

Sources of information for small-holder cattle farmers in Dr Ruth Segomotsi Mompati District Municipality in the North West Province, South Africa

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Abstract

The purpose of this paper was to identify sources of information used by small-holder cattle enterprises and evaluate their influence on productivity of those enterprises. Results showed that public extension is the main (85-87%) source of information for small-holder cattle producers, followed by radio (52%) and other farmers (47-48%). More educated farmers prefer magazine and TV to extension officers while women prefer office visits to magazine, TV and commercial farmers ($P < 0.05$). Older farmers tend not to rely on magazine, radio, TV, commercial farmers and veterinarian while owners of larger herds prefer these sources to office visits ($P < 0.05$). Older farmers tend not to rely on magazine, radio, TV, commercial farmers and veterinarian while owners of larger herds prefer these sources to office visits ($P < 0.05$). Source commonly used by more educated farmers, men, younger farmers and owners of large herds such as radio, TV and commercial farmers, suppressed the sale of cattle and small stock ($P < 0.05$). Reliance on other small-holder farmers for agricultural information, resulted in lower calving rates while reliance on both commercial and small-holder farmers suppressed the sale of small stock ($P < 0.05$). Sources preferred by women such as office visits and telephone stimulated the sale of sheep and small stock in general. We recommend that age, gender, education and herd size should guide the selection channels for disseminating information to small-holder cattle producers and that the extension content be enriched to include markets and entrepreneurship in the study area.

Keywords: Extension, sources of information, small-holder cattle farmers, productivity, entrepreneurship.

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Introduction

The South African government has prioritized the development of the small-holder agriculture since independence. Small-holder farmers own a substantial proportion (40%) of the cattle population in the country (RMDT, 2008) but continue to be plagued by low productivity (Scholtz and Bester, 2010), which limits their ability to realise their full potential. As in the case of other developing countries (Ahmad *et al.*, 2007; Adetayo and Eunice, 2013) these farmers depend on public extension services for agricultural information. However, the efficacy of agricultural extension has been put to question since the past three decades (Rivera, 1991). Generally, agricultural development in developing countries is hamstrung by structural inadequacy of extension delivery systems, which are characterized by weak linkages between research and extension (Kaimowitz, 1991). Globally, the inadequacy of public extension necessitated a policy shift towards reduced funding for public extension services (Kidd *et al.*, 2000; Contado, 2013) such as the introduction of private extension delivery systems in some developed countries (Rivera, 1993). It is recognised that privatization is not a simple alternative to monolithic public extension (Chapman and Tripp, 2003), which still plays an important role in agricultural development in developing countries (Ahmad *et al.*, 2007; Omobolanle, 2008; Lashgarara and Hosseini, 2011). Moreover, Rivera (1993) noted that private extension hardly benefits small-holder farmers, it is important to focus attention on this category of farmers. It is therefore important to devise modalities to improve efficiency of extension to become more responsive to farmers' needs (Adetayo and Eunice, 2013). Extension efficiency can be enhanced by employing a holistic knowledge systems approach where stakeholders including farmers are important parts of a single agricultural knowledge and information system (Röling, 1990). Meanwhile, evidence from developing countries shows that various modalities of public extension services have improved the productivity of small-holder farmers (Haq, 2011; Elias *et al.*, 2013; Hasan *et al.*, 2013). In South Africa, the state introduced mentorship programmes, to enable lead farmers

to complement the public extension service to facilitate the establishment of small-holder farmers (AgiSETA, 2012). However, the preferred sources of information for small-holder cattle producers in South Africa have not been investigated. The purpose of this paper was to identify sources of information used by small-holder cattle enterprises and evaluate their influence on productivity of those enterprises.

