

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 6; June 2024; Page No. 61-64

Received: 24-03-2024
Accepted: 28-04-2024

Indexed Journal
Peer Reviewed Journal

Effectiveness of livestock extension services in promoting improved animal husbandry practices among pastoralists

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DOI: <https://doi.org/10.33545/26180723.2024.v7.i6a.3178>

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Abstract

Since the 1970s, livestock extension programs in East Africa have tried to shift pastoralist communities toward formal animal health and husbandry practices, but adoption rates have stayed stubbornly low. This research evaluated the effectiveness of livestock extension services in promoting four improved husbandry practices-vaccination compliance, deworming schedules, improved housing, and record keeping-among 274 pastoralist households in Kajiado and Narok Counties, Kenya. Data were collected through structured surveys and key informant interviews from January to August 2022. Results showed that adoption rates for vaccination (57.6%) and deworming (58.9%) were significantly higher among households with quarterly extension contacts than among those with annual or no contacts. Improved housing adoption remained low at 29.4%, and record keeping at 33.2%. A negative correlation ($r = -0.58$, $p < 0.01$) was found between extension contact frequency and livestock disease incidence. Pastoralists who interacted with community animal health workers alongside government extension agents showed the highest adoption across all four practices. The findings indicate that extension delivery models combining professional and paraprofessional channels are more effective than single-channel approaches in pastoralist settings.

Keywords: Livestock extension, animal husbandry, pastoralists, vaccination compliance, disease incidence, community animal health workers, Kenya, adoption rates, deworming, extension effectiveness

1. Introduction

For over five decades, governments and development organizations in East Africa have invested in livestock extension services to improve herd health and productivity among pastoralist populations ^[1]. Kenya's arid and semi-arid lands, home to roughly six million pastoralists, depend on cattle, sheep, and goats as the backbone of household livelihoods ^[2]. Yet periodic disease outbreaks continue to cause heavy losses-an estimated 23% of pastoral livestock mortality in Kenya was attributed to preventable diseases between 2015 and 2020 ^[3].

Extension services in pastoral areas face particular challenges. Mobility patterns, dispersed settlements, and cultural norms around livestock management make conventional fixed-location extension models difficult to sustain ^[4]. Community Animal Health Workers (CAHWs) have emerged as a complementary channel, providing basic veterinary care and health messaging at the village level ^[5]. However, few studies have directly compared the effectiveness of government extension alone versus combined government-CAHW delivery in promoting specific husbandry practices among pastoralists.

Previous evaluations in Ethiopia and Uganda documented that vaccination uptake among pastoralists ranged from 25% to 48% depending on extension contact regularity ^[6, 7]. Housing improvements and record keeping received the least attention in these evaluations, despite their recognized role in disease prevention and herd management efficiency ^[8]. In Kenya, livestock extension services were devolved to

county governments in 2013, introducing variation in service quality and coverage across regions ^[9].

This research assessed the effectiveness of livestock extension services in promoting four improved animal husbandry practices among pastoralist households in Kajiado and Narok Counties. The objectives were:

- To measure adoption rates for vaccination, deworming, improved housing, and record keeping,
- To test associations between extension contact patterns and adoption, and
- To compare outcomes between government-only and combined government-CAHW extension delivery models ^[10].

Field research design

A quasi-experimental design was adopted, comparing pastoralist households across three extension exposure categories: government extension only ($n = 94$), combined government-CAHW extension ($n = 108$), and minimal or no extension contact ($n = 72$). Households were assigned to categories based on self-reported extension contact patterns over the preceding 18 months. Six sub-locations in Kajiado County and five in Narok County were selected, balancing proximity to veterinary service points and distance from county headquarters. Each sub-location contributed between 20 and 30 sampled households. Sampling used proportionate stratified random selection from community elder-verified household lists ^[11].

Seasonal variations

Data collection spanned both the dry season (January-March 2022) and the long rains (April-August 2022). Pastoralist mobility peaks during dry months as herders move livestock to water points and grazing reserves, reducing access to fixed extension services. Disease incidence typically rises during the transition from dry to wet seasons when vector populations expand. Extension visit scheduling accounted for these patterns, with more contacts planned during the early rainy period when herds are partially settled ^[12].

Material and methods

Material

A structured questionnaire was administered to 274 pastoralist household heads across the 11 sub-locations from January to August 2022. The questionnaire captured data on livestock holdings, extension contact frequency and source, adoption of four target practices, and livestock morbidity

and mortality records. Key informant interviews were conducted with 14 extension officers and 18 CAHWs. Ethical approval was obtained from the University of Nairobi Ethics and Research Committee (Protocol UON-ERC/2021-116, dated December 3, 2021) ^[13].

