Willingness to pay for extension services in Uganda among farmers involved in crop and animal husbandry

By

Mwaura, Francis; Muwanika, Fred Roland; and Okoboi, Geofrey

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Francis Mwaura*, Fred Roland Muwanika and Geofrey Okoboi

Economic Policy Research Centre, P.O. Box 7841 Kampala, Uganda. Tel. +256-414-541023/4 Email: mwaura@eprc.or.ug

- **Corresponding author.**

Abstract

Although the Ugandan government is determined to aid farmers increase agricultural productivity as an intervention on increasing food security and reducing poverty through extension services, resources constraints are dampening its efforts. Private extension services providers are being invited to take up information dissemination roles with queries on the availability and demand of the services among farmers to attract private sector and factors influencing the demand for extension services. Data collected by the Uganda Bureau of Statistics (UBOS) on national service delivery throughout the country in 2008 among 5363 and 3318 farmers involved in crops' and animals' husbandry was used to predict willingness to pay, amount farmers were willing to pay for extension services and factors that were to influence willingness to pay. It was established that about 35% and 40% of the farmers were willing to pay on average Ugandan shillings 3,400 (US$ 1.8) and 3,700 (US$ 2) per trip for extension services in crop and animal husbandry respectively. Key farmer's attributes that influenced willingness to pay included sex, age, education level, regions of residence and preferred means to receive the services. The demand for extension and preferred price are low for private sectors engagement and the government should first educate the public on the importance of the services.

Introduction

Per capita food consumption and other social economic indicators have continued to be low in Uganda for the last two decades (World Bank, 2005; UNDP, 2006). This has been contributed by negative per capita growth in agriculture production compared to a higher population growth rate estimated at about 3.2% p.a. (UBOS, 2009). At the same time, the country seem to be trapped in a vicious cycle of declining terms of trade and high indebted resulting in low economic growth which in turn limits the capacity to attract the required investment and technologies for the development of agriculture (World Bank 2005). Policy failure in agriculture has been blamed for poverty, economic stagnation and decline in households' income (Holden and Binswanger, 1998). The agricultural woes that have hampered the sector development include; low soil fertility, fragile ecosystems, over dependence on rainfall, aging rural population, underdeveloped and inadequate rural infrastructure, insufficient research, inadequate training and extension services, high post harvest losses, insufficient market, lack of credit and insufficient agri-input delivery systems, inconsistent agricultural policies and inefficient land tenure (Batiano *et al*, 2004).

Consensus have been reached among various agricultural development stakeholders on the country's need of addressing these constraints (MoFPED, 2010) considering country's higher agricultural potential (contributed by higher and reliable rainfall, originally fertile soil and tropical temperatures), sectors employment levels (about 70%), entirely reliance on food and agro-based industries and its contribution to the Gross domestic Product (GDP) at 21% (UBOS, 2009).

Although the government recognizes the importance of agricultural services including research, extension, training and information services for improved production,, commitments to liberalization and lack of sufficient resources have hindered successful implementation of the services (GoU, 2000). In Uganda, despite 71 % and 43.2% of farmers demanding for extension services in crop and animal husbandry respectively, only 17% of crop and 21% of animal farmers were served by the extension services (Muwanika et. al, 2010). Implying that the existing public extension system is unable to provide extension services to the farmers whenever they are needed, necessitating private sector entry. The extent to which the farmers are willing to pay for extension services has not been researched in Uganda. Outcome of such a study will aid policy makers and implementers as they operationalise the inaugural national development plan (MoFPED, 2010). Failure to examine the willingness to pay for extension services could lead to poor strategies in targeting extension services, resulting ineffective extension services and low technology adoption. Low adoption of technology will affect productivity, the country's food security and the fight against poverty. This paper seeks to assess the farmers' willingness to pay for extension services and factors that will influence the probability of the demand for extension services.