Materials and methods

This study was conducted in the Dr Ruth Segomotsi Mompati (RSM) District Municipality of the North West Province. A random sample of 308 was selected from a list of 1700 cattle farmers from the District Department of Agriculture and Rural Development. Three wards of Taung North (25%), Morokweng (31%) and Ganyesa (44%) were used as strata to draw proportionate samples. A questionnaire aimed at capturing cross-sectional data on factors affecting cattle off-take for 2011 breeding season was developed and administered through face to face interviews with respondents. The instrument containing 73 questions ranging from demographic data to production data including sources of information and sales was administered between May and July 2012. Off-take rate was calculated as number of sales during 2011/ average of opening and closing herd sizes during 2011 x 100. For this purpose, animals were categorized as bull, ox, cow, heifer, bullock and steer.

Data were analysed using IBM SPSS statistics 22 (2013). Descriptive statistics were computed using frequencies and means to determine patterns between variables. . Ranking scales were transformed into dummy variables to enable statistical tests. Males were coded 0 while females were coded 1. Herd sizes were classified according to categories suggested by Tapson (1990) where herds of less than 10 were regarded as small. The GLM multivariate analysis was performed to test effect of farming area and farm level variables on herd mortality and off-take rates. Means were separated using least significant differences (LSD) tests. Correlation analysis was performed to measure associations between demographic characteristics, sources of information as well as herd off-take.

Results and discussions

The majority (76%) of respondents were males, 82% of whom lived at home. This result confirms finding by Ragasa *et al.*, (2012) who reported that men constituted 70% of farmers in some parts of Ethiopia. Taung North had the highest proportion of women (46%) compared to 22% and 10% for Ganyesa and Morokweng, respectively (Table 1). The age of household heads ranged from 24 to 86 with an average of 57 years. The majority (46%) of respondents belonged to middle age of between 45 and 65 although seniors (>65) constituted a significant proportion of the population (34%). The low participation of youth in cattle production agrees with findings from other parts the Continent (Chirwa and Matita, 2012; Adensehinwa *et al.*, 2004; Omobolanle, 2008). Table 1 shows that these demographic differences were amplified at ward level indicating that farmers from Taung North were older and owned smaller herds than the rest but and had less cattle production experience than those from Ganyesa ($P<0.05$). In terms of herd performance, the former had higher mortality and off-take rates than the rest but experienced lower calving rates than those from Morokweng alone ($P<0.05$). The low participation of both women and youth in the study area implies that there is a need to identify barriers to entry into the cattle industry. It is worth noting that the majority of household heads (79%) attended school for between one and 17 years with an average schooling years of 7.6. Furthermore, household sizes in the study area ranged from one to 15 with an average of 5.1 members. No significant differences were observed for education levels and household sizes between the three extension wards.

Table 1 Distribution of farmers according to extension ward and gender

Extension ward	Number farmers		Household size		Age head		Years experience		Years schooling		Herd size		Calving rate		Mortality rate		Off-take rate	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Taung North	41	36	5.4	4.1	63.7	53.9	19.7	15.2	6.7	8.7	16.1	15.6	38.1	44.2	16.6	9.6	25.6	20.1
Mean	77		4.8		59.2 ^a		17.7 ^a		7.6		15.9 ^a		41.2 ^a		13.4 ^a		23.1 ^a	
Ganyesa	105	30	5.1	5.4	55.1	60.7	23.0	21.1	7.5	7.2	45.1	31.2	56.3	42.7	7.6	9.0	13.7	14.6
Mean	135		5.2		56.3 ^b		22.6 ^b		7.4		42.7 ^b		53.1 ^{ab}		7.9 ^b		13.9 ^b	
Morokweng	86	10	4.8	5.8	48.6	63.1	20.9	24.9	8.9	4.6	50.0	26.5	63.4	44.8	8.6	10.2	10.9	4.4
Mean	96		4.5		50.8 ^b		21.2 ^{ab}		8.3		46.5 ^b		61.6 ^b		8.9 ^b		9.9 ^b	
Total	232	76	4.8	4.9	54.3	58.4	20.9	20.9	7.8	7.4	42.6 ^a	24.1 ^b	56.8	43.5	9.4	9.5	14.6	15.0
	308		4.9		56.8		20.9		7.7		35.3		53.6		10.0		15.0	
SE			0.21		0.97		1.02		0.34		1.99		1.66		1.18		0.96	