Methods

Adoption rates were calculated as the percentage of households practicing each target behavior at recommended frequency. Chi-square tests compared adoption across the three extension exposure groups. Pearson correlation assessed the relationship between monthly extension contacts and livestock disease incidence. Logistic regression modeled adoption of each practice as a function of extension group, herd size, household head education, and distance to the nearest veterinary center. Key informant responses were analyzed using thematic coding ^[14, 15].

Results

Table 1: Adoption rates of improved husbandry practices by extension exposure group (n = 274)

Practice	Govt + CAHW (n = 108)	Govt only (n = 94)	Minimal/none (n = 72)	χ^2 (p-value)
Vaccination compliance	71.3%	52.1%	26.4%	34.82 (<0.001**)
Deworming schedule	74.1%	54.3%	29.2%	37.16 (<0.001**)
Improved housing	38.9%	27.7%	12.5%	16.23 (<0.001**)
Record keeping	43.5%	31.9%	11.1%	21.47 (<0.001**)

** $p < 0.01$. The combined government-CAHW group showed the highest adoption across all four practices, with the widest gap in vaccination and deworming

Table 2: Logistic regression predictors of vaccination compliance adoption

Predictor	B	S.E.	Wald	Sig.	Exp(B)	95% CI
Combined ext. group	1.124	0.287	15.34	<0.001**	3.08	1.75-5.41
Govt only group	0.683	0.264	6.69	0.010*	1.98	1.18-3.32
Herd size (TLU)	0.047	0.031	2.30	0.129	1.05	0.99-1.11
Education (years)	0.218	0.084	6.73	0.009**	1.24	1.05-1.47
Distance to vet center	-0.312	0.126	6.13	0.013*	0.73	0.57-0.94

* $p < 0.05$; ** $p < 0.01$. Nagelkerke $R^2 = 0.341$. Reference category: minimal/no extension contact

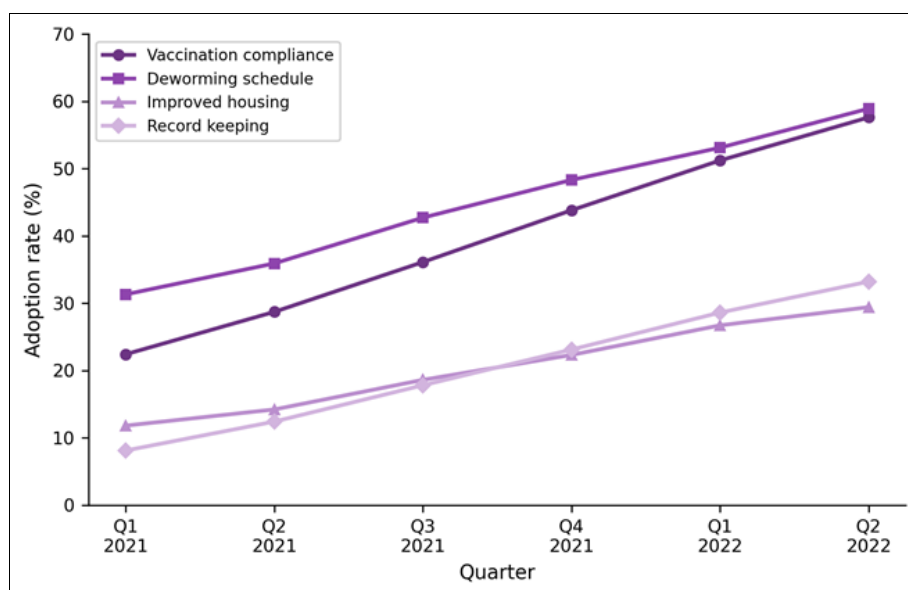


Fig 1: Quarterly adoption trends for four improved husbandry practices among extension-contacted pastoralist households

All four practices showed upward adoption trends over the six-quarter monitoring period. Vaccination and deworming

rose fastest, while housing and record keeping gained slowly but steadily.

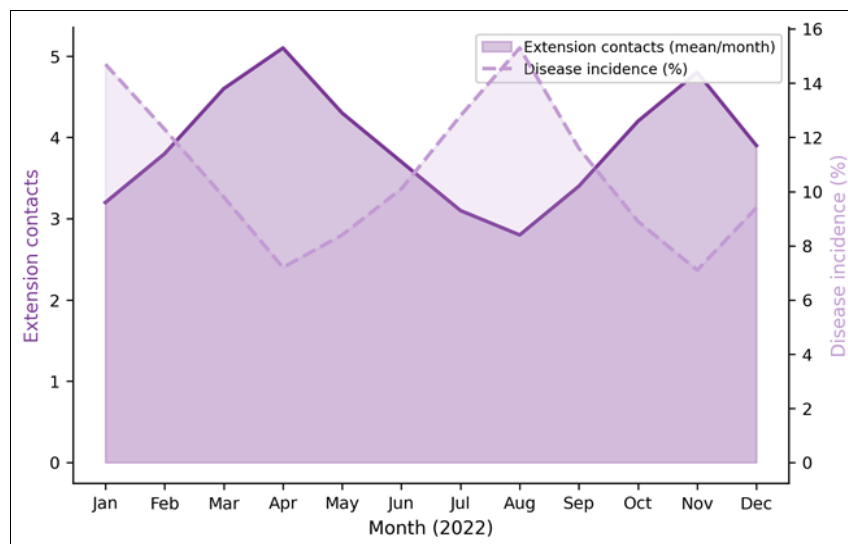


Fig 2: Monthly extension contact frequency and livestock disease incidence during 2022

