ASSESSMENT OF FARMERS' WILLINGNESS TO PAY FOR DEMAND-DRIVEN EXTENSION SERVICES IN NIGER STATE, NIGERIA

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Abstract

The study examined farmers' willingness to pay for demand-driven extension services in Niger State, Nigeria. To achieve the study objectives, multi-stage sampling techniquewas used to select 377respondents for the study. Validated interview schedule was used to collect relevant data.Data collected were analyzed using both descriptive and inferential statistics.Result of the study shows that the mean amount of the respondents' willingness to pay for extension services per year was ₦14,991. Farm size,degree of commercialization of crop enterprise and farm income had significant positive effect on farmers'willingness to pay for demand-drivenextension services. Finding indicates thatmost(81.2%) of the respondents werewilling to pay for demand-driven extension services in cash. In addition, the study reveals thatmajority of the respondents were willing to pay more for agricultural information on processing and storage technologies.Furthermore,Increase yield and incomewas indicated as the reason for willingness to pay for demand-driven extension services by most of the respondents. It was therefore recommended thatsince both farm size and degree of commercialization of crop enterprise influenced farmers' willingness to pay, demand-driven extension service providers should target high value cash crops farmers more, who have large farms and are capable of spreading the service cost across a broader income base.Also, to take advantage of the existing demand, the service providers should package their services in a logical manner to adequately train farmers on post-harvest technologies to enable them produce farm products that will meet buyers' preference for maximum profit.

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Introduction

In recent times, many developing nations including Nigeria have acknowledged the significant task that agricultural extension can perform in agricultural transformation. This recent attention on agricultural extension is because of the realization of the role that agriculture is expected to perform in food security (World Bank, 2007).Agricultural extension services involve teaching farmers on better farming skills to promote farm output and profit, as well as promoting socio-cultural, recreational and intellectual opportunities with attendant improvement in the welfare of rural dwellers.In apparent realization of the importance of extension services to agriculturesector and rural transformation, various governments in Nigeria introduced a number of extension systems.One of the most visible changes in Nigeria's agricultural extension system wasthe introduction of Training and Visit (T and V) extension system in 1975to overcome some of the problems experienced in the past extension systems.

However, few years after the implementation of the T and V extension system, the system was found to be ineffective in a number of ways. While lending credence to this assertion, Abubakar (2009) reported that an ever growing number of literature on Training and Visit extension system have found the extension system to be inappropriate in rain agriculture, in farming system with small-scale farming characteristics, where research institutes are not strong, and where monitoring, logistic and fund is not sufficient. Similarly, World Bank (2002) in its evaluation report on success and challenges in agricultural extension and research stations, stressed that Training and Visit system is expensive and has little financial resources to function well; has inadequate innovations to disseminate; that neither research institutesnor extension agencies was aware of the need to evaluate the challenges and prospects of the diverse farming types as a yard stick to know relevant technological innovations. The report further added that extensionprogramme design and implementation paid less attention to the farming family's involvement in constraint identification, solution to problem solving and extension project. The finding therefore, concluded that a top-down approach is widespread and common in the government extension sectors in manyunder-developing nations.

As a result of this, there have been calls for demand-driven extension delivery system which is expected to provide more effective and efficient services to the farmers, but the success of the demand driven extension system is determineby the readiness of the farmers to pay for the extension services.It is against this background that this study was carried out to assess farmers'

willingness to pay for demand-driven extension services. The specific objectives of the study are to:

i. determine amount farmers are willing to pay for demand-driven extension services;

ii. ascertaindeterminants of farmer's willingness to pay for demand-driven extension services;

iii.determinepreferred form of payment for demand-driven extension services;

iv.identify thetype of information/technologies for which farmers are willing to pay for demand-driven extension services; and

v. ascertainreasons for farmers' willingness to pay for demand-driven extension services.

