyses (adapted from Reed et al., 2009).

TABLE 2 Descriptions of categories of support for selected livestock interventions.

No.	Categories of support	Descriptions
1	Financial	Direct budget support, allocating budget for implementing, monitoring, training, purchasing of inputs, budget for developing technologies through research, allocating budget for other institutions to introduce technologies
2	Technical	Conducting ground activities of the interventions with and without other stakeholders, support local and international projects while implementing the interventions
3	Policy and law	Develop policies, strategies, laws, and bye-laws regarding the interventions, legal certifications of CBBP cooperatives and timely renewals of certificates
4	Monitoring, evaluation, reporting	Evaluating the interventions based on their objectives, collection of information's, analyzing and reporting scientifically and locally, organizing reports for policy briefs and scaling ups of the interventions
5	Input supply	Direct delivery of inputs such as veterinary drugs, animal feed, laboratory equipment, field working material (like tablets) and equipment supporting the interventions. Budget support for purchasing inputs
6	Technology supply	Vaccine development based on different disease strains, research outputs regarding developing new technologies, and delivering technologies (feed mills, artificial insemination equipment)
7	Capacity building, training	Construction of offices and other buildings, delivering trainings, sharing knowledge for technologies implementation, experience sharing, and related interventions to enhance knowledge and attitude of smallholder farmers and pastoralists
8	Marketing	Searching and linking with better price markets, purchasing selected rams for genetic dissemination, implementing weight based and modern marketing system, allowing the sale of animals to the market
9	All category	Stakeholders participating on all the CBBP and animal health categories listed from No. 1 to 8

local market participants. Representatives from these institutions were invited to FGDs, where their respective contributions, and challenges were discussed in-depth. These group discussions also explored forward-looking activities to ensure the sustainability and scalability of interventions.

Data analysis

The qualitative data collected were analyzed using a deductive approach, guided by predefined themes and categories based on the study objectives and existing literature. This method allowed the data to be interpreted within the IAD framework.

To analyze the institutional dynamics of the CBBP and AHI, stakeholder mapping was conducted to visualize and characterize the relationships among key actors. Stakeholders were assessed across eight key categories: financial support, technical assistance, capacity building, technology provision, policy advocacy, market linkage, input supply, and monitoring and evaluation (Table 2). These categories were derived from stakeholder meeting and FGD discussions. Participants rated each stakeholder's level of involvement on a scale from one (low) to 10 (very high). Stakeholder contributions were then aggregated and

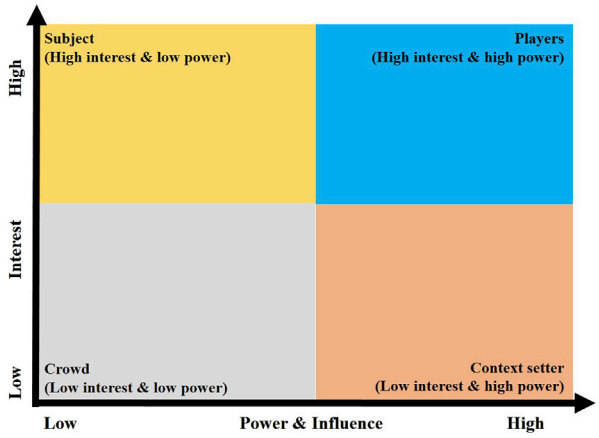


FIGURE 3
Power-interest matrix [adapted from Demir et al. (2015); Mekuria et al. (2021)].

classified into four categories: low (10%–30%), medium (31%–60%), high (61%–90%), and very high (above 90%), based on the number of categories in which each stakeholder was actively involved.

The mapping process adopted a participatory Net-Map approach (Schiffer, 2007; Schiffer and Waale, 2008), which involved visually representing stakeholders and their linkage. Each stakeholder was assigned a coded identifier and mapped using different symbols and line styles to indicate the direction and strength of their relationships. Influences was depicted by placing varying numbers of stones next to stakeholder markers, with photographs taken to capture the visual layout done of the flat sheets. These hand-drawn maps were later digitalized using Microsoft PowerPoint for clarity and documentation. Stakeholder relationships were illustrated using directional arrows and line types, following Zimmermann and Maennling (2007) guidelines.

To further evaluate stakeholder significance, the study used a power-interest matrix, categorizing stakeholders across four quadrants: high power/high interest, high power/low interest, low power/high interest, and low power/low interest (Zimmermann and Maennling, 2007; Demir et al., 2015; Mekuria et al., 2021). Power was defined as a stakeholder's financial, political, or organizational influence, while interest was measured by their level of engagement, resources committed, and support for long-term sustainability. Each stakeholder was scored from 1 to 10 on both dimensions, and their placement in the matrix informed strategic recommendations for engagement and collaboration. The matrix utilized a four-quadrant grid (Figure 3) to segregate stakeholders based on their levels of power and interest:

- High Power/High Interest: Stakeholders in this quadrant are crucial and require active collaboration, as they hold significant influence and have a vested interest in the interventions.
- High Power/Low Interest: These stakeholders possess authority but are less directly invested. Maintaining their satisfaction through strategic engagement is critical.
- Low Power/High Interest: While lacking significant power, these stakeholders have a strong interest in the outcomes. Effective engagement with this group is essential to leverage their support and address potential concerns.
- Low Power/Low Interest: These stakeholders have limited influence and interest but should still be kept informed to maintain transparency and foster goodwill.

The outcomes of the stakeholder analysis, including mapping visuals, contribution scores, and power-interest positioning, were compiled and analyzed using Microsoft Excel. These results offered a comprehensive understanding of how institutional relationships, power structures, and interest alignments shape the implementation and sustainability of livestock development interventions.

Results

Identified stakeholders and their contributions in the selected interventions

In both interventions, 43 stakeholders were identified and from which 13 of them have participated on both interventions. Stakeholders working both on CBBP and AHI were categorized based on their contribution types (Figure 4). The identified stakeholders include government organizations and NGOs, local administrative bodies, private sector and local communities or farmers. In both interventions, technical support involved the highest number of institutions (48) followed by capacity building (38) and financial support (36). Support related to policy and law, marketing, and technology supplies involves relatively small number of stakeholders, might be due to the delegation of these responsibilities being limited for federal-level institutions. Four institutions, such as Debre Birhan Agricultural Research Center, Regional and District Livestock and Fishery Resources Development Offices, and ICARDA, in Menz sheep CBBP; two institutions, such as Bonga Agricultural Research Center and ICARDA, in Bonga sheep CBBP; and five institutions, such as Debre Birhan Agricultural Research Center, Bonga Agricultural Research Center, District Livestock and Fishery Resources Development Offices, Pastoral Development Offices, ICARDA, and HEARD, in AHI contributed to all the categories.

