

Full length Research Paper

Understanding situational incompatibility of payment for the delivery of public extension services

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Received 12 April, 2013; Accepted 10 September, 2013

Persistent financial problems confront public extension organizations world-wide. Governments have embarked on funding arrangements, including commercializing the delivery of extension services to producers to ensure financial sustainability. These funding methods are innovative in the sense that they have not been used previously. They have to be accepted eventually by producers. The situational incompatibility aspects represent the barriers en route to the adoption of such innovations. This study therefore attempts to identify the perceived problem/barriers, commonly called independent variables associated with the adoption of innovations, such as the payment for the delivery of public extension visits. Further assessment is made of the important independent variables that contribute the most to the variance in the adoption of payment for the delivery of public extension visits. A non-probability survey of 97 medium and small-scale commercial crop farmers was conducted between September and October 2010 in three districts of the Free State Province. Findings indicate that farming orientation, group membership, desired number of visits and perceived credibility of the public extension service made the most contribution to explain the variation in the adoption of the payment for the delivery of public extension visits. Credibility of information source and desired number of visits made the single most important contributions. These findings have positive implications for funding extension service delivery.

Key words: Situational incompatibility, medium and small-scale commercial farmers, payment for delivery of public extension, independent variables.

INTRODUCTION

Financial constraints, especially, inadequate operating funds beset public extension services world-wide including South Africa (Gebremedhin et al., 2006; Umhlaba Rural Services, 2007). This problem seems to be persistent, affecting both developed and developing countries (Fei and Hiroyuki, 2000; World Bank, 1994). This had led to ineffective extension work among others

(Rivera, 1991). Public extension organizations globally have since the 1980's been adopting reform measures to ensure financial sustainability of their operations (Qamar, 2002; Rivera and Alex, 2004c). The operational financial problems facing public extension worldwide have spurred on calls for users of public extension services to contribute towards the recurrent cost of extension if

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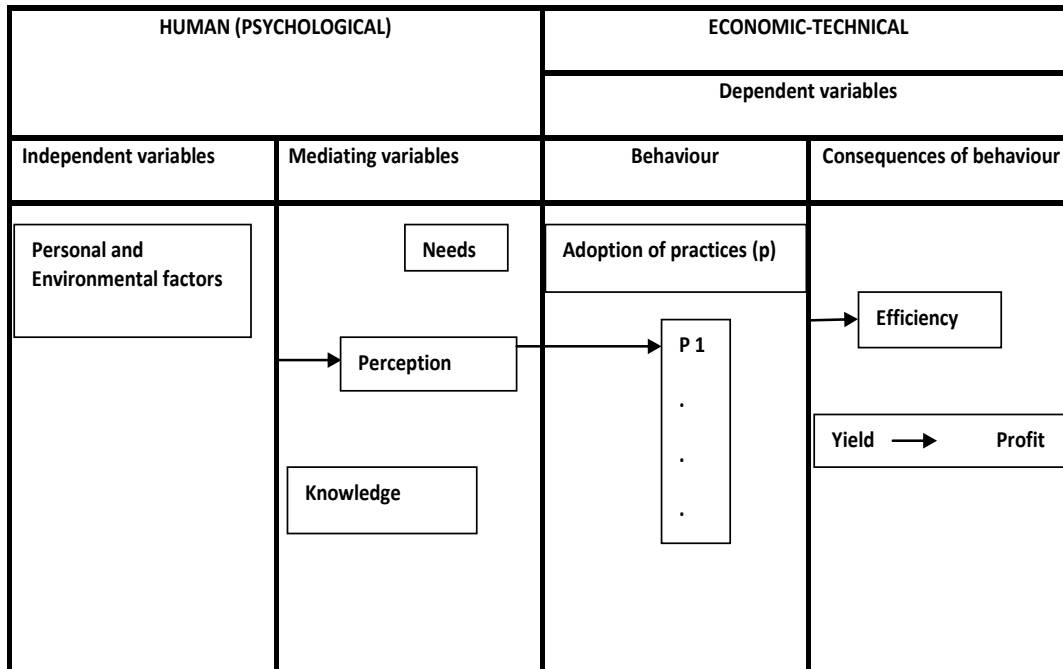


Figure 1. Relationship between behavior- determining variables, behavior and consequences of behavior (Düvel, 1991).