Literature review:

Development in technology creates opportunities, benefits and efficiency gains for farmers resulting to competitive utilization of factors of production (Gurel, 1998). Globally agriculture has a high risk and uncertainty due to its production being highly influenced by other factors that are beyond the farmer's control including pestilence, diseases, weather, elastic demand of produce and infrastructural need due to produce bulkiness (Batiano *et al.* 2004) Dissemination of information on elite agricultural technologies is a key intervention for increased productivity hence improved livelihood. Effective extension system needs to continuously be updated and fine-tuned by new information derived from research that is relevant to farmers' needs (Picciotto and Anderson, 1997). For years extension services has been provided by the governments to farmers without due consideration whether the recipient really require the information provided, resulting to ineffective and inefficient information dissemination routines. By farmers demanding for extension services it is anticipated that relevant information on technologies will reach desired target effectively and efficiently and will also result to increased utility, output and impacts on poverty reduction (Kidd *et al*., 1999). Bernet and others (2001) suggested that, extension providers need income generating, potential improving and financially effective activities to attract them to the enterprise. .

Although the importance of public extension services in Uganda has been known, provision of the services was restricted to a few non government organizations, in the first fifteen years of political stabilization (Reinikka and Collier, 2001). Government formulation of the Plan for Modernization of Agriculture (PMA) in 2000 was an effort to address the development need of the economy beyond the rehabilitation and the adjustment policy stages. The National Agricultural Advisory Services (NAADS), a component of PMA, was put in place by an Act of Parliament in April 2001 with five sub-components including: (i) advisory and information services to farmers (ii) technology development and linkage with markets (iii) quality assurance—regulations and technical auditing (iv) private sector institutional development and (v) programme management and monitoring. NAADS aims to develop a demand-driven, client oriented and farmer led agricultural service delivery system particularly targeting the poor and the women (GoU, 2000). Currently NAADS program is being implemented in 64 districts out of the 79 rural district representing 81% coverage.. However the program has been greatly criticized for its failure to provide adequate extension services to farmers based on their needs (Kyomugisha, 2008). In response to developing issues and in pursing to improve agriculture sector, a new approach "Agricultural Sector Development Strategy and Investment Plan (DSIP) has been put in place (MAAIF, 2010). DSIP endevours to enhance production and productivity, improve access to markets and value addition, create an enabling environment and institutional strengthening. One of the main challenges of the PMA and a potential hindrance to the success of DSIP is the lack of effective dissemination of agricultural technology. Structural adjustment and commitment to market based agricultural development has reduced the direct role of the state in providing services (Stringfellow *et al.,* 1997). This implies that farmers must be in position to contribute to the provision of extension services where government may not fully meet their needs. However it is not clear if the farmers are willing to pay for the extension services, the amount they are willing to pay and factors that will affect the willingness to pay.

Demand for extension services can be evaluated through establishing the willingness to pay for the services among farmers. The success of private veterinary services in the Kenya high agricultural areas was to be influenced by both demand and the supply side of the services. Although demand for services among the targeted clients exists based on their enterprise and personal characteristics, understanding the demand side factors by the private veterinary providers and for governments wishing to privatize the delivery of veterinary services was recommended as necessary for effectiveness of the services (Tambi, *et al.* 1999).

Willingness to pay (WTP) is a strong research approach that involves the targeted clients for potential services in establishing the preferences of the services proposed and the value the respondents are ready to pay. Mostly, WTP studies involve contingent valuation (CV) and hedonistic methods. WTP for a service is the maximum amount of money an individual would be willing to pay for goods or services rather than do without it. WTP studies are widely used in assessment of markets, goods, services by planners, entrepreneurs and for environmental valuation. In agriculture, WTP studies have been used to evaluate demand and cost curves for extension services delivery through commercial agents (Nambiro and Omiti, 2007).

Blaine et al. (YEAR), observed that basic attitude toward conservation, area of residence and income were important factors affecting WTP for green space and farmland conservation in Ohia. Services costs, poverty levels, location, own capability to provide and perception of the individual influenced the demand and price stated for piped water connection ex-ante in Sri-Lanka (Hanayak, et al, 2006). Both the Costa Rican and foreign tourists declared their preferences for increased nature and scenic beauty and although the results were robust across respondents with different socio-economic characteristics, high income groups among both populations were more willing to contribute to payment for environmental services (Bienabe and Hearne, 2005). Verbic and Slabe-Erker (2009) used the contingent valuation and closed choice method to establish willingness to pay for sustainable development in Slovenia. Stated value of willingness-to-pay was positively affected by respondent's income, his consciousness, his concern about unplanned development in the area, his perception of probable damage to natural and cultural heritage in general, and the number of values embodied in the area's environmental goods.