Based on the FGD and KII reports, the identified stakeholders for CBBP and AHI were prioritized based on their contribution level (indicated in Figure 4), from low to high. Most of the institutions (36%) had higher contribution for CBBP and 35% of institutions had very high contribution for animal health interventions (Figures 5A,B).

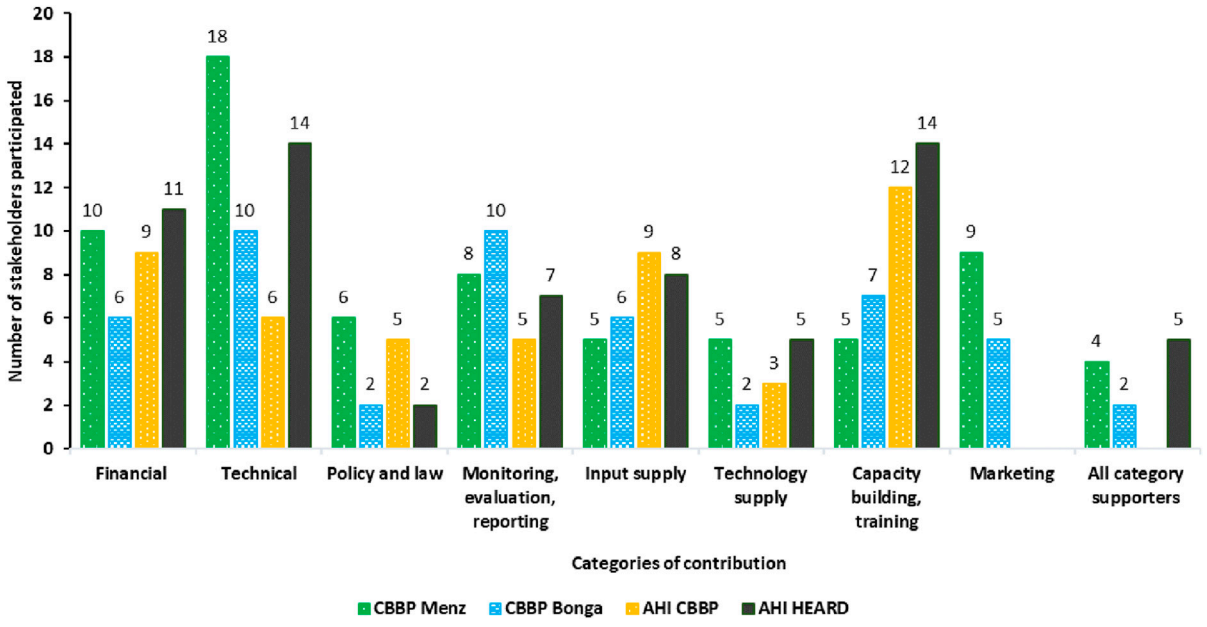


FIGURE 4
Number of institutions across the categories of contribution in selected interventions.

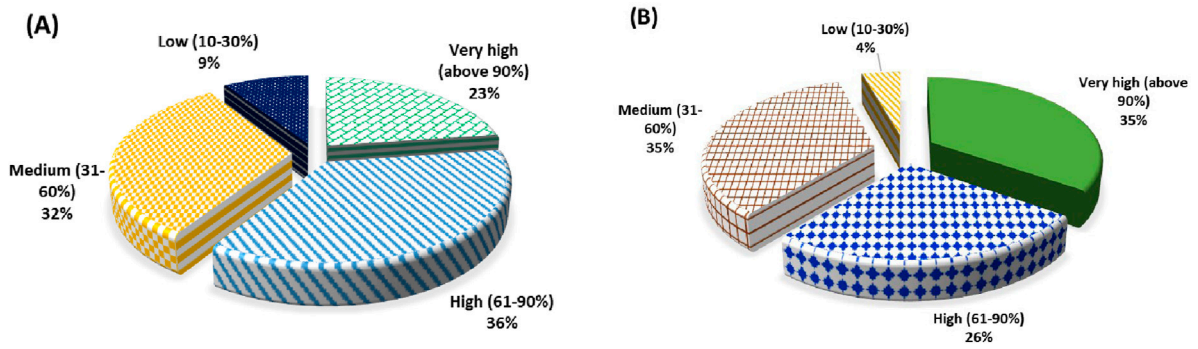


FIGURE 5
Proportions of stakeholders under their contribution level: **(A)** CBBP and **(B)** AHI.

Stakeholders and their contribution for the selected interventions

Community-based breeding program in Menz and Bonga sheep

Based on the stakeholder meetings and FGD, different institutions and organizations across the hierarchy level with their contribution type were identified (Table 3). Institutions such as research institutes across their hierarchy (ARARI, SWRARI, BARC, DBARC), livestock development offices across their hierarchy (zone, district, and kebele LFRDO) from government organizations, and ICARDA from international research institutions, play a pivotal role in the success of CBBP through the involvement of all contribution categories (Table 3). Besides, a private digital market (*Yatherber*) contributed to the CBBP through adopting weight-based pricing for Menz sheep CBBP cooperatives and participants.

Animal health interventions

Animal health interventions, in common with other livestock interventions (such as breeding), necessitated the

TABLE 3 Institutions across their hierarchy contributing to the implementations of community-based breeding program (CBBP) and animal health interventions (AHI) in selected districts.

