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AWARENESS OF AND DEMAND FOR PRIVATE AGRICULTURAL EXTENSION SERVICES AMONG SMALL-SCALE FARMERS IN NIGERIA

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Abstract. This study investigated the awareness of and demand for private agricultural extension services among small-scale farmers in Nigeria, using farmers in Oyo state as a case study. Specifically, the study examined the availability and operations of private agricultural extension services and factors that determine farmers' willingness to pay for such services. The results showed that a considerable number of farmers are willing to pay for private agricultural extension services. The number of plots cultivated by the farmers was found to influence farmers' willingness to pay for private agricultural extension services at one percent level of significance. Income, awareness, family size and total number of plots were identified as the major factors influencing the use of private agricultural extension services in the study area. The study recommended the need for the government to mobilize farm households to avail themselves of benefits of private extension services. Efforts should also be stepped up by all development stake-holders to provide additional sources of income for farm households, in order to raise their income and demand capabilities.

Key words: agricultural extension, demand, privatization, awareness, small-scale farmers

INTRODUCTION

Information is a critical ingredient for the advancement of agriculture. It provides the basis for scientific innovations and, for a country to achieve food security, its agricultural extension systems must be given utmost priority (Hu et al., 2009; Swanson, 2006). Numerous definitions of extension exist (Garforth, 1993), but essentially, it may be defined as including all activities involved in the exchange of information relevant to agriculture. It is concerned with bringing about changes in farmers' attitude, knowledge and skills through education and communication. According to Williams (1998), agricultural extension performs functions which include getting farmers into a frame of mind and attitude conducive to acceptance or adoption of technological change, disseminating the results of research, and carrying the farmers' problems back to the research system for solution, as well as helping farmers make good decisions in farm management. According to Lioutas and Charatsari (2011), "agricultural extension education services have three major characteristics that complicate their marketing: first, these are 'rural services' that are heavily influenced by the 'rurality' of their field of action; second, their aim is to promote intangible behavioural

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changes which inevitably are considered by the potential customers as risky; third, their orientation is usually non-profit". It is now widely accepted by many developing countries that agricultural extension can play a very essential role in agricultural development (Anderson, 2007; Birner et al., 2006; Omotesho et al., 2014; Williams, 1998).

Agricultural extension services in Nigeria face several challenges: inadequacy and instability of funding, poor logistic support for field staff, the use of poorly trained personnel at the local level, ineffective agricultural research-extension linkages, insufficient and inappropriate agricultural technologies for farmers, disproportionate extension agent-farm family ratios and lack of clientele participation in extension program development. Others include inadequate input supply, irregular evaluation of extension programmes and policy and institutional and programme instabilities of national agricultural extension systems (Agbamu, 2005). Apart from the conventional audio-visual aids used by agricultural extension personnel in Nigeria, modern information technologies have not been fully put into use in the discharge of job functions (Meera et al., 2004). From the global perspective, the prevalent public extension in Nigeria faces criticism for its costs and inefficiency and for not pursuing programmes that foster equity (Rivera and Cary, 1997).

The need for more efficient and less government controlled extension service has led to a number of strategies for changing extension services delivery. In several developing countries, public and private coordination is already established. Alternative patterns indicate a fostering of private corporate initiative, encouraging cooperative ventures by farmers, coordinating public – private extension services and privatizing the public system (Wilson, 1991).

Similarly for Nigeria, the growing urban population coupled with dwindling government revenue, is coercing successive governments to hinge most of its activities on private participation in governance (Fakayode et al., 2010), In this vein, besides the general government extension programs in Nigeria, there now exist some private extension programs for the advancement of agriculture. The foremost participants in private extension services are United African Company (UAC), John Holt, Nigerian Tobacco Company (NTC), and Diocesan Agricultural Development Programme of the Catholic Diocese of Ijebu-Ode, among several others who became involved in agricultural production, processing, and marketing some decades ago (Adedoyin, 1995). Recently, Green River Project of the Agip Oil Company, Ciba Geige Agro-Chemical extension outfit, and Olam Nigeria Limited (formally Agro Millers) at Makurdi Benue State, Nigeria have been found to have a positive effect in the communities where these private companies locate their extension programs (Akele and Chukwu, 2004; Isife and Madukwe, 1999). Privatization of agricultural extension services offers governments the opportunity to restructure internally, reducing waste and seeking ways to improve their own capacity to identify problem areas and capitalize on opportunities for collaboration with the private sector, NGOs, and farmers' organisations (Umali and Schwartz, 1994). It takes some of the financial pressure off the government, ensures financial sustainability and provides the basis for the establishment of a more demand-driven responsive extension service.

