



FACTORS INFLUENCING POTATO FARMER'S SATISFACTION WITH THE QUALITY OF AGRICULTURAL EXTENSION SERVICES IN PLATEAU STATE, NIGERIA

Bedima, C. G., Garba, M. and Abdullahi, S.

Department of Agricultural Extension and Rural Development
Abubakar Tafawa Balewa University Bauchi

Corresponding Author's Email: chalibedagonzuk95@gmail.com, **GSM:** 08130637695

ABSTRACT

The study examined the factors influencing potato farmers' satisfaction with quality of agricultural extension services in Plateau State, Nigeria. Multi-stage sampling technique was employed in selecting 209 farmers. Data were collected through the administration of structured questionnaires and analyzed using both descriptive and inferential statistics. The results showed that majority (63.4%, 79.7% and 64.9%) of the Irish potato farmers were male, married and had attended tertiary levels of education respectively. The results also reveal that majority (70.8%, 67.8% and 67.3%) of the Irish potato farmers had a farm size of 0.5-2.6ha, 1-10 persons per household and were within the age bracket of 32-45 years respectively. The result also shows that Irish potato farmers were highly satisfied with method of farmers training (2.7), provision of inputs (2.7) and relevance of innovation to farmers (3.1). On the other hand, the result also shows that sex ($r = 6.680$), marital status ($r = 6.513$) and membership of association ($r = 7.055$) were significant ($P < 0.01$) in influencing Irish potato farmers satisfaction with extension service delivery. The study further reveals that inadequate training to farmers (93.6%), financial constraints (88.6%) and poor farmers outreach (68.8%) were the major constraints to Irish potato farmers satisfaction with extension services delivery. The study concludes that sex, marital status and membership of associations were the factors influencing Irish potato farmers satisfaction with extension service delivery. The study recommends that Irish potato farmers should form and actively participate in farmers' cooperatives/association to increase their access to extension services and credit, government should assist Irish potato farmers by providing inputs at subsidized rates.

Keywords: Irish potato, Satisfaction, Extension services and Delivery.

INTRODUCTION

Agriculture plays a fundamental role in economic growth, enhancing food security, poverty reduction and rural development. It is the main source of income for about 2.5 billion people in the developing world (Wandji *et al.*, 2021). It has long been the cornerstone of Nigeria's economy, providing sustenance and livelihoods to a significant portion of its population. The country's agricultural sector contributes substantially to its Gross Domestic Product (GDP), and it is a vital source of employment, particularly in rural areas (World Bank, 2019). Agriculture is a complicated system, closely related to natural systems and social systems. Agriculture Knowledge System is a collection of actors in research, extension services, education and training and support systems that act on the knowledge of farmers and generate innovations in response to problems and opportunities, desired outcomes, system drivers and regulatory policies and institutions (Rudman, 2020). Agricultural extension is an agriculture-based informal education, training, capacity building, and knowledge sharing rendered to farmers or prospective farmers. These services are done to improve farming systems, techniques, and performances in livelihood standards and environmental



sustainability (Ovharhe *et al.*, 2020). Irish potato (*Solanum tuberosum* L.) is the world's fourth largest food crop in terms of production after maize, rice and wheat Food and Agricultural Organization Statistics (FAOSTAT, 2016). It is thus, the largest non-cereal food crop cultivated in the world after it was first cultivated in South America and its global output is estimated at 388 million metric tonnes and the yield per hectare stands at 20,110.8kg/ha (FAOSTAT, 2019). In Africa, potato output stands at 25 million metric tonnes with yield per hectare of 13,215.4 kg/ha (Zhang *et al.*, 2016).

Despite the importance of agricultural extension services, various factors may influence the satisfaction of potato farmers in Plateau State with the quality and effectiveness of these services. Socio-economic characteristics, including education, age, and landholding size, can play a crucial role in shaping farmers' interactions with extension services (Olatunji, 2017). The methods and channels through which extension services are delivered also vary, and the accessibility and relevance of these methods may significantly impact farmer satisfaction (Afolayan, 2019). The satisfaction of potato farmers with the quality of agricultural extension services is essential for their prosperity and the overall agricultural development. Nevertheless, numerous factors may be undermining the satisfaction of these farmers with the services provided to them. While there is a growing body of literature on agricultural extension services in Nigeria, particularly in the context of various crops, there are specific research gaps that this study aims to fill: limited focus on potato farming as many studies on agricultural extension services in Nigeria have primarily focused on staple crops like maize, rice, and cassava. This study will address this gap by specifically examining the satisfaction of potato farmers with extension services, thereby contributing valuable insights to the existing knowledge base. The research directly aligns with poverty alleviation efforts. Plateau State, like many other regions in Nigeria, faces challenges related to rural poverty. Enhancing the satisfaction of potato farmers with extension services can lead to increased agricultural productivity and higher incomes for farmers. The outcome of the research will provide information to policy makers in the area of agricultural extension. It will help in fashioning out good agricultural extension policies. It will also add to existing literature and serve as an opening for further academic research and serve as a reference material for research of this nature. The study was carried out to analyse the factors influencing potato farmer's satisfaction with the quality of agricultural extension services in Plateau State, Nigeria. The specific objective were to;