financial sustainability and accountability are to be achieved and to make public extension effective (Neuchâtel Group, 2002; Holloway and Ehui, 2001 cited in Anderson, 2008). There are indications that extension cost recovery initiatives are spreading around the world (World Bank, 2006 cited in Anderson, 2008). Among the extension activities that have been commercialized in some developed and developing countries are dissemination of information and direct contact with growers in the field (Dinar, 1996). Direct contacts such as farm visits, however, take up a lot of extension workers' time and financial resources to accomplish (Dinar, 1996; Wilson and Gallup, 1955). Among the issues that make for ineffectiveness of the public extension system in South Africa is few number of visits by public extension officers to farmers (Jacobs, 2003). Some examples of payment for extension farm visits exist in Israel (Dinar, 1996), Ethiopia (Holloway and Ehui, 2001) and India (Shekara, 2001).

Insights gained from the literature review, however, show that empirical research regarding farmer payment for the delivery of public extension visits is non-existent in South Africa. This notwithstanding, some papers have been published on the broader issue of commercialization/privatization of extension services in this country (Botha and Treunicht, 1997; Eweg and Owens, 2004). It therefore, stands to reason that a current and pressing need exists for investigations into and analytical studies of the important factors that influence farmers to contribute towards/accept payment for the delivery of public extension visits.

Theoretical framework

The critical and decisive issue in the search for the most appropriate mode of financing public extension delivery is that it will have to be adopted by the farmer producers. This brings to the fore the crucial role of the human being, and the challenge to understand and influence his/her adoption behaviour. The adoption of an innovation perceived to have a few positive aspects is made even more difficult if it is fraught with a number of negative dimensions. The latter consists of disadvantages pertaining to the innovation as well as the barriers en route to the goal. The disadvantages relate more to the innovation as such and can be changed to positive forces; the situational incompatibility aspects however, represent the barriers, commonly called independent variables, associated with adoption of innovations and are potentially negative (Düvel, 1991). Düvel (1991) represented the behaviour determinants and their influence relationship in the context of behaviour change and the results of behaviour change as shown in Figure 1.

Aims and objectives

This study, therefore, was motivated by the need to investigate the possibility of user contributions for the delivery of public extension visits as a way of generating more operational funds to finance such extension visits. This is particularly important because nationally, medium and small-scale commercial farmers, the target

Table 1. Distribution of respondents according to farming orientation and payment for the delivery of public extension visits (N = 97).

Payment decision	Farming orientation					
	Part –time		Full –time		Total	
	n	%	n	%	N	%
No	13	46.4	17	24.6	30	30.9
Yes	15	53.6	52	74.5	67	69.1
Total	28	100.0	69	100.0	97	100.0

$\chi^2 = 4.427$; $df = 1$; $p = 0.035$; Significant = 0.05.

population of this study, use 21 to 30% of public extension time (Düvel, 2002) and receive farm management information/service from public extension via farm visits. The objective of this paper was to identify the important independent variables that influence medium and small-scale commercial crop farmers' acceptance to pay for the delivery of public extension visits. The hypothesis of the study was: An incompatibility of payment for the delivery of public extension visits with the situation of the farmer has influence on the acceptance to pay for the delivery of public extension visits. The specific hypotheses are:

1. Farming orientation may have a positive influence on the payment for the delivery of public extension visits.
2. Group membership has a positive influence on the payment for the delivery of public extension visits.
3. Percentage earnings from farming have a positive influence on the payment for the delivery of public extension visits.
4. Desired number of extension visits has a positive influence on the payment for the delivery of extension visits.
5. The credibility of public extension service provider has a positive influence on the payment for the delivery of public extension visits.
6. The effect of drought on gross farm sales has a positive influence on the payment for the delivery of public extension visits.
7. Farming experience may have a positive influence on the payment for the delivery of public extension visits.
8. Mentorship has a positive influence on the payment for the delivery of public extension visits.
9. The type of farming enterprise has a positive influence on the payment for the delivery of public extension visits.

RESEARCH METHODS

This paper is based on a survey of medium and small-scale commercial crop farmers¹ in three of the five districts of the Free

¹The small/medium-scale farmer definition adopted for this study after careful study of the literature was "farmers who produce mainly for the market and LRAD beneficiaries who may have own consumption and the market in view as the ultimate purpose of production".