Methodology

Niger State falls within latitudes 8^0-10^0N and longitudes 3^0-8^0East. The State is located in the Southern Guinea Savanna ecological zone of Nigeria.Annual rainfall rangesfrom 1,100mm in the North to 1,600mm in the South.The vegetation distribution of the State consists of short and medium grasses, shrubs and scattered trees. Soils are predominantly light and well drained.Farming is the primary occupation of 85 percent of the State's population; the major arable crops grown include maize, cassava, vegetables, rice, yam, millet, cocoyam, potato, cowpea, groundnut, guinea corn, fruits and sugarcane. The major tree crops cultivated are oil palm, mango, citrus, coconut, cashew, banana and pawpaw. Livestock reared include goat, sheep, cattle, chicken and donkey.

The population for the study was made up of all farmers participating in the demand-driven extension delivery systemof National *Fadama*Development Project II in Niger State, Nigeria. The sample design was based on National *Fadama* Development Project activities in the State. In line with the above consideration, multi-stage sampling technique was used to select the respondents from the three agricultural zones in the State (Zone I, II and III). In the first stage three Local Government Areas (LGAs) were selected from each zone, while in the second stage three *Fadama* Community Associations (FCAs) were randomly selected from each LGA. Thereafter, two farmers' *Fadama* User Groups (FUGs) were selected in the third stage from each FCA. At the fourth stage seven farmers were randomly sampled from each farmer's FUG using simple random technique. In all, a total of 378 farmers were selected for the study. However, due to incorrect entry, 1 interview schedule was invalid and the remaining 377 interview schedules were used for the study.Cronbach's Alpha reliability test was carried out to determine the reliability of the data collection instrument.

The data for the study were obtained from a combination of primary and secondary sources but mainly through the former.Primary data were collected from a cross-sectional survey of farmers through the administration of interview schedule with the assistance of employed enumerators.Data were collected on the amount farmers are willing to pay for services per year, preferred form of payment (cash or kind), type of technology and production activity farmers are willing to pay morefor serviceas well as reasons for willingness to pay.

Data collected were analyzed using both descriptive and inferential statistics. Objective one, three, four and five were achieved using descriptive statistics,while logit regression analysis was used to achieved objective two of the study. The result was tested at 5% level of significance.

The model is expressed in its implicit form as:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14})$

Y = Willingness to pay: dummy variable: 1 if the farmer has paid for demand-driven extension services or willing to pay for demand- driven extension services and 0 otherwise.

X_1= Education (years of schooling)

X_2= Gender: dummy variable (1 if male and 0 if female)

X_3= Access to credit: dummy variable (1 if yes and 0 otherwise)

X_4= Farm size (in hectares)

X_5=Age (in year)

X_6= Cooperative membership: dummy variable (1 if yes and 0 otherwise)

X_7= Crop commercialization (i.e. percentage of crop sold)

X_8= Livestock commercialization (i.e. percentage of livestock sold)

X_9= Agric. training: dummy variable (1 if farmer has agric. training and 0 otherwise)

X_{10}=Total livestock owned (TLU- cow= 1; pig=0.36; goat/sheep=0.09; poultry=0.01)

X_{11}= Family size (in number)

X^{12} =Farm income (in naira)

X^{13} = Distance to nearest market (in kilometer)

X^{14} = Fish farming: dummy variable (1 if yes and 0 otherwise)

Results and Discussion

Amount farmers are willing to pay for extension services

Table 1 reveals that 41.1% of the respondents were willing to pay between ₦1,000 and 10,000 per annum for extension information, while 34.7% were willing to pay between ₦10,001and

20,000. Only 21.2% were willing to pay above ₦20,000. The average amount respondents' were willing to pay was ₦14,991 per annum. This mean amount is fairly attractive and comparable to US $ 3.50 consultation fee charged per extension visit by service providers in Kenya as reported by Nambiro*et al*. (2005). The willingness of the respondents to pay for extension services would serve as a boost to demand-driven extension services, because Francais (2001) said that the success of demand-driven extension delivery system is measured by the willingness of the farmers to pay for the services.

