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Margaret Ngugi, Prof. Hellen Mberia, and Dr. Kyalo Wa Ngula

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The Influence of Communication Participants on Adoption of Contagious Bovine Pleuropneumonia (CBPP) Vaccine among Arid and Semi-Arid Lands (ASAL) Pastoralists in Kenya

Virginia Wangari Ndungu[1*], Professor Hellen K. Mberia[2], Dr Kyalo Wa Ngula[3], and Dr. Joseph Othieno[4]

[1]PhD Student, Department of Media Technology and Applied Communication, Jomo Kenyatta University of Agriculture and Technology (JKUAT)

[2]Lecturer, Department of Media Technology and Applied Communication, Jomo Kenyatta University of Agriculture and Technology (JKUAT)

[3]Lecturer, Department of Humanities, Chuka University

[4]Lecturer, Department of Agricultural Economics, University of Nairobi

[*]Corresponding Author's Email: wangarindungu123@gmail.com

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Abstract

The purpose of this study was to establish the influence of communication participants on adoption of Contagious Bovine Pleuropneumonia (CBPP) Vaccine among Arid and Semi-Arid Lands (ASAL) pastoralists in Kenya.

Methodology: The study population was pastoralists in Narok South Sub-county. Sample size was 468 respondents inclusive of qualitative and quantitative samples where 440 responded to questionnaire, 24 in focus group discussions, and 4 in key informant interviews. Cross-sectional research design entailing collection of qualitative and quantitative data was used to assess association between variables. Multi stage, purposive, simple random, systematic and stratified sampling techniques were then employed to come up with respondents. Data derived from 468 respondents was analyzed using statistical Package for Social Scientists (SPSS) version 20.0 and presented using regression coefficients and ANOVA.

Findings: All respondents engaged in discussions with others before vaccinating cattle against CBPP. This is because as members of social groups, they interacted with each other through networks, a dominant mechanism for diffusion. Within parameters of experts, veterinary officers and agro-veterinary sales people were influential. In the community, family and neighbours were equally influential and among peers were elders and herders. These influencers were effective because of their attributes and social qualities; trustworthiness and credibility, accessibility, knowledgeability, government authority, advised on many issues, related easily with others and were friendly.

Unique contribution to theory, practice and policy: Some people have influence over others in CBPP vaccine adoption among ASAL pastoralists. Governments, veterinary researchers, and communication experts need to leverage on them to encourage diffuse of the vaccine. These influencers could also be trained on some basic aspects of disease reporting, control and eradication.

Keywords: *Communication, participant, influencers, adoption*

1.0 INTRODUCTION

In many developed and developing societies, farmers have been a target of diffusion of agricultural innovations efforts. This is because there are many changes originating from scientific research, which to be effective, have to be applied by these farmers and members of the rural community. One of the main factors in these innovations is that they are not instantly adopted thus frustrating researchers and extension agents. In Kenya for example, Smale *et al.* (2011) found out that a maize hybrid, H614 released in 1986, still dominated on farms despite an increase in range of hybrids sold in the seed market. In livestock sector, (Musaba, 2010) about five out of ten livestock management practices disseminated to farmers are adopted.

Diffusion of innovation and social learning theories provided grounding for this study to establish the influence of communication participation on adoption of Contagious Bovine Pleuropneumonia (CBPP) Vaccine among Arid and Semi-Arid Lands (ASAL) pastoralists in Kenya. CBPP is a highly contagious disease of cattle lung which spreads through direct contact with cough droplets, facilitated by crowding of animals (Provost *et al.*, 1987). According to Office International des Epizooties (OIE 2014, OIE 2008),) CBPP is a notifiable disease, and countries with infections are excluded from international trade of live animals. The disease has a devastating effect on the livelihoods of 24 million people across 19 African countries who rely solely on livestock (Thompson, 2005). Tambi et al. (2006) estimates that the costs due to sickness and mortality from CBPP in Africa is US$41 million, of which US$6.4 million is attributed to Kenya. The Government of Kenya acknowledged (Kuti, 2012) that control of CBPP in Africa and Kenya is urgent because it threatened the establishment of disease free zones, envisaged in the country's development blue print Vision 2030. The presence of this trans-boundary disease is not only a threat to improved quality and quantity of livestock production but also to international market standards of meat, hides and skins. Currently, CBPP is controlled mainly by use of vaccines, although uptake by smallholder livestock farmers is low, at 20- 60 % (Kuti, 2012; Wanyoike 1999).