Values with different superscripts differ significantly (P < 0.05)

These households owned herds ranging from one to 169 with an average of 35 head of cattle (Table 2). The majority (71%) of herds can be described as medium comprising 11-30 (40%) and 31-70 (31%) while small herds (1-10) constituted only 13% of the population. The average calving rate was 55% ranging from 5.6% to 100% whilst herd mortality ranged from 0.5% to 94.8% with an average of 10%. Herd off-take rates ranged from 2.7% to 66.7% with an average of 15%. The herd dynamics in the study area were atypical of the lower levels reported in other studies of South African small-holder cattle (Tapson, 1990; RMDT, 2008; Scholtz and Bester, 2010), which reported lower calving and off take rates as well as higher mortality rates.

Table 2 Distribution of respondents by herd dynamics

Herd category	size	Number of farmers	Percent frequency	Calving rate	Herd mortality rate	Herd off-take rate
1-10		57	18.5	55.5	18.1	22.5
11-30		121	39.3	51.7	8.8	12
31-70		94	30.5	57.5	8.6	13.8
>70		36	11.7	55.6	6.1	16.4
Total		308	100	55	10	15

Figure 1 shows that extension officers (85%) and animal health officers (87.3%) are the main source of information for small-holder cattle producers in the study area. Ahmad *et al.*, (2007) also reported that 87% of farmers in some villages of Pakistan use extension as their main source of information while Adetayo and Eunice (2013) reported a 90% reliance for Nigeria. Furthermore, the high reliance on public extension suggests that focussed efforts aimed at improving the skills of extension officers may have a great impact on productivity of farmers. Chapman and Tripp (2003), Contado (2013), and Adetayo and Eunice (2013) advocate for pluralistic modalities of extension to enable cooperation between the public and the private sector. In South Africa, the public extension is complemented by model farmers who provide advisory services either formally or informally. Our study shows that farmers rely on their peers (48%) and established commercial farmers (47%) for agricultural information. This pattern is reminiscent of the diffusion theory by Rogers (1983), which suggests an accelerated technology uptake when some farmers learn from innovators and early adopters. In addition, radio is the main (52.3%) form of mass communication while magazines are the least (28.2%) used medium. As illustrated in the subsequent sections of this paper, the low use of magazines is related to literacy. Ahmad *et al.*, (2007) also reported a 53% use of radio by farmers in Pakistan. The high access to radio is partially attributable to the proliferation of community radio stations resulting from South Africa's public broadcast policies.

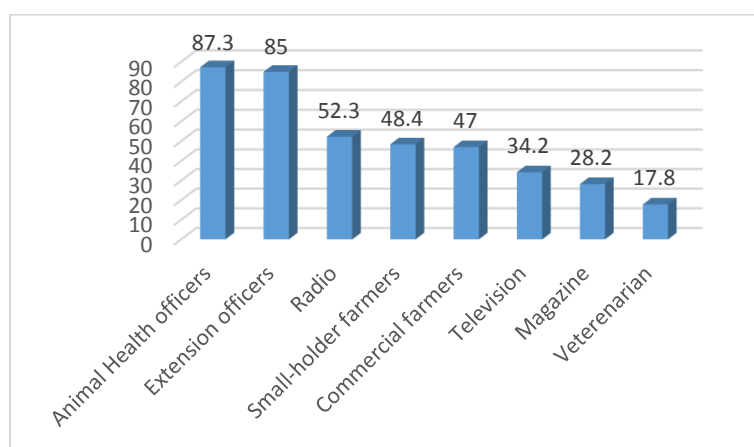


Figure 1 Sources of information for small-holder cattle producers in Dr Ruth Segomotsi Mompati District Municipality

