

# Analysis of Willingness to Pay for Agricultural Extension Services by Rural Small-scale Fish and Crops Producers in Kogi State, North central Nigeria: Imperative for Sustainable Agricultural Development

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**ABSTRACT---** *Scholars have advocated cost sharing approaches to sustainable agricultural extension services in Nigeria due to poor funding. This study was conducted in Kogi state of Nigeria to: describe the socioeconomic characteristics of small scale farm families, identify types of extension services provided, estimate the amount the farmers were willing to pay for agricultural extension services and examine the determinants of this amount. Data for the 2009 farming season were obtained from 288 respondents and analyzed using descriptive statistics and OLS regression. Results revealed that the average annual household income of the farmers was 1109.75 USD i.e. 0.44USD/head/day. Furthermore, the farm households engaged in varying combinations of agricultural production and enjoyed a number of extension services but have little confidence in the present extension system. They are willing to pay an average of 1.8 USD per month as counterpart funds for extension delivery. This amount is small compared to the enormous financial requirements of an extension delivery system but is likely to increase with education ( $t=1.78$ ), income ( $t=2.54$ ), farm size (2.28), confidence in the present system of extension delivery ( $t=5.55$ ), and extension contacts ( $t=8.19$ ). Increased access to farmland, education opportunities and improvement in the present extension delivery systems are recommended.*

**Keywords----** Agriculture, extension, delivery, system, funding, cost sharing, willingness to pay

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## 1. INTRODUCTION

Fish production is emerging as an important part of Nigeria's agriculture. The fisheries subsector contributes about 4 percent to the total agricultural GDP. The prospect of fish production is high owing to the abundance of water bodies and human resources yet the level of production leaves much to be desired. Domestic production hovers around 24% of the domestic requirements creating a huge pressure on foreign reserves. The irony is that the aquacultural sector which currently contributes about 6% of total domestic production could provide over 90% of the domestic fish need [1]. Traditionally, the crops sector provides the bulk of the agricultural output but it has largely remained in the hands of small holder farmers. The combination of crops production with some form of fish production is important in safeguarding against total loss and increasing income. While those living close to water bodies have been practicing this for long, aquaculture is gradually some relevance among farmers who are far from rivers. What is common to all combinations of agricultural production in Nigerian in low level of production and productivity [2,3,4].

The role of agriculture in the welfare of rural Nigerians cannot be overemphasized. In the 21<sup>st</sup> century, agriculture remains fundamental to economic growth, poverty alleviation, improvement in rural livelihood, and environmental sustainability[5]. To fulfill this mandate, agriculture has to advance beyond its present primitive state. It requires technological, organizational and institutional innovations. These innovations required for increased production/productivity are channeled through the extension delivery system. In Nigeria, the extension delivery system is largely a government establishment.

Successful execution of agricultural extension mandate is strongly dependent on adequate and timely funding. The major agricultural extension service financiers in Nigeria currently are the federal and state governments-supported through loans and grants from the World Bank, International Fund for Agricultural Development (IFAD) and African Development Bank (ADB) [6]. Nigeria's Agricultural extension service has been experiencing dwindling funding from

government in the last three decades [6,7,8]. This is very apparent in the sliding performances of the state wide ADPs. Attempts by governments in Nigeria to initiate agricultural programmes in order to achieve food security have failed mainly due to inadequate funding, and in some cases, lack of commitment in the implementation of such programmes [9]. Commitment to funding of programmes usually proves problematic as soon as external bodies discontinue with funding. [10] reported that the Agricultural Development program (ADP) for example, has suffered serious setbacks due to funding instability following the expiration of the counterpart funding arrangements.

In Nigeria, the ADPs serve as the conduit between agricultural research institutions and farmers. While research institutes continue to generate relevant, appropriate, and affordable technologies, the capacity of extension organizations to effectively transfer them to the farmers has been impaired by inadequate and uncertain funding [8,11].

The resultant effects of poor funding of agricultural extension service are mass retrenchment of field extension workers, stagnation of both field and supervisory workers, low morale of staff, a wide gap between agricultural technology generation and technology adoption, resulting in decreased agricultural production [6].

Consequently, scholars like [8,9] have advocated for various alternative funding systems for agricultural extension service in Nigeria and other developing Nations. One of these is cost sharing. Cost sharing in agriculture involves government-farmer partnership in the funding of agricultural extensions service and technology delivery. It has been described by [12] as a tenable privatization policy towards providing adequate and stable funding for agricultural service in Nigeria.

