



TRAINING NEEDS OF FARMERS FOR MAIZE CULTIVATION IN NIGER STATE, NIGERIA

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ABSTRACT

This study examined the training needs of maize farmers in Niger State, Nigeria, aiming to assist agricultural extension agencies in developing tailored training programmes. A total of 240 respondents were proportionately and randomly selected from three Local Government Areas in the State. Data were collected using a validated interview schedule with a reliability coefficient of 0.81 and analyzed through descriptive statistics and Poisson regression. The findings revealed that the average age of the farmers was 38 years, with 73.3% having formal education and an average farm size, household size and farming experience of 1.7 hectare, 4 persons and 10 years, respectively. The primary training needs identified were in planting methods, weed control, pest management, disease control, and fertilizer application. The results also revealed 58.3% preferred training sessions to be conducted quarterly during the rainy seasons (64.2%), held in the villages (57.5%) for short durations. The results of regression analysis revealed that, educational level ($P < 0.05$), farming experience ($P < 0.05$), farm size ($P < 0.10$), cooperative membership ($P < 0.05$), and income ($P < 0.10$) significantly influenced the training needs of the maize farmers in the study area. The study concluded that level of education, farming experience, farm size and membership of cooperative societies were the significant factors influencing the training needs of the maize farmers in the study area. The study recommends the importance of considering time preferred by the farmers and locations when planning training programmes. Priority should be given to methods of planting, weed control, pest management, disease control, and fertilizer application in training sessions.

Keywords: Cultivation, Farmers, Maize, Training needs, Niger State.

INTRODUCTION

Maize (*Zea mays*) is one of the important crops for food and industrial uses which has the highest yield/ha. among the cereal crops. Hence, maize is called Queen of the Cereal Crops. Maize is a leading and important cereal crop used in the human diet in most parts of the world. Also, it is an important feed component in livestock sector. In terms of total world production, maize on average over the last five years ranked higher than paddy rice and wheat (Bushra *et al.*, 2019). Economically, maize is very essential because it is a vital source of minerals, vitamins and fiber as well as oil for cooking and soap making. Maize starch is well known and widely utilized in pharmaceutical industries as diluents and also used in making cosmetics. Its seed is used to make alcohol while stem is used for paper manufacturing (Kumar and Jhariya, 2013). Federal Ministry of Agriculture and Rural Development of Nigeria (2011) stressed that as a result of maize worldwide utilization, nutritional value and unique importance for human, animals and industries, farmers can earn more money by cultivating maize. For farmers to grow maize effectively and efficiently, more training is required because knowledge gaps lead to yield gaps. Agro-services and



quality inputs are vital productivity enhancing tools, but their optimum use requires knowledge through training.

According to Ganapathy and Vetrivelan (2019), training is vital to motivate, create confidence and infuse competence in an individual. Training can improve knowledge, attitude and skills of the farmers for improving the rate of adoption of modern crop cultivation practices. Training is an essential component of technology transfer as well as indispensable medium for human development for better performance. Thus, training need to be provided to the farmers to educate them about the improved recommended practices for crop production to help them to gain more profit by improving productivity through extension training.

In order to make these training more impactfully, effective and efficient, the various training needs and preferences of the farmers have to be determined prior to the training sessions. It is against this background that this study was carried out to generate empirical research information to extension agencies and their agents for programme planning, plan of work and calendar of work for training maize farmers. The specific objectives of the study are to:

- i. examine socio-economic characteristics of farmers; determine the training needs of farmers for maize cultivation;
- ii. ascertain the training preferences of maize farmers; and
- iii. determine factors influencing training needs of maize farmers.

METHODOLOGY

The Study Area

The study was carried out in Niger State, Nigeria. The State is located in Guinea Savanna Ecological zone of Nigeria between Latitudes $8^{\circ} 22'$ and $11^{\circ} 30'N$ and Longitudes $3^{\circ} 30'E$ and $7^{\circ} 20'E$. Annual rainfall of the State ranged from 1,600mm in the South to 1100mm in the North with average monthly temperature range of about $23^{\circ}C$ to $29^{\circ}C$. Farming is the common means of livelihood of the people in the area. (Niger State Geographic Information System, 2007).