Willingness to pay for agricultural services is influenced by a number of paradigms including the innovation-diffusion model (Makokha, *el al* 1999), economic constraints model (Pitt and Sumodiningrat, 1991) and the adopter's perception model (Adesina and Baidu-Forson 1995). Innovation-diffusion model may includes factors the respondent may have been exposed to in relation to the extension services being targeted including duration, regularity of services, quality of the services and the effectiveness of its delivery. Attitude and confidence toward using the precision agricultural technologies, perceptions of benefit, farm size and farmers

educational levels positively influenced the intention to accept precision agriculture technologies (Adrian, et al. 2005).

Services being tested are evaluated by receptors on relevance that will increase effectiveness and value within his/her environment. Relevance and quality of research information was perceived to be influenced by proximity to source of trials and the attitude towards the sourced organization (Llewellyn, 2007). Economic importance of animal husbandly enterprise and respondent's socio-economic characteristics influenced livestock producers' demand for private veterinary services including clinical services, Artificial Insemination, vaccination and health services in the high potential agricultural areas of Kenya (Tambi, et al., 1999).

Data and methods

Data source

This paper utilized the Uganda National Service Delivery Survey (NSDS) data set of 2008 collected by the Uganda Bureau of Statistics (UBOS). The data was collected at community, district (service providers) and household (beneficiaries of services) throughout the country. The variables used in this paper included region, location of household, education level, sex of household head, age, marital status willingness to pay for extension services (yes/no), frequency of extension services proposed and how much farmers are willing to pay for the extension services. Data was analysed using STATA v 10 statistical package. The main thrust of the analysis was to identify the individual, household characteristics that influenced willingness to pay for extension services.

Data were summarized by computing frequencies, and percentages. In addition to the descriptive analysis, cross tabulations were performed to assess for any association between the willingness to pay for the extension services by agricultural categories (crops or animal husbandry) and socio-demographic characteristics of the farmer. Probit regression model was fitted to assess the factors that may be associated with willingness to pay (WTP) for the extension services stratified by agricultural activity.
The Probit model takes the form

$$\phi^{-1}(p_i) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + \beta_k X_k + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where p_i the probability of willingness to pay(WTP) for extension service , β_i are the coefficients to be estimated, X_i are the socio-demographic characteristics of the household heads (age, sex, location, region, marital status and education level), and ε_i the error term. The interpretation will be based on $d\phi / dX_i = \beta_i$ whereas β_is are the change in the probability of willingness to pay for extension services.

Results and Discussion

Descriptive analysis

As shown in Table 1, similarities were observed on the socioeconomics characteristics of farmers involved in either crop or animal husbandry. Male head of household was recorded in 75% and 77% of farmers involved in crop and animal husbandry respectively. In each of category of farmers, those who were married accounted for more than three-quarters. The sample used was mostly rural as in either case only less than 3% of respondent were urban. Highest education levels achieved by household head showed similar trends between farmers involved in crop and those in animal husbandry. In either category, the largest proportion of respondents (about a third), highest education achieved was between primary 5 and 7 and the least had advanced certificate education. Those who had not received any formal education accounted for a fifth of respondents in each of the farmers' category. Those who had received education above the basic primary education were 20% and 22 % among those involved in crop and animal husbandry respectively. The two farming activities depicted farmers with identical age patterns. The least of farmers (less than a tenth) were in the age cohort less than 24 years, while the most (26%) were aged between 35 to 44 years in either of the farmers' category. Household sizes in the two categories showed similarities. In either of the category 28%, 40% and 32% had households with 1-3 members, 4-6 member and above 7 members respectively.

In either category of farmers, the Uganda's main regions were well represented among the survey respondents. The proportional of respondents in Central, Eastern, Northern and Western were 24%, 30%, 23% and 25% respectively among crop farmers. Among animals rearing farmers, 26%, 31%, 21% and 23% were from the Central, Eastern, Northern and Western respectively. In addition to the socio-demographic characteristics of the farmers, access related characteristics and the willingness to pay for extension services were assessed. The results are shown in Table 2. Accessibility of farmers to extension as represented by distance to the nearest produces collection stage or point and road showed similarity between those involved in crop and animal husbandry. Those living closer to the produce collection stages (i.e. 2 km) were 52% and 49% among farmers involved in crop and animal husbandry respectively. Crop and animal husbandry farmers accessing the produce loading stages in a distance between 2 km and 5 km were 27% and 28% respectively while those beyond 5 km were about a fifth in either of the category. More than three-quarters of all farmers were accessed by community roads while a fifth were served by feeder roads. Similarities were observed on roads serving the farmers with the largest proportional served by community, followed by feeder, murram and tarmac roads respectively.