In spite of continued support for private extension services, very little has been done to determine the willingness of farmers to pay (WTP) for agricultural extension services in developing countries in general and Nigeria in particular. This study was therefore carried out to achieve the following objectives to:

- identify and describe the socio-economic characteristics of the respondents
- examine the availability and operations of private agricultural extension services in the study area
- assess the factors that determine farmer's willingness to pay for private agricultural extension services; and
- determine constraints to the demand for private agricultural extension services.

METHODOLOGY

Study area and sampling technique

The study area for this work is Oyo State, Nigeria which stretches from latitude 7° N to latitude 9° N and longitude 2.8° E to longitude 4.5° E. The state has four administrative zones, one of which is the badan/Ibarapa agricultural zone where this study was carried out. The zone is made up of eight local government areas comprising Lagelu, Ido, Akinyele, Egbeda, Ona Ara, Ibarapa north, Ibarapa central and Ibarapa east with Each local government area representing an extension block of the Oyo State Agricultural Development Programme

(OYSADEP). Majority of the inhabitants of the area are farmers who engage in cultivating various food crops like maize, soybean, cowpea, yam, cassava, melon, sorghum and vegetables. The zone has a good number of Federal and International agencies such as the Oyo State Agricultural Development Programme (OYSADEP), National Institute for Horticultural Research and Training (NIHORT), Institute of Agricultural Research and Training (IAR&T), Cocoa Research Institute of Nigeria (CRIN) and the International Institute for Tropical Agriculture (IITA) that provide advisory services and technical support to farmers.

The study employed a three stage random sampling technique in selecting the respondents for this study. The first stage was a random selection of five blocks from the zone. The second stage was a random selection of two villages from the selected blocks. Hence, 10 villages were selected. These villages had similar demographic characteristics and the population of farmers in these villages was relatively similar. The third and final stage was a random selection of twelve farmers from the selected villages to arrive at a total sample of 120 respondents. A well structured questionnaire was used to obtain necessary information relating to demand for private extension services. However, only 118 retrieved questionnaires were found useful for the analysis.

Analytical techniques

Descriptive statistics which include mean, frequency distribution, standard deviation and tabulation was used to investigate the socio-economic characteristics of farmers, the availability and operations of private agricultural extension services, and the constraints limiting the demand for private agricultural extension services in the study area while the Principal Component Analysis (PCA) and the Spearman's correlation coefficient were used to determine the factors influencing respondents' willingness to pay for private extension services in the study area.

Principal Component can be defined as a linear combination of optimallyweighted observed variables. It is a variable reduction procedure and useful when one has obtained data on a number of variables (possibly a large number of variables), and believes that there is some redundancy in those variables (Deb, 2002). It is a multivariate statistical technique used to reduce the number of variables without losing too much information in the process. The PCA technique achieves this by creating a fewer number of variables which explain most of the variation in the original variables. The new variables which are created are linear combinations of the original variables. The first new variables will account for as much as possible of the variation in the original data. Each principal component is uncorrelated with all the others and the squares of its coefficients sum to one. The principal component analysis involves finding the eigenvalues and eigenvectors of the correlation matrix (O'Rourke and Larry, 2013). Following Siswadi and Toni (2012), the specification of the principal component analysis is given in equations (1) and (2) for given variables $X_1, X_2, \ldots, X_p$.

$$W_1^T X = W_{11} X_1 + \ldots + W_{1p} X_p \quad (1)$$

Where weight coefficient vector W_1 should be determined such that it maximizes the variance. The second principal component $W_2 X$ is constructed such that it is uncorrelated with the first principal component and has second biggest variance, and so on. Standard Lagrange multiplier technique reveals that the optimal weight W_i is equivalent to the eigenvectors of covariance matrix of X corresponding to the i-th biggest eigenvalue λ_ι.

In general, transformation from the original variable matrix X to principal component Y can be written as $Y = WX$ where, W denotes the weighting matrix constructed from the eigenvectors of covariance matrix of X. Position of each object on the principal component coordinate system, i.e., the score, is provided by $Z = XW^T$. The total of variance which can be explained by first k principal components is then given by V_k.

$$V_k = \frac{\Sigma_{i=1}^{k} \lambda_\iota}{\Sigma_{i=1}^{p} \lambda_\iota} \quad (2)$$

The principal component analysis was used to reduce the dimensionality of the data set in terms of the factors influencing the willingness to pay for private agricultural extension services by respondents in the study area.