Institutional hierarchy	Interventions	Participating institutions	List of activities	Category of support
Federal	CBBP	o Ethiopian Institute of Agriculture (EIAR) o National Veterinary Institute (NVI) o Veterinary Drug and Animal Feed Administration and Control Authority (VDAFACA) o Ministry of Agriculture (MoA) o Private input suppliers	o Support CBBPs through finance, technical, and collaboration of activities o Popularizing achievements through publications and other methods for wider dissemination o Supplying vaccines, and medicaments, and o Suppling agricultural inputs like feeds, ear tag and applicators, markers etc	o Financial o Technical o Policy o Input/technology supply o Monitoring and evaluations
	AHI	o MoA o NVI o Ethiopian Animal Health Institute (EAHI) o Ethiopian Agricultural Authority (EAA) o EIAR, Ethiopian Veterinary Associations (EVA) o MoE	o Providing vaccine for Transboundary animal diseases (TADs), diseases eradication, capacity building, policy and strategy development, project fund mobilization, cross border coordination o Vaccine production, disease surveillance, outbreak investigation, laboratory diagnosis o Drug quality control, certification of imported drugs and other product o Organizing/coordinating animal health issues on educational forum, conduct research and report of new outputs o Professional regulation as veterinary statutory body	o Financial o Technical o Policy o Input/technology supply o Capacity building o Monitoring and evaluations
Regional	CBBP	o Amhara Agricultural Research Institute (ARARI) o Southwest Ethiopia Agricultural Research Institute (SWEARI) o Livestock and Fishery Resources Development Office (LFRDO) o Bonga Agricultural Research Center (BARC)	o Financial support and collaboration of the CBBP activities o Popularization of achievements through proceedings o Scaling-out of the activities o Technical and capacity building support for zone and district experts o Monitoring and reporting of achievements o Implementing and running the whole activities of CBBP (village selection, implementation, ram selection, monitoring and reporting results)	o Financial o Technical o Capacity building o Input supply o Market linkage o Monitoring and evaluation
	AHI	o ARARI o SWRARI o LFRDO o Somali Region Pastoral and Agro-pastoral Research Institute (SoPARI) o Bureau of Agriculture (BoA) o Somali Pastoral Development Burea (SPDB) o Research center o Regional animal health laboratories (RAHL) o Universities o BARC	o Support/monitor zone and district level offices o Capacity building activities o Monitor revolving fund use and management for animal health services o Research work on animal health and report new outputs, educating veterinary professionals, and community services o Disease diagnosis, PPR eradication, outbreak investigation, surveillance o Vaccine supply, disease reporting	o Financial o Technical o Input/technology supply o Capacity building o Monitoring and evaluations
Zone/District	CBBP	o Debre Birhan Agricultural Research Center (DBARC) o Bonga University (BU) o Debre Birhan University (DBU) o LFRDO o Cooperative offices o Private input suppliers o Trade and market development office o Private veterinarians	o Implementing and running the whole activities of CBBP (village selection, implementation, ram selection, monitoring and reporting results) o Support and collaborate with research centers o Cascading updated laws for sheep breeding cooperative establishments; certify sheep breeders cooperative and timely renewing the certificate o Supplying inputs like feeds, veterinary drugs, etc o Creating market linkage, facilitating loan o Auditing and delivering trainings about	o Technical o Financial o Policy o Capacity building o Input/technology supply o Monitoring and evaluation

(Continued on following page)

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TABLE 3 (*Continued*) Institutions across their hierarchy contributing to the implementations of community-based breeding program (CBBP) and animal health interventions (AHI) in selected districts.

Institutional hierarchy	Interventions	Participating institutions	List of activities	Category of support
			rules and regulations of cooperative o Deliver animal health services	
	AHI	o LFRDO o District administrator o Pastoral Development office (PDO) o Jigjiga University (JU) o Veterinary drug shops (pharmacies)	o Vaccination together with kebele health post, awareness creation and community mobilization o Animal disease treatment support, regular deworming, revolving fund use and management, disease reporting o Financial support, vaccine, drug, and other equipment's delivery o Monitor and support kebele level animal health interventions o Supply veterinary drugs and equipment's for pastoralists	o Financial o Technical o Input/technology supply o Capacity building o Monitoring and reporting
Kebele	CBBP	o Kebele administrator o CBBP cooperative office o Agriculture office o Financial institutions (like Tseday bank and Omo microfinance) o Private veterinarians o Data collectors o Farmers	o Support and collaborate with research centers o Mobilizing farmers for different activities (like vaccination, deworming of sheep) o Delivering animal disease treatments o Searching for better price sheep markets o Allowing land for construction of different offices for the CBBP cooperative o Allows loan for farmers o Collecting and submitting the required data from the CBBP members o Herding their sheep based on the directions from researcher centers and other officials o Keeping and delivering required data on their sheep flock o Mating with selected ram and culling of unproductive and unselected animal	o Financial o Technical o Input provision o Monitoring and reporting
	AHI	o Administrator o Agriculture office o Animal health post o Community Animal Health Workers (CAHWs) o Private veterinarians	o Provide animal health interventions like deworming, vaccination and disease treatment o Awareness creation and community mobilization o Delivering animal disease treatment through mobile services o Report the occurrence of outbreaks especially TADs and notifiable diseases	o Technical o Monitoring and reporting
Non-governmental organizations (NGO)	CBBP	o International Centre for Agricultural Research in the Dry Areas (ICARDA) o Food and Agriculture Organization (FAO) o Organization for Rehabilitation and Development in Amhara (ORDA) o Livestock and Fisheries Sector Development Project (LFSDP)	o Financial support for ram purchase, capacity building, materials purchase and installing feed mill plants for CBBP cooperatives o Demonstrating and delivering materials and inputs/packages for sheep fattening technologies	o Financial o Technical o Inputs/technology supply o Monitoring and evaluation
	AHI	o International Livestock Research Institute (ILRI) o FAO o ICARDA o Health of Ethiopian Animals for Rural Development (HEARD) o LFSDP o Mercy Corps	o Financial support for office infrastructure fulfilment, materials supply o Provide veterinary drugs and vaccines, capacity building, trainings o Conduct animal health interventions on farmers and pastoralists o Supporting pastoralists during drought seasons through provision of animal feeds	o Financial o Technical o Input/technology supply o Policy o Capacity building o Monitoring and reporting
Others	CBBP	o *Yatherber* (private market)	o Purchasing sheep from CBBP with weight based pricing	o Financial