State Province, South Africa. Convenience and purposive, non-probability sampling techniques were used to survey farmer respondents because of a lack of reliable sampling frame. A semi-structured, self-administered, pre-tested questionnaire was used to collect information from 97 farmer respondents between 1 September and 7 October 2010. After a critical examination of the literature on the adoption of innovations, nine independent variables relevant to the adoption of payment for the delivery of farm visits were identified. These variables were chosen to ensure content validity of the measuring instrument (Cooper and Schindler, 2001). The questionnaire, therefore, asked respondents amongst other issues to indicate information on their farming orientations, percentage earnings from farming, group memberships, desired number of public extension visits, effect of drought on their gross farm incomes, farming enterprises, farming experiences, farming with the support of mentors, credibility of public extension provider. Effort was expended to improve the reliability of the measuring instrument by eliminating or reducing subject bias, observer bias and observer error Saunders et al. (2000).

Following Stockburger (1998), in which categorical variables with two levels may be directly entered as predictors or predicted variables in a multiple regression model, a multiple regression model was specified to study the relationship between the study variables and payment for the delivery of public extension visits. The prediction of Y is accomplished by the following equation:

$$\hat{Y}_i = b_0 + b_1 X_i + \epsilon_i \quad (i = 1, 2, 3, \dots, n)$$

Where \hat{Y} is the predicted value of the dependent variable, namely payment for the delivery of public extension visits, the b values are the regression weights or the coefficients of the predictor variables, the X 's represent the various predictor variables (mediating variables), ϵ_i is the error term and n is the number of observations. The data were analysed using the Statistical Package for the Social Sciences (SPSS). The data were analysed by means of descriptive statistics and two key inferential statistical procedures, namely the Chi Square (X^2) tests of independence and multiple linear regression analysis which were used to test whether any observed differences were statistically significant.

RESULTS AND DISCUSSION

The results of the nine independent variables and their influence relationship with the payment for the delivery of public extension visits investigated in this study are presented as follows:

Farming orientation

Table 1 shows the results of the investigation of the

Table 2. Distribution of respondents and their decision to pay for the delivery of public extension visits according to percentage earnings from farming (N = 97).

Payment decision	Percentage earnings from farming (% of total income)								Total	
	0 to 24		25 to 49		50 to 74		75 to 100			
	n	%	n	%	n	%	n	%	N	%
No	5	35.7	10	58.8	4	19.0	11	24.4	30	30.9
Yes	9	64.3	7	41.2	17	81.0	34	75.6	67	69.1
Total	14	100.0	17	100.0	21	100.0	45	100.0	97	100.0

$\chi^2 = 8.616$, $df = 3$, $p = 0.035$; Significant = 0.05.

Table 3. Distribution of respondents and their decision to pay for the delivery of public extension visits according to their group membership (N = 97).

Decision to pay	Group membership					
	No		Yes		Total	
	n	%	n	%	N	%
No	14	45.2	16	24.2	30	39.9
Yes	17	54.8	50	75.8	67	69.1
Total	31	100.0	66	100.0	97	100.0

$\chi^2 = 4.321$, $df = 1$, $p = 0.038$; Significant = 0.05.

influence relationship between farming orientation (full-time or part-time farming) and the adoption of payment for the delivery of public extension visits. The result was positive influence ($p = 0.035$). The study hypothesis that the farmer's situation as a full-time or part-time farmer influenced payment was thus supported. In this case, full time farmers were more inclined than part time farmers to pay for extension visits. The available literature on the influence of farming orientation on adoption of farm innovations is mixed. The expected difference between full-time and part-time farmers with respect to willingness to pay is ambiguous and therefore, seemed to be situation specific. Sulaiman and Sadamate (2000) for example, found non-significant results in two of their research sites while reporting a significant result in a third area of their study. Kenkel and Norris (1995) on the other hand found that farming orientation significantly influenced the adoption of raw weather data but a non-significant result on value-added data.

Percentage earnings from farming

The investigation of the effect of the percentage earnings per year from farming was found to be positively related to payment for the delivery of public extension visits (Table 2) as indicated by a significant Chi-square test for independence at 5% level ($p = 0.035$). The study hypothesis was thus supported. The general picture was that as the percentage earnings per year derived from

farming increased, the percentage of respondents who showed a tendency to accept to pay for the delivery of public extension visits also increased, although, the increase was not linear. This was particularly evident when the income from agriculture exceeded 50%. The positive significant influence of the percentage earnings per year from farming on payment for the delivery of public extension visits found in this study was similar to the finding reported by Sulaiman and Sadamate (2000) who found this variable to significantly influence respondents' willingness to pay for agricultural-related information in two of the three survey areas. Yapa and Ariyawardana (2005) also mentioned similar findings with their small-scale tea growers in Sri Lanka.