The Spearman's rank correlation coefficient is a non-parametric measure of statistical strength of a monotonic relationship between paired data. The correlation measure is used when variables are qualitative ordinal scale variables. In a sample it is denoted by r_s and is by design constrained as $-1 \leq r_s \geq +1$. The closer r_s is to ± 1,

the stronger the monotonic relationship (Agresti and Finlay, 1997; Oyeniyi, 1997). The Spearman correlation coefficient is defined as the Pearson correlation coefficient between the rank variables. For a sample of size n, the n raw score X_i, Y_i are converted to ranks x_i, y_i, and ρ is computed from these:

$$\rho = \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_i (x_i - \bar{x})^2 \sum_i (y_i - \bar{y})^2}}$$

The sign of the Spearman correlation indicates the direction of association between x (the independent variable) and Y (the dependent variable). If y tends to increase when x increases, the Spearman correlation coefficient is positive. If y tends to decrease when x increases, the Spearman correlation coefficient is negative. A Spearman correlation of zero indicates that there is no tendency for y to either increase or decrease when x increases.

RESULTS AND DISCUSSION

A summary of the socio-economic characteristics of the respondents is given in Table 1. The results showed that the peasant farmers in the study area were male dominated (83.9%). This may be as a result of the fact that farming is culturally known to be a male's job and the female were to sell the farm produce. The age distribution of the respondent shows that majority of them (27.1%) were between the ages 31–40 years while about 25.4% were between 30 years or younger. The mean age of the respondents was 42.20 years, with the youngest farmer being 21 years and the oldest 73 years. The modal age group was 35 years. The study revealed that more than 85% of the respondents were married. This coupled with the polygamous nature of the area probably explains the large family size recorded. The mean family size was about 6 persons per household and the modal family size was 5 to 10 members. About 50% of the respondents had their family size greater than 5 members and about 18.6% had their family size greater

Table 1. Summary of the socio-economic and demographic characteristics of the respondents
Tabela 1. Podsumowanie profilu socjoekonomicznego i demograficznego respondentów

Characteristics Badana cecha	Frequency Częstotliwość występowania	Percentage Udział procentowy
1	2	3
Gender – Płeć		
Male – Mężczyzna	99	83.9
Female – Kobieta	19	16.1
Total – Suma	118	100
Age of the respondents – Wiek respondentów		
21–30	30	25.4
31–40	32	27.1
41–50	25	21.2
51–60	14	11.9
>60	17	14.4
Total – Suma	118	100
Marital status – Stan cywilny		
Single – Kawaler/panna	25	21.2
Married – Żonaty/zamężna	85	72.0

Table 1 cont. – Tabela 1 cd.

1	2	3
Divorced – Rozwiedziony/rozwiedziona	7	6.0
Widowed – Wdowiec/wdowa	1	0.80
Total – Suma	118	100
Household size – Wielkość rodziny		
1–5 members – 1–5 członków	59	50
6–10 members – 6–10 członków	37	31.4
>10 members – >10 członków	22	18.6
Total – Suma	118	100
Farming experience (years) – Doświadczenie w rolnictwie (lata)		
1–10	30	25.4
11–20	50	42.4
21–30	21	17.8
>30	17	14.4
Total – Suma	118	100
Educational status – Wykształcenie		
Quranic education – Szkoła koraniczna	7	5.9
Primary education – Podstawowe	25	21.2
Secondary education – Średnie	57	48.3
Tertiary education – Wyższe	21	17.8
Adult education – Edukacja dorosłych	8	6.8
Total – Suma	118	100
Membership of association – Członkostwo w stowarzyszeniu		
Members of association – Członkowie stowarzyszenia	102	86.4
Non-members of association – Poza stowarzyszeniem	16	13.6
Total – Suma	118	100

Source: own calculations based on field survey.
Źródło: obliczenia własne na podstawie badań terenowych.

than 10 members. The study also revealed that 12.7% of the respondents had no formal education with only 48.3% and 17.8% having secondary and post secondary education respectively. The years of farming experience of the farmers ranged from 3 to 55 years with an average of 16.7 years. About 74.6% of the respondents had more than 10 years experience as a peasant farmer.