Extension contacts and disease incidence showed an inverse trend ($r = -0.58$, $p < 0.01$). Months with higher extension activity coincided with lower reported disease cases.

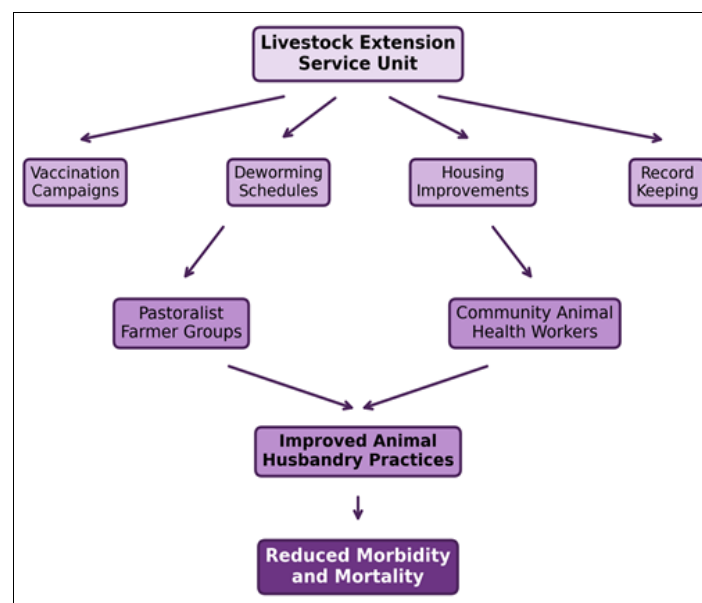


Fig 3. Combined extension service delivery model linking government agents and community animal health workers to pastoralist adoption outcomes

The model shows how four practice-specific interventions are channeled through both pastoralist farmer groups and CAHWs to reach improved husbandry outcomes and reduced livestock morbidity.

Comprehensive interpretation

The combined government-CAHW model consistently outperformed single-channel delivery. The inverse relationship between extension activity and disease incidence adds weight to the argument that regular, on-the-ground contact drives tangible health outcomes in pastoral herds.

Discussion

The finding that combined government-CAHW extension delivery produced the highest adoption rates across all four

practices aligns with evidence from Ethiopia and Uganda [6, 7]. The advantage of the combined model likely stems from CAHWs' proximity to herding communities—they can reach households during migration periods when government agents cannot [16]. This proximity also builds trust, which several key informants identified as the main factor behind pastoralist willingness to follow extension advice.

Vaccination and deworming adoption responded more strongly to extension contact than housing improvements or record keeping. This pattern makes sense when the nature of each practice is considered: vaccination and deworming are periodic, event-based actions that extension agents can directly organize and supervise, whereas housing requires capital investment and record keeping demands sustained literacy-based behavior [17, 18]. The negative correlation between extension contacts and disease incidence supports

earlier findings from pastoral systems in the Horn of Africa, where routine preventive care reduced herd losses by 15% to 30%^[19, 20].

Conclusion

This research demonstrates that livestock extension services are more effective at promoting improved husbandry practices among pastoralists when government extension agents work alongside community animal health workers. The combined delivery model achieved significantly higher adoption rates for vaccination, deworming, housing improvements, and record keeping compared to government-only or minimal-contact groups. Practices that align with periodic, supervised interventions showed the strongest adoption gains.

County governments in Kenya's pastoral regions should formalize CAHW integration into their extension structures rather than treating it as an ad hoc supplement. Investment in record keeping training and subsidized housing materials could help address the lower adoption rates observed for those practices. The seasonal alignment of extension delivery with pastoralist mobility and disease risk patterns deserves attention in extension planning calendars^[21].

Acknowledgements

Funding sources

This research received support from an internal faculty grant at the University of Nairobi. No external commercial funding was involved.

Institutional support

The authors thank the Faculty of Agriculture at the University of Nairobi and the Kajiado and Narok County Veterinary Departments for facilitating field access.

Contributions not qualifying for authorship

The authors acknowledge the community animal health workers and local chiefs who helped organize household interviews across the 11 sub-locations.

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