The Relationships between Farmers' Perceptions of Relevance and Quality of Services Provided at Plant Clinics, and Farmers' Demand for Services from the Plant Clinics in Nakuru-North Sub-County, Kenya

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Abstract

Plant Clinics were introduced in Nakuru North Sub-County in 2010 with an objective of improving farmers' access to crop protection extension services subsequently reducing incidences of crop pests and diseases. The services are provided to the farmers on demand. Since their introduction, farmers' demand for the services has been low. Many farmers are therefore not benefiting from the services. In order to understand the scenario and adopt policies that will ensure many farmers benefit from plant clinics services, it is crucial to establish the factors which determine Farmers' Demand for Plant Clinics Services. The objective of this study was to establish relationships between selected factors which are likely to determine farmers' demand for services from plant clinics and farmers' demand for services from plant clinics in Nakuru-North Sub-County. The selected factors were farmers' perception of relevance, and farmers' perception of quality of services provided at the plant clinics. A Correlation study was conducted on 152 small scale farmers randomly selected from 6,000 small scale farmers in 4 out of the 12 locations of the Sub-County.

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A self-administered questionnaire was used to collect data from the farmers. Data was analyzed using the Statistical Package for Social Sciences (SPSS) for windows. Descriptive statistics was used to describe the sample of the study in the form of frequency distribution, percentages and means. The relationship between independent and dependent variables was analyzed using Chi-square statistics and interpreted at $\alpha=0.05$ level of significance. The study established that there is a statistically significant relationship between Farmers' Perceptions of the Quality of Services Provided at the Plant Clinics and the Farmers Demand for Services from Plant Clinics in Nakuru North Sub-County. The study concluded that Farmers' Perceptions of Quality of Services Provided at the Plant Clinics determines the Farmers Demand for Plant Clinics Services and improving on it would improve Farmers Demand for Plant Clinics Services and subsequently reducing crop losses from pests and diseases. It recommends that more resources should be allocated to improve the Quality of Services Provided at the Plant Clinics.

Keywords: Farmers' Demand for plant clinics services; Perceptions of Quality of Services; Perceptions of relevance Plant Clinics; Plant Doctor; Small Scale Farmer.

1. Introduction

One major contributory factor to low agricultural productivity in the world is crop losses due to plant pests and diseases problems [1]. In addition to low yields, infected plants negatively affects human and livestock health by contaminating food and feed resulting in diseases and disorders when consumed [2]. Interventions towards improved global food security should therefore endeavor to improve plant health [1].

Plant Clinics have been identified as an innovative agricultural extension service delivery method to help farmers deal with crop pests, diseases and other plant health problems [3]. They were started by Global Plant Clinics (GPC) in the year 2000 [4]. The method is being used in several developing countries as a way of providing regular, low cost plant health services to smallholder farmers who have limited access to advisory services [5]. Plant Clinics were introduced in Kenya in 2010. Nakuru-North is one of the pioneer Sub-Counties. It started with four of them [6]. A Plant Clinic is a facility where farmers take samples of their affected plants for problems identification and management recommendations [7]. A basic Plant Clinic consists of a table, chairs, a banner or prominent sign that helps to attract people. They are held regularly in weekly or biweekly sessions of 2-3 hours in a prominent meeting place like a market centre. Publicity is done and farmers made aware of the visiting days of extension staff (plant doctors). The farmers take samples of noted cases of crop pests and diseases infestation to the clinics for identification and advice. Plant Clinics are manned by 'Plant doctors' who are in most cases agriculture extension staff. They first undergo a standardized training programme and are provided with analyzing tools and reference materials to help them in making accurate diagnoses and suggesting affordable and available treatment to farmers [6].