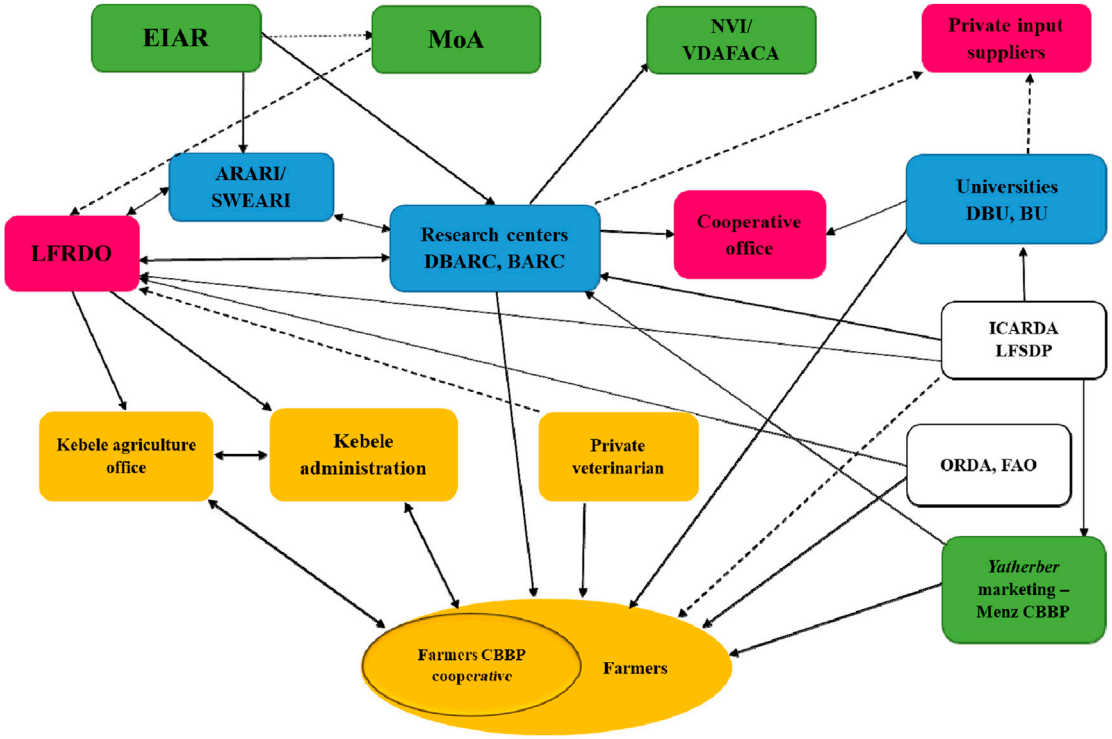


FIGURE 6
Stakeholders mapping and linkage involved in Menz and Boga sheep CBBP. (1) Institutions depicted in green boxes are national/federal offices; blue boxes are regional and zonal offices; purple boxes are offices with regional, zonal, district and kebele hierarchy; yellow boxes are kebele level offices and farmers; white boxes are non-governmental organizations. (2) The double face arrows indicate two directional communication; single-face arrows indicate one directional communication; broken lines indicate loss level of communication.

proactive and responsible involvement of many institutional and non-governmental organizations. Based on the stakeholder mapping and institutional analysis done for animal health interventions, the federal-level institutions such as the National Veterinary Institute (NVI) and the AHI, had intensively collaborated in addressing animal health services through developing vaccines and delivering different veterinary medicines (Table 3). Animal health intervention as part of CBBP interventions was delivered through research centers and public veterinary services at kebele level. In the pastoral areas, the Degehabour District of the Somali region, the animal health activities were well conducted through community-animal health workers (CAHWs), private veterinarians and drug shops. Beyond governmental organizations in Ethiopia, various non-governmental organizations and projects, including HEARD, LFSDP, ILRI, and others, are collaborating closely with farmer villages to enhance farmers' livelihoods with a focus toward food security, women's empowerment, and reducing the impact of climate burden on livestock.

Stakeholder linkage and communication level in CBBP and AHI

For CBBP, 17 stakeholders with 30 linkages and communication levels were mapped (Figure 6). According to the map, many of the linkages were from and to the research centers (DBARC and BARC). This is because the entire activity of the CBBP was implemented with the leading role of research centers. The research center has communications to get inputs such as vaccines from NVI, and animal feed seeds, and medicaments from private input suppliers. National institutions, highlighted with green, have unidirectional communication with regional offices; this is related to their contribution being limited to either one or two categories of contributions. Non-governmental organizations such as ICARDA contribute to the CBBP jointly with research centers because they have no hierarchy to the implementation village (kebeles). Livestock and Fishery Resources Development Offices (LFRDO) support the CBBP villages through the involvement of their development agents at kebele agriculture offices.

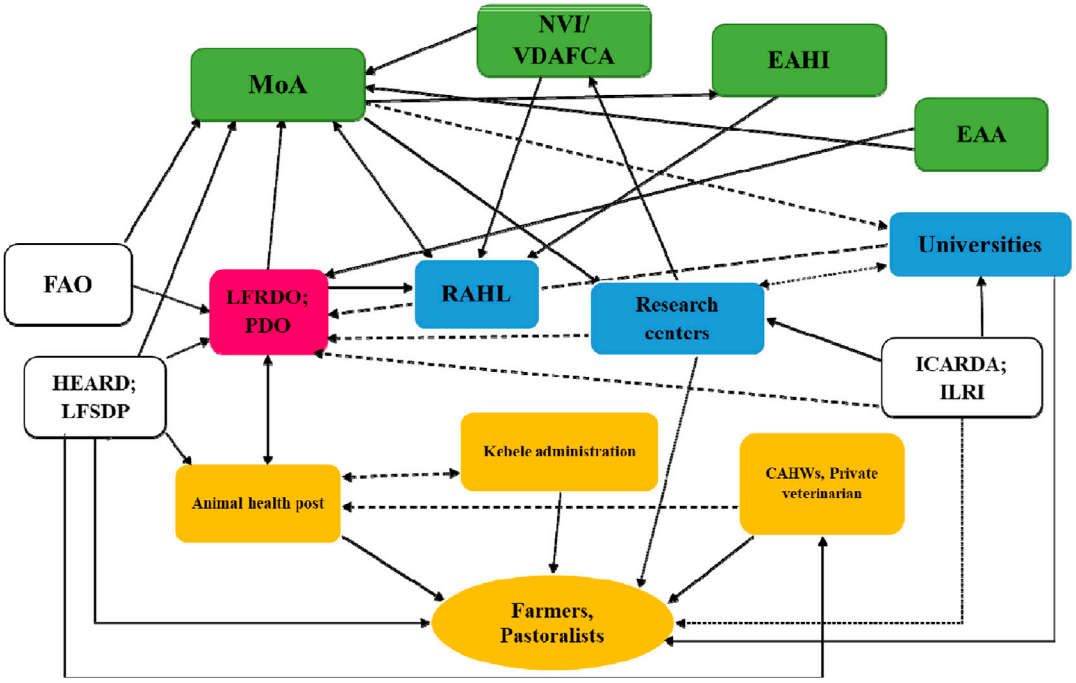


FIGURE 7
Stakeholders mapping and linkage involved in animal health interventions. (1) Institutions depicted in green boxes are national/federal offices; blue boxes are regional and zonal offices; the purple box are offices with regional, zonal, district and kebele hierarchy; yellow boxes are kebele level offices and farmers; and white boxes are non-governmental organizations. (2) The double face arrows indicated two directional communication; single-face arrows indicated one directional communication; broken lines indicated loss level of communication.

Fifteen stakeholders with 36 linkages were analyzed for AHI in the selected areas (Figure 7). As shown from the map, the federal-level institutions, mapped in green, have a higher linkage with regional-level and among other federal-level organizations. Non-governmental organizations such as FAO, LFSDP and HEARD make their contribution through the hierarchy of the Ministry of Agriculture (MoA) and work together with LFRDO and PDO, while ILRI, ICARDA, provide animal health intervention through their linkages to research centers and universities. The HEARD project, besides working with MoA, also intervened directly with the pastoralists and private veterinarians through their experts hired at the district level (Figure 7).

Contribution level and outcomes of the stakeholders in CBBP and AHI

Considering the contribution level and category, the stakeholders were prioritized based on a total (out of 100%) contribution to the selected interventions (Figure 8). From the governmental organizations, research centers (DBARC, BARC), and universities and ICARDA, the non-governmental organization, contributed 100% to the CBBP intervention. Similarly, the RAHL, Kebele animal health practitioners, LFSDP, and HEARD projects contributed 100% to the successful implementation of animal health interventions. Farmers and pastoralists contributed 100% to the implementation of both interventions.