The focus on communication participants was informed by the slow pace of adoption of a livestock vaccine, live T144 to eradicate CBPP in Kenya. The study was important because mass communication research (McQual et al., 1981; Lowery et al., 1995) played a role in the process of encouraging adoption of innovations both in developing and advanced societies where scientific research have to be applied to replace old methods with new technologies. The study shifted attention from the vaccine to the adoption users to human behavior in communication acceptance or rejection of CBPP vaccine.

1.1 Objective of the Study

To examine the influence of communication participants on adoption of CBPP vaccine among ASAL pastoralists in Kenya

2.0 LITERATURE REVIEW

Mass communication has the ability to raise awareness of an innovation, but it is widely recognized that interpersonal influence through social networks is the dominant mechanism for diffusion (Greenhalgh et al., 2004; Rogers 1995; Katz, 1957). Rogers (2003) described innovation diffusion as, "the process by which an innovation is communicated through certain channels over time among the members of a social system". Mass media may produce awareness and knowledge but personal influence are important for a decision to be adopted.

In the social system, change agents and opinion leaders were identified as an important factor in influencing technological change. Nutley *et al.* (2002) identified experts or change agents as those "who work proactively to expedite and widen innovation". In the agricultural extension model, these change agents have traditionally taken the form of extension agents appointed by the state, or private providers, working as intermediaries between researchers/scientists and end users. The ability of change agents to work with both of these groups is critical to their success. Equally, it has been asserted that they work best in partnership with opinion leaders (Nutley *et al.*, 2002). Opinion leaders are thought to exert influence over the adoption decisions of their peers (Rogers 1995; Greenhalgh *et al.*, 2004; Muchunku, 2015; Chatman, 1987; Weimann, 1994; Feder *et al.* 1985; Gafsi *et al.* 1979; Sharara 2011). Valente et al. (1999) observed that learning occurs most efficiently when individuals are trained by their near peers, whom they have chosen as their models. Lowery *et al.* (1995) sais that values in small groups are sources of influence and interpretation tended to be drawn to each other and close-knit groups. When people are in system of close and interdependent interaction with one another, they tend to demand a high degree of conformity.

An understanding of the community or audience profile can enable communication that takes into consideration the demographic and psychographic information, education levels, cultural beliefs, values, customs etc. (Witte et al., 2001). A community is an important element in the diffusion of innovation process**.** Rogers (2003) identified three types of innovation-decisions: optimal, collective and authority. Where an 'optimal innovation decision' is based upon individual decision-making irrespective of the wider social system; 'collective innovation decision' is forged by group agreement and 'authority innovation decisions' are made by a select group of powerful individuals. In rural societies, families retain strong social ties with neighbours, and farmer to farmer influence is an important factor in decisions to adopt a given agricultural information particularly when ideas come from the outside. Interpretations made by neighbours are critical importance in determining the likelihood of adoption (Harris, 1972). In Kenya, (Kairu-Wanyoike et al., 2014) observed the existence of, "the key informants or more knowledgeable participants", who influenced for adoption of CBPP vaccine among the pastoralists.

3.0 RESEARCH METHODOLOGY

The study used mixed method design which entailed merging qualitative and quantitative data to provide findings of the study. The study population were pastoralists who lived in Narok South Sub County. The area was selected for several reasons. First, the population owned big number of herds and had a deep knowledge of CBPP and benefits of its control because 11 out of 16 CBPP outbreaks recorded in Kenya since independence were in Narok South sub-county; principally in Mara and Loita. Secondly, the sub-county has been a target of CBPP vaccinations and under permanent quarantine (Wanyoike, 1999; Kairu-Wanyoike et al., 2010). The focus on participants was informed by the slow pace of adoption of a vaccine currently being used, live T144 to eradicate CBPP in Kenya. CBPP communication participants were categorized as experts, community and peers. Experts were veterinary officers and agro-veterinary sales people, community included neighbors, family, chiefs, religious leaders and other professionals while peers included elders and herders. Figure 1 shows the study area.