Table 3 presents correlation between household attributes and sources of information. As expected, the education level of farmers was positively correlated ($P < 0.05$) with the use of magazine ($r = 0.328$) and television ($r = 0.139$) but negatively correlated with extension ($r = 0.193$). On the contrary, there was a negative correlation between the age of household head with the use of magazine ($r = 0.363$), radio ($r = 0.183$), TV ($r = -0.298$) as well as commercial farmers ($r = 0.128$) and the veterinarian ($r = 0.175$) as the source of information ($P < 0.05$). Results also show that male farmers used magazine ($r = 0.130$) and TV ($r = 0.183$) while women used office visits ($r = 0.216$) for agricultural information ($P < 0.05$). It can be inferred from these results that small-holder farmers in the study area obtain agricultural information through alternative modalities of extension.

Previous studies in other developing countries showed varying correlation between extension, household demographics and productivity. Participation in extension has been reported to improve productivity among crop farmers in Pakistan (Ahmad *et al.*, 2007), Ethiopia (Elias *et al.*, 2013) and Uganda (Hasan *et al.*, 2013). Haq (2011) reported a positive correlation between extension contacts and productivity in Bangladesh. In our study, we found no significant correlation between reliance on both extension and animal health officers for agricultural information. However, Ragasa *et al.*, (2012) showed that lower productivity of female farmers in Ethiopia was partially attributable to limited access to extension. Despite insignificant correlation with extension, as shown in Table 1 our study indicates that female farmers tend to experience lower calving and high mortality rates. On the other hand, Obomolanle (2008) reported a positive correlation between farmer's age and affiliation as well as adoption of technology in Nigeria. However, our study found no significant correlation between farmers age and herd performance. A lack of significant correlation between extension and productivity in our study suggests that variations in productivity might be associated with alternative modalities of executing extension in the study area.

Table 3 Correlation between household attributes and sources of information

Sources of information	Age	Years of schooling	Gender	Herd size
Magazine	-.364**	.328**	-.130*	.179**
Radio	-.183**	.067	-.109	.186**
Television	-.298**	.139*	-.183**	.225**
Commercial farmers	-.128*	.113	-.179**	.174**
Small-holder farmers	.023	-.034	-.081	-.005
Extension officers	-.101	-.193**	-.096	-.014
Veterinarian	-.175**	.033	-.042	.126*
Study groups	-.075	-.080	.168	-.006
Office visits	.008	.071	.216**	-.268**
Telephone	.155	.097	.140	-.164

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

In this regard, alternative extension methods had an influence on herd performances. Herd size was positively correlated with the use of magazine ($r = 0.179$), radio ($r = 0.186$), TV ($r = 0.224$), commercial farmers ($r = 0.174$) and veterinarian ($r = 0.126$) but negatively correlated with the frequency of office visits ($r = 0.268$) ($P < 0.05$). This is understandable because these preferred modalities are less interruptive on routine farm activities than office visits, which tend to halt production. The result on the use of commercial farmers suggests the existence of mentorship programme (AgriSETA, 2011) indicating close cooperation either formally or informally between commercial and small-holder farmers in the study area. Moussa *et al.*, (2011) reported that radio broadcast reinforced other extension methods and increased adoption rates of cowpea storage technologies among West African farmers. Table 4 shows a negative correlation between the use of radio and herd off-take rates ($r = 0.161$) and the

sale of small stock ($r=0.169$) ($P<0.05$). The negative correlation suggest that radio programmes put less emphasis on issues of market and trade.