Power and influence level of institutions for selected interventions

The power and interest level of the stakeholders for the selected interventions vary depending on their capacity, objective, understanding, and hierarchical level. As shown in Figures 9, 10, institutions such as MoA, research centers, EIAR, and projects such as ICARDA and HEARD have a high level of power and interest to implement both interventions, which is mainly related to their position at the federal level, where political and financial decisions are amended for both interventions. Beyond their position, these institutions have experts to implement the interventions at the ground level across their hierarchy. ICARDA and HEARD projects had high power/interest due to their internationally allocated funds and their collaboration with federal-level institutions such as MoA. However, private sector actors such as veterinarians, community animal health workers, and input suppliers had high interest with low power, which is due to these stakeholders' technical support to the interventions, with no

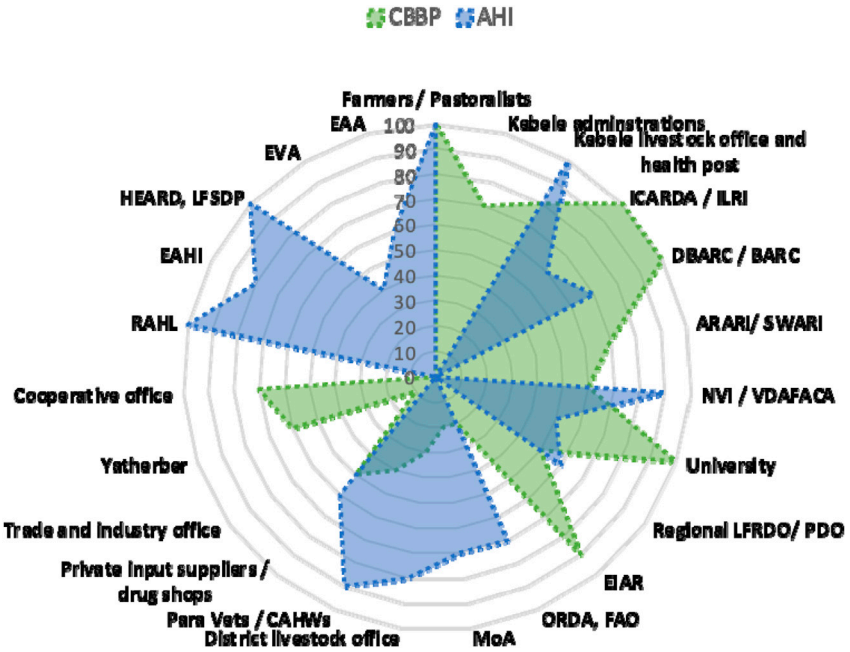


FIGURE 8
Perceived percentage contributions of various stakeholders to the CBBP and AHI initiatives. Variations in shape and size reflect the differing levels of involvement by each stakeholder group.

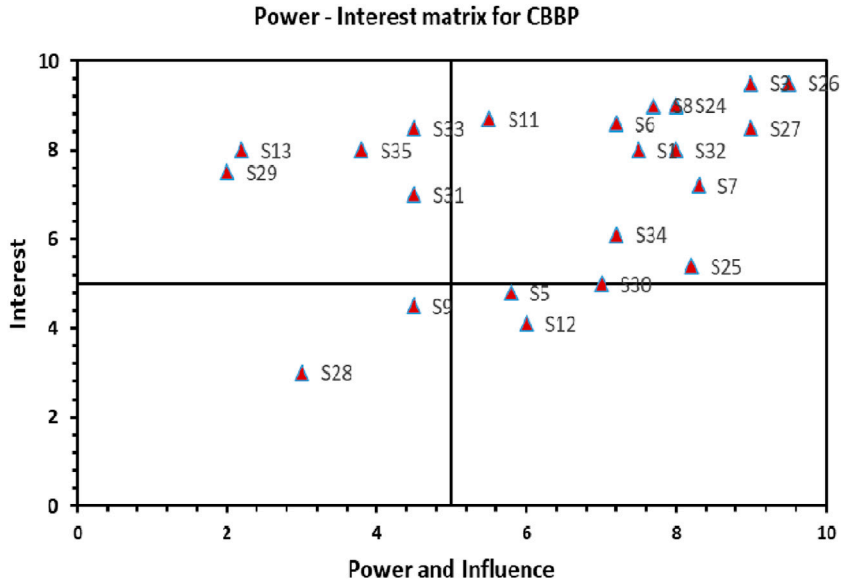


FIGURE 9
Analysis of stakeholders power and interest level in Menz and Bonga sheep community-based breeding programs.

political and financial powers. Institution with high power and low interest such as Ministry of Education, Ethiopian Agriculture Authority in AHI, trade and market development office, NVI/VDAFCA in CBBP interventions, need to be approached to use their power in support of the success of the interventions. The stakeholders and their code are described in Table 4.

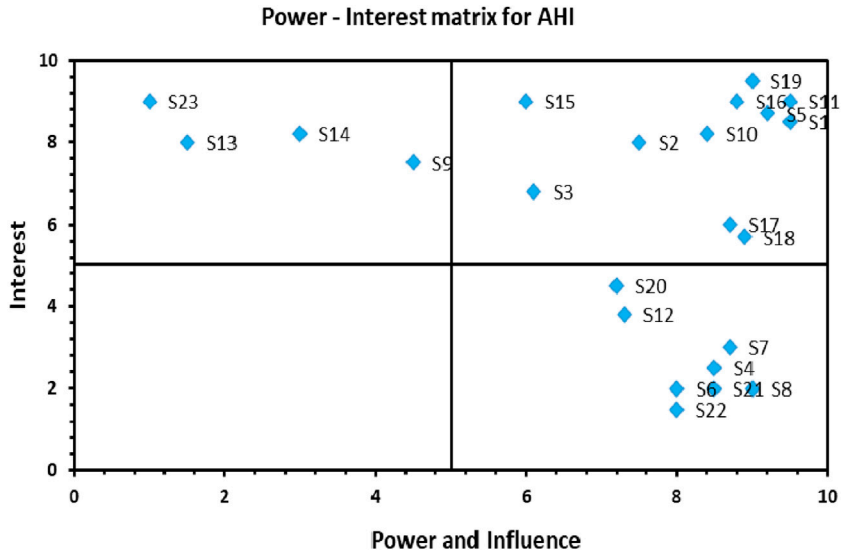


FIGURE 10
Analysis of stakeholders' power and interest level in animal health interventions.

TABLE 4 Stakeholders and their codes used in the power-interest matrix analysis (refer Table 3 for full names of abbreviated stakeholders).