Sampling Technique and Sample Size

Multi-stage sampling technique was adopted for the study. At the first stage, three Local Government Areas (Katcha, Gurara and Wushishi) one from each agricultural zone in the State were randomly selected. At the second stage, three villages were randomly selected from each Local Government Area to obtain nine villages. At the third stage, 10% of the farmers in each village were randomly selected. In all, a total of 240 respondents were sampled for the study from a sampling frame of 2,400 farmers established through village heads with the assistance of village extension workers attached to the localities sampled.

Data Collection and Analysis

Content validity of the data collection instrument (interview schedule) was ensured through expert consultation. The validated interview schedule which was subjected to Cronbach's Alpha reliability test ($r=0.81$) was used for data collection in January, 2023 by the researcher and trained enumerators, which last for one month. Data were collected on socio-economic characteristics, areas of training needs and training preference. Age, educational level and farming experience were measured in years, while sex was measured as male or female. Farm size was measured in hectare. Similarly, household size was measured in numbers. Access to credit, marital status and cooperative membership were measured as dummy variables. Income was measured in Naira. Also, the respondents were asked to indicate their training preference in terms of season, venue, type, frequency and duration of training from the list provided. Areas of training needs were measured using 4-points Likert



type scale of greet need = 4, some need = 3, little need = 2 and no need = 1. In order to determine area of training need, the values of the scale (1+2+3+4) were summed up to get 10 which was divided by 4 to obtain 2.5 (mean). Any area of training need with a mean score of 2.5 and above suggests major need of training and any area with mean less than 2.5 was regarded as minor need of training. Objectives one, two and three of the study were achieved using descriptive statistics (frequency, percentage and mean), while objective four was achieved using inferential statistics (Poisson regression).

Model Specification

The model is expressed in implicit form as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}) \dots \dots \dots (1)$$

The functional form is expressed in the explicit form as:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + U \dots \dots \dots (2)$$

Where:

$\beta_1 - \beta_{10}$ = Parameters estimated

Y = Training needs (Scores)

$X_1 - X_{10}$ = Independent variables.

Where;

X_1 = Age of the farmer (years)

X_2 = Gender (male=1, female=0)

X_3 = Level of education (number of years spent in school)

X_4 = Farming experience (years)

X_5 = Household size (number)

X_6 = Farm size (ha.)

X_7 = Access to credit (yes=1, no=0)

X_8 = Marital status (married=1, otherwise=0);

X_9 = Cooperative membership (yes=1, no=0);

X_{10} = Income (#)

a = Constant

e = Error term

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The result in Table 1 showed that the mean age of the respondents was 38 years, which means that most of the farmers were still in their active productive ages. At this prime age of full health and strength, farmers will require training to boost their maize production. Table 1 also indicated that 75.0% of the respondents were married with dependents and are likely to be more committed to maize cultivation through relevant training on modern crop production techniques. According to Umar *et al.* (2018), married people are more committed task than the unmarried people because of family responsibilities. The mean household size of the respondents in the study area was four persons. This suggests that the farmers have medium household sizes, thus the need for more training in order to produce adequate food for the family members. In a related study, Jane *et al.* (2013) reported house size mean of six persons among farmers. Table 1 further revealed that majority (73.3%) of the respondents had formal education ranging from primary to tertiary education with an average of nine years spent in school. With this level of literacy, the extension agents can train the farmers with ease.

The average farming experience of the respondents was 10 years which is an indication that the respondents had long experiences in maize cultivation, which will enable



them to appreciate the benefit of training on modern maize cultivation techniques, especially when compared with the previous method of cultivation. This agrees with the findings of Irvboje *et al.* (2021) who reported that most of the farmers had long experience in farming. Table 1 further indicated that 87.5% of the respondents were at least a member of one cooperative society. This will facilitate the training of farmers in group through the cooperative associations. Moreso, Table 1 revealed that majority (63.3%) of the farmers were male while female farmers accounted for 36.7%. This implies that male farmers dominated farming in the study area. Furthermore, the result showed that more than 80% of the respondents did not have access to credit for maize cultivation. Additionally, the mean income realized from maize cultivation was #189,000. This suggests the need for more training in order to improve the income of maize farmers. The mean farm size of the farmers was 1.7ha; signifying that majority of respondents were into small farming.