Farmers have to demand for plant clinics services in order to benefit from them. According to [8], farmers demand and their need for advisory services are decisive factors in determining the effectiveness of extension services. The current scenario is that the available diagnostic facilities are often under-utilized [5]. According to a plant clinics progress report from [9], low farmers turn out during plant clinic sessions have been the major

challenge facing their implementation. The average farmers turn out during plant clinic sessions in the Sub-County stands at three to four farmers per plant clinic session [9]. Some factors are known to be related with farmer's reception of agricultural extension services and may therefore be related with farmers' demand for plant clinics services as well. For example the farmers' perceptions determine the adoption of an innovation [10]. An understanding of farmers' perceptions of a particular type of extension service and their relationship with the demand of this service is necessary in providing answers to demand of agricultural innovations [11]. Several factors including Education and experience play a role in the formation of these perceptions [12]. The issues of time keeping, staff attitude, reliability of diagnosis, efficacy and feasibility of the advice given to farmers can potentially affect clients' confidence in the service and may go some way in building the farmers' perception about the quality of the services provided at the plant clinics [13]. In order to understand the scenario and adopt policies that will ensure many farmers benefit from plant clinics services, knowledge of factors which determine Farmers' Demand for Plant Clinics Services in the Sub-County is crucial. This study was conducted with an objective of establishing the relationships between Farmers' Perceptions of Relevance and Quality of Services Provided at the Plant Clinics, and Farmers' Demand for Services from Plant Clinics in Nakuru-North Sub-County. The Sub-County was selected since it was among the first Sub-Counties to implement Plant Clinics in the country [6], and has implemented them for a longer period of time. In addition the Sub-County has a high agricultural potential with many small scale farmers which make it possible to get a large sample of farmers for the study. The purpose of the study was to establish whether the Farmers' Perceptions of Relevance and Quality of services provided at Plant Clinics determines the Farmers' Demand for Services from the Plant Clinics in Nakuru-North Sub-County, Kenya. The objectives of the study were to establish the relationship between Farmers' Perceptions of Relevance and Quality of services provided at Plant Clinics, and Farmers' Demand for Services from the Plant Clinics.

The following Null hypotheses derived from the objectives guided the study:

H_{O1}:   There is no statistically significant relationship between farmers' perceptions of relevance of plant clinics and demand for services from the plant clinics in Nakuru-North Sub-County.

H_{O2}:   There is no statistically significant relationship between farmers' perceptions of quality of services provided at the plant clinics and demand for services from the plant clinics in Nakuru-North Sub-County.

The findings of the study intends to inform policy makers while developing policies and strategies related to agriculture extension and especially in relation to crop protection extension. Further an understanding of the relationships between the selected factors and farmers' demand for services from the plant clinics can help the extension service providers to attract a higher farmers' demand for plant clinic services.

This will result in more farmers accessing crop protection information and the consequent reduction of crop pests and diseases incidences. With more farmers advised on crop protection there will be higher crop yields and therefore improved food security as well as increased farm incomes.

2. Materials and Methods

The study was conducted in Nakuru North Sub-County and specifically in Bahati, Kabatini, Dundori and Githioro Locations. A Correlational Study was used. The target population of the study comprised of the 23,500 small scale farmers in Nakuru- North Sub-County. The accessible population was the 6000 small scale farmers in Bahati, Kabatini, Dundori and Umoja Locations.

The farmers are distributed among the four Locations as shown in table 1 and this formed the sampling frame.

Table 1: Summary of the accessible population in the study area (N = 6,000)

Location	Number of farmers
Bahati	1960
Kabatini	1560
Dundori	770
Githioro	1710
Total	**6000**

Source: Sub-County Agriculture Office-Nakuru North.

Purposive sampling was used to select the four locations of the study from the 12 locations in the Sub-county.

Proportionate random sampling was used to select the farmers to be studied from each of the study Locations.

The sample size was calculated using the formula $n = \dfrac{NC^2}{C^2 + (N-1)e^2}$ as advanced by [14].

Where n = Sample size

N = Population

C = Coefficient of variation

e = Standard error

A coefficient of variation of 25% and a standard error of 0.02 were used.

Hence, $n = \dfrac{6000(25\%)^2}{(25\%)^2 + (6000-1)(0.02)^2} = 152$

Table 2 gives the names of the study locations and the corresponding number of respondents that were selected.