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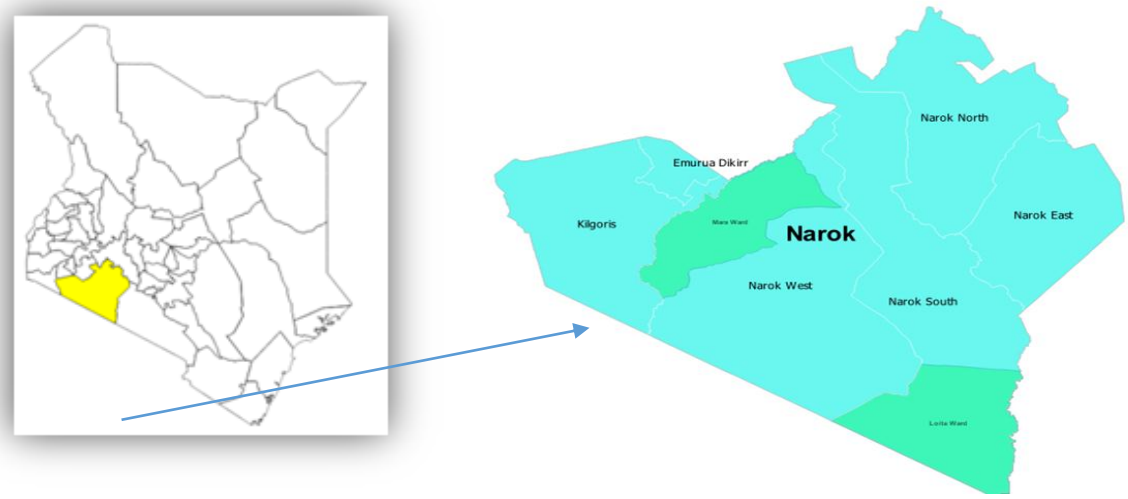

Figure 1: Map of Narok South Sub County, Narok County

Source: http:// Narok.go.ke

Multistage sampling entailing purposive, simple random, systematic and stratified was used to achieve adequate representation from mixed farmers, agro pastoralists, and pastoralists sub samples. Following this, the proportionate allocations of households per division and strata were; Loita 131 where a sample of 68 respondents were agro pastoralists and 63 respondents were pastoralists. In Mara, the sample was 293 where 18 respondents were mixed farmers and 275 were pastoralists. Statistical Package for Social Scientists (SPSS) version 20.0 was used to analyze data and results were presented using regression coefficient and ANOVA. Table 1 summarizes the sample size.

Table 1: Study's sample size

Div	Pop	H/H	HHs	SL	MF	P	AP	Total	FGDs	KII
Loita	22,873	4,409	136	Olngarua	0	39	41	***84***	0	0
				Nkopon	0	24	27	***52***	6	0
Mara	67,365	14,140	304	Sekenani	3	49	0	***53***	6	0
				Aitong	5	80	0	***89***	6	0
				Olkinyei	3	49	0	***53***	0	0
				Siana	7	97	0	***109***	6	0
										4
Total sample					**18**	**338**	**68**	**440**	**24**	**4**

Key: Div- Division, Pop- Population HH- Households, HHS- Household sample, SL- sub location, MF-Mixed farmers, P- Pastoralists, AP- Agro Pastoralists, FGDs- Focus group discussions, KII- Key informant interviews

4.0 PRESENTATION OF FINDINGS, ANALYSIS AND INTERPRETATION

Results from the study showed that almost all (98.9%) respondents reported that they engaged in discussions with one another before vaccinating their cattle against CBPP. Rogers diffusion of innovations and Granovetter's threshold models of collective behavior (Rogers 2014, Granovetter 1978), explained how influence stemmed from person's social ties in adoption of an innovation such as CBPP vaccine being studied. In herder communities, Othieno et al., (2022) reported that interpersonal information sharing and radio were the leading sources of information. CBPP influencers who were consulted on CBPP vaccine are shown in table 2 below.

Table 2: Those who influenced the community

Influencers	Frequency	%
Neighbours	416	95.4
Veterinary officers	397	91.1
Family (wife, husband, children, relatives)	260	59.6
Herders	257	58.9
Maasai elders	169	38.8
Chief and Assistant Chief	98	22.5
Religious leaders and professionals from the community (e.g. teachers & pastors)	52	11.9
Others	1	1.4

This study found that veterinary officers, some members of the community and peers in Narok South Sub-county were more influential than others in adoption of CBPP vaccinations. Thus, neighbours (95.4%), veterinary officers (91.1%) family (59.6%), and herders (58.9%) were cited by most respondents as being influential. The interpersonal influence in Narok South typically occurred at relaxed environments such as watering points, livestock markets, or slaughter houses during interactions referred to as *Romon* (idle talk). Herders were particularly influential because they spent a lot of time with the animals, and were deemed to have a lot of information. In other documented research *(*Munchunku, et al. 2014, Keller et al. 2003, Haydarov et al. 2014), support this study after they found that residents of ASAL regions were distrustful of news and advertising from mass media, preferring recommendations or communication from friends, family, coworkers, and peers instead. The study findings on the influence of communication participants and their attributes on CBPP adoption was corroborated by the qualitative data of the research; *"We usually seek each other out, family, neighbors, friends and animal health assistants before collectively agreeing to vaccinate against CBPP!*