List and code of stakeholders identified for CBBP and animal health interventions		
Kebele administrations (S1)	Private veterinarians (S13)	Kebele agriculture office (S25)
Kebele Animal health post (S2)	Veterinary drug shops (pharmacies) (S14)	DBARC/BARC (S26)
ICARDA (S3)	Research Centers (S15)	ARARI/SWEARI (S27)
Research institutes (S4)	Regional pastoral livestock office (S16)	Female and Youth office (S28)
NVI/VDAFCA (S5)	RAHL (S17)	Private input suppliers (S29)
Universities (S6)	EAHI (S18)	Trade and market development office (S30)
Regional LFRDO (S7)	HEARD (S19)	Yatherber (S31)
EIAR (S8)	EVA (S20)	Cooperative/union office (S32)
ORDA, FAO, Mercy corps (S9)	EAA (S21)	CBBP cooperative office (S33)
District pastoral development office (S10)	MoE (S22)	Tseday bank and Omo micro finance (S34)
MoA (S11)	CAHWs (S23)	Data collectors (S35)
District LFSDO (S12)	Farmers (S24)	

Policies and strategies in supporting the selected interventions

The key informant interviews (KIIs) regarding policies and strategies were carried out with experts working at selected district and kebele agriculture offices, cooperative commission office, trade and market development offices, financial institutions, private input suppliers, private veterinarians, and veterinary drug shops. Most of the experts working at the agriculture offices are knowledgeable about the animal breeding, animal health, and marketing policy and strategy defined in the Ethiopian livestock master plan. This strategy is considered to be the only policy covering the topics. Knowledge on the policy is acquired by participating in publicizing and brainstorming workshops organized through the ministries.

According to cooperative commission office experts, the policy in support of the interventions is the proclamations/ rules used to legally establish, certify, and register sheep

producers' cooperatives at village level. Experts from the trade and market development office indicated that the policy and strategies in their office related to the interventions deal with loading and unloading of livestock, transportation, feeding during transportation, isolated transportation (based on species), feeding and watering troughs at marketplaces, shades at marketplaces, and animal welfare issues related to livestock marketing. A private veterinary drug shop responds to the presence of policies dealing with the preconditions to open veterinary drug stores, drug transportation, drug storage protocols, and disposal of expired drugs. The respondents across the different sectors argued that the policies are not fully implemented through the zonal and district levels due to technical, financial, and capacity-related problems. Besides, the respondents indicated that lack of critical focus on the policies and absence of cooperation among various stakeholders limit the implementation level of the available policies and strategies. Loose management of drugs in private veterinarians, together with agrochemicals and seeds, was also mentioned as being caused by low follow-ups of policies.

KII participants identified several challenges facing livestock sector. These includes budgetary constraints, with limited funding allocated to the center; technical challenges such as lack of both short- and long-term trainings and awareness programs for livestock experts; and logistics issues, particularly the shortage of transportation resources like vehicles and motorbikes. Institutional challenges were also noted, especially poor coordination and integration among different stakeholders. An animal health experts in Menz Mama District stated the transportation issue, stating, "*we deliver vaccination and deworming by walking over 30 km on foot*," underscoring the lack of essential field logistics. Additional challenges emphasized by experts included the frequent occurrence of livestock diseases (e.g., Peste des Petits Ruminants (PPR) and sheep pox), shortage of veterinary drugs and diagnostic eqipments, lack of vaccine storage facilities (e.g., refrigerators), and rising anthelmintic drug resistance. In pastoral areas, drought and shortage of feed and water further compounded these issues. It was also reported that although relevant policies, strategies, and bylaws at the national level, their implementation and adaptation at lower administrative level remain limited.

Main actors and their responsibilities in the selected interventions

Ministry of agriculture (MoA)

The Ministry of Agriculture is the main organization coordinating, managing, and monitoring all activities related to animal agriculture. The ministry has hierarchical offices to the lower administration, kebele level. MoA contributes to the CBBP through the active participation of its experts, delivering training, and the provision of different technologies and inputs. The ministry also provides vaccines for transboundary animal diseases (TADs), is involved in PPR, rabies, and other disease eradication programs, policy and strategy development, project fund mobilization, coordination, monitoring, and reporting of all animal agriculture achievements throughout the country.

National veterinary institute (NVI)

In Ethiopia, NVI is the only institute to develops and produce vaccines for different animal species and disease strains. The institute collaborates with different institutions requesting vaccines for distribution, such as the Ministry of Agriculture, different research institutions, and national and regional animal health laboratories. Developing efficient vaccines contributed to the control of emerging diseases, drug resistance, improved animal health, and lower mortality. Besides NVI, the Veterinary Drug and Animal Feed Administration and Control Authority (VDAFACA) works on the delivery of different veterinary drugs and animal feeds, in collaboration with the aforementioned organizations.

Research centers

Debre Birhan Agricultural Research Center (DBARC) and Bonga Agricultural Research Center are the nucleus of CBBP and animal health interventions for Menz and Bonga sheep improvement. The centers handle all activities, starting with site and farmer selection and implementation of the interventions through continuous monitoring and evaluation tasks. The centers mobilize resources, collaborate with institutions, and report the findings and best practices for further scaling out of the technologies. Researchers are involved in various interventions for the CBBP implementation. Breeders work on the selection of candidate rams, prepare mating design, and handle all collected data; forage and nutrition researchers introduce improved animal feeds and feeding packages, including fattening technologies; veterinarians perform strategic deworming and vaccination activities; and design different disease control methods.

Livestock and fishery resources development office (LFRDO)

The Livestock and Fishery Resources Development Office, including pastoral offices in the Somali region, is the main organization for the dissemination and scaling out of different project and research outputs to farmers and pastoralists. The office has a long hierarchy stretching from the Ministry of Agriculture to the Kebele level, including district, zone, and regional offices in between. According to the key informants' responses, the main activities conducted in support of CBBP and AHI were technical and monitoring and evaluation activities. The kebele-level experts such as animal production and animal health disciplines participate in

strategic deworming and vaccination, disease treatments, delivering different technologies, and consulting and mobilizing farmers and pastoralists to reduce disease occurrences and improve animal productivity. According to the KII responses, these offices, through their hierarchy, collaborate directly and indirectly with different governmental (research centers, universities), and non-governmental organization and projects (ORDA, Safety Net programs, ICARDA, ILRI, FAO, and HEARD) to improve the livelihood of the smallholder farmers in their kebele and district. It was noted that the LFRD office faces challenges related to budgetary constraints (low financial allocations), technical deficiencies (lack of short- and long-term training), institutional coordination and integration with other stakeholders (lack of coordination and integration), and logistics (lack of vehicles). The office's ability to continue and expand community-based breeding and animal health initiatives is greatly impacted by these challenges.