- i. describe the socio-economic characteristics of potato farmers;
- ii. assess the level of satisfaction of potato farmers with agricultural extension services;
- iii. determine the factors that influencing potato farmers' satisfaction with extension service delivery;
- iv. describe the constraints to farmers' satisfaction with agricultural extension services in the study area.

METHODOLOGY

The Study Area

Plateau State is located in the north-central zone of Nigeria and located between latitude 8°24' N and 10°30' N and longitude 8°32' E and 10°38' E (Plateau State, 2022). It has an estimated population of 3,178,712 (NPC 2006), and based on the annual population growth rate of 3.2%, the projected population of the State is about 4,864,480 million people in 2023 and 4,807,509 people in 2023. The State has a landmass of 30, 913 square kilometres.

Plateau State has a near temperate climate with an average temperature of between 13°C and 22°C, (FAO, 2019). Based on soils, climate and typical farming systems, the state is classified into three distinct agro-ecological zones, namely; the moist lowland savannah, which

falls within southern Guinea and Savannah rain forest, having extensive low-lying flat land with high water holding capacity favourable for the production of rice, yam, cassava, melon and groundnut. The mid-latitude zone falls within 500-1,500 meters above sea level, with soils that are sandy clay and heavy rains, while predominantly maize, Irish potato, and assorted vegetables and produced (FAO, 2019).

Plateau State falls within the Northern Guinea Savannah zone and characterized by two distinct wet and dry seasons. The wet season starts in late April and ends in October, while the dry season starts in November and ends mid-April. The mean annual rainfall is about 1450mm, and relative humidity of 60%. The mean monthly maximum and minimum temperatures are 20°C and 15°C, respectively (FAO, 2019). It is primarily an agrarian community. The State has a land mass of 30,913 square km or 6,678,162 acres with two thirds of the land area is arable (National Bureau of Statistics, 2016).

Livestock such as cattle, sheep and goats were also found in the State due to its mostly open grass land which suitable for grazing.