Table 2: Sample size per study location

Location	Number of small scale farmers	Proportion of the population	Number selected (sample size)
Bahati	1960	0.33	49
Kabatini	1560	0.26	40
Dundori	770	0.13	20
Githioro	1710	0.28	43
Total	6000	1.00	152

A list of land registration numbers for farmers from each study Location was obtained from the records of the Sub-County Agriculture Office of Nakuru North Sub-County. This list constituted the sampling frame from which the farmers were sampled. Using a table of random numbers the respondents were selected.

To collect data, a self-administered questionnaire was used. The questionnaire had three sections. Section A captured data on Farmer's Level of Awareness of Plant Clinics, Section B on Farmers' Demand for Plant Clinics Services, and Section C on Accessibility of Plant Clinics Services by Farmers. To ensure that the instrument is valid, it was availed to lectures in the Department of Agriculture education and extension to establish its content and construct validity and ensure that the items adequately represented the subject area to be studied. Their comments were then used to make the necessary corrections on the instrument. To ensure the instrument is reliable it was piloted in Bahati Ward of Nakuru North Sub-County on a sample of 30 respondents with similar characteristics as the population being studied [15]. Cronbanch's alpha procedure was used to establish the instrument's reliability and the instrument was found to have a reliability coefficient of 0.799 at $\alpha=0.05$ level of significance. A reliability coefficient of at least $\alpha=0.70$, at $\alpha=0.05$ level of significance is considered acceptable [15,16]. Before commencing to collect the data, the researcher got an introductory letter from the Graduate school of Egerton University. This was used to get research permit from the National Council for Science and Technology. At the Sub-County level authority to collect data was sought from the Sub-County Agriculture Office. The office also facilitated in acquiring the list of land Registration Numbers and the area land subdivision map. The respondents for the study were contacted through village elders to inform them of the intended data collection and the dates. The researcher took the questionnaire to each of the sample farmers at their homes and explained the purpose of the study before the farmers filled the questionnaires. The researcher was present throughout the exercise to clarify any issues that arose and then left with the filled questionnaires. Assistance of the area agriculture extension staff was sought where necessary to assist in tracing the study farmers, and in clarifying and verifying some of the issues encountered during the study. Most of the farmers in the area understand either English or Kiswahili. As such there was no need of a translator. The study assumed that:

- All respondents gave truthful information.
- The small scale farmers' farm situations and agricultural practices in all the study area are generally the same.
- The farmers' characteristics in all the study area are the same as those in other parts of the Sub-Country.

The completed questionnaires were reviewed to check for any errors. The data was then entered into Statistical Package for Social Sciences (SPSS) for analysis. Descriptive statistics was used to describe the sample of the study in the form of frequency distribution, percentages, means and standard deviation. Inferential statistics was used to make inferences about the population based on the results of the representative sample [15]. Null Hypotheses (Ho_1) and (Ho_2) were tested using Chi–square statistics at $\alpha=0.05$ level of significance.

3. Results and Discussions

The study sought to establish the relationships between farmers' perceptions of the relevance of plant clinics and of the quality of services provided at the plants, and farmers' demand for plant clinics services in Nakuru-North Sub-County, Kenya. To test the Farmers' Perceptions of Relevance of Plant Clinics, the respondents were asked to indicate their opinion on the relevance of plant clinics by responding to a set of six statements. The responses were recorded on a five point Likert scale with 1=Strongly disagree, 2 = Disagree, 3 = No opinion, 4 =Agree, 5=Strongly agree. The results are summarized in table 3.

Table 3: Farmers' perceptions on the relevance of plant clinics

Statement	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree		Total	
	f	%	f	%	f	%	f	%	f	%	f	%
Plant clinics are pertinent	58	38.2	66	43.4	16	10.5	10	6.6	2	1.3	152	100
Plant clinics provide required information	56	36.8	60	39.5	29	19.1	7	4.6	-	-	152	100
Plant clinics provide appropriate services	40	26.3	73	48.0	33	21.7	6	3.9	-	-	152	100
Recommendations provided at plant clinics are applicable	41	27.0	72	47.4	34	22.4	4	2.6	1	0.7	152	100
Plant clinics services are timely	17	11.2	48	31.6	59	38.8	25	16.4	3	2.0	152	100
Information provided at plant clinics is current	27	17.8	61	40.1	50	32.9	12	7.9	2	1.3	152	100

n=152, f - frequency, % - percentage

An index score was then computed as a simple sum of the response scores from the six statements giving a maximum score of 30 and a minimum score of 6. The midpoint is 18 indicating that the farmer has no opinion or is not sure. An index score below 18 indicates that the farmer perceives plant clinics as not relevant (negative perception) while an index score above 18 indicate that the farmer perceives plant clinics as relevant (positive perception). The results are summarized in table 4.