The availability and operations of private agricultural extension services was also examined. Table 2 shows the response of the farmer to the type of agricultural extension which they are in contact with and the different types of services offered to them. The results shows that about 48.3% of the respondents are in contact with public agricultural extension, about 22.9% are in contact with private agricultural extension services while 28.8% are not in contact with either the private agricultural extension or the public agricultural extension and as much as 58.5% of the respondents are willing to pay

Table 2. Availability and operations of private agricultural extension services
Tabela 2. Dostępność i funkcjonowanie prywatnych usług w dziedzinie doradztwa rolniczego

Characteristics Badana cecha	Frequency Częstotliwość występowania	Percentage Udział procentowy
Extension type – Rodzaj wybieranych usług		
Public Agric Extension – Publiczne doradztwo rolnicze	57	48.3
Private Agric Extension – Prywatne doradztwo rolnicze	27	22.9
None – Brak	34	28.8
Total – Suma	118	100
Willingness to pay – Skłonność do zapłaty		
Willing to pay – Skłonni do zapłaty	69	58.5
Not willing to pay – Nieskłonni do zapłaty	49	41.5
Total – Suma	118	100
Services received – Otrzymywane usługi		
Identifying rural problems – Identyfikacja problemów na wsi	2	1.7
Arrange input supply – Pozyskiwanie nakładów	10	8.5
Processing loans Rozpatrywanie wniosków o pożyczki	5	4.2
Communication of recommended practices Komunikowanie zalecanych praktyk	13	11.0
Feeding back farmers problems to research Poddawanie problemów rolników dalszym badaniom	3	2.5
Giving advice on agricultural problems Udzielanie porad rolniczych	8	6.8
Home and farm visit Wizyty domowe i w gospodarstwie	2	1.7
Providing specialized information for production Zapewnianie specjalistycznych informacji na temat produkcji	14	11.9
Arranged input supply, processing loans, providing special information for production Pozyskiwanie nakładów, rozpatrywanie wniosków o pożyczki, zapewnianie specjalistycznych informacji na temat produkcji	30	25.4
Learning new ideas in agriculture, giving advice on agricultural problems, providing special information for production Nauka nowych koncepcji rolniczych, udzielanie porad rolniczych, zapewnianie specjalistycznych informacji na temat produkcji	18	15.3
Communication of recommended practices, giving advice on agricultural problems Komunikowanie zalecanych praktyk, udzielanie porad rolniczych	13	11
Total – Suma	118	100

Source: own calculations based on field survey.
Źródło: obliczenia własne na podstawie badań terenowych.

for private agricultural extension services. Arrangement of input supply, processing of loans, providing special information for production and giving advice on agricultural problems were the major services that were offered to the respondent by the agricultural extension agents. Other services such as learning of new ideas in agriculture, communication of recommended practices, giving advice on agricultural problems, loan recovery, home and farm visit and feeding back farm problems to researchers were also cited.

Determinants of willingness to pay for private agricultural extension services

The results of the principal component analysis are given in Table 3. The total number of plots, marital status of the respondents, family size, and awareness of private agricultural extension services were the four variables that are within and above 1 in the Eigen. The scree plot diagram showing the distribution of the variables for the principal component analysis is given in Figure 1. These variables are hypothesized to be the main factors likely to influence willingness to pay for private agricultural extension services in the study area. The total number of plots cultivated is hypothesized to have a positive relationship with willingness to pay for agricultural extension services. This is because farmers with larger number of plots are likely to be more commercially inclined (Foti et al., 2007; Oladele, 2008). Marital status is hypothesized to have a positive or negative relationship with the dependent

Table 3. Determinants of willingness to pay for private agricultural extension services
Tabela 3. Determinanty skłonności do zapłaty za prywatne usługi w dziedzinie doradztwa rolniczego

Independent variables Zmienne niezależne	Component – Składowa			
	1	2	3	4
Age (years) Wiek (lata)	0.417	0.641	0.085	–0.486
Marital status Stan cywilny	–0.017	–0.017	–0.04	0.942
Family size Wielkość rodziny	–0.055	0.848	0.146	0.225
Farming experience (years) Doświadczenie w rolnictwie (lata)	0.422	0.732	0.056	–0.338
Educational level (years) Wykształcenie (lata)	–0.172	–0.575	0.458	0.11
Total number of plots Całkowita liczba działek	0.91	0.135	0.094	–0.033
Total plot size (ha) Całkowita wielkość działki (ha)	0.932	0.123	0.54	–0.46
Membership of association Członkostwo w stowarzyszeniu	0.12	–0.199	–0.777	–0.6
Awareness of agricultural extension services Świadomość nt. usług w dziedzinie doradztwa rolniczego	0.062	–0.023	0.835	0.153

Extraction method: principal component analysis.
Rotation method: Varimax with Kaiser normalization.
Source: own data analysis.
Metoda przetwarzania danych: analiza głównych składowych.
Metoda rotacji: Varimax z normalizacją Kaisera.
Źródło: własna analiza danych.