ICARDA and other projects

The International Center for Agricultural Research in the Dry Area (ICARDA) is the main actor in the implementation of CBBPs and animal health interventions. ICARDA, under the International Livestock Research Institute, supports these interventions through financial, technical, and capacity building. The project works in close collaboration with the research centers and the district and kebele office experts. The KII with district and kebele animal production and animal health experts indicated that ICARDA had delivered veterinary drugs for deworming and vaccinations and improved animal feed for CBBP implementing kebeles.

Beyond ICARDA, in the CBBP villages, the Organization for Rehabilitation and Development in Amhara (ORDA), Livestock and Fishery Sector Development project and Mercy Corps, financially support the purchase of veterinary drugs and equipment and capacity building through trainings for livestock production experts. Besides, safety-net programs also support women and youths by delivering breeding ewes and sheep for fattening to improve their food and nutrition security. These projects deliver their services through kebele and district livestock experts.

HEARD project

According to the report by Tadele (2024), the HEARD project was implemented to improve the quality of animal health services in Somali, Amhara and Oromia regions of Ethiopia. The project provided funds for establishment of infrastructure in district livestock offices, provision of veterinary drugs, provides capacity building through trainings for animal health technicians and experts, build veterinary clinics, and equipped different laboratory materials. Besides, through its experts the project implemented animal health activities such as deworming, external parasite control and vaccination against production limiting diseases.

Kebele administration

Kebele administration plays a role in the CBBP and AHI through mobilizing farmers, kebele experts, cooperating with research centers, and projects. The administration also participates in establishing the community at a cooperative level, allocating land for office construction, and feed development. The administrator also strengthens the cooperatives by linking them with projects working at their kebele.

Farmers/pastoralists

Farmers as stakeholders, play a significant role in the successful implementation of CBBP and AHI. Proper care must be taken when organizing the community, as reluctant and influential farmers in a village can contribute to the failure of any technology. Thus, supportive and cooperative farmers are, therefore, essential partners in the execution of any intervention. Farmers participating in the community-based breeding program work with research centers during animal selection, forage development, deworming and vaccination, culling, castration of unselected rams, and grouping of selected rams. Pastoralists participating in the HEARD project also collaborated for the successful implementation of animal health services in their area, which contributed to improvement of livelihood income and food security. Since they are the floor-level stakeholders, their livelihood was impacted based on the success or failure of the interventions.

Discussion

Stakeholders' contributions in selected livestock interventions

In community-based breeding programs and animal health interventions done in the selected study areas, above 43 stakeholders were identified with various levels of contributions, indicating that interventions in livestock production have various tasks necessitating the involvement of various stakeholders. For CBBP, 17 stakeholders with 30 linkages and for animal health interventions, 15 stakeholders, with 36 potential linkages were mapped. From various contribution categories, abundant stakeholders participated in technical and capacity-building activities while policy, marketing, and technology supplies got the involvement of a small number of stakeholders. In line with the current finding, several scholars (Haile et al., 2018; Wurzinger et al., 2021; Getachew et al., 2021; Haile et al., 2023) have reported that community-based breeding programs requires the active and accountable participation of various stakeholders for their success.

According to Haile et al. (2019b), even though there are different institutions and organizations involved in small ruminant breeding programs, e.g., the Livestock Development Institute (LDI), and Ethiopian Biodiversity Institute (EBI), their involvement and contribution were insignificant. The reason for the low involvement and contribution of these institutions could be due to the absence of clear institutional arrangements for the conservation and genetic improvement of livestock resources and the first priority given for food crop production, respectively. Formal agreements in the sharing of resources and support among stakeholders to achieve their role and avoid overlapping efforts on similar tasks in the same area and breed was reported (Haile et al., 2019b; Mueller et al., 2021; Getachew et al., 2021). In the workshop report, Getachew et al. (2021) identified about 18 institutions that have a stake in scaling up of CBBPs among which research centers, livestock development offices, universities, and other projects were mentioned.

Jemberu et al. (2024) reported the involvement of various stakeholders in addressing the animal health issues in small ruminants. The author noted that the active involvement of stakeholders in animal health interventions resulted in reduction of 67.5% morbidity loss, 32.4% mortality loss, and 0.1% animal health treatment and control expenditure loss. Coupled with environmental burdens, livestock disease impacts the food security and livelihoods of smallholder farmers and pastoralists through lowering the performance, and even loss of the animals (Gemeda et al., 2016). The major challenge in the prevention and control of animal diseases both in the lowland pastoral and highland mixed crop-livestock smallholder systems has been the absence of efficient schemes for the delivery of animal health services, and the small number and inefficiency of animal health posts at kebele level (Gizaw et al., 2019).

To tackle problems related to animal health, the HEARD project was implemented to enhance efficient and sustainable implementation of animal health services through incentivizing and supporting private animal health graduates and community animal health workers (CAHWs), capacitating the kebele health posts, and strengthening the linkage between public and private veterinarians (Gizaw et al., 2021; Tadele, 2024). Though private veterinarians and CAHWs contributed to addressing animal health services, the sustainability of their contribution was not supported through policy domains that remained the necessity of projects. Likewise, ILRI and ICARDA projects intervened to address integrated animal health interventions (i.e., vaccination, deworming, health follow-up, treatments, and awareness creation campaigns) in CBBP villages through a cost-effective animal health intervention calendar considering seasons, production cycles of various classes of animals, reproduction cycles, and seasonality of pathogens (Gemeda et al., 2016; Mekonnen et al., 2019; Mekonnen et al., 2021). In pastoral areas, where livestock is a backbone for livelihood, disease is a major challenge and timely disease reporting for implementing interventions is required. In this regard, similar to the current findings for Somali pastoralists, community-animal health workers were the main actors in animal health interventions at the Kenyan pastoralists (Sentamu et al., 2024). In line with this, Sentamu et al. (2024) reported 19 stakeholders with 67 linkages were reported for livestock disease reporting.

Policies and strategies in livestock interventions

The Ethiopian livestock master plan published in 2015 (Shapiro et al., 2015) is considered the only policy for support of livestock production. While in cooperative offices, a proclamation used to certify sheep breeder cooperatives is the only policy in the livestock sector. In addition, the policies and strategies in the trade and market development office related to livestock deal with issues related to loading and unloading and feeding during transportation, separate transportation based on species, shades at the marketplace, and animal welfare issues. Moreover, policies and strategies related to animal health are limited to the fulfillments of preconditions to open veterinary drug stores, drug transportation, drug storage protocols, and disposal of expired drugs.