In addition, reliance on other small-holder farmers for agricultural information, resulted in lower calving rates ($r=0.200$) and sell fewer small stock ($r=0.161$), which is a combination of both sheep and goats ($P<0.05$). The sale of small stock also declined ($r=0.194$) as respondents relied on commercial farmers for information ($P<0.05$). While the depressed calving rates could be attributed to the limited scope of agricultural technology among small-holder producers, the suppression of small stock sale by both commercial and small-holder farmers raises a question whether there is sufficient commercial orientation in the study area towards small stock farming. The foregoing is reinforced by the negative correlation ($r=-0.418$) between the frequency of extension contacts and the sale of sheep ($P<0.01$). On the other hand, there was a positive correlation ($r=0.308$) between office visits and the sale of sheep ($P<0.01$), which suggest that extension officers may use other experts in the office to persuade farmers to sell livestock during the face to face sessions. Furthermore, the use of telephone also increased the sale of both sheep ($r=0.393$) and overall small stock ($r=0.296$), which implies the use of individual communication methods might induce a commercial orientation amongst small-holder. The apparent entrepreneurial orientation associated with alternative office visits and telephone communication is commendable suggesting that such methods may reinforce extension efforts to transform small-holder farmers to become commercially oriented.

Table 4 Correlation between sources of information and herd performance

Sources of information	Calving	Mortality	Herd off-take	Sheep sale	Small stock sale
Magazine	.019	-.050	-.046	.015	-.043
Radio	-.027	-.113	-.161**	-.137	-.169*
Television	.072	-.114	-.105	-.190	-.186*
Commercial farmers	-.095	-.053	-.107	-.112	-.194*
Small-holder farmers	-.200**	.006	-.110	-.050	-.161*
Extension officers	.036	-.056	-.075	-.418**	-.053
Veterinarian	-.014	-.098	.050	-.088	-.101
Study groups	.066	-.001	.141	.135	.049
Office visits	-.147	.130	.114	.348**	.094
Telephone	-.127	-.035	.088	.393*	.296*

** . Correlation is significant at the 0.01 level (2-tailed)

* . Correlation is significant at the 0.05 level (2-tailed)

In terms of farmer perception of extension, 79% of farmers reported that their contact with extension always addresses cattle production while 72% regarded the extension information to be relevant. Furthermore, 80% of the farmers attributed their new knowledge about cattle production to extension while 72% felt that extension improved their competence in cattle production. As noted by Bahn and McAleer (2007), modern day extension has to address farming problems including markets and economics. Despite the high ranking of extension, our study revealed that extension seldom addresses issues of markets and agri-business. This finding suggests that there is a positive image about extension in the study area. However, there is need to adopt a market orientation if extension has to become relevant to changing farmer needs.

Conclusions

This paper evaluated the sources of information used by small-holder cattle farmers. Results show that public extension through extension and animal health officers remains the main source of information for farmers. The preference of sources of information is associated with demographic attributes of farmers with determine the choice of information sources in varying ways.

For instance more educated farmers preferring magazine and TV to extension officers while women prefer office visits to magazine, TV and commercial farmers. Older farmers tend not to rely on magazine, radio, TV, commercial farmers and veterinarian while owners of larger herds prefer these sources to office visits. We conclude that age, gender, education and herd size should be used when selecting appropriate channels for disseminating information to small-holder cattle producers in the study area.

However, some preferred sources for more educated farmers, men, younger farmers and owners of large herds such as radio, TV and commercial farmers, suppressed the sale of cattle and small stock. Reliance on small-holder farmers also suppressed calving rates and the sale of small stock in general while extension contacts suppressed the sale of sheep in particular. On the other hand, sources preferred by women such as office visits and telephone stimulated the sale of sheep and small stock in general. The negative influence of mass media such as radio and TV on off-take rates implies a lack of market focused content in the broadcast programmes targeting small-holder farmers. The same applies for the subjects addressed through farmer to farmer using both commercial and small-holder farmers. We recommend that extension efforts be directed towards improving calving rates among small-holder farmers. Furthermore, the scope of radio and TV programmes should be extended to include markets and entrepreneurship with a view to increasing the off-take rates among small-holder farmers.

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