This arrangement has certain benefits. According to [13] local cost sharing and co-financing arrangement are aimed at strengthening collaboration through joint responsibility by building on the comparative advantage of the stake holders. Also, as a participatory methodology, it will promote innovation ownership, increase adoption rate and acceptability of new technologies. Furthermore, it will enhance linkages between the various stakeholders such as the researchers, farmers, extension workers and the input producers. Another benefit is that it has the advantage of promoting institutional pluralism, accountability to clientele and efficiency in operation [5].

The most challenging policy issue facing the agricultural extension service today is to secure a stable source of funding [9]. The need for improved and expanded extension activities has led to a number of strategies for changing the way extension services are delivered. These alternative patterns call for a change in the financing and delivery of public services with the idea of the users charge emerging as one of the most probable steps in the adjustment programmes.

However, the present socio-economic conditions of the farmer are such that they cannot afford private extension services. Thus full commercialization of extension services is not possible at present since majority of Nigerian farmers do not have the capital base to pay fully for extension services. It is on this basis that the need for participatory (cost sharing) approach to financing agricultural extension services is advocated [14,15]. According to World Bank [5], in introducing various co-financing arrangements like producer-controlled levy on agricultural products, fee-for-service arrangements and cost sharing arrangement, only the large producers might be able to fully pay for services.

While willingness-to-pay is a function of attitudes, political sensitivities and social perceptions, ability-to-pay is a fact of social and economic condition [16]. Thus cost sharing arrangement should be based on an informed understanding of the peculiarities of a people. University administrations in Nigeria have witnessed crises due to their failure to recognize this fact.

It is therefore imperative to know how much farmers would pay as their own part of the shared cost for extension services, considering their occupational and socioeconomic characteristics. Studies on cost sharing as alternatives to funding extension services in Nigeria are few as this is a relatively new concept in the country. Again, these studies have left an information gap in that they either dwelt on the generality of Nigerian farmers as in [12] or on a select group of farmers participating in a special intervention programme [9]. This study specifically dwelt on the generality of Kogi state small holder farmers and sought to bring to light the prospects of introducing the cost sharing alternative. Kogi state of Nigeria is an agrarian state in north central Nigeria. It is one of the poorest states in country. Poverty in the agricultural communities is pervasive. The level of agricultural development in the state and country is not substantially different from those of third world countries. It is thus our informed belief that the findings in this study can also be useful to policy makers in third world countries where the agricultural sector engages the bulk of the poor population.

In attempting to explore the cost sharing approach as an alternative means of funding agricultural extension delivery in the study area, the following questions were raised: What are the socioeconomic characteristics of the farmers? What type of services do they enjoy from the extension system? How much confidence do the farmers have in the present extension delivery system? Can cost sharing be successfully introduced in the study area? How much would farmers be willing to pay for Agricultural Extension services? What factors determine their willingness to pay this amount, and what institutional arrangement for payment would they prefer? To answer these questions, the following objectives of the study were sought:

(i) describe the socio-economic characteristics of farmers in the study area (ii) assess the perceptions of farmers on agricultural extension services (iii) determine the amount they are willing to pay as counterpart funding for agricultural extension services in a month (iv) determine the factors influencing this amount and (v) explore the preferences of the farmers on institutional arrangement for this payment.

The next section of this work dwells on a brief conceptual frame work and literature review. Thereafter, methodological issues are considered. The next section deals with the results and discussion while the final section relays the conclusion and recommendations.

## **2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW**

The theoretical concepts that influence reform and the frame work under which costs sharing can be incorporated are the transaction cost theory. The transaction costs theory [17] compares the cost of planning, adapting, monitoring, coordination, and enforcement of contracts under alternative governance structures. Some transactions are better suited to market type arrangement [18] in order to improve efficiency of service delivery.

There has been significant increase in transaction cost associated with the agricultural technology delivery system. In recent years there has been marked increase in budgetary provisions due to increased responsibility. However, corruption of government official and, poor as well as unstable funding have worked against the payment of extension agents for some months. There is also the issue of inadequacy of materials and transportation facilities. Furthermore, increased transaction costs coupled with dwindling funding have impacted negatively on the extension delivery system with concomitant decrease in food production. A way out of this ugly situation may lie on the path of cost sharing. Cost sharing will make the market competitive with the involvement of private profit agencies, thereby lowering transaction cost.[9].