In the literature (FDRE, 2011), it was published that the Ethiopian policy and strategy related to animal production was first published in 2011 (FDRE, 2011), followed by a small ruminant breeding strategy (2018–2030) (Gizew et al., 2018), targeting breeding strategies and related interventions to enhance the productivity of small ruminants as a national wealth. Different proclamations, such as Proclamation No. 2671/2002 (FDRE, 2002) on animal disease prevention and control, proclamation No. 728/2011 (EFDR, 2017) on veterinary drug and feed administration and control, and Proclamation No. 1022/2024 (EAA, 2024) on control of veterinary drugs, were enacted. Currently, the Agriculture and Rural Development Policy (FDRE, 2024) on livestock and fishery development and health interventions, the National Livestock and Fisheries Extension Strategy and Roadmap (2023–2033) (ATI, 2023), and others have been published to enhance the livestock production and animal health services to improve the livelihoods and increase export earnings from livestock and livestock products. Though these policies, strategies, and proclamations are amended, they are not fully implemented to contribute to the renaissance of the livestock sector. The main reasons might be that the documents are shelved in the ministries and are not cascaded to the implementers, the time-bounded nature and are not updated based on available circumstances across years, their implementation is not monitored, and there are lost relationships between and across implementing actors (MoA and ILRI, 2013; Shapiro et al., 2017; FAO, 2019).

Gaps and challenges for the success of livestock interventions

Based on the result, strategic gaps hindering the success of CBBP and AHI include inadequate monitoring, evaluation and coordination of contributing stakeholders, lack of sustainable funding, and the lack of enabling policies and strategies. Consequently, in different breeds and working sites, some CBBP villages are closed; numerous villages are striving to survive. Addressing these requires institutionalizing interventions within a single organization and shifting from project-based funding (e.g., ICARDA, HEARD) to dedicated national government budget allocations. Furthermore, strategically approaching stakeholders with low interest but high power is crucial to use their influence.

Zonabend et al. (2013) and Gutu et al. (2015) emphasized that the active, coordinated, and accountable participation of organizations and institutions is crucial for the sustainable development of the livestock sector, as it enables the sharing of resources, knowledge, and experiences. However, Haile et al. (2019a) highlighted that the absence of a central organization to harmonize breeding programs has led to duplicated efforts by multiple institutions. Similarly, Kaumbata et al. (2020) and Wurzinger et al. (2021) stressed that the success and scalability of breeding programs depend on the strength and accountability of stakeholder institutions. Weak relationships among stakeholders in the livestock sector thus pose a significant challenge to the effectiveness and sustainability of interventions.

In livestock interventions like CBBP, farmers have reported several gaps, including a lack of transparency by committee leaders, insufficient training for members, inadequate animal health services, poor linkages with district and zone experts, and budget shortages for program setup (Gutu et al., 2015; Areb et al., 2021; Habtegiorgis et al., 2022; Mustefa, 2023). These challenges stem from inadequate follow-ups, a lack of continuous monitoring, weakened relationships, and insufficient accountability among stakeholders involved in the CBBP and animal health interventions.

Conclusions and recommendations

The findings of this study underscore that while CBBPs and AHIs have demonstrated meaningful potential to improve livestock productivity and rural livelihoods, their broader impact has been constrained by fragmented institutional arrangements, inconsistent stakeholder engagement, limited financial sustainability, and weak policy enforcement mechanisms. The nature of livestock interventions—spanning multiple administrative levels and involving diverse actors—necessitates a more coordinated, well-integrated, and sustainably resourced system to ensure lasting outcomes.

Although more than 43 stakeholders were identified across CBBPs and AHIs, most concentrated their efforts in technical and capacity-building activities, with limited participation in critical domains such as policy influence, input provision, and market facilitation. The lack of a centralized mechanism to coordinate and monitor stakeholder contributions has resulted in duplication of efforts, unclear accountability, and weak alignment between federal strategies and local implementation. This institutional disjoint has undermined the sustainability and scalability of promising pilot programs. To address these strategic gaps, the establishment of a central coordinating and oversight mechanism is imperative. This body should be mandated to facilitate stakeholder integration across administrative hierarchies, ensure systematic monitoring and evaluation, and align interventions with national livestock development priorities. Without such a framework, interventions will continue to operate in silos, reducing their overall effectiveness.

In parallel, ensuring long-term financial sustainability is critical. The current dependence on donor-funded, time-bound projects has led to the collapse of several initiatives once external funding ends. A strategic shift is needed toward national budget allocations dedicated to livestock development, with clearly defined exit strategies for externally supported programs. This will help institutionalize interventions and ensure continuity of services and capacity beyond project cycles. Equally important is the engagement of high-power, low-interest stakeholders who, despite their influence, have remained largely inactive. Targeted awareness-raising, regular sensitization, and structured policy dialogues are needed to mobilize these actors and harness their potential to drive systemic change. Their participation is crucial for creating enabling environments for scale-up and ensuring political and financial support.

Bridging the gap between policy and implementation at the local level also remains a priority. National-level policies and strategies often fail to reach district and kebele-level experts due to limited access to training, workshops, and digital communication. Dissemination of updated policy documents in hard copies, combined with continuous in-service training and workshops, is essential to strengthen the capacity of frontline implementers and improve local-level compliance and adaptation. Finally, expanding access to sustainable animal health services is critical for improving livestock productivity and resilience in remote pastoral and mixed crop-livestock systems. Current service coverage remains largely confined to project-supported areas, leaving significant gaps—particularly in underserved pastoral areas. To address this, strategic investment is needed in scaling up the role of Community Animal Health Workers (CAHWs) and creating enabling environments for private veterinary service providers. This includes implementing targeted policy instruments such as subsidies, cost-sharing schemes, and performance-based contracting models. Furthermore, formally integrating these actors into the national animal health and extension systems will enhance service efficiency, accountability, and long-term viability—contributing to broader goals of rural development and food security.

In conclusion, the success and scalability of livestock-related interventions such as CBBPs and AHIs hinge on coherent policy

frameworks, integrated stakeholder participation, and sustained institutional commitment. Moving from fragmented, project-based models toward a harmonized national system is critical. Without deliberate institutional reform and long-term investment, the potential of these interventions to transform the livelihoods of smallholder livestock farmers and pastoralists will remain largely unrealized.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

Conceptualization: AT, MT, and SM. Data curation: AT, CD, AD, GG, TD, and SM. Formal analysis: AT, ZN, and SM. Funding acquisition: SM, SV, SS, and DS. Investigation: AT, MT, AH, and SM. Methodology: AT, RS, MS, and SS. Project administration: AT, SM, SW, AW, and SV. Software: AT, RS, and ZN. Supervision: MT, AH, ZN, DN, SM, TC, DS, SD, and BM. Writing – original draft: AT. Writing – review and editing: all authors. All authors reviewed the results and approved the final version of the manuscript.

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Conflict of interest

Authors SM, SV, RS, MS, and AW were employed by Unique Land Use GmbH.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Correction note

This article has been corrected with minor changes. These changes do not impact the scientific content of the article.

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The author(s) declare that no Generative AI was used in the creation of this manuscript.

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