Comparability was observed in the preferred means of accessing information between crop and animal husbandry farmers. The most preferred means was group meeting with extension worker followed by individual contacts with the extension providers. Mass media was the least preferred mean of accessing the required extension services. Sixty-two percent of crop and 56% of animal farmers favoured group approach to extension. Thirty-five percent of animals and 29% of crop farmers were for individual based extension services. Farmers preferred regular contacts with the extension workers. Eighty one percent of farmers involved in animal husbandry preferred accessing extension services in a frequency of less than 3 months. Three-

Table 1: Distribution of socio-demographic characteristics of the farmers

Variable	Crop husbandry (n=5,363)		Animal husbandry (n=3,318)	
Sex	**Frequency**	**Percent**	**Frequency**	**Percent**
Male	4,015	74.9	2,562	77.2
Female	1,348	25.1	756	22.8
Marital status				
Married	4,096	76.4	2,619	78.9
Single	165	3.1	86	2.6
Divorced/separated	378	7.1	191	5.8
Widowed	724	13.5	422	12.7
Residence				
Urban	194	3.6	101	3.0
Rural	5,169	96.4	3,217	97.0
Education level				
None	1,186	22.1	646	19.5
P1-p4	1,272	23.7	761	22.9
P5-p7	1,811	33.8	1,154	34.8
O' level	766	14.3	536	16.2
A' level	118	2.2	83	2.5
Tertiary	210	3.9	138	4.2
Age				
15-24	409	7.6	216	6.5
25-34	1,372	25.6	802	24.2
35-44	1,371	25.6	859	25.9
45-54	1,031	19.2	689	20.8
55+	1,180	22.0	752	22.7
Household size				
1-3	1,496	27.9	933	28.1
4-6	2,150	40.1	1,318	39.7
7+	1,717	32.0	1,067	32.2
Region				
Central	1,279	23.8	858	25.9
Eastern	1,499	30.0	1,014	30.6
Northern	1,235	23.1	682	20.6
Western	1,350	25.2	764	23.0

quarters of crop farmers wished to access the extension services at least once in 3 months. Some farmers preferred contacting the extension services at most once in 6 months.

Willingness to pay (WTP)

The study revealed that 1,891(35%) out of the 5,363 and 1,327(40%) out of the 3,318 farmers under crop and animal husbandry respectively were willing to pay for extension services. Figure 1 shows the proportional of those willing to pay for extension services among the two categories of farmers. The willingness to pay for extension services was slightly higher among animal husbandry than crop husbandry. This slight difference is associated with the fact that while crop farming is subsistence, animal husbandry is more commercial as the animals and their products are sold for farmers to buy other basic needs especially food (Tambi *et al.* 1999). Also each of the animals has a specified value that is considered as an asset among farmers

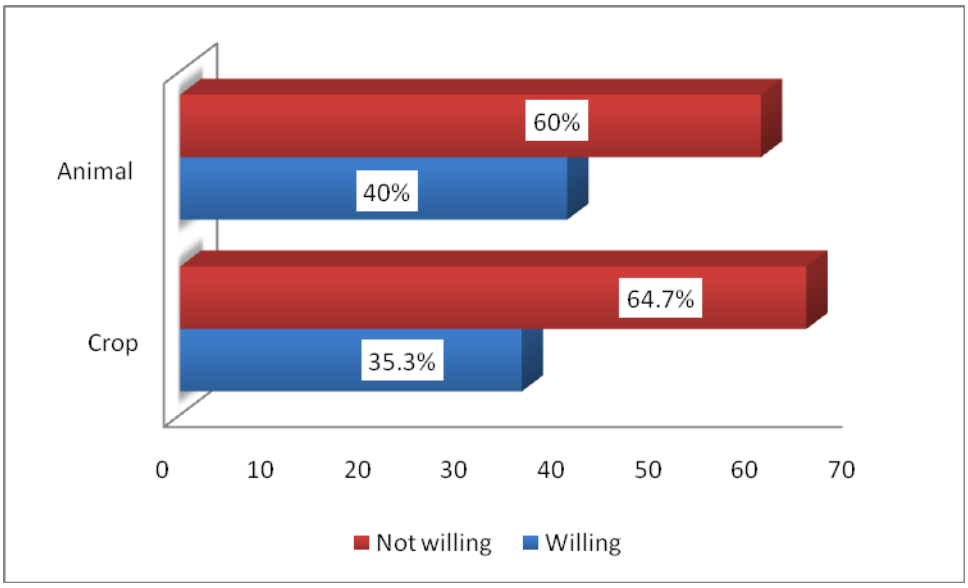
Table 2: Distribution of access related characteristics of the sampled farmers