Table1: Distribution of respondents based on the amount they are willing to pay

Amount willing to pay (₦)	Frequency	Percentage
1,000 - 10,000	166	44.1
10,001 – 20,000	131	34.7
20,001 - 30,000	57	15.1
30,001 – 40,000	22	5.8
40,001 – 50,000	1	0.3
Total	377	100.0
Mean	14,991	

Source: Field survey, 2012

Determinants of farmer's willingness to pay for demand-driven extension services

Result of the logit regression analysis in Table2 shows that farm size was associated with willingness to pay for demand-driven extension services. This suggests that farmers with large farm sizes have higher likelihood to demand for agricultural extension services than those with small farm lands. This result corroborates the finding of Saravanan and Veerabhadraiah (2003) who reported that farm size of the farmers had positive significant correlation with willingness to pay for extension services in their study of clientele satisfaction and willingness to pay for private extension services. Age of the respondents had significant negative effect on willingness to pay. The inverse relationship could be attributed to belief; elderly farmers are not familiar with the method of paying for extension services and thus, they are less likely to pay for demand-driven extension services.Furthermore, the degree of commercialization of crop enterprise has significant effect on willingness to pay for extension services. This is likely because most of the respondents in study area are engaged more in crop enterprises. This result agrees with the

finding of Mitei (2001) who stressed that highly commercialized farms create more demand for extension services.

Family size of the respondents had significant negative effect on willingness to pay. The negative effect for family size could be due to the fact that large family sizes of the respondents draw more from family income, thereby reducing the financial resources and willingness to pay for agricultural information or extension services. Farm income of the respondents had significant relationship with farmers' willingness to pay for demand-driven extension services. This result is not surprising because higher financial status is associated with a higher ability to pay for services. With improved income, the farmers will be better placed to spend more on improved farm practices that would further increase their farm incomes. The significant relationship between farm income and willingness to pay for extension services as revealed by this study is consistent with the findings of previous studies such as that ofHaba (2004) and Birner*et al*. (2006).

Table2: Logit regression analysis for determinants of farmers' willingness to pay for demand-driven extension services.

Variables	Coefficient	t-value	P-value
Constant	7565.93	0.02	0.988^{NS}
Education	0.0441765	0.79	0.431^{NS}
Gender	0.0118479	0.08	0.939^{NS}
Access to credit	-3.47438	-1.78	0.074^{NS}
Farm size	4.68436	1.97	0.049*
Age	-0.000405	-2.01	0.044*
Cooperative membership	-7561.82	-0.02	0.988^{NS}
Percentage of crop sold	0.112440	2.01	0.045*
Percentage of animal sold	-0.0071628	-0.21	0.834^{NS}
Agric training	9808.16	0.06	0.951^{NS}
Livestock owned	0.0904196	0.14	0.890^{NS}
Family size	-3.35987	-2.19	0.029*
Farm income	3.84074	2.29	0.022*
Distance of market	0.0533223	0.42	0.673^{NS}
Fish farming	0.0930458	0.35	0.729^{NS}

Computed from Field survey data, 2012

Log-likelihood =13.071,

P-value =0.019,

NS= Not significant,

*= Significant at 5% level

Preferred form of payment

Preferred form of payment here connotes the respondents' willingness to pay for services either in kind or cash.Analysis of data in Table3 reveals that majority(81.2%) of the respondents were willing to pay for demand-driven extension services in cash. However, a total of 65 respondents representing 17.2% indicated their willingness to pay for demand-driven extension charges in kind i.e. in form of farm produce.

Table3: Distribution of respondents based on their preferred form of payment

Kind of payment	Frequency	Percentage
Cash	306	81.2
Kind	65	17.2
None of the above	6	1.6
Total	377	100.0

Source: Field survey, 2012

Type of information/technologies for whichfarmers are willing to pay for services.