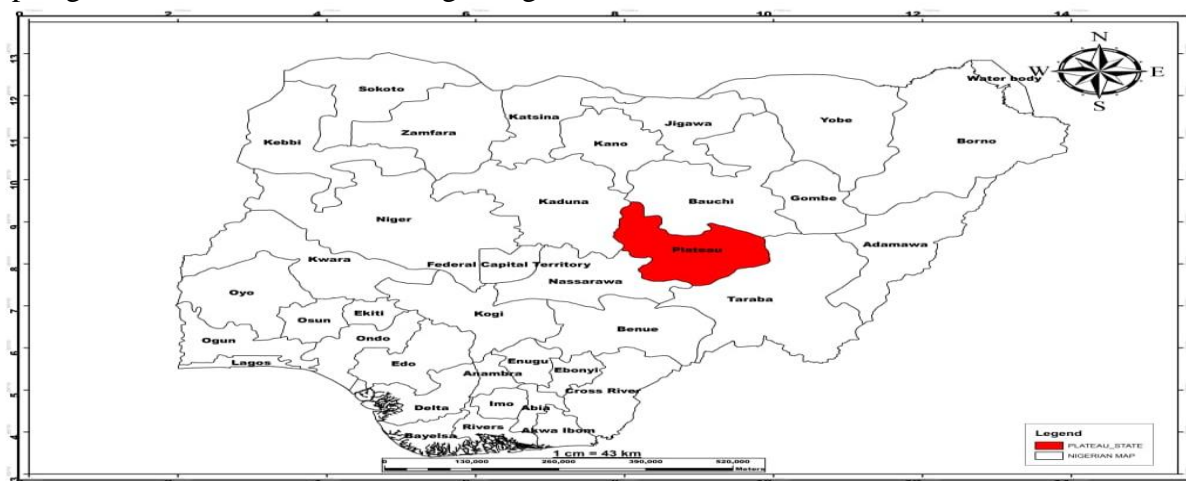


Figure 1: Map of Nigeria Showing Plateau State

Sampling Technique and Sample Size

A multi-stage sampling technique was used in the selection of respondents for the study. The first stage involved the purposive selection of two Local Governments Areas (LGAs). These are Barikin-Ladi and Bokkos based on predominance of irish potato production among the farmers. The second stage involved also purposive selection of four (4) districts from each of the selected LGA making a total of eight (8) districts. These include Fan, Foron, Heipang and Ropp from Barikin-Ladi while the selected districts in Bokkos LGA are Bokkos, Daffo, Manguna and Sha based on the intensity of irish potato production. The third stage involved a proportionate and random selection of (96) and (113) of irish potato farmers from Barikn-Ladi and Bokkos LGA making a total of 209 respondents. The selection of these respondents was assisted by a sampling frame of irish potato farmers obtained from Pleateau State Agricultural Development Programme (PSADP) as shown in Table 1.

Table 1: Sampling Size Selection Plan

| LGAs | Districts | Sample frame | Sample Size |
|--------------|-----------|--------------|-------------|
| Barikin-Ladi | Fan | 178 | 14 |
| | Foron | 65 | 5 |
| | Heipang | 380 | 30 |
| | Kopp | 589 | 47 |
| Sub-total | | 1, 212 | 96 |
| Bokkos | Bokkos | 1,980 | 59 |
| | Daffo | 950 | 28 |
| | Manguna | 617 | 19 |
| | Sha | 240 | 7 |
| Sub-total | | 3, 787 | 113 |
| Total | | 4, 999 | 209 |

Source: PSADP, 2023

Method of Data Collection

Data were collected through the administration of structured questionnaire to respondents randomly sampled from the study area.

Method of Data Analysis

Data were analysed using both descriptive and inferential statistics. Descriptive statistics such as frequency distribution table, mean and mean score were used to achieve objective i, ii, and iv. On the others hand inferential statistics such as regression analysis was used to achieve objective iii.

Model Specification

Multiple regression analysis was used to determine the factors influencing the level of potato farmers' satisfaction with extension services in the study area. The regression model used is specified as;

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + \dots + b_{14}X_{14} + e \quad \dots (1)$$

Where;

Y = Satisfaction (1= Satisfied, 2= moderately satisfied, 3=undecided and 4= Not satisfied)

β_1 to β_6 = Coefficients to be estimated;

α = Constant term;

e_i = Error term;

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

X_2 = Age (years)

X_3 = Marital status (1=single, 2=married, 3=divorced, 4=widowed)

X_4 = Household size (number of persons)

X_5 = Farm size (ha)

X_6 = Farming experience (years)

X_7 = Educational level (1=primary, 2=secondary, 3=tertiary, 4=adult 5=not educated)

X_8 = Membership of association (1=yes, 2=no)

X_9 = Other occupation (1=crop farming, 2=livestock rearing, 3=civil servant, 4=artisan, 5=trading, 6=retiree, 7=agro-marketing)

X_{10} = Land ownership (1=inheritance, 2=purchase, 3=communal, 4=rent, 5=leased, 6=gift, 7=government)

X_{11} = Access to credit (1=yes, 2=no)

X_{12} = Potato yield (in bags)

X_{13} = Annual income (₦)

X_{14} = Access to extension (1=yes, 2=no)



RESULT AND DISCUSSION

Socioeconomic Characteristics of Irish Potato Farmers

The result from Table 2 depicts the socioeconomic characteristics of the respondents. The result showed that majority (63%) of the respondents were male, while 37% of the respondents were female. This implies that Irish potato farming is dominated by male farmers which could be attributed to the tedious nature of activities involved in Irish potato farming in the study area. This agrees with Ekwe (2019) further reported that most of the farmers were male in Plateau State. The finding also shows that 41.1% of the respondents were within the ages of 32-38 years, while 26.2% and 20.3% of the respondents were within the ages of 39-45 and 25-31 years, respectively. The finding further revealed that 9.9% and 2.5% of the respondents were within the ages of 46-52 and 53- and above years, respectively. This implies that most of the respondents were within their active ages of production in agriculture, which translate that they will be willing to adopt technologies and innovations to improve their level of productivity which in turn will increase their level of income and improve their standard of living. This is in tandem with Ekwe (2019) who found that majority of respondents were in their youthful age in the Study area. The result was also affirmed by Wassihun *et al.* (2019) who also found that Irish potato farmers were mostly male and aged 47 years on the average.

The results further showed that majority (79.7%) of the respondents were married, while 11.4% and 8.9% of the respondents were single and divorced, respectively. This finding implies that majority of the Irish potato farmers were married and had certain level of responsibility which could motivate their intention to adopt production technologies. The result also shows that 46% of the respondents had a household size of 6-10 persons, while 21.8%, 11.4% 10.9% and 9.9% of the respondents had a household size of 1-5, 21 and above 16-20 and 11-15 persons, respectively.



Table 2: Distribution of Irish Potato Farmers According to their Socioeconomic Characteristics (n=202)

| Variables | Frequency | Percentage |
|---------------------------|-----------|------------|
| Sex | | |
| Male | 128 | 63.4 |
| Female | 74 | 36.6 |
| Age | | |
| 25-31 | 41 | 20.3 |
| 32-38 | 83 | 41.1 |
| 39-45 | 53 | 26.2 |
| 46-52 | 5 | 2.5 |
| 53 and above | 20 | 9.9 |
| Marital status | | |
| Single | 23 | 11.4 |
| Married | 161 | 79.7 |
| Divorced | 18 | 8.9 |
| Household size | | |
| 1-5 | 44 | 21.8 |
| 6-10 | 93 | 46.0 |
| 11-15 | 20 | 9.9 |
| 16-20 | 22 | 10.9 |
| 21 and above | 23 | 11.4 |
| Farm size | | |
| 0.5-1.5 | 78 | 38.6 |
| 1.6-2.6 | 65 | 32.2 |
| 2.7-3.7 | 43 | 21.3 |
| 3.8-4.8 | - | - |
| 4.9 and above | 16 | 7.9 |
| Farming experience | | |
| 2-6 | 65 | 32.2 |
| 7-11 | 69 | 34.2 |
| 12-16 | 53 | 26.2 |
| 17-21 | 14 | 6.9 |
| 22 and above | 1 | .5 |
| Educational level | | |
| Primary | 7 | 3.5 |
| Secondary | 55 | 27.2 |
| Tertiary | 131 | 64.9 |
| Not educated | 9 | 4.5 |
| Membership of association | | |
| Yes | 31 | 15.3 |
| No | 171 | 84.7 |

Source: Field Survey, 2024

This implies that most of the Irish potato farmers had relatively a large household size which provides a cheap source of labour for production in the study area. The result also showed that 38.6% and 32.2% of the respondents had a farm size of 0.5-1.5ha and 1.6-2.6ha, while 21.3% of the respondents had a farm size of 2.7-3.7ha. However, 7.9% of the respondents



had a farm size of 4.9ha and above in the study area. This implies that majority of the respondents were relatively small scale farmers producing Irish potato for family sustenance in the study area.

The result further reveals that 34.2% and 32.2% of the respondents had 7-11 years and 2-6 years of farming experience, while 26.2% of the respondents had 12-16 years of farming experience. In addition, 6.9% and 0.5% of the respondents had 17-21 years and 22 or above years of farming experience in the study area. The finding translates that most of the respondents had relatively high number of years in Irish potato farming which helps to increase their adoption and risk management. In a related study Arimi (2019) opined that higher number of years of experience in farming helps a farmer to understand and tackle the complications of the enterprise. Similarly, Kabir and Ranais (2012) reported that farming experience increases the likelihood of adoption of best practices by experienced farmers since they have both knowledge and adequate information. The result also shows that majority (64.9%) of the respondents had attended tertiary levels of education, while 27.2%, 4.5% and 3.5% of the respondents had attended secondary, no formal and primary education, respectively. This implies that most of the respondents had attended one form of education or another which helps in Irish potato farmers' ability to understand and adopt technologies related to their farming in the study area. The result also shows that majority (84.7%) of the respondents were not members of any association, while 15.3% of the respondents belong to one form of association or another. This implies that most of the respondents were not members of any association which shows that Irish potato farmers may have little or no access to farm inputs and access to extension which members of association benefits in the study area.

Perceived Level of Satisfaction of Irish Potato Farmers to Extension Service

The result in Table 3 describe the level of satisfaction on extension service among respondents. The finding reveals that respondents were highly satisfied with method of farmers training (\bar{X} =2.7), provision of farm inputs (\bar{X} =2.7) and technologies of innovations to farmers (\bar{X} =3.1) as indicated by the mean scores above the threshold value of 2.5 in the study area.

Table 3: Distribution of Irish Potato Farmers According to their Level of Satisfaction on Extension Services (n=202)

| Variables | Mean | Remark |
|--------------------------------------|------|--------|
| Types of farmers training | 2.7 | High |
| Provision of inputs | 2.7 | High |
| Relevance of technologies to farmers | 3.1 | High |
| Advisory role | 2.9 | High |
| Procedure of technology delivery | 2.9 | High |
| Mastering of subject matter | 2.7 | High |
| Eloquence and fluency of speech | 2.5 | High |
| Demonstration of technology | 2.4 | Low |

Source: Field survey, 2024

The result also shows that the farmers were satisfied with advisory service roles (\bar{X} =2.9), procedures of technology delivery (\bar{X} =2.9), mastering of subject matter (\bar{X} =2.7) and eloquence/fluency of speech (\bar{X} =2.5) as indicated by mean scores above the threshold value of 2.5. On the other hand, the result shows that respondents were not satisfied with demonstration of technology (\bar{X} =2.4) as indicated by the mean score less than the mean threshold value of 2.5. This finding implies that most of the respondents were highly satisfied with extension service delivery, this might be due to the fact that, majority of the respondents

had no access to extension delivery procedure in the study area. Tafida and Sa'adu (2019), also reported that, access to innovations, skills and modern inputs are linked mostly to extension services and training.

Factors Influencing Irish Potato Farmers Satisfaction to Extension Service

The result in Table 4 explain the factors influencing irish potato farmer's satisfaction with extension service delivery. The finding revealed that sex ($r=6.680$) was positive and significant ($P<0.01$) in influencing Irish potato satisfaction with extension service delivery. This finding implies that increase in unit of male participants in Irish potato farming will lead to a unit increase in satisfaction with extension service delivery and vice-versa.

Table 4: Regression Result Showing Factors Influencing Extension Service Satisfaction among Potato Farmers

| Variables | B | Std. Error | Beta | t | Sig. |
|---------------------------|-----------|------------|--------|---------|--------------------|
| (Constant) | -33.242 | .624 | | -53.301 | .000*** |
| Sex | 6.680 | .086 | 3.329 | 77.475 | .000*** |
| Age | -.007 | .001 | -.064 | -5.158 | .000*** |
| Marital status | 6.513 | .127 | 3.031 | 51.283 | .000*** |
| Household size | .002 | .002 | .013 | .862 | .390 ^{NS} |
| Farm size | -1.802 | .054 | -2.388 | -33.660 | .000*** |
| Farming experience | -.073 | .004 | -.448 | -19.490 | .000*** |
| Educational level | .010 | .013 | .007 | .753 | .452 ^{NS} |
| Membership of association | 7.055 | .128 | 2.631 | 55.277 | .000*** |
| Primary occupation | 1.130 | .028 | 1.475 | 40.337 | .000*** |
| Land acquisition | -2.100 | .031 | -2.696 | -67.564 | .000*** |
| Access to credit | 1.602 | .054 | .605 | 29.462 | .000*** |
| Potato yield | .216 | .003 | 3.106 | 65.020 | .000*** |
| Annual income | -1.794E-6 | .000 | -1.117 | -17.925 | .000*** |
| Access to extension | 1.283 | .054 | .627 | 23.597 | .000*** |

Source: Field survey, 2024 *** Significant at 1% ($P<0.01$) ^{NS} Not significant

The result also shows that marital status ($r=6.513$) was positive and significant ($P<0.01$) in influencing satisfaction with extension service delivery among Irish potato farmers. This finding implies that an increase in marital status will lead to increase in satisfaction with extension service delivery. This cannot be unconnected to the determination of married people to increase their yield from little advice, experience and need for high output results to satisfaction of little occasional extension service delivery in the study area. The results also showed that membership of association ($r=7.055$) was positive and significant ($P<0.01$) in influencing satisfaction with extension service delivery in the study area. This finding implies that increase in participation of members in association will lead to increase in satisfaction with extension service delivery among Irish potato farmers. This could be attributed to the roles of farmer's association in increasing extension service delivery to their members in the study area.