Variable	Crop husbandry (n=5,363)		Animal husbandry (n=3,318)	
Distance to nearest stage	**Number**	**Percent**	**Number**	**Percent**
<=2km	2,765	51.6	1,620	48.8
2.1-5km	1,440	26.9	927	27.9
5km	1,158	21.6	771	23.2
Nearest road to household				
Truck road(tarmac)	136	2.5	86	2.6
Truck road(murram)	417	7.8	249	7.5
Feeder road	1,159	21.6	690	20.8
Community road	3,651	68.1	2,293	69.1
Preferred means to access information on extension services				
Mass media	151	2.8	86	2.6
Group meeting with extension worker	3,317	61.9	1,858	56.0
Individual meeting with extension worker	1,559	29.1	1,174	35.4
Other	336	6.3	200	6.0
Frequency of demand				
More than once a month	970	18.1	830	25.0
Once a month	1,501	28.0	1,060	32.0
Once in 3 months	1,537	28.7	789	23.8
Once in 6 months	888	16.6	336	10.1
Annually	367	6.8	171	5.2
Other	100	1.9	132	4.0

unlike crops which gets value when mature and harvested. Animals has more observable detrimental effects if they fail to receive the required attention including veterinary services as the farmer will lose the entire animal unlike crops that will be have yield reduced. Farmers involved in animal husbandry can estimate the risk involved in an animal loss and the inventions are more salient than those of crop farmers (Marra, *et al.* 2003). It has also been observed that animal husbandry is becoming popular among farmers even those that have been involved in crop farming. A large number of farmers may perceive to have required information on crops but they have no confidence on how to practice animal husbandry.

Farmers' attributes associated with willingness to pay for extension services

To assess the farmers' attributes associated with willingness to pay for agricultural services, cross tabulations were done between each farmer characteristics and willingness to pay. In addition regression analysis using probit model was used at multivariate level of analysis. The Probit model was used because the willingness to pay had two outcomes (1-willing, 0-not willing). Dummy variable were created for the categorical variables and proportion willing to pay, the percentage change in probability, and p-values were computed for each category. The results of the modeling effort are shown in Table 3. Marital status, household size and location of household were not significant in influencing the willingness to pay for neither crop nor animal husbandry. Therefore these variables were not included in the final model.



Among the male headed households, 37% were willing to pay for the extension services in crop husbandry as compared to about 30% among female headed households. Male headed households had a 4.7% increased probability of willingness to pay for extension services in crop husbandry as compared to female headed households. Under extension services for animal husbandry, male headed households had a 3.7% increased chances of willingness to pay for extension services as compared to their female counterparts, however the change was not statistically significance (p=0.091). Willingness to pay for extension services for crop husbandry was associated with sex of the household head in that males had increased chances of willingness to pay for the services (p=0.004). The result are consistent with the other findings (Doss and Morris, 2001;) that male headed households are more probable to adopt or accept change due to resources ownership and production system (Quisumbing and Pandolfelli, 2009; Smale and Heisey, 1994), education (Asfaw and Admassie, 2004) risk averseness and access to information (Marra, *et al*. 2003). Observations are more defined by characteristics of household rather than gender (Rogers, 1995). It is therefore important to understand the issues that affect the female headed households before designing policies that are aimed to intervening on their situation (Doss and Morris, 2001).

Presence and ease of access of good roads has a large bearing on the access and willingness to pay for services. In this respect we assessed the effect of the type of road on willingness to pay for extension services. The results show that 36.8% of households that were 2km or less from the nearest road were willing to pay for extension services in crop husbandry as compared to 34.5% among those household located more than 5km from the nearest road. The same trend was observed for animal husbandry extension services. Households that were between 2.1-5kms away from the nearest road had a 3.3% and 5.8% reduced probability of willingness to pay for crop and animal husbandry extension services respectively as compared to households that were within 2km or less from the nearest road. Increasing distance from the nearest road is associated with reducing likelihood of willingness to pay for extension services for both crop and animal husbandry. Distance was related to access to market and previous extension services. Markets access affects profitability and hence acceptance and investment in

Table 3: Probit results for farmers attributes associated with willingness to pay for extension services by agricultural activity

Variable	Crop husbandry			Animal husbandry		
	Proportion WTP	%Δprob	p-value	Proportion WTP	%Δprob	p-value
Sex						
Male	37.1	4.7	0.004**	41.3	3.7	0.091
[R] Female	29.9			35.5		
Distance to nearest road						
[R] <=2km	36.8			42.5		
2.1-5km	33.0	-3.3	0.036**	35.2	-5.8	0.005**
5+km	34.5	-2.5	0.144	40.6	-2.4	0.273
Age						
[R] 15-24	41.6			47.7		
25-34	38.9	-2.3	0.389	43.9	-3.4	0.360
35-44	37.4	-3.6	0.170	42.1	-5.3	0.155
45-54	34.3	-5.7	0.037**	37.5	-8.8	0.021**
55+	27.2	-12.0	<0.001**	33.5	-12.3	0.001**
Preferred means to access information on extension services						
Mass media	39.0	15.4	0.003**	43.0	9.6	0.156
Group meeting with extension worker	36.1	16.5	<0.001**	38.3	13.4	<0.001**
Individual meeting with extension worker	34.8	13.5	<0.001**	46.3	13.1	0.001**
[R] Other	27.0			34.0		
Education level						
[R] None	27.2			32.4		
P1-p4	34.7	4.5	0.030**	38.4	4.5	0.108
P5-p7	36.1	3.8	0.059**	40.8	4.2	0.115
O'level	41.6	8.9	<0.001**	44.2	8.1	0.010**
A' level	38.1	4.7	0.331	39.8	2.3	0.699
Tertiary	51.9	20.7	<0.001**	61.6	26.7	<0.001**
[R] Region						
Central	44.7			50.9		
Eastern	35.5	-9.0	<0.001**	36.9	-14.4	<0.001**
Northern	36.9	-7.7	<0.001**	46.6	-4.4	0.083
Western	24.6	-19.8	<0.001**	26.1	-24.2	<0.001**
Marital status						
Married	36.8			41.3		
Single	38.8			45.4		
Divorced/separated	32.8			38.2		
Widowed	27.2			31.5		
Nearest road to household						
Truck road(tarmac)	42.7			48.8		
Truck road(murram)	37.4			43.4		
Feeder road	36.8			43.9		
Community road	34.2			38.1		
Residence						
Urban	39.2			48.5		
Rural	35.1			39.7		
Household size						
1-3	34.6			39.3		
4-6	36.7			42.2		
7+	34.1			37.9		

Note: [R] reference category, ** significant at 5% level

intervention that will increase yield (Negatu and Parikh, 1999). Logistics and operation cost of assembling produce has impacts on the perception of enterprise benefits and profitability. While farmers closer to road can go on undertaking their economic chores awaiting the assemblers those who are far dedicates time to get to the roads and wait for the assemblers (Barrett, 1997).

Clients in remote locations are disadvantaged in accessing extension workers especially in developing countries where the extension units are poorly equipped, wide dispersed and farmer-extension officer ratio high (Staal, *et al*. 2002). Insufficiency in resources, contributed to NAADS introducing extension services first by targets 4 district and later systematically increasing the districts covered instead of rolling out entire nation programme (GoU, 2000). Considering that the country went through instability in 1970s and 1980s which greatly affected public sectors, extension services and their potential impacts are lacking among some farmers with the highest probability of farmers being in remote areas (Reinikka and Collier, 2001).