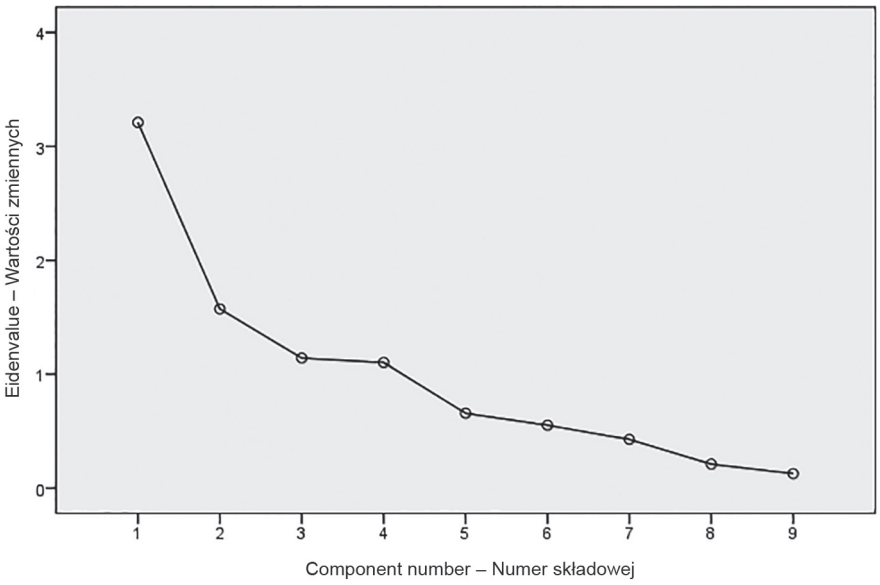

Fig. 1. Scree plot diagram showing the distribution of the variables for the principal component analysis
Rys. 1. Wykres osypiska przedstawiający rozkład zmiennych dla analizy głównych składowych

variable. This is because the structure of the household could influence the risk averseness and decision making tendencies of the household (Doss and Morris, 2001; Rogers, 1995). Family size is expected to have a positive relationship with the willingness to pay for private agricultural services given that large families are likely to be keener to increase production to meet the needs of the household. Farmers' awareness of private agricultural extension services is expected to have a positive relationship with willingness to pay for private agricultural extension services. This is supported by the fact that such farmers are more likely to have access to private agricultural extension services (Kaliba et al., 1997). These variables were subjected to Spearman's correlation coefficient.

As shown in Table 4, the results of the Spearman's correlation analysis showed that the total number of plots was the only significant determinant ($P < 0.001$)

Table 4. Estimate for determinants of willingness to pay for private agricultural extension services
Tabela 4. Ocena determinant skłonności do zapłaty za prywatne usługi w dziedzinie doradztwa rolniczego

Variables – Zmienne	Coefficient – Współczynnik	Probability – Istotność	Decision – Decyzja
Total plots – Całkowita liczba działek	0.395***	0.000	Significant – Istotna
Marital status – Stan cywilny	–0.011	0.903	Not significant – Nieistotna
Family size – Wielkość rodziny	0.078	0.402	Not significant – Nieistotna
Awareness – Poziom świadomości	0.046	0.618	Not significant – Nieistotna

***Correlation is significant at the 1% level (2-tailed).
Source: own data analysis.
***Korelacja jest istotna na poziomie 1% (dwustronna).
Źródło: własna analiza danych.

of willingness to pay for private extension services in the study area. The positive relationship implies that the willingness to pay for private agricultural extension services increases with increase in number of plots cultivated. Though family size and awareness of private agricultural extension services were not significant, the nevertheless have the expected positive signs while marital status has a negative sign. These result is in line with that obtained by Foti et al. (2007) who asserted that farm size and attitude of the farmer significantly affect the demand for private fee-for-service extension in Zimbabwe.