Most modern technologies and information accompanying them are classified as private goods because of their high level of rivalry and excludability [19]. The nature of information requires therefore that cost sharing should be made in such a way that fees are charged only for those information that are private. Making farmers pay some amount for extension services can encourage them to exercise their right as information consumers, thereby ensuring programme effectiveness. A demand-driven technology provision scenario will generally transmit to efficient technology delivery to farmers, increased output and poverty reduction through the ensuing competitive market features.

The concept of cost sharing of Agricultural technology transfer in Nigeria has been explored by [12] who found that the majority of the farmers and extension staff in all the six geopolitical zones had positive perceptions towards cost sharing of agricultural technology transfer. In his research on the attitudes of farmers towards cost sharing in the Fadama I project in Okigwe agricultural zone of Imo State, [10] found that the majority of farmers have strong positive attitude towards the project. In a study of farmer's attitudes towards cost sharing in the Fadama II, project in Kogi State [9] found that majority of Fadama II farmers had strong positive attitude towards the programme.

These works however fell short of analyzing factors likely to influence the amounts farmers were willing to pay as in [16] who applied ANOVA to investigate cost sharing in Nigerian universities system. These scholars found that socioeconomic variables were vital in the implementations of a cost sharing arrangement. In this work, we go further in the agricultural sector to ascertain how much farmers are willing to contribute as counterpart fund for extension delivery system and the factors that influence this amount. Our analysis of factors influencing willingness to pay will however be based on ordinary least square regression which we consider to be a more plausible econometric method.

## **3. METHODOLOGY**

Kogi State is located in North central Nigeria and has a total land area of 28,313.5 km<sup>2</sup>. It consists of a wide stretch of arable land for farming, good grazing ground for livestock and large bodies of water for fishing. The large body of water is sustained by Rivers Niger and Benue which form a confluence in Lokoja, the state capital. In 2006, it had a population of 3,278,487- majority of who are involved in agricultural production. The state is marked with two distinct seasons: the wet season which spans through middle of March to October and the dry season spans through November to February. For the purpose of agricultural development- especially in the area of extension delivery system, it is divided into four agricultural zones.

The sample was spread over the entire state and the sample frame was obtained from the zonal ADP offices. A two stage stratified random sampling method was adopted in selecting the ultimate respondents. In the first stage 2 local government areas were randomly selected from each the four agricultural zones. Then 2 farming communities were randomly selected from each of these local government areas bringing the total number of the farming communities to sixteen. This was followed by the random selection of the ultimate respondents. The number of ultimate respondents selected from the farming communities varied from 15 to 20 depending on the population of farmers in the communities. In all, a total of 300 respondents were selected for questionnaire administration in order to generate the data for analysis. Only 288 copies of the questionnaire were however found valid for analysis.

## Analytical Techniques

Descriptive statistics were used to achieve objectives I, ii, iii and v while OLS regression analysis was used determine the factors influencing the amount the farmers would be willing to pay as their contribution to the cost sharing alternative for financing the extension delivery system (objective iv). The model is specified implicitly as  $Y_i = a + bX_i + e_i$  Where:

$a$ =constant,  $b_s$  = regression coefficients,  $e_i$ =error term,  $Y$  = dependent variable  $X_i$ =Independent variable.

Explicitly, the model is specified as:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + \dots + X_n$$

$Y_i$  = is the dependent variable (a naira measure of how much the farmers are willing to pay for extension services.

$X_1$  = Sex (1= female, 2= male)

$X_2$  = age (in years)

$X_3$  = Educational level (years of schooling)

$X_4$  = Family size (number of family members)

$X_5$  = Annual income (in naira)

$X_6$  = level of confidence in the present system ( 1=low, 2= medium, 3= high)

$X_7$  = Total Farm size (in hectare)

$X_8$  = Membership of farmers' association (1 If the farmer belongs to an association, 0 otherwise)

$X_9$  = Extension contact (number of contact with extension personnel during the last farming session)

## 4. RESULTS AND DISCUSSION

### Summary of descriptive statistics

**Table 1.** Summary statistics of socioeconomic characteristics of respondents.

Variable	Observation	Mean	Std.dev.	Min.	Max.
<b>Age</b>	288	40.51	6.77	22	62
<b>Years of schooling</b>	288	6.89	4.69	0	17
<b>Household size</b>	288	6.74	4.37	2	21
<b>Total Farm size (Ha)</b>	288	1.51	1.08	0.5	5
<b>Agricultural experience</b>	288	13.53	5.81	1	28
<b>Annual income (₦'000)</b>	288	155.37	73.73	45	276
<b>Male: 86%, Female: 14%; Single: 8.3%, Married: 87.5%, Divorced/widowed: 4.2%</b>					

Source: Field survey, 2010.