The population studied was almost entirely homogenous providing an opportunity for the influencers to be successful in persuasion. This is because (McGuire,1969) audiences were attracted to communication sources that shared common demographic characteristics with them such as age, education, occupation, income level, religion, race and place of residence. But Lowery et al., (1995) argues that this might not always be the case. Family and friends may play an influential part, but neighbours' opinions may not be so important due to differences within the

social groups resulting to communication breakdown (Newheiser et al.,2012). Connolly (2019) further explains this aspect of human behavior through the conspiracy theory. The theory advances that audiences are a suspicious lot especially when a few people or elitists seemed to be pushing an issue construed to benefit them and not the masses. In CBPP messaging, communication participants did not clearly address two areas of concern for the respondents- inoculation site and side effects of the vaccine on some animals. Severe post-vaccination reactions, inappropriate vaccination seasons and lack of knowledge of the vaccine (Kairu-Wanyoike et al.,2014) seemed to give credence to the conspiracy theory, and was evident when some respondents skipped some vaccinations.

On attributes of CBPP vaccine adoption influencers, trustworthiness and credibility of the family was rated at 91.1%, herders at 88.8%, veterinary officers at 82.6% and neighbours at 81.4%. Knowledge of CBPP and other livestock issues was also highly rated among family 74.9%, herders 70.3%, veterinary officers 69.5%, neighbours 66.5%. Accessibility of family was rated at 83.4%, herders at 79.1%, neighbours 72.3%, and veterinary officers at 70.3%. Ability to explain the benefit of vaccination was herders 75.1%, family 74.9%, and veterinary officers 67% and neighbours at 65.8%.

These attributes were key in influencing behavior of audiences as reported by Birnbaum et al., (1979), Fishbein et al., (1975), but Kelman (1961) the power attribute was the most effective. Powerful sources had three characteristics- perceived control, concern, and scrutiny. Despite their heterophilous state, veterinary officers in Narok South Sub County were successful because they were deemed to be professionals or change agents who communicated desired adoption decisions. Tan (1985) says such an outcome was because audiences perceived educated information sources as knowing the "right answer," or the correct stand on an issue. Veterinary officers used the government authority they held to exercise perceived control (an extent to which the audience perceived the source's ability to administer rewards and punishment). They used this power to mobilize the community to take CBPP vaccine and were instrumental in changing people's attitudes and behaviors towards control of the disease, but in extreme circumstances they instituted quarantines severely enforcing it.

As earlier pointed, the *Romon* interactions in relaxed environments such as watering points, livestock markets, or slaughter houses provided opportunities for respondents and their influencers engage on matters relating to their community. In so doing, respondents actively engaged in learning activities from each other including CBPP vaccine innovation. The study finding on the attributes of their influencers was corroborated by the qualitative data of the research while figure 2 demonstrates influential CBPP communication participants and their attributes. *Influencers are accessible, they live among us, we interact a lot. Some of them such as veterinary people are very knowledgeable, and they are from Government and we do as they say"*

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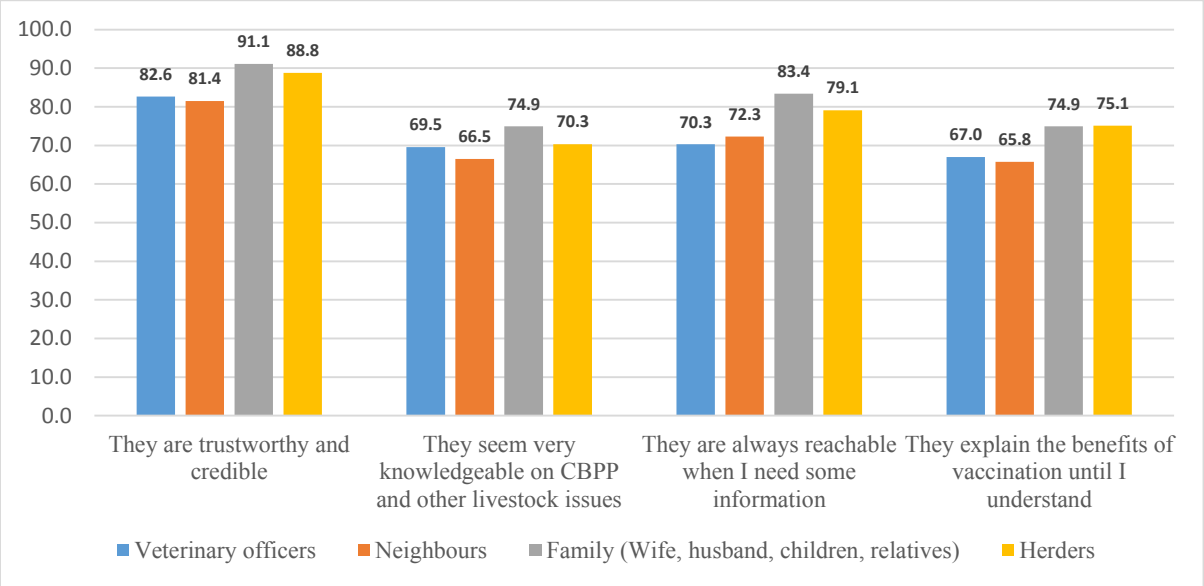