As other studies (Chebil, et al. 2009), have shown age of the farmer was recognized as very important in the utilization, adoption and willingness to pay for the service. The survey, found out that 41.6% of household heads in the age bracket of 15-24 were willing to pay for extension services in crop husbandry as compared to only 27.2% of household head at least 55 years old. A similar trend is observed for the animal husbandry extension services where increasing age is associated with decreasing willingness to pay for extension services. Increasing age is associated with reducing likelihood of willingness to pay for extension services for both crop and animal husbandry. For example household heads 55 years plus had 12% and 12.3% reduced chance of willingness to pay for extension services for crop and animal husbandry respectively ($p<0.001$) as compared to those in the age group 15-24 years. The young people are willing to pay because they are ready to adopt the new technologies that are provided in the extension services to improve their agricultural practices. A number of factors have been attributed to age as a factor of acceptance and investing in interventions. Young people are risk takers, a likely to be more educated, have more avenues for information, more likely to change perception and have disposable income (Kaliba, et al. 1997). The eagerness for information coupled by the socio-economic characteristics of the young increase their probability to demand and pay for extension services either on crop or animal husbandry. Although the demographic patterns of rural areas does acknowledge aging patterns in agriculture (Batiano et al. 2004), intervention for this challenge is missing. Young people especially without professional training initially engage in agriculture as an economic activity. Later if they acquire capital they shift engagement to business while pursuing commercialization of their farming activities. If they are not very successful in agriculture they migrate to urban areas in pursue of manual jobs (Goldsmith et al. 2004). An intervention that will improve the young in agriculture and encourage them to remain in the sector will yield desirable agricultural results for Uganda considering its agricultural potential.

Education level of the individual played an important role in the willingness to pay for extension services for both crop as well as animal husbandry. Increasing education level was associated with increasing willingness to pay for extension services. Among household heads

that had attained tertiary level of education, 52% and 62% were willing to pay for extension services in crop and animal husbandry respectively as compared to 27% and 32.4% among those with no formal education at all. Household head that had attained tertiary level of education had 20.7 and 26.7% increased probability of willingness to pay for crop and animal husbandry respectively as compared to those with no formal education. The more educated people are more enlighten about the importance of the extension services unlike people with little formal education.

Availability of relevant information on topical issues of concern affects the willingness to pay and stated preference. With provision of the information on biopower energy on focus group survey in Alabana, WTP for a premium on biopower changed among participate on the focus group (Hite, et. al. 2008). Factors that affected change in perception on organic farming among agricultural professionals were knowledge, experience, education, occupational effects and attitudes on the individual aspects of organic agriculture. Agricultural professionals with increased knowledge and experience were more likely to think favourably about organic agriculture (Wheeler, 2009). Chebil and other (2009) report of education being among factor influencing farmers willingness to adopt salt-tolerant forage crops in Tunisia.

Among the farmers that preferred to receive the information through the mass media, 39 and 43% were willing to pay for extension services in crop and animal husbandry respectively as compared to 27 and 34% among those who preferred to access the information through other means. The results of the regression analysis reveals that farmers who preferred accessing information through group meeting with extension workers had 13.4% and 8.6% increased probability of willingness to pay for crop and animal husbandry extension services respectively. This could be attributed to the fact that knowledge in crop husbandry is better understood when the farmers are trained in groups as compared to the case with in animal husbandry. Animal husbandry requires information which maybe case specific and is effectively delivered when the need arises (Kyomugisha, 2008; Tambi, et al. 1999).

Other forms of access to information especially mass media may be inappropriate with farmers due to its lack of contact, non-participatory, and may be deficient in addressing farmers' problems. Farmers' education levels where 80% and 78% of farmer involved in crop and animal husbandry respectively had less than sufficient basic primary education (see Table 1)

Table 4: Average amount to be paid by background characteristics of the farmer

Variable	**Crop husbandry(n=1,891)**		**Animal husbandry(n=1,327)**	
Sex	Average	**p-value**	**Average**	**p-value**
Female	3,020	0.033**	3,169	0.080
Male	3,614		3,814	
Marital status				
Married	3,446		3,664	
Single	5,898	<0.001**	4,154	0.867
Divorced/separated	3,485		4,023	
Widowed	3,026		3,517	
Residence				
Urban	4,964	0.008**	7,898	<0.001**
Rural	3,426		3,522	
Education level				
None	3,391		4,208	
P1-p4	3,336		3,435	
P5-p7	3,145	0.008**	3,192	0.026**

O'level	4,002		3,927	
A' level	3,678		5,191	
Tertiary	4,862		4,718	
Distance to nearest road				
<=2km	3,712		3,785	
2.1-5km	3,196	0.103	3,602	0.770
5+km	3,265		3,546	
Age				
15-24	4,525		3,856	
25-34	3,432		3,668	
35-44	3,495	0.060	3,350	0.635
45-54	3,185		3,776	
55+	3,352		4,021	
Household size				
1-3	3,457		3,769	
4-6	3,592	0.716	3,733	0.810
7+	3,375		3,540	
Region				
Central	4,418		4,431	
Eastern	2,262	<0.001	2,248	<0.001
Northern	3,119		3,848	
Western	4,270		4,196	

implying that the mass media would be limited in effectiveness. Designing an information dissemination system that allows farmers to learn through seeing or doing would be the most appropriate, hence farmers understand their position and demand for an intervention that responds to their socio-economic characteristics. Coincidence between farmers' choice of the access to extension services and their socio-economic characteristic justify consultation before designing interventions for them.

Significance differences were observed on willingness to pay among regions. Farmers in Central Regions showed more willingness to pay for extension services be they on crop or animal husbandry. Willingness to pay decreased by 9%, 8% and 20% as one moved Eastern, Northern and Western regions respectively among crop husbandry farmers. Among livestock farmers the willingness to pay decreased to 14%, 4%, and 24% as one considered farmers in Eastern, Northern and Western respectively. The higher willingness to pay for extension services is associated with the market oriented farming enterprises due to access to major urban centres including Kampala, Masaka, Entebbe, Mukono and Jinja. It also need to be remembered agricultural sector development has favoured the region ever since colonization and even the political crisis of the 1970s and 1980s didn't completely disrupt the agricultural development activities in the region (Reinnikha and Collier, 2001).

Amount farmers are willing to pay by agricultural activity

On average farmers were willing to pay approximately Uganda shillings 3,500((±4,961**)** for crop husbandry extension services while Uganda shillings 3,700((±5,397) for extension services in animal husbandry. The average amounts farmers were willing to be paid for crop husbandry as well as animal husbandry range between Uganda shillings 100 and 60,000. . The average for the crop husbandry extension services was slightly lower than that of the animal husbandry. However, in both cases there were wide variations in the amounts farmers were willing to pay as predicted by the standard deviations (SD). The variations were attributed to inequalities that

exist among farmers. Table 4 shows the average amounts and p-value for Analysis of Variance (ANOVA) farmers were willing to pay.

The analysis of variance show that there were differences in average amounts farmers were willing to by sex, marital status, residence, education level and age for crop husbandry. Sex, residence and education were influenced the amounts animal husbandry farmers were willing to pay for extension services. A Poisson regression model was fitted for each of the agricultural activities i.e. crop and animal husbandry to aid in predicting willing to pay for each of the category. On average crop husbandry farmers were willing to pay Uganda shillings 3,400(SD±784) with the minimum of 2,300 and maximum of 9,200. Farmers involved in animal husbandry, on average were willing to pay 3,700 (SD±995) with minimum of 2,600 and maximum of 10,100.

Conclusions and recommendations

This paper estimated the farmers' willingness to pay for extension services and how much they are willing to pay by agricultural services. The paper established that about 35% and 40 percent of the farmers were willing to pay on average UGX 3,400 and 3,700 for extension services in crop and animal husbandry respectively. Considering the low productivity recorded in the country against research finding, the recorded demand for extension services may be low than anticipated. It may be that farmers don't have an understanding of potential benefits they stand again if they adopt the elite agricultural technologies. Government and other development agencies should endevour to educate farmers on the expected benefits of extension services to improve demand for the services and ensure the amount farmers dedicate for extension allows sustainable private sector engagement in the services.

The study also established that sex, age, education level and preferred means to receive extension services are key farmer attributes influencing the willingness to pay for the services. For successful intervention any extension services provider should taken farmers with such characteristics as their services will be appreciated. Farmers with such characteristics should act as innovators upon which others could come and learn from them. The benefits of technologies adaptation should be domiciled at these farmers' farms where other could come and learn. Central and Western regions farmers are more ready for extension services than other regions due to their agricultural systems that are markets oriented. Extension services should be rolled out in these areas as efforts to educate farmers takes place in the entire country.

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