The Summary of descriptive statistics for the socioeconomic characteristics is presented in Table 1. It indicates that the average age of farmers in the area is 40.5 years. This implies that farmers in the area were, on the average within their productive economic life. Studies have relayed that younger people are likely to be more receptive to innovations. The average number of years spent acquiring formal education was seven. This reveals a low level of education which may not be unrelated with income poverty. Kogi state is the second poorest state and one of the educationally less developed states in Nigeria. Education makes farmers better managers of resources and more receptive to innovations like cost sharing. The table also shows that the average household size for Kogi farmers is about 7. This is close to the national household size of 6. According to [20] large family size may mean more family expenses and fewer funds for agricultural activities. However, [21] relay that influence of family size on availability of funds for agricultural investments is dependent on the age mixes in families. For instance, a family with fewer dependents is more likely to meaningfully engage in cost sharing initiative.

The average farm size was 1.5 (which is a little higher national average of 1.3) revealing small-holder nature of Nigerian farmers. The mean farming experience was 13 years. This reflects the fact that farming is not a new occupation for the people of Kogi state. The average annual income of the farmers was found to be ₦155,365 which is about ₦1,850 per head per month (0.44 USD/head/day; 1 USD = ₦140). This is reflective of a high level of poverty in the area and the

dire need for an enhanced extension delivery system. This is also an important factor in the ability of a farm household to pay for extension services. Farming in the area is male-dominated and most of the farmers are married.

**Table 2.** Farmers' enterprises, services enjoyed, perception of confidence level, and amount farmers are willing to (₦/ pay per month) in a cost sharing arrangement and institutional arrangement for cost sharing.

<b>Variables</b>	<b>Frequency</b>	<b>%</b>
<b>Enterprise (multiple responses)</b>		
Crop production (a)	57	19.8
Animal production (b)	19	6.6
Fish production (c)	12	4.2
a and b	225	78.1
a and c	31	10.8
b and c	12	4.2
a, b, and c	5	1.7
<b>Services type enjoyed (multiple responses)</b>		
Information on inputs	204	70.8
Market Information	137	47.6
Improved techniques	288	100.0
Home economics	170	59.0
Health education	102	35.4
<b>Level of confidence in the present extension delivery system</b>		
Low	109	37.9
Medium	123	42.7
High	56	19.4
Total	288	100.0
<b>Amount (₦) that farmers are willing to pay/month as part of cost for extension services</b>		
100-200	122	42.4
201-300	77	26.7
301-400	35	12.1
401-500	36	12.5
Above 500	18	6.3
Total	288	App=100.0
<b>Mean = ₦263.5</b>		
<b>Preferred Institutional arrangement</b>		
Through Cooperative	154	53.5
Through Consultancy firms	55	8.7
Directly to government	79	37.8
Total	288	100.0

Source: Field survey, 2010.

Table 2 presents the enterprises of the rural farmers, extension services enjoyed, amount farmers are willing to (₦/ pay per month) in a cost sharing arrangement and institutional arrangement for cost sharing. It reveals that majority of the respondents were solely involved with crop production (19.8%) while relatively fewer were involved solely with cash animal production (6.6%) and fish production (4.2%). This low involvement in animal and fish production could be due to the difficulty in acquiring the requisite technical and financial basis needed to operate these enterprises. Most of the respondents combine the enterprises in varying degrees. The traditional practice of combining crop and animal production is prominent (57%). Rural farmers in the area are known to keep some domestic animals to serve as protein sources and or to be used to entertain visitors. In some cases, these animals serve as a quick way of raising money in times of emergency or when the crops have been exhausted. Enterprise combinations involving fish production are relatively lower.

The services rendered by the extension agents in the area to the farmers were captured using multiple responses. This is also presented in Table 2. All the farmers benefited from the introduction of improved techniques in agricultural production. On their perception of the level of confidence in the present delivery system however, the response was on the negative side as only about 19% indicated a high level of confidence. Meanwhile, majority (69.1%) of the farmers would not be willing to pay more than ₦300.00 (2.14 USD) in a month were they to partake in cost sharing in order to fund extension services (Table 2). The average amount they will be willing to pay for extension services is ₦ 263.5 (1.8 USD). This low amount may not be unconnected with their low monthly income level. The farmers indicated that they would prefer to have the cost sharing arrangement coordinated through their cooperative societies or consultants rather than having to deal directly with the government.

**Factors influencing the amount farmers would pay in a cost sharing arrangement.**

**Table 3.**Regression results for factors influencing the amount farmers are willing to pay for extension services in a cost sharing arrangement.

<b>Variable</b>	<b>Coefficient</b>	<b>t – ratio</b>
<b>Sex</b>	1.172	0.63
<b>Age</b>	-0.114	-0.70
<b>Education</b>	0.029	1.78**
<b>Family size</b>	-0.023	-1.04
<b>Annual income</b>	0.190	2.54**
<b>Level of confidence</b>	0.328	5.55***
<b>Total Farm size(ha)</b>	0.125	2.28**
<b>Membership of association</b>	0.420	1.03
<b>Extension contact</b>	9.080	8.19***
<b>R<sup>2</sup>= 0.53, adjusted R<sup>2</sup>= 0.45, F-ratio=10.40 (0.000)</b>		

Source: Field survey, 2010. \*, \*\*, \*\*\* = significant at 10%, 5%, 1% respectively.

Regression results for factors influencing the amount farmers are willing to pay for extension services in a cost sharing arrangement is presented in Table 3. Sex of household head has a positive relationship with the amount farmers are willing to pay for extension services. Though without a robust t-ratio, the relationship suggests that male headed farm households are likely to pay more for agricultural extension services in the event of a cost sharing arrangement. The relationship of the dependent variable with age is however negative and insignificant. Positive relationship between age and the amount parents were willing to pay for education of their children has however been found by [16].

Furthermore, the table reveals that the level of education has significant influence on the amount farmers in the area will be willing to pay in a cost sharing arrangement. Education makes the adoption of innovation easier due to the exposure and the ability to decipher information it confers. Education is thought to create a favourable mental attitude towards for the acceptance of new practices [22]. Family size, as expected was negatively signed- though the t- ratio was not robust. Annual income was found to be positively related to the amount farmers are willing to pay in the event of cost sharing. This relationship is significant. More income means that a farmer has more funds to spend and can decide to experiment with the idea of sharing the cost of extension delivery. [16] also found that income level was a key determinant of the amounts parents were willing to pay in a cost sharing arrangement for the education of their children.

The relationship between farm size and the dependent variable is positive and significant. A large farm size makes commercialization/mechanization feasible and farmers will be more willing to pay for extension services if they have large farm sizes in order to also enjoy economies of scale. It has been shown that farmers with larger farm sizes are more likely to adopt agricultural innovations [23]. Membership of association was found to have an insignificant positive relationship with the independent variable.

Extension contact has a positive relationship with the amount farmers are willing to pay for extension services and a robust t ratio. A high number of contacts with extension staff would boost the confidence of the farmer to engage in a more business like relationship with the extension staff. The confidence emerges from the fact that in a business relationship, the farmer can have greater or at least a regular level of access to the extension personnel. Related to the number of extension contact is the level of confidence the farmers have in the extension workers based on ongoing interaction. This variable also has a robust positive relationship with the amount farmers are willing to pay should extension services be partly commercialized. [16] relayed that quality of service delivery was a key factor influencing the willingness to partake in a cost sharing arrangement in the education sector.

## 5. CONCLUSION AND RECOMMENDATIONS

The study was conducted in Kogi state of Nigeria to bring to light the perception of small scale rural farmers of extension delivery system and the amount they would be willing to pay as their contribution in the event that a cost sharing arrangement is put in place. We found that these farmers enjoy a number of extension services but, have a low confidence on the present extension delivery system and are willing to pay a very low amount of money as contribution to funding of extension services. Education, income, farm size, confidence in the present system of extension delivery as well as number of contacts with extension personnel in the previous farming season were found to be key positive determinants of the amount farmers are willing to pay for extension services. While the cost sharing alternative to sustainable extension delivery system is a viable one, there is still a lot of work to be done in order to get the farmers to pay a substantial amount in Kogi state. Efforts should therefore be made to influence these variables in order to facilitate the decision to pay a higher amount. For instance, increased confidence in the present delivery system will elucidate the desire to pay a higher amount of money as counterpart fund in extension delivery system.

Based on the findings in this work, the following recommendations are made:

1. An effective adult education programme should be pursued in order to increase the farmers' level of education.
2. The provision of cheap and affordable credit to farmers that will assist them in paying for extension services should also be pursued since their incomes are generally low.
3. Legislation that will make the acquisition of as much land as a farmer can put into productive use possible should also be put in place.
4. Finally, and most importantly, the present system should work on improving service delivery to increase confidence level as this could encourage farmers to pay more in the event of a cost sharing arrangement

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