Constraints to the demand for private agricultural extension services

The constraints limiting the demand for private agricultural extension services in the study area as perceived by the farmers are presented in Table 5. The results show that the most important constraints in the study area are accessibility to private extension services, income of the farmer, experience and farm size. Other constraints such as timeliness of availability, illiteracy among the farmers, distance of private agricultural extension to farm and inadequate information from the private agricultural extension were also identified as important constraints.

Table 5. Constraints to the demand for private agricultural extension services
Tabela 5. Ograniczenia popytu na prywatne usługi w dziedzinie doradztwa rolniczego

Characteristics Badana cecha	Frequency Częstotliwość występowania	Percentage Udział procentowy
Poor accessibility Słaba dostępność	29	24.6
Non-availability Brak dostępności	9	7.6
Inadequate income Niewystarczający dochód	19	16.1
Small farm size Małe gospodarstwo	7	5.9
Lack of experience Brak doświadczenia	19	16.1
Lack of knowledge Brak wiedzy	1	0.9
Long distance to farm Duża odległość od gospodarstwa	8	6.8
Inadequate information Niewystarczające informacje	2	1.7
Poor accessibility and inadequate income Słaba dostępność i niewystarczający dochód	8	6.8
Lack of income and experience Brak wystarczającego dochodu i doświadczenia	7	5.9
Lack of income and small farm size Brak wystarczającego dochodu i małe gospodarstwo	9	7.6
Total Suma	118	100

Source: own calculations based on field survey.
Źródło: obliczenia własne na podstawie badań terenowych.

CONCLUSION AND RECOMMENDATIONS

Based on the results and findings of this study, it can be concluded that the demand for private agricultural extension services in the study area has not been completely embraced. This may be related to the fact that the number of farmers that had contact with private agricultural extension agents in the study area was relatively low. In line with the findings of this study, it is recommended that the Government should provide an enabling environment for private agricultural extension institutions to thrive in the form of incentives and improved infrastructural facilities particularly in the rural areas. Efforts should also be stepped up by all development stake-holders at providing additional income sources for the farm households, in order to raise their income and demand capabilities. There is need for increase awareness on the benefit of professional advice from private extension agents to farmers as against the cost to be incurred given that about 58% of the respondents are willing to pay for private agricultural extension services. It is also important that extension agents acquaint themselves with innovations in agriculture to ensure that farmers receive quality services which translate to increased productivity and consequently increased income as such will encourage the farmers to be willing to pay for agricultural extension services.

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ŚWIADOMOŚĆ DOTYCZĄCA PRYWATNYCH USŁUG W DZIEDZINIE DORADZTWA ROLNICZEGO ORAZ POPYT NA NIE WŚRÓD WŁAŚCICIELI MAŁYCH GOSPODARSTW ROLNYCH W NIGERII

Streszczenie. W niniejszym artykule przedstawiono badanie poziomu świadomości dotyczącej prywatnych usług w dziedzinie doradztwa rolniczego oraz popytu na nie wśród właścicieli małych gospodarstw rolnych w Nigerii. Badaną grupę stanowili rolnicy zamieszkujący stan Oyo. Szczególnie skupiono się na dostępności i funkcjonowaniu prywatnych usług w dziedzinie doradztwa rolniczego oraz na czynnikach, które wpływają na skłonność rolników do zapłaty za tego typu usługi. Wykazano, że znaczna liczba rolników jest skłonna zapłacić za prywatne usługi z zakresu doradztwa rolniczego. Okazało się, że na skłonność rolników do zapłaty wpływała liczba uprawianych działek ziemi, przy istotności na poziomie 1%. Dochód, poziom świadomości, wielkość rodziny i całkowitą liczbę działek uznano za główne ograniczenia w korzystaniu z prywatnych usług w dziedzinie doradztwa rolniczego na badanym obszarze. W artykule wskazano na konieczność zachęcenia gospodarstw rolnych przez rząd do skorzystania z prywatnych usług w dziedzinie doradztwa rolniczego. Także udziałowcy powinni podjąć kroki w celu zapewnienia dodatkowych źródeł utrzymania gospodarstwom, by zwiększyć ich dochód oraz popyt na usługi.

Słowa kluczowe: doradztwo rolnicze, popyt, prywatyzacja, świadomość, właściciele małych gospodarstw rolnych

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