Table 1 Socio-economic Characteristics of the Respondents

Variable	Frequency	Percentage	Mean
Age			
30 years and below	58	24.2	38 years
31-40 years	96	40.0	
41-50 years	56	23.3	
Above 50 years	30	12.5	
Marital status			
Widow(er)	12	5.0	
Divorced	6	2.5	
Single	42	17.5	
Married	180	75.0	
Household size			
1-4 persons	140	58.3	4 members
5-8	94	39.2	
Above 8	6	2.5	
Level of education			
Non-formal education	64	26.7	9 years
Primary education	62	25.8	
Secondary education	76	31.7	
Tertiary education	38	15.8	
Farming experience			
1-10 year	120	50.0	10 years
11-20 years	82	34.2	
Above 20 years	38	15.8	
Cooperative membership			
Yes	210	87.5	
No	30	12.5	
Gender			
Male	152	63.3	
Female	88	36.7	
Access to credit			
Yes	46	19.2	
No	194	80.8	
Income (#)			
1-100,000	30	12.5	189,000
101,000-200,000	114	47.5	
201,000-300,000	80	33.3	
301,000-400,000	16	6.7	
Farm size (ha)			
0.1-1.0	62	25.8	1.7
1.1-2.0	120	50.0	
2.1-3.0	38	15.8	
3.1-4.0	20	8.4	

Source: Field survey, 2023

Training Needs of Farmer for Improved Maize Cultivation

Result in Table 2 revealed that training need was expressed for planting method in the area of plant spacing ($\bar{x} = 3.04$), sowing method ($\bar{x} = 2.62$) and seed rate ($\bar{x} = 2.51$) for adequate knowledge of accurate plant spacing, sowing method and seed rate per hectare in order to reduce production cost and increase yield. Similarly, training needs were also



expressed by the farmers for pre-emergence herbicide application ($\bar{x} = 3.09$) and post-emergence herbicide application ($\bar{x} = 3.06$) to save labour cost and time. However, majority of the farmers did not need training on hand weeding ($\bar{x} = 1.09$); indicating clearly that farmers were already familiar with hand weeding. Moreso, farmers need training on how to spray insecticides ($\bar{x} = 2.75$) and fumigation ($\bar{x} = 2.61$). From time to time, farmers experience outbreak of stem borers, grasshoppers and weevils and thus, were very much interested in knowing about pest management practices. This result concurs with the finding of Umar *et al.* (2013) who reported that majority of farmers were in need of training on application of agro-chemicals. On disease control, training need was expressed for only use of resistance variety ($\bar{x} = 2.61$) by farmers for controlling maize disease. In addition, it can be inferred from Table 2 that training need was solicited for fertilizer placement ($\bar{x} = 2.65$); this was followed by training need for spot application of fertilizer ($\bar{x} = 2.57$) and foliar fertilizer application ($\bar{x} = 2.52$) which were denoted as the needed areas of training by the farmers for maize cultivation. This result shows that farmers are either not aware or familiar with foliar fertilizer, which might be the reason for the expressed training need for foliar fertilizer application.