Figure 2: Influential CBPP communication participants and their attributes

4.1: Regression coefficients analyses for communication participants and adoption of CBPP vaccine

Communication participants and adoption of CBPP vaccine were subjected to regression coefficients analyses as shown in table 3.

Table 3: Regression coefficients

Coefficients					
		Unstandardized Coefficients		Standardized Coefficients	
Model		**B**	**Std. Error**	**Beta**	**t-test**	**P-value.**
1	(*Constant)*	-.029	.055		-.519	.604
	Communication Participants	.198	.067	.147	2.945	.003

Dependent variable: Adoption of CBPP

The regression analysis of coefficients in table 3 above shows that the regression model is statistically significant since p=0.003 is less than 0.05. This implies that communication participants significantly influenced adoption of CBPP. Therefore, the model can be defined as;

Y=-.029+0.198X1 where Y= Adoption of CBPP and X1=Communication Participants.

However, this regression model was tested further using ANOVA in order to determine whether it is adequately fit to predict the dependent variable.

4.2: ANOVA analyses for communication participants

An analysis of variance test in table 4 below was used to predict the dependent variable

Table 4: ANOVA analyses

Model		Sum of Squares	df	Mean Square	F	p-value
1	Regression	23.279	1	2.910	19.913	.000[a]
	Residual	62.252	434	.146		
	Total	85.531	435			

Dependent Variable: Adoption of CBPP
*Predictors: (Constant), communication c*hannels

The results show that F=19.913 is large, and the p-value=0.00 is less than 0.05. Therefore, the regression model is adequate to explain adoption of CBPP vaccine hence a conclusion that communication participants significantly influence adoption.

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Summary of findings

The study established that virtually all respondents engaged with other people before vaccinating their cattle against CBPP. In that regard, some communication participants were found to be more influential while others had limited influence. Among those with most influence were neighbors, county veterinary officers, family, herders in that order. Attributes of influencers were trustworthiness and credibility, knowledge of CBPP and other livestock issues, accessibility and ability to explain the benefit of vaccination. Veterinary officers were successful because they were professionals or change agents who influenced desired adoption decisions

5.2 Conclusion

The study concluded that communication participants; veterinary officers and, neighbours, family and herders played a significant role of adoption of CBPP vaccine in the ASALS. Pastoralists like any other communities are composed of people with similar enthusiasms, interests and purpose, and are said to possess internalized "shared, tacit and codified understandings." Informal interpersonal influence through *Romon*, was integral part of people's lives in this region, and a social network upon which vaccination and other decisions were often made. The influencers' attributes included power, trustworthiness, credibility, knowledgeability, and ability to explain the benefits of CBPP vaccination were of utmost importance. Future vaccine campaign efforts could leverage on this information is useful in future efforts to improve adoption to desired 80% level.

5.3 Recommendations

As devastation caused by CBPP continues to manifest due to myriad of challenges including communication, this study recommends the following measures to mitigate the disease. One, heightened awareness at the policy making level on the impact of pastoralists' losses attributed to CBPP. This will enable the policy makers to marshal financial and human support for communications and other veterinary interventions. Second, behavior change communication strategy whose main objective is improved awareness and understanding of CBPP vaccinations

among ASAL communities affected by the disease. In this strategy, the complexity and need of audiences based on their characteristics will be defined. Third, future efforts could leverage on social and professional veterinary networks to disseminate vaccine messages since these were found to be useful in influencing respondents' decisions to adopt the vaccine. Future communication investments could also be channeled through these networks. Fourth, the community through their opinion leaders could be trained on some basic aspects of disease reporting control and eradication.

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