The result further indicates that occupation ($r=1.130$) was positive and significant ($P<0.01$) in influencing respondents satisfaction with extension service delivery. In addition, the results showed that access to credit ($r=1.602$) was positive and significant ($P<0.01$) in influencing the Irish potato farmers satisfaction with extension service delivery. This finding implies that a unit increase in access to credit will lead to increase in satisfaction with extension service delivery and vice-versa.

The result also showed that potato yield/output ($r=.216$) was positive and significant ($P<0.01$) in influencing Irish potato farmers satisfaction with extension service delivery. This finding implies that increase in potato yield will result to increase in satisfaction with extension service delivery in the study area. This is not unconnected to the benefits derived from adoption of technologies transferred by extension agents to the Irish potato farmers. The result further showed that access to extension service ($r=1.283$) was positive and significant ($P<0.01$) in influencing satisfaction with extension service delivery in the study area. This finding implies that increase in extension service will lead to increase in extension service satisfaction among Irish potato farmers which is not unconnected to the fact that without access to extension there will be no satisfaction.

On the other hand, the result showed that age ($r= -.007$) was negative and significant ($P<0.01$) in influencing Irish potato farmers satisfaction with extension service delivery. This finding implies that increase in age will lead to decrease in extension service satisfaction among Irish potato farmers. This is attributed to the fact that as age of Irish potato farmers increases their participation in production and ability to attend workshops/seminars decreases thereby decreasing their access to extension and satisfaction in the study area. The finding further showed that farm size ($r=-1.802$) was negative and significant ($P<0.01$) in influencing satisfaction with extension service among Irish potato farmers. This finding implies that increase in farm size will lead to decrease in satisfaction with extension service delivery among Irish potato farmers. The result further shows that farming experience ($r= -.073$) was negative and significant ($P<0.01$) in influencing satisfaction with extension service delivery among Irish potato farmers. This implies that increase in farming experience will lead to decrease in satisfaction with extension service delivery. The result also showed that land acquisition ($r=-2.100$) was negative and significant ($P<0.01$) in influencing satisfaction with extension service delivery and vice-versa. This finding implies that increase in land acquisition will lead to decrease in satisfaction with extension service delivery among Irish potato farmers. The result also showed that annual income ($r= -1.794E-6$) was negative and significant ($P<0.01$) in influencing satisfaction with extension service delivery among Irish potato farmers.

Respondents Constraints to Extension Service Satisfaction

The result in Table 8 shows the constraints of Irish potato farmers' satisfaction with extension service delivery in the study area. The finding showed that the major constraints faced by the respondents were inadequate training to farmers, financial constraints and poor farmer outreach which were ranked 1st, 2nd and 3rd, respectively.

Table 3: Distribution of Irish Potato Farmers According to their Constraints to Extension Service Satisfaction (n=202)

| Variables | Percentage * | Rank |
|---|--------------|-----------------|
| Inadequate training to farmers | 93.6 | 1 st |
| Financial constraints | 88.6 | 2 nd |
| Poor farmer outreach | 68.8 | 3 rd |
| Inadequate awareness | 67.8 | 4 th |
| Irresponsiveness to farmers needs | 60.9 | 5 th |
| Inadequate delivery of relevant information | 52.0 | 6 th |
| Low staff morale and skill gap | 49.5 | 7 th |
| Inability to facilitate and reform | 46.5 | 8 th |

Source: Field survey, 2024 *Multiple response

The result further revealed that inadequate awareness, irresponsiveness to farmers' need and inadequate delivery of relevant information which were ranked 4th, 5th and 6th,



respectively. Other constraints include low staff morale/skill gap and inability to facilitate/reform which were ranked 7th and 8th by the respondents, respectively. This finding implies that most of the respondents who had access to extension were faced with one form of constraint to another hindering their satisfaction with extension service delivery in the study area.

CONCLUSION AND RECOMMENDATIONS

The study concluded that Irish potato farmers were highly satisfied with quality of extension service delivery. Age, sex, marital status, membership of association, primary occupation and access to credit to mention few were the factors that influence Irish potato farmers satisfaction with quality of extension service delivery in the study area

Based on the constraints highlighted the study make the following recommendations were made;

- i. Irish potato farmers should form and actively participate in farmers' cooperatives/association to increase their access to extension services and credit
- ii. Irish potato farmers should adopt the early planting of irish potato to avoid late potato blight disease infestation
- iii. Government should assist irish potato farmers by providing inputs at subsidized rates in the study area
- iv. Agricultural extension service organizations should increase the number of farmers training and workshop in the study area
- v. Farmers should pull down resources and assist extension officers with little token to motivate their efforts

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