Table 4 shows that 90.9% of the respondents were willing to pay more for services on processing, while 86.4% of the respondents were willing to pay more for services onstorage technologies. This result implies that there is an existing demand and ready market for agricultural information on processing and storage technologies in the study area. This finding agrees with the assessment report of *Fadama*II project by IDA (2009) who stressed that the demand for fee based post harvest extension services increased among farmers. The next technology that the respondents were willing to pay for service was improved seed/planting materials (81.2%). In an earlier study, Saravana and Veerabhadriaiah (2003) also reported that farmers were willing to pay for extension services on new varieties and post-harvest technologies. Other technologies for which respondents were willing to pay include livestock

breeds (70.0%), marketing strategies (69.2%), crop management (66.8%), veterinary services (60.2%), livestock pasture/feeds (58.0%), weed control (38.1%), soil water conservation (34:7%), aquaculture (33.9%), leadership skill training (24.4%), agro forestry (11.9%) and bee keeping (0.5%).

The first two areas of interest which the respondents were willing to pay more for services (processing and storage technologies), are areas that relate to financial benefits which should be the concern of every rational farmer participating in demand-driven extension delivery system, where farmers are expected to pay for services. As such, demand-driven extension service providers should pay particular attention in educating farmers on post harvest technologies to enable farmer's maximize profit, as addressing these areas of interest will serve as basis for farmers' willingness to pay for demand-driven extension services.

Table 4: Distribution of respondents according to the type of information or technologies for which farmers were willing to pay more.

Information/technology*	Frequency	Percentage
Improved seeds/planting materials	307	81.2
Chemical fertilizer	195	51.7
Soil water conservation	131	34.7
Crop management	252	66.8
Weed control	144	38.1
Storage technologies	326	86.4
Livestock breeds	264	70.0
Livestock pasture/feeds	219	58.0
Agro forestry	45	11.9
Bee keeping	2	0.5
Aquaculture	128	33.9
Processing technologies	343	90.9
Marketing strategies	261	69.2
Leaders skill training	92	24.4
Veterinary services	227	60.2

Source: Field survey, 2012

* Multiple responses

Reasons for farmers' willingness to pay for extension services

When the respondents were asked to give reasons why they were willing to pay more for some information and technology,increased yield and income were given as the reasons for willingness to pay more for information on crop production activity by 52.2% of the respondents, as indicated in Table 5.On the other hand, one quarter (25.4%) of the respondents mentioned that they were willing to pay more for livestock, because they value their animals and that livestock related problems are more complicated to solve than those of crops. Moreover, some of the respondents (24.1%) reported that they were willing to pay more for livestock, because animals serve as sources of income to them and source of power in the farms for traction.

Table 5: Reasons for willingness to pay for extension services

Reasons for willingness to pay *	Frequency	Percentage
Livestock problems too complex to solve	96	25.4
Livestock serve as a source of wealth and work bull in farms	91	24.1
Increase crop yield and income	197	52.2

Source: Field survey, 2012

* Multiple responses

Conclusion

Based on the findings of the study, it can be concluded that the average amount of the respondents' willingness to pay for demand- driven extension services per year was ₦14,991.Determinants of farmers' willingness to pay for demand-driven extension services were farm size, degree of commercialization of crop enterprise, and farm income.Majority of the respondents (81.2%) indicated their willingness to pay for services in cash.The respondents were willing to pay more for information on processing and storage technologies, while increased yield and income was given as the reasonfor willingness to pay by majority of the respondents.

Recommendations

Both farm size and degree of commercialization of crop enterprise influenced farmers' willingness to pay for demand- driven extension services, because of the high commercialization value of the cash crops that dominated the enterprises. Therefore, demand-driven extension service providers should target high value cash crops farmers more, who have large farms and ability of spreading the service cost across a broader income base.

Findings showed that some of the respondents were willing to pay for services in kind; the service providers should put into consideration the problems of the farmers in terms of the service cost. The service providers should help the farmers by accepting service charges in kind in special cases where farmers prefers to pay in kind in form of farm produce.

The result of the study indicated that the respondents were willing to pay more for services on storage and processing technologies, which implies the existence of a demand. To take advantage of the existing demand and market, the service providers should package their services in a logical manner to adequately train farmers on processing and storage to enable them produce farm products that will meet buyers' preference for maximum profit. If farmers derive higher benefit from agriculture, they would be willing to pay for agricultural extension services.

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