Table 4: Farmers' perceptions of relevance of plant clinics

Perception	Frequency	Percent
Negative	15	9.9
No Opinion	6	3.9
Positive	131	86.2
Total	152	100.0

n=152

The results indicated that 10 % of the respondents perceive plant clinics as not relevant. 86.2% of the respondents perceive plant clinics as relevant. 3.9% of the respondents had no opinion on the relevance of plant clinics.

To measure the 'farmers' demand for services from plant clinics' respondents were requested to indicate the number of times they attended a plant clinic in the past one year. All the respondents responded to this question. Based on the number of times they attended a plant clinic in the past one year, the respondents were categorized into 3 levels of demand for plant clinics services.

Those who did not attended were categorized as Non-users, those who attended once were categorized as One time users, while those who attended more than once were categorized as Return Clients. The results are summarized in table 5.

Table 5: Demand for services from plant clinics

Demand	Frequency	Percent
Non-users	94	61.8
One time users	17	11.2
Return Clients	41	27.0
Total	152	100.0

n=152

The results indicate that 61.8% of the respondents were Non-users of plant clinics, 11.2% were one time users while 27% were return clients.

The Hypothesis stated: There is no statistically significant relationship between farmers' perception of relevance of plant clinics and demand for services from plant clinics in Nakuru-North Sub-County.

Chi-Square test was used to test the Hypothesis $\alpha=0.05$ level of significance. The results are shown table 6.

Table 6: Chi-square test for Hypothesis (Ho$_1$)

Test	Value	df	Asymp. Std. Error
Pearson Chi-Square	8.462	4	
Pearson's R	.213		.055
N of Valid Cases	152		

The test statistics was 8.462. Table value of Chi-square (χ^2) at 4 degrees of freedom and $\alpha=0.05$ level of significance is 9.48733. The Null Hypothesis that there is no statistically significant relationship between farmers' perception of relevance of plant clinics and farmers' farmer's demand for services from plant clinics was therefore accepted.

The absence of a relationship between farmers' perception of relevance of plant clinics and farmers' demand for services from plant clinics implies that the farmers demand for plant clinics services is not determined by farmers' perception of relevance of plant clinics. Improving the farmers' perceptions of relevance only will therefore not result in any significant change in farmers demand for plant clinics services. Efforts to do so should be in addition to improving the factors that have significant relationship with the farmers demand for plant clinics services.

To establish the Farmers' Perceptions of the Quality of Services Provided at the Plant Clinics the respondents were asked to respond to a set of six statements. The responses were recorded on a five point Likert scale with 1= Strongly disagree, 2 = Disagree, 3 = No opinion, 4 = Agree, 5= Strongly agree. The results are summarized in table 7.

An index score was then computed as a simple sum of the response scores from the six statements giving a maximum score of 30 and a minimum score of 6. The midpoint is 18 which indicate that the farmer has no opinion or is not sure. An index score below 18 indicates that the farmer perceived the quality of services provided at the plant clinics as poor (negative perception) while an index score above 18 indicate that the farmer perceives the quality of services provided at the plant clinics as good (positive perception). The results are summarized in table 8.

The results indicated that 8.6 % of the respondents perceived the quality of services provided at the plant clinics as poor. 87.5 % of the respondents perceived the quality of services provided at the plant clinics as good. 3.3% of the respondents had no opinion on the quality of services provided at the plant clinics.

The Hypothesis stated: There is no statistically significant relationship between farmers' perception of quality of services provided at the plant clinics and demand for services from plant clinics in Nakuru-North Sub-County. Chi-Square test was used to test the Hypothesis α=0.05 level of significance. The results are shown table 9.