Table 2: Area of Training Needs of Maize Farmers

Training need areas	Mean score	Remark
Season		
Raining season	1.51	Minor need
Dry season	1.39	Minor need
Land preparation		
Primary tillage (ploughing)	1.84	Minor need
Secondary tillage (harrowing)	1.87	Minor need
Planting method		
Seed rate	2.51	Major need
Spacing	3.04	Major need
Sowing method	2.62	Major need
Weed Control		
Pre-emergence herbicide application	3.09	Major need
Post-emergence herbicide application	3.06	Major need
Hand weeding	1.09	Minor need
Pest control		
Insecticides spraying	2.75	Major need
Fumigation	2.61	Major need
Cultural control method	1.17	Minor need
Disease Control		
Destroying of affected crop	1.06	Minor need
Use of resistance variety	2.52	Major need
Crop rotation	2.44	Minor need
Manure application		
Farm yard manure	1.84	Minor need
Methods of Fertilizer Application		
Spot application	2.57	Major need
Fertilizer placement	2.65	Major need
Broadcasting	2.28	Minor need
Foliar application	2.52	Major need
Fertilizer Requirement (NPK,Urea/ha)	2.33	Minor need
Harvesting		
Maturity test	2.01	Minor need
Harvesting time	1.62	Minor need
Harvesting method	1.12	Minor need
Shelling		
Method of shelling	1.07	Minor need
Storage		
Crib	1.94	Minor need
Rumbus	1.17	Minor need
Fireplace	1.09	Minor need
Silos	1.03	Minor need
Processing		
Method of processing	1.20	Minor need
Uses		
Corn meal	1.78	Minor need
Beer	1.06	Minor need
Baking flour	1.07	Minor need
Livestock feed	1.08	Minor need

Source: Field survey, 2023



Training Preference of Maize Farmers

Table 3 indicated that most (64.2%) of the respondents preferred receiving training during the raining season when farming activities are on, while 35.8% of the respondents preferred to receive training during dry season. The preference for training during raining season by majority of the respondents may be attributed to the fact that farmers would want to get their maize cultivation challenges solved in training through training professionals' intervention. On the other hand, the respondents that opted for training during dry season could have thought of using their off season, before the commencement of next cropping season for a useful purpose. The result further revealed that more than half (57.5%) of the respondents preferred to receive training in villages, while more than one quarter (25.8%) of the respondents preferred to receive training in cooperative association offices. This suggests that villages and cooperative association offices are suitable venues for organizing trainings. Furthermore, the type of training preferred by majority of the respondents was peripatetic training with 71.7% response rate. Provision of place-to-place training can provide more information and enhanced participation. The remaining 28.3% of the respondents preferred institutional training in order to visit institutions and meet experts. Regarding the frequency of training, 58.3% of the respondents preferred training to be quarterly, followed by monthly (21.7%), biannually (15.0%) and yearly (5.0%). On the duration of training, above half of the respondents (50.8%) preferred three days training and 26.7% of the respondents preferred two days of training. These is followed by 12.5% and 10.0% of the respondents who preferred one and four days of training respectively. The finding implies that farmers require short time trainings.



Table 3: Training Preference of Maize Farmers

Preferences	Frequency	Percentage
Training season		
Dry season	86	35.8
Raining season	154	64.2
Training venue		
Village	138	57.5
Farm centre	6	2.5
Cooperative association office	62	25.8
Research institute	10	4.2
Extension agency	18	7.5
Agricultural institution	6	2.5
Training type		
Institutional training	68	28.3
Peripatetic training	172	71.7
Training frequency		
Monthly	52	21.7
Quarterly	140	58.3
Biannually	36	15.0
Yearly	12	5.0
Once in 2 years	0	0.0
Once in 3 years	0	0.0
Training duration		
One days	30	12.5
Two days	64	26.7
Three days	122	50.8
Four days	24	10.0
Five days	0	0.0
One week	0	0.0

Source: Field survey, 2023

Factors Influencing Training Needs of Farmers

Poisson regression model was used to examine the factors influencing training needs of farmers. The result in Table 4 shows R^2 of 0.5813; which implies that 58% of variations that occur in the training needs of farmers were explained by the independent variables included in the model. The Prob> F was significant at 1% level of probability, which explain the fitness of the model. Finding revealed that the coefficient of farm size was positively significant at 1% level of probability; this implies that as the farm size increases, there is likelihood of increase in the training need of the farmers and vice-versa. Also, the result revealed that the coefficient of level of education was positive and significant at 5% level of probability. This points to the fact that educational attainment increases the level of adoption of technