Farmers' Perceptions Towards Privatisation of Extension Services in Eastern Cape and Kwazulu-Natal Provinces of South Africa

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Abstract

In South Africa, the state provides all extension and advisory support services to smallholder farmers. However, it appears that the government is struggling to provide adequate farmer support, and production among smallholders is not improving, leading to many calling for the states' withdrawal and the private sector to deliver extension services to farmers. The study aimed to assess farmers' perceptions of the privatisation of extension services in South Africa, and it was guided by the following research questions: 1) What are smallholder farmers' perceptions of the privatisation of extension services? 2) which factors influence these perceptions? 3 If extension services were privatised, would farmers be willing to pay? Research activities included a formal survey conducted on 265 farmers, selected using simple random and data collected using a structured questionnaire through interviews. Chi-square, t-test, and logistic regression were employed to analyse descriptive and inferential statistics. The logistic regression showed that farmers who supported the privatisation of extension services had access to secure land tenure rights, a frequent response from extension officers, and were satisfied with extension visits. The study concluded that extension services should be privatised in Eastern Cape and KwaZulu-Natal Provinces, and farmers who exhibit these characteristics should be used as innovators. This study contributes to the growing understanding of the private sector's involvement in smallholder agriculture in developing countries. The study's findings provide empirical evidence and direction to be considered by donors and policymakers in pursuing pluralistic agricultural extension services production in South Africa.

Introduction

The first known works of modern agricultural extension services came into existence due to a disaster. The records point to the potato blight outbreak of 1845 in Ireland, which today forms part of the United Kingdom (Swanson, 2008). The attacks were severe on the Irish peasant because the population predominantly relied on potatoes as part of their everyday diet. This necessitated the Irish government to seek help across Europe, and lecturers were appointed to travel around the most distressed districts (Swanson, 2008). The teachers were tasked with disseminating information and demonstrating to small farmers how to grow nutritious root crops other than potatoes (Liebenberg, 2015). This event of extension and advisory services on the Irish island persisted until 1851.

Modern history also records that the term extension was first used to describe adult education programmes in England around 1857 (Schwartz, 1994). Oxford and Cambridge University programmes were centred on teaching rural peasants (farmers) about literacy, social topics, and later agricultural subjects. In 1860, the two universities held discussions focused on these educational programmes; the idea was to find means of extending their work beyond the campus gates into the neighbouring communities (Swanson, 2008).

However, it was not until 1867, when the first practical attempts were made, and these teachings and demonstrations were a success, that the activities quickly developed to become a well-established movement before the end of the century (Anderson, 2007). In the United States of America, extension work began because of large groups of people working together to improve agricultural techniques and disseminate agricultural information within private organisations and agricultural societies (Schwartz, 1994). This was around 1853 when many schools and colleges of agriculture began having farmers' institutes, public meetings, and lectures presenting and disseminating agricultural information (Swanson, 2008). The demonstration movement grew from these institutes, whereby instructors would hold public demonstrations of new practices in what became an outdoor classroom (Schwartz, 1994).

The land grant universities, established in 1890, were the first formal institutes funded by the United States government to recognise the value of education for the nation. The idea was to create a broader education for the American people in the arts of peace and especially in agriculture and mechanics (Swanson, 2008). This was followed by establishing and passing the Smith-Lever Act of 1914, which established the cooperative extension system to benefit people from current developments in agriculture, home economics, and other related subjects (Schwartz, 1994). During this time, Britain transferred responsibility for extension activities from Universities to the Ministry of Agriculture, and the terminology for this new responsibility was changed to advisory services (Anderson, 2007). Most European countries

then adopted this strategy as they developed similar advisory services within their respective Ministries of Agriculture.

Travelling lecturers introduced the formal agricultural extension system from European countries and the United States of America in continents such as Africa, Asia, and the Caribbean. According to Daku (1997), donor agencies such as the Agency for International Development (USAID) played an active role in establishing agricultural universities and extension systems that we see today in developing countries. Many national systems still carry the extension title introduced in the 19th and 20th centuries, and nearly all extension systems are now officially connected to the Ministries of Agriculture (Turyahikayo & Kamagara, 2016).

Theoretical Framework

As mentioned earlier, many developing countries have their extension and advisory services as part of their ministry of agriculture makeup. South Africa's agricultural extension sector is recognised as a national and provincial competency for delivering advisory and input supply services to farmers free of charge as social welfare (Koch & Terblanché, 2013). The sector incurs all the costs of inputs and service delivery. It is increasingly under pressure to deal with various policy issues, including accountability, relevance, responsiveness, and cost-effectiveness (Swanson & Sammy, 2002). Also, many international and bilateral donors are demanding institutional modernisation within the public extension, considering trade liberalisation, the emerging role of the private sector, and governments with fewer resources (Swanson, 2008).

The public extension appears unable to provide extension support to farmers adequately. This is worsened by the low extension worker-to-farmer ratio (1:1500), the laying off of skilled workers, poor essential support (e.g. transport), and the inadequate supply of inputs and information (Abdul & Eatzaz, 2007; World Bank, 2010; Ghosh, 2012; Hlatshwayo & Worth, 2016; Nkosi, 2017). The challenges mentioned above, with climate change, depreciating soil health, and agriculture's contribution to the overall Gross Domestic Product (GDP), require extension services that are up to date with technological advancement and practices that sustain the environment (Lamm, 2021; Lamiño Jaramillo *et al.,* 2022).

Swanson & Sammy (2002) posited that the private sector presents an alternative to the public sector. Nemaangani (2011), Koch & Terblanché (2013), & Liebenberg, 2015 reiterated that the private sector delivering extension services to farmers would be ideal for South Africa given that these independent services providers have been in existence for at least 40 years. These firms, farmers, and factories have rendered extension services to their clients under contractual agreements and at specific fees (Chapman & Tripp, 2003). Many businesses/firms offer various agricultural-related services, including technical production advice, marketing, infrastructure development

(e.g. irrigation), business management, and research (Liebenberg, 2015). Moreover, since then, commercial farmers and some smallholders have been consulting the private sector at a fee (DAFF, 2014).

Uddin et al. (2016) view the withdrawal of the state in service delivery will allow farmers to share in the responsibility of paying the costs for extension delivery. Oladele (2008) and Davis & Terblanché (2016) are adamant that such an intervention could help recover the costs of providing extension services and ensure that extension officers are accountable to the government and the farmers who contribute to the costs. Uddin et al. (2016) argued that the private sector has various benefits that could help reduce pressure on the government, such as greater operational efficiency, cost-effectiveness, and accountability of extension officers to perform and produce results. More importantly, the private suppliers of extension services are said to be profit-orientated, which translates well to the commercial aspirations of some smallholder farmers. Liebenberg (2015) supports this and indicates that agricultural commercialisation is built on the premise that smallholder farmers want to graduate from subsistence farming to profit-oriented producers.

This transition to self-sufficiency would require a change from traditional non-commercial methodologies to scientifically improved farming techniques and farmers willing to pay for agricultural information (Uddin et al., 2016). The transition of farmers to self-sufficiency and paying for extension services has ignited a debate among researchers and whether it is feasible to privatise extension services in countries where the smallholder sector is most dominant (Agholor, 2012).

According to Rivera (2011), the decision to Privatise extension services is difficult for many developing countries, as there is adequate evidence in the literature to suggest for and against it. Studies by Rivera & Alex (2004), Anderson (2007), Swanson (2008), Ramaila *et al*. (2011), Ghosh (2012), & Zwane (2016) seem to advocate for the Privatisation of extension services. They posit that if extension services were Privatised, there would be a sudden decrease in wasteful expenditure resulting from poor planning and unclear strategies put in place by the government. Moreover, introducing profit-oriented farming practices could help address various socio-economic challenges, such as poverty, unemployment, and food insecurity (Oladele, 2008; Uddin *et al*., 2016; Labarthe & Laurent, 2013).

In addition, Nettlea *et al.* (2018) argue that if services are privatised correctly, returns would be immensely high; the telecommunications and banking sectors can be examples of this success. On the contrary, arguments made by Mwaura et al. (2010), Ajieh & Chuks (2014) & Hellin (2012); Department of Agriculture, Forestry and Fisheries (DAFF) 2016, warn against the Privatisation of extension, arguing that it will be limited to a few and relatively sophisticated farmers who can afford to pay. Furthermore, several questions have been raised on the feasibility of privatising an extension system that has long been provided by the public sector (DAFF, 2016)

These include the socio-economic implications of Privatisation in terms of access to services by smallholder farmers; do fee service systems necessarily lead toward greater efficiency and equity (Mwaura et al., 2010)? Another concern stems from Chile's Technical-Entrepreneurial Assistance (ATE) program, which hit the country's economy hard in the later years of its existence (Rivera & Alex, 2004).

Diffusion of Innovations

Diffusion theory, developed in the U.S. by rural sociologists, is a significant theory that defines the change process. In this case, research refers to the diffusion of innovations in communities in developing countries. According to Padel (2001) & Lamm et al. (2021), this theory tries to foresee the behaviour of farmers and social groups in adopting innovation, considering their characteristics, social relations, the time factor, and the characteristics of the innovation. Pejanović and Njegovan (2009) stated that *"innovation is a new method of production of known goods, discovery and production of new types of products, the introduction of new production combinations"*. This theory records how innovations are communicated through specific channels over time among the members of a social system (Lamm et al., 2021). Masambuka-Kanchewa et al. (2021) & Rogers (2003) specified that diffusion innovation is a social process that includes relational communication, while communication is a development in which participants create and share information to reach mutual understanding. As a result, diffusion innovation has five characteristics: relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). Individuals (especially farmers) follow phases of the innovation-decision process before deciding whether to use innovation (Rogers, 2003). These phases, along with innovation characteristics, individual user characteristics, organisational structure, and external factors, influence system innovativeness and privatisation. The communication messages and strategies for agricultural innovations must be custom-made to extension workers' and consumers' needs (Moyo & Salawu, 2017). This model has been used primarily for development and agricultural extension worldwide. As a result, the theory provides a viable framework for studying the use of privatisation of an agricultural extension within international extension systems through innovations, use-decision processes, and interpersonal circumstances. Due to various constraints, the use of traditional methods, and one-way diffusion of information, may not yield the beneficial result of enhancing agricultural productivity and farm returns. The use of modernised and traditional knowledge and innovation is essential for adopting the privatisation of extension to develop smallholder farmers' needs.

Scale Development

The scaling development theory is the most significant to increase agricultural research for development investment to improve agricultural yield,

farm returns, and food security among rural households. The focus has been on 'scaling' successfully established innovations to achieve 'large-scale impact' in agricultural productivity, climate change resilience, and the United Nations Sustainable Development Goals. This theory is also significant for developing a scale for the privatisation of extension capacity assessment within international and national extension systems, which permits stakeholders to determine the local needs and directions of privatisation of extension development positioned within the characteristics of an innovation, the innovation-decision process, and the environmental and social frameworks of the immediate region. This will be very important in closing the gap between theory and what is practised to privatise extension development to enhance agricultural production. This will permit a framework that provides a robust foundation for assessing the content validity of the privatisation of extension and capacity instruments.

Purpose and Research Questions

The National Policy of Extension and Advisory Services document in South Africa stated that *"…in its current form, the public extension service cannot facilitate the accelerated capacity development of a range of producers that is desired to address challenges of rural and economic growth, food and nutrition insecurity, inequality and unemployment "* (DAFF, 2016: p 2).

All these realities are putting new pressure on the delivery of extensions. Thus, this study aimed to assess farmers' perceptions of the privatisation of extension services in South Africa, focusing on the smallholder agricultural sector. The study was guided by the following research questions: 1) What are smallholder farmers' perceptions of the privatisation of extension services? 2) which factors influence these perceptions? 3 If extension services were privatised, would farmers be willing to pay?

Methodology

Study Area

A list of different categories of farmers actively involved in farming: households, smallholders, and large-scale farmers was obtained from the Department of Agriculture, Forestry and Fisheries (DAFF). The literature reviewed from Agholor, 2012, Sikwela (2013), DAFF (2016), & Statistics South Africa (StatsSA) (2016), and the experience of the authors was instrumental in assisting with selecting the study areas. It was established that the Eastern Cape (EC) and KwaZulu Natal (KZN) provinces house many smallholder farmers in South Africa practising both livestock and crop production. Moreover, farmers in these two provinces have agricultural support from the government, the private sector, and other institutions (Sikwela, 2013; Sinyolo & Mudhara, 2017).

Research Design, Population, and Sampling Technique

This study employed a cross-sectional survey, where data collection was carried out at a single point in EC provinces. The population interested in this part of the study were smallholder farmers in the Eastern Cape Province. A sampling frame was created from the Department of Agriculture, Forestry and Fisheries and Agricultural Research Councils' database of commercial farmers in South Africa. Using a stratified two-stage sampling technique, 397 farmers (both commercial (171) and smallholder farmers (226) were recruited from a population of 397 to participate to ensure the sample was representative of all farmers in South Africa. The first stage involves stratifying respondents into commercial and smallholder farmers across the two provinces' data sets corresponding to questionnaire types. The second stage consists of the selection of all sampled farmers' respondents across the EC province in South Africa. The study sample size was 397 smallholder and commercial farmers. The 397 were farmers willing to participate from both provinces. Finances and time constraints were challenges that limited the study from covering larger geographic areas of farmers in both provinces, and the study used a cross-sectional research design.

Instrumentation and Data Collection.

The study used primary data in the form of a semi-structured survey. To safeguard the semi-structured interview guides confined to relevant and objective questions, a content analysis was conducted on various sources of extension used and print materials developed and disseminated to farmers. The farmers' interview guide was pre-tested with 30 farmers from Zibeleni farmers in Chris Hani District in the Eastern Cape as the study site. The semi-structured questionnaire was made up of close-ended questions and open-ended questions. The study was conducted from January to September 2019.

Six trained enumerators and principal investigators conducted the interviews. All the farmer interviews were conducted at a central location chosen by the farmers and farm organisations. Agricultural extension workers for each community recommended mobilising the farmers to meet at a central location to save time and costs. The extension workers communicated with the farmers a day before each meeting so the farmers could come to a specific meeting place. Arrangements were made to ensure every participant could express their views without being interrogated (Morgan, 1996), so the one-on-one interview was conducted privately. All the farmer interviews were conducted in IsiXhosa and IsiZulu, the vernacular languages of the two provinces, and lasted for one hour. The data collected from farmers were farm characteristics, land ownership, access to agricultural extension, various sources used for agricultural information, factors limiting farmers in accessing information, and challenges faced by farmers.

Data Analysis

The data was collected via a questionnaire and coded on an Excel spreadsheet. The data was transported from Excel to Statistical packages for analysis: STATA 15 and SPPS version 26. The study used descriptive and inferential statistics to estimate farmers' characteristics and perceptions in the form of mean, frequencies, tables, figures, pie charts, chi-square, and T-test to establish the relationship between the socioeconomic characteristics of the respondents and the Privatisation of extension services. Logit regression was used to estimate factors influencing farmers' decision to Privatise extension services in the study area.

Logit Regression Model

The Logistic regression analysis was used as the primary analytic tool in this paper to

analyse factors influencing farmers' decision to Privatisation of extension services in the study area because it deals with issues of whether farmers decide to Privatise extension services or not (dichotomous variables). The logit regression analysis was used to investigate the manipulative power of the privatisation of extension service decision-making processes based on factors that may influence smallholder and commercial farmers. The logit model was chosen since it is a standard method of analysis when the outcome variable is dichotomous (Hosmer & Lemeshow, 2000). It is used to model a functional relationship between a dichotomous response variable and one or more predictors. When the response variable is dichotomous, this study considers the logit model suitable for estimating the functional relationship between the response (dependent) variable and the predictors (independent). Mdoda (2020) specified that the logit regression model is simply a non-linear transformation of the linear regression.

Logit regression is a multivariate technique used to study the relationship between a dichotomous dependent variable and one or more independent variables. Logit regression is advantageous because it estimates the dichotomous outcome variables, which are more straightforward and flexible to make results more meaningful for interpretation (Sigigaba et al., 2021). X_i represents the set of parameters that influenced the farmer's decision to Privatise or not. This model was employed because it accommodates two categories in the dependent variable. It can resolve the heteroscedasticity problem and pleases the cumulative normal probability distribution. Hence, the logistic model was selected for this study. The Logit was selected because of its capacity to answer our main research questions better and because of our data and sample characteristics (association between variables, slope tells how the log odds ratio in favour of choices to Privatise or not Privatise changes as independent variable change). Additionally, the significant explanatory variables do not have the same level of impact on the adoption decision of farmers.

According to Pindyck & Rubinfeld (1981), the cumulative logistic

probability function is specified as:

$$Pi = F(Zi) = F = (1/1 + e^{-(a+\Sigma \beta_i x_i)}) \tag{1}$$

Where

Pi represents the probability that i^{th} a farmer will make a certain choice (in this case Privatise and not Privatise), given explanatory variables (X_i) represents the base of natural logarithms; X_i represents the explanatory variables; i represents the number of explanatory variables, i = 1, 2, 3 … n and α and β_i is the estimated model parameters. The interpretation of the coefficient will be understandable if the logistic model is written in terms of odds and odds log (Hosmer & Lemeshow, 1989)

The odds ratio is simply the ratio of the probability of privatizing (Pi) to the probability that he/she will not advocate for Privatisation ($1 - Pi$). Nevertheless, Pi is non-linear not only in X_i but also in a_i and β_i, which creates an estimation problem. Therefore, OLS cannot be used to estimate the parameters:

$$1 - Pi = \frac{Pi}{1-Pi} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} \tag{2}$$

Or

$$\frac{Pi}{1-Pi} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{(\alpha+\Sigma_{i=1}^{m} \beta_i X_i)} \tag{3}$$

Therefore, to get linearity, we take the natural logarithms of an odds ratio equation, which results in the logit model as indicated below:

$$Zi = Ln\left(\frac{Pi}{1-P_i}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_m X_m \tag{4}$$

As P moves from 0 to 1, the logit model also moves from $-\infty$ to ∞. In other words, while the probabilities are between 0 and 1, the logs are not so constrained (Gujarati, 2004). If the disturbance term u_i is considered, the logit model becomes:

$$Z_i = \alpha + \Sigma_{i=1}^{m} \beta_{i=1} X_i + u_i \tag{5}$$

Not all imperative explanatory variables have the same degree of effect on the dependent variable. Therefore, by holding the continuous variables at their mean values, the effect of each significant variable on the likelihood of the dependent variable can be determined (Temesgen & Tola, 2015). In this study, the logit regression model was used, and its dependent variable was treated against the possible variables affecting the Privatisation of agricultural extension services.

Explanatory (independent) variables used in the model

The study used the Chi-square test to test the strength of association between categorical predictor variables as well as simple logistic regression for the association between quantitative predictor variables and the qualitative dependent variable. Using this method, the study sought to build a statistical model to reduce explanatory variables until the most appropriate model that describes the data was predicted. Table 1 shows the list of independent variables included in the Logit regression, as well as their measurement and expected relationship to the choice of extension services.

Table 1
Explanatory (independent) Variables used in the Logit Regression Model

Dependent variable	Measure	
Privatisation of extension services	1 = Privatise (farmer thinks that extension services should be Privatised) 0 = Not to Privatise (farmer thinks that extension services should not be Privatised	

Explanatory variable	Measure	Expected outcome
Type of farmer	Dummy - Full-time = 1; Part-time = 0	+
Age	Continuous, Actual years	+
Land tenure	Dummy – Commercial = 1; Communal = 0	+
Cash crops	Dummy - Cash crops = 1; No cash crop = 0	+/-
Number of livestock	Continuous - Number of livestock	+
Access to extension services	Dummy - 1 = Easy; Difficult = 0	+/-
Frequency of extension visit	Categorical - Weekly = 1; Monthly =2; Quarterly= 3; Annually = 4	+
Satisfaction with extension visits	Dummy – Yes = 1; No = 0	+
Frequency of response from extension officials	Dummy - Instant = 1; Otherwise = 0	-

Instrument Validity

Numerous methods are used to create scale validity (Lamm et al., 2020); namely, content validity, response process validity, internal structure validity, and consequential validity were examined.

Content Validity

This type of validity ensures that a thorough review of the literature was steered before and during the development of the farmers' scales. Moreover, the mainstream of the projected items was directly linked with previous research, precisely identifying the capacities necessary for extension systems and farmers to choose the privatisation of extension. One final list of privatisations of the extension was developed, and a board of experts reviewed the instrument to establish content validity (Lamm et al., 2021). The specialists signified expertise in international extension, programs, and scale development and had role titles such as Professor, Executive Secretary General, and Program Administrator.

Consequential Validity

The follow-up survey was conducted in January 2020, where supply was done among extension system management which contributed to the study to

appraise the proposed Privatisation of extension and establish significant validity. Defendants were asked to deliver their input regarding the overall choices of Privatisation of extension data. The response rate of farmers was 98%, which was a good turnout. This turnout was established throughout the Privatisation of extension services and whether respondents intended to Privatise services to enhance agricultural production.

Results

Demographic Characteristics

Table 2 below reports the study's socio-economic characteristics and empirical results, paying specific attention to the factors influencing the Privatisation of extension services. The frequency and statistical distribution of demographic characteristics, farming practices, and access to extension services were examined, as the bivariate relationships between them and the Privatisation of extension services. The study employed Chi-square, T-test for descriptive statistics, and Logistic regression for inferential statistics.

Table 2

Demographic Characteristics

Privatisation of extension services	Explanatory variables %				X^2
	Type of farmer				
	Full-time farmer		Part-time		
	214		51		
Privatise	48		51		ns
Not privati ze	52		49		
	Age groups (years)				
	Age 21-35	36-50	Age 51-65	> 66	
	19	89	88	69	*
Privatise	53	53	52	38	
Not Privatise	47	47	48	62	
	Farming experience (years)				***
	≤ 10	11-25	26-35	36-45	> 46
	124	104	28	7	2
Privatise	50	52	50	43	0
Not Privatise	50	48	50	57	100
	Gender				
	Male		Female		
	190		75		ns
Privatise	50		45		
Not Privatise	50		55		
	Level of education				**
	No Education	Primary	Secondary	Tertiary	
	26	57	121	61	
Privatise	42	44	49	56	
Not Privatise	58	56	51	44	

Notes: ***, **, *, means significant at 1%, 5% and 10% levels of significance, respectively, ns = not statistically significant

Age

Age categorised into groups was significantly related to the Privatisation of extension services ($p < 0.05$). This means age has a significant direct effect on the farmer's decision to favour privatisation. Table II shows a positive relationship between farmers' age and privatisation; this is to say, the younger the farmer, the likelihood to advocate for Privatisation of extension increases. Krishnan & Patnam (2013) found that younger farmers are receptive to innovations (e.g., privatisation) that will improve their farming methodologies and income compared to their counterparts.

Farming Experience

The farming experience was significantly related to the privatisation of extension services ($p < 0.01$). This suggests that farming experience directly

influenced farmers' decision to favour the Privatisation of extension. The distribution in Table two shows that farmers' decision to favour Privatisation increases as farming experience decreases.

Level of Education

The level of education was significant in the privatisation of extension services ($p < 0.05$). Table II shows that level of education has a positive direct effect on the farmer's decision to favour privatisation. The level of education had a proportional relationship with the Privatisation of extension; this is to say, the higher the level of education among farmers, the more receptive they are toward privatisation. This is in line with the findings made by Oladele (2008) that educated farmers are often flexible to ideas if they perceive them to be better than their current farming operations.

Table 3
Comparison of Average Incomes and Land of Farmers Advocating for Privatisation of Extension Services or otherwise

Explanatory variables	Privatisation of extension services		T-test Significance
	Yes	No	
Average income (R)	434 209	303 879	**
Average land size (ha)	549	470	*

Notes: ***, **, *, means significant at 1%, 5% and 10% levels of significance, respectively, ns = not statistically significant

Agricultural Income and Land Size

A common phenomenon when defining smallholder farmers is that of size. The World Bank (2010) defines smallholders as farmers with a landholding of between 0.5 - 5 hectares with a low asset base. However, Kirsten & van Zyl (1998) dispute this definition by the World Bank, indicating that characterising a group of individuals based on their landholding alone is misleading. Kirsten & van Zyl (1998) asserted that size alone is not a good criterion for defining smallholder farmers. For example, one hectare of irrigated peri-urban land, suitable for vegetable farming or herb gardening, has a higher profit potential than 500 hectares of low-quality land in the Karoo. Turnover, or net farm income level, determines the farm size category and not the land size (Kirsten & van Zyl, 1998). This study follows this assertion and doesn't use landholding as the main criterion to define smallholder farmers.

Agricultural Income

Table 3 results combine smallholder and commercial farmers' average income and land size. Agricultural income is a significant indicator of farm progression, as it provides information about the profitability or lack thereof (DAFF, 2016). Agricultural income is the total income (cash or in-kind) earned of farm products sold and other income (StatsSA, 2016). A T-test was

employed to examine the significance and relationship between farmers' agricultural income and perceptions of the Privatisation of extension services. The average agricultural income of farmers in favour of Privatisation is R434 209 higher than that for farmers not in favour (R303 879); the difference is statistically significant at a 5% level.

Land Size

Similar to agricultural income, the average land size of farmers in favour of privatisation is 549 ha, higher than that for farmers not in favour (470 ha), and the significance level is 10%.

Farming Operation of the Sample

The study profiled farmer enterprise, land tenure, farming purpose, and land ownership to understand the respondents' operations in the field. Chi-square was used, and the results are in Table 4.

Table 4
Farming Characteristics of Farmer Advocating for Privatisation of Extension Services or Otherwise

Privatisation of extension services	Explanatory variables %			X^2
	Farming enterprise			
	Crop farming 28	Livestock farming 70	Mixed farming 167	ns
Privatise	50	43	51	
Not Privatise	50	57	49	
	Land tenure			**
	Commercial 111		Communal 154	
Privatise	58		42	
Not Privatise	42		58	
	Farming purpose			
	HH Cons 9	Selling 61	Both HHC & selling 195	ns
Privatise	44	54	47	
Not Privatise	56	46	53	
	Land Ownership			
	Yes 120		No 145	**
Privatise	51		48	
Not Privatise	49		52	

Notes: ***, **, *, means significant at 1%, 5% and 10% significance levels, respectively, ns = not statistically significant.

Land Tenure

As demonstrated in Table 4, land tenure was significant at a 5% level related to the Privatisation of extension services. For land tenure, the distribution of farmers showed that 58% of farmers who practised farming for commercial reasons favoured the Privatisation of extension services.

Land Ownership

Land ownership was significant at a 5% level towards the privatisation of extension services. Furthermore, 51% of the landowners favoured the privatisation of extension services.

Extension Services Operations and Privatisation

In recent years, agricultural extension has come to encompass a wide range of activities in both the public and private sectors. The exchange of information continues to be the primary focus of all extension activities. The Chi-square statistical test assessed the significance and relations between farmers' perceptions. The distribution of the results is presented in Table 5.

Table 5

Extension Operation

Privatisation of extension services	Explanatory variables %				Chi-Square significance
Access to extension services					
	Yes		No		
	256		9		
Privatise	47		44		ns
Not Privatise	53		55		
Extension visits					ns
Privatise	Weekly	Monthly	Quarterly	Annual	
Not Privatise	15	63	130	47	
	33	49	54	38	
	69	51	46	62	
Extension visit					
	Yes		No		
	136		129		
Privatise	42		55		
Not Privatise	58		47		**
Response of extension officers					
	Weekly	Monthly	Quarterly	Annually	
	28	121	74	30	
Privatise	54	48	45	47	ns
Not Privatise	46	52	55	53	
Do extension officials practice demonstration					
	Yes		No		
	133		127		
Privatise	55		42		*
Not Privatise	45		58		
Use improved seed					
	Yes		No		
	149		111		**
Privatise	54		42		
Not Privatise	46		58		

*Notes: ***, **, *, means significant at 1%, 5% and 10% levels of significance, respectively, ns = not statistically significant

Extension Visits

As shown in Table 5, extension visits were significant at 5% related to the Privatisation of extension services. However, most farmers (55%) were not in favour of privatisation; this could be related to their dissatisfaction with the frequency of visits from extension officers.

Field Demonstrations

According to Table 5, the use of field demonstrations as a skill and technology transfer method was significant to the Privatisation of extension

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services (p < 0.1). Moreover, 55% indicated that they favour the Privatisation of extension.

Use of Improved Seeds

The use of improved seeds as recommended by extension officers was significant at a 5% level to privatisation of extension services. Most farmers (54%) indicated that they favour the privatisation of extension services.
Focus Group Discussions on privatisation of Extension Services

This subsection reports focus group discussions and findings on the Privatisation of extension service services. The focus groups were given 13 random statements favouring and rejecting the privatisation of extension services in South Africa. These were investigated using a 3-point Likert rating scale, presented as follows; Agree = 3, Undecided = 2, disagree = 1.

The values were then summed up using SPSS version 25 to provide descriptive statistics in the form of percentages. The literature review informed the statements on the privatisation of extension services (Düvel, 2004; Chapman & Tripp, 2003; Muyanga & Jayne, 2008; Yusuf et al., 2011; Labarthe & Laurent, 2013). Findings are presented in Table 6.

Table 6

Farmers' Perceptions towards Privatisation of Extension Services

Farmers' perceptions towards Privatisation	Agree %	Undecided %	Disagree %
Extension services should be provided by private organizations that specialize in a particular commodity.	58	28	14
Private agricultural companies should provide extension services to smallholder farmers.	57	28	15
Privatisation of extension services will make agricultural information delivery to become more effective.	61	26	13
Private provides extension services that will make smallholder farmers change their farming practices.	56	29	15
Private sectors are results orientated and this is what smallholder farmers want to improve their productivity.	59	27	14
Smallholder farmers' farm income from will be improved if extension services are privatised.	56	31	13
I think all my farming needs can be catered for by private extension officers.	53	32	15
Extension services provided by a private organization will help me get access to credits and markets.	50	34	16
Extension services should be provided by government officials and for free.	37	18	46
I don't want to pay for extension service even its provided by private extension officers	30	17	53
There is no difference between extension services provided by public and private organizations, so I am not willing to pay	13	30	57
Paying for private extension services will affect my expenditure negatively.	30	37	33
I will only pay for extension services only if it's provided by a private organization.	42	37	22

Table 6 shows farmers' responses to the 13 random statements on the Privatisation of extension services in South Africa. From the questions, many farmers appeared to advocate for the Privatisation of extension services. For example, farmers were presented with the following statement and asked to evaluate "Private agricultural companies should provide extension services to smallholder farmers", and the results show that 57% of farmers agreed, followed by 28% undecided, while 15% disagreed.

Other statements that rejected Privatisation were presented to the focus groups and asked to evaluate "Government officials should provide extension services and for free" the results show that a significant number (46%) of farmers disagreed with the statement, followed by 37% who agreed

and 17% were undecided. Furthermore, when given a statement such as "I will only pay for extension services only if a private sector organisation provides it, " the results show that 42% of the farmers agreed, followed by 37% who were undecided and 22% who disagreed. This appears to indicate that most farmers advocate for the Privatisation of extension services in South Africa.

Empirical Results of the Logit Regression Model

This subsection reports on the inferential statistics of the logistics model. Table VII shows the results of the logit regression model. Nine variables were fitted into the logit model, and four had a direct positive influence in identifying farmers who exhibit attributes associated with advocating for the Privatisation of extension services. These were captured as age groups, land tenure, satisfaction with extension visits, and the response frequency from extension officers.

TABLE 7
Factors Influencing Farmers' Perception towards Privatisation of Extension Services

Explanatory variables for privatisation of extension services	Coefficient	Std. Err.	Z	P>z
Type farmer	-0.557903	.3538372	-1.58	ns
Age groups	-0.2508826	.1470622	-1.71	*
Land tenure	0.6055218	.2913575	2.08	**
Cash crops	0.4192605	.3064082	1.37	ns
Total number of livestock	0.0008612	.0005891	1.46	ns
Access to extension	-0.331971	.264506	-1.26	ns
Frequency of farm visit extension	0.2945636	.1795915	1.64	ns
Satisfied with farm visits	1.118269	.3550754	3.15	***
Frequency of response from extension officers	0.327147	.1458498	2.24	**
_cons	-1.078998	.9350325	-1.15	ns
Number of obs = 263				
Prob > chi2 = ***				

Notes: ***, **, * means significant at 1%, 5% and 10% levels of significance, respectively
ns = not statistically significant

According to Greene (2003), the marginal effects in the logit regression model are essential, because the coefficients of the logit model cannot be interpreted from the initial output. Succinctly, the marginal effects help to predict how much the outcome variable's (conditional) likelihood increases as the value of variables changes, keeping all other variables at certain values(constant). The marginal effect of the results is presented in Table 8.

Table 8

Marginal Effects of the Logit Regression Model

Explanatory variables for Privatisation of extension services	dy/dx	Std. Err.	Z	P>z
Type farmer	-0.137391	.08473	-1.62	ns
Age groups	-0.062719	.03676	-1.71	*
Land tenure	0.150129	.07109	2.11	**
Cash crops	0.104296	.07541	1.38	ns
Total number of livestock	0.0002153	.00015	1.46	ns
Access to extension	-0.082991	.06613	-1.26	ns
Frequency of farm visits from extension	0.0736393	.0449	1.64	ns
Satisfied with the frequency of farm visits	0.2725037	.08217	3.32	***
Frequency of response from extension officers	0.081785	.03646	2.24	**

Notes: ***, **, * means significant at 1%, 5% and 10% levels of significance, respectively

ns = not statistically significant

*dy/dx is for discrete change in a variable from 0 to 1

Age

Age divided into groups was significantly related to the privatisation of extension services ($p < 0.1$). The coefficient was negative, indicating that age did not have a positive direct effect on the privatisation of extension services. This could be because older farmers are often sceptical of change (such as the privatisation of extension services) or are late adopters/laggards (Yusuf et al., 2011). Another reason could be that older farmers believe that they have accumulated adequate experience to farm independently and do not see the need to pay for Privatised extension services (Mwaura et al., 2010). The other reason could be that farmers do not have money to pay for Privatised extension services.

Land Tenure

Land tenure was significantly related to the privatisation of extension services ($p < 0.05$). The coefficient was positive, indicating a positively direct effect land tenure has on the privatisation of extension services. Moreover, the average marginal effect on the probability $y = 1$ relative to land tenure increases by 18%. This means that farmers who have access to tenure rights are in favour of privatisation. This could be because of the benefits of the private sector, such as profit-driven, operational efficiency, and access to markets. Aliber et al. (2011) point to land ownership as a powerful indicator of farmers' willingness to invest in that land. In other words, a farmer is more inclined to invest (pay for private sector extension service) in the land if they have full ownership.

Satisfaction with the Frequency of Farm Visits from Extension

Farm visits are important for teaching farmers new farming methodologies, cultivars, and vaccines and creating a good working

relationship with farmers (Agholor, 2012). Satisfaction with the frequency of farm visits from extension officers was statistically significantly related to Privatisation($p < 0.01$).

The coefficient was positive, indicating that the frequency of farm visits positively affected the privatisation of extension services. The expected difference in probability of $y = 1$ associated with satisfaction with the frequency of farm visits increases by 27%, indicating farmers advocate for the privatisation of extension services. Liebenberg (2015) agrees with this experience.

Frequency of Response from Extension Officers

In general, the value of extension services depends on various quality attributes embodied in services; this also includes how extension officers respond to the call of their farmers (Van Niekerk et al., 2009). Table 8 shows that the response frequency was statistically significantly related to the privatisation of extension services ($p < 0.05$).

The coefficient was positive, indicating a positively direct effect frequency of response has on the privatisation of extension services. Moreover, the predicted difference in probability of $y = 1$ associated with the frequency of extension response increases by 81%. Reference (Van Niekerk et al., 2009) asserts that private extension provision has an advantage over public suppliers because they are quick to respond to the farming needs of their recipients.

Conclusion

The National Policy of Extension and Advisory Services document in 2016 indicated that the public extension service could not facilitate the accelerated capacity development of a range of producers that is desired to address challenges of rural and economic growth, food and nutrition insecurity, inequality, and unemployment. On these bases, a research study focusing on alternative funding and extension service provision was undertaken.

The study concluded that extension services of the Eastern Cape Provinces of South Africa should be privatised. This is partly because some farmers are willing to pay for the Privatised extension and because the private works to ensure a return on investment for all parties involved, which guarantees technical efficiency, which is what some smallholder and commercial farmers want for their enterprise. The combined averages of commercial and smallholder farmers reveal that both groups, with an average agricultural income of R434 209 and an average land size of 549, agree to privatise extension services to enhance their productivity and increase farm returns from their land.

Moreover, the logistic regression model indicated that farmers who supported the privatisation of extension services had access to secure land tenure rights, a frequent response from extension officers, and were satisfied with extension visits. These attributes were critical to privatising extension services, as suggested in this study. The results from this study can be used to improve the private sector's provision of extension services as part of the effort to revitalise the agricultural sector in developing countries. In countries where the public sector cannot deliver the required services to farmers, the private sector can be used to help determine the value of the provision of such services to understand the desirable changes that should occur on equity and efficiency grounds.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Data Availability Statement

Data sharing does not apply to this article as sharing interview transcripts could compromise the code of ethical clearance and privacy of research participants.

Limitations

Despite the nature of the present research, several limitations must be acknowledged. Although a thorough review of extension literature, mainly from South Africa and some international case studies, was undertaken, there were likely studies which were not included in this research. The exclusion or omission of any studies may influence the overall results and interpretation. Accordingly, the results of this study should be used as a starting point and be updated and revised as new data becomes available. An additional limitation is related to the sample size. Factors such as budgetary constraints, the distance between the study areas, and participants' availability restricted the sample size.

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