Table 7: Farmers' perceptions on the quality of services provided at plant clinics

Statement	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree		Total	
	f	%	f	%	f	%	f	%	f	%	f	%
Plant clinics services are reliable	28	18.4	78	51.3	29	19.1	15	9.9	1	0.7	151	99.3
Staff manning plant clinics responds promptly	26	17.1	47	30.9	53	34.9	21	13.8	4	2.6	151	99.3
Staff manning plant clinics are well qualified	32	21.1	69	45.4	40	26.3	10	6.6	0	0	151	99.3
Staff manning plant clinics are polite	48	31.6	75	49.3	26	17.1	1	0.7	1	0.7	151	99.3
A trusted institution is running the clinics	79	52.0	47	30.9	22	14.5	3	2.0	0	0	151	99.3
Plant clinics have appropriate tools	11	7.2	38	25.0	62	40.8	28	18.4	12	7.9	151	99.3

n=152, f - frequency, % - percentage

Table 8: Farmers' perceptions of the quality of services provided at the plant clinics

Perception	Frequency	Percent
Negative	13	8.6
No Opinion	5	3.3
Positive	133	87.5
Total	151	99.3
No response	1	.7
Total	152	100.0

Table 9: Chi-square test for Hypothesis (Ho$_2$)

Test	Value	df	Asymp. Std. Error
Pearson Chi-Square	9.506	4	
Pearson's R	.213		.055
N of Valid Cases	151		

The test statistics was 9.506. The table value of Chi-square (χ^2) at 4 degrees of freedom and 95% level of confidence is 9.48733. The Hypothesis that there is no statistically significant relationship between farmers' perception of quality of services provided at the plant clinics and farmers demand for services from plant clinics is therefore rejected and concluded that there is a statistically significant relationship between farmers' perception of quality of services provided at the plant clinics and farmers demand for services from plant clinics in Nakuru-North Sub-County.

The existence of a statistically significant relationship between the independent factor 'farmers' perception of quality of services provided at the plant clinics' and the dependent variable 'farmers demand for plant clinics services' implies that farmers' demand for plant clinics services is determined by the farmers' perception about the quality of services provided at the plant clinics. The finding agrees with [8], who noted that farmers demand quality services which can satisfy their needs. It also concurs with [17], that if farmers experience high quality plant clinic extension services, then they are less likely to seek for services from competing organizations and are more likely to recommend the services to others.

Improvement of the quality of services provided at the plant clinics is therefore crucial in order attract more farmers to attend plant clinics and benefit from their services. This can possibly be done by; making them more reliable e.g. having more sessions during long and short rains when the pests and diseases are more prevalent, ensuring that the plant clinics have the appropriate equipments for the diagnosis of pests and diseases, and having well qualified 'plant doctors' providing the services promptly and politely.

Since the study established that 86.2% of the respondents perceive plant clinics as relevant and that 87.5% of the respondents had positive perception on the quality of services provided at the plant clinics but only 37.5% of the respondents attended plant clinics in the last one year, then it implies that there could be other factors a part from perceptions of relevance and of quality of plant clinics services that determines farmers demand for plant clinics services.

4. Conclusions

Since the study established that there is a statistically significant relationship between Farmers' Perception of Quality of Services provided at the Plant Clinics and Farmers' Demand for services from Plant Clinics, it was concluded that Farmers' Demand for Services from Plant Clinics is determined by the Farmers' Perceptions of the Quality of Services provided at the Plant Clinics and therefore improving the Quality of Services provided at the Plant Clinics would improve Farmers' demand for the services.

5. Recommendations

Based on the finding and conclusion of the study it is recommended that more resources should be allocated to improve the quality of services provided at the plant clinics.

The plant clinics should be well equipped with the appropriate equipments and the 'plant doctors' should be more trained and their skills regularly updated to improve their capacity to identify plant health problems and

advice farmers.

6. Limitations of the Study

- The study did not cover all the locations of Nakuru North Sub-County that are operating plant clinics due to financial and time implications.
- The study did not cover all the possible factors as this would have made the questionnaire to long and thereby compromising the quality of the study.

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