Group membership

Table 3 shows there was significant positive relationship between group membership among respondents in this survey and payment for the delivery of public extension visits ($p = 0.038$). This finding supported the study hypothesis. Similar findings were reported by Ajayi (2006) and Gautam (2000). Habtemariam (2004) also indicated a tendency among his efficient respondents to be slightly more organizationally involved. Daramola (1989) however, did not find co-operative membership to significantly influence the probability of fertilizer adoption decisions in his sample and in fact, its influence was negative. A possible reason could be culturally-related where the people tended to be individualistic because of

Table 4. Distribution of respondents and their decision to pay for the delivery of public extension according to their desired number of extension visits (N = 97).

Decision to pay	Desired number of visits per month										Total	
	1		2		3		4		5			
	n	%	n	%	n	%	n	%	n	%	N	%
No	12	66.7	1	6.7	2	10.5	15	30.0	0	0.0	30	30.9
Yes	6	33.9	5	3.3	17	89.5	35	70.0	4	100.0	67	69.1
Total	18	100.0	6	100.0	19	100.0	50	100.0	4	100.0	97	100.0

$\chi^2 = 16.847$, $df = 4$, $p = 0.002$.

Table 5. Distribution of respondents' views on the effect of drought on their gross farm income according to their desire to pay for public extension (N = 77).

Decision to pay	Respondents' views on the effect of drought on the gross farm income					
	Very little to not affected		Much to very much affected		Total	
	n	%	n	%	N	%
No	6	27.3	22	40.0	28	36.8
Yes	16	72.7	33	60.0	49	63.6
Total	22	100.0	55	100.0	77	100.0

$\chi^2 = 1.100$, $df = 1$, $p = 0.432$; Missing = 20.

lack of trust of other people in group settings. Another possible explanation why people might not join groups like farmer co-operative as in his sample might be due to past disappointments with such groups. These findings clearly suggested that, although group membership is a great enhancer of the adult learning and adoption process, adoption is not guaranteed by group membership.

Desired number of visits

Respondents' desired number of visits was found to have a significant positive influence on the acceptance to pay for the delivery of public extension visits (Table 4) ($p = 0.002$). The study hypothesis was thus supported. A significant finding was that, of the farmers who wished to receive between 2 and 4 visits per month, with a mean of 3.16 visits per month ($SD = 1.213$), most of them (89.5%) wanted to pay. The mean number of visits reported in this study was close to the designated visits of one every two weeks (or 2 visits per month) in the Kenya extension project (Gautam, 2000) and similar to the 2 visits per month requested by livestock farmers in Turkey (Budak et al., 2010). The desired number of visits by respondents in this survey is much higher by any standards than that reported by Gautam (2000) who indicated that more than two-thirds of the respondents in his survey desired to receive one visit every three months while 50% of contact farmers desired to meet the extension officer no more

than once every three months. These differences in reported number of visits in this study and others might be due to different amounts of resources available to the particular extension organizations. Farmers would not want to meet their extension worker often if they perceived that the encounter would not add value to their work. In fact, they saw such encounters as a waste of their precious time. This had been observed by Gebremedhin et al. (2006) in Ethiopia, where farmers claimed they knew better than the development agents (DAs) in agricultural production, and all they needed the DA for was only input supply.

Effect of drought

The results (Table 5) showed that the effect of drought on producers' gross farm income did not seem to influence producers to pay for the delivery of public extension visits. This was indicated by chi-square results that lack significance ($p = 0.432$). The study hypothesis was, therefore, not supported. In a more direct question about respondents' views on the possible effect of the drought spells on their gross farm income if they paid for public extension, most respondents (80.8%) were hesitant, that is, had no idea whether it would be worth paying (Table 6). This seemed to suggest that respondents did not believe in the current competency level of the public extension service to rescue the situation under a paid public extension service. On a related question to assess

Table 6. Distribution of respondents' views on the effect of drought spells on gross farm income under a paid public extension service (N = 73).

Effect of drought spells on gross farm income under a paid public extension	Respondent	
	N	%
No idea	59	80.8
Not affected	7	9.6
Very little effect	7	9.6
Total	73	100.0

Missing = 24.

Table 7. Distribution of respondents' views on the effect of drought spells on gross farm income under a paid private extension (N = 73).

Effect of drought spells on gross farm income under a paid private extension	Respondents	
	N	%
No idea	40	54.8
Not affected	22	30.1
Very little effect	11	15.1
Total	73	100.0

Table 8. Distribution of respondents' farming enterprise according to their decision to pay for the delivery of public extension (N = 97).

Decision to pay	Farming enterprise									
	Vegetables		Sunflower		Maize		Lucerne		Total	
	n	%	n	%	n	%	n	%	N	%
No	20	38.5	1	9.1	9	30.0	0	0.0	30	30.9
Yes	32	61.5	10	90.9	21	70.0	4	100.0	67	69.1
Total	52	100.0	11	100.0	30	100.0	4	100.0	97	100.0

$\chi^2 = 5.640$, $df = 3$, $p = 0.130$.

the confidence of respondents in paid private extension service to mitigate the effect of drought on their gross farm income, only 54.8% did not seem to have confidence in a paid private extension service to reduce the gross income losses as a result of drought (Table 7). This implied that respondents had a little more confidence in a paid private extension service than a paid public extension service in this matter.

Farming enterprise

According to Table 8, farming enterprise did not influence the decision of producers in this survey to pay for the delivery of public extension visits ($p = 0.130$). The study hypothesis was thus not supported. A possible reason for this finding could be that so far as payment for the delivery of public extension visits was concerned, all the producers of the crops in the survey had need for more farm management information/advice/service and

therefore, for more contacts with the public extension agent. They were prepared to pay for such visits. For this reason, the types of crops planted did not significantly discriminate between those who would and those who would not. Kenkel and Norris (1995) found similar results and stated that for the raw data/value-added model, the production of peanuts, cotton, or alfalfa did not significantly impact willingness to pay.

Farming experience

This variable was investigated in this study and the results are presented in Table 9. The majority of farmers (74.2%) in this survey had between 1 to 5 years farming experience with a median experience of 1 year. According to the results, farming experience did not influence the decision of producers in this survey to adopt the payment for the delivery of public extension visits ($p = 0.985$). The study hypothesis was therefore, not

Table 9. Distribution of respondents' farming experience and their decision to pay for the delivery of public extension visits (N = 97).

Decision to pay	Farming experience category						Total	
	1 to 5		6 to 10		11 to 15			
	n	%	n	%	n	%	N	%
No	22	30.6	5	1.3	3	33.3	30	30.9
Yes	50	69.4	11	68.8	6	66.7	67	69.1
Total	72	100.0	16	100.0	9	100.0	97	100.0

$\chi^2 = 0.030$, $df = 2$, $p = 0.985$.

Table 10. Distribution of respondents involved in mentorship and their decision to pay for the delivery of public extension visits (N = 97).

Decision to pay	Respondents' involvement in mentorship				Total	
	Not involved		Involved			
	n	%	n	%	N	%
No	29	33.0	1	11.1	30	30.9
Yes	59	67.0	8	88.9	67	69.1
Total	88	100.0	9	100.0	97	100.0

$\chi^2 = 1.824$, $df = 1$, $p = 0.177$.

Table 11. Distribution of respondents' assessment of the credibility of the public extension service and their decision to pay for the delivery of public extension visits (N = 97).

Decision to pay	Respondents per overall credibility category				Total	
	Less credible		More credible			
	n	%	n	%	N	%
No	20	45.5	10	18.9	30	30.9
Yes	24	54.5	43	81.1	67	69.1
Total	44	100.0	53	100.0	97	100.0

$\chi^2 = 7.955$, $df = 1$, $p = 0.005$.

supported. This finding was similar to other past studies (Chukwuone and Agwu, 2005; Kenkel and Norris, 1995).

Farming with the support of a mentor

The results (Table 10) suggest that mentorship did not influence the decision of respondents in this survey to pay for the delivery of public extension visits ($p = 0.177$). The study hypothesis was, thus not supported. The Master Mentorship Programme was launched within the South African agricultural system by the Department of Agriculture in 2005 and was piloted in 2006 (Department of Agriculture, Forestry and Fisheries, 2009). In 2008, only the Milk Producers' Organization (MPO) conducted a mentorship programme in the Free State where this study was conducted (Department of Agriculture, Forestry and Fisheries, 2009). The data (Table 10) show that only

9.3% of the total number of respondents in the survey reported farming with a mentor. This indicated that the mentorship programme had not caught on well in this province; this could be a possible reason for the lack of influence of this variable on the adoption of payment for the delivery of public extension. This notwithstanding, there was an indication in the results that a large proportion of respondents farming with a mentor (88.9%) indicated a desire to pay for the delivery of public extension.

Credibility of public extension service provider

There was evidence (Table 11) that respondents' opinions as revealed in their assessment of the credibility of the public extension service provider relative to other sources of farm management service/information that credibility had a positive effect on the acceptance to pay

Table 12. Multiple regression estimates of the effects of the independent variables on the payment for the delivery of public extension visits.

Variable	Beta	T	P
Farming orientation	0.127	1.006	0.001*
Percentage farm earnings	0.173	1.488	0.142
Farming enterprise	0.236	1.862	0.067
Farming experience	0.203	-1.739	0.087
Credibility	0.549	6.429	0.000*
Drought effect on gross farm income under paid public extension	0.233	1.740	0.086
Desired number of visits	0.290	3.183	0.002*
Mentor	-0.020	-.231	0.818
Group membership	0.149	1.724	0.009*
Constant	-	-5.266	0.000

$R^2 = 0.588$; Significant at 0.01*

for the delivery of public extension visits ($p = 0.005$). Ajayi (2006) made a similar finding in Nigeria based on the assessment of the extent to which respondents were visited and trained on relevant agricultural production-related activities. What should be of concern to policy makers though is the fact that about 45% of respondents did not find the public extension credible. About 54% of this number however, would still like to pay for the delivery of public extension; perhaps this is because it was the only source they could afford compared with private extension. Policy makers should think seriously about improving the competency of field level extension practitioners to be able to service their clientele better.

Contributions of independent variables to variation in the adoption of payment for the delivery of public extension visits

To assess more accurately the contribution of the independent variables on the adoption of the payment for the delivery of public extension visits, a multiple regression analysis was employed. All nine independent variables did not show multi-collinearity and as a result were entered into the regression analysis. The results are shown in Table 12. The analysis shows that all variables except mentor and farming experience positively correlated with the dependent variable. However, only farming orientation, credibility of the extension service/agent, desired number of visits and group membership made a significant contribution to the variance in adoption of payment for the delivery of public extension visits. Together, these four variables explained 58.8% of the variation in the adoption of the payment delivery of public extension visits. The model was significant (at 5% level) ($F = 10.477$, $p = 0.004$). The credibility of the extension agent/service made the largest contribution (0.549) to the payment adoption variance. The next biggest contributor was desired number of visits

(0.290). In terms of their contributions to the R^2 , credibility and desired number of visits contributed 25.8 and 6.3%, respectively.

SUMMARY OF CONTRIBUTIONS AND CONCLUSIONS

Regarding the objective of the study, findings indicate that farming orientation, percentage earnings from farming, group membership, desired number of visits and the perceived credibility of the public extension service were the important variables that positively influence respondents' acceptance to contribute towards the delivery of public extension visits. Of these variables, desired number of visits and perceived credibility of the public extension service made the most single, independent contributions towards the adoption variance. These findings imply that it was possible to secure financial contributions from users of the public extension service to finance more extension visits. This would contribute towards the financial sustainability of the public extension service and make it possible for extension agents to visit farmers optimally. Another implication of these findings was that any extension programme to secure the acceptance of producers to contribute towards the cost of public extension visits should pay particular attention to these 4 variables that had been identified in this study. The findings in this study could help shape policy towards farmer contributions to the cost of delivery of visits to farmers. Among the issues, policy makers should pay special attention to and improve is its credibility as perceived by producers if they hope to get more and more producers to buy into the idea of contributions for the delivery of extension visits. Furthermore, the public extension service should try and provide the number of visits (2 to 4 per month) producers' desired from the public extension agent to motivate producers to contribute towards the cost of extension visits.

The study was based on non-probability sampling and this makes it inappropriate to generalize the results to the wider medium and small-scale commercial crop farmers in South Africa. A replication of the study by means of probability sampling methods would validate the veracity of the findings in the larger population of medium and small-scale commercial crop farmers in the country.

Conflict of Interests

The author(s) have not declared any conflict of interests.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the following organizations for their financial support: The National Research Foundation for funding the research project from which this manuscript was written and the Govan Mbeki Research and Development Centre's fellowship that made the writing of the manuscript possible. The Free State Department of Agriculture is highly appreciated for providing logistic support during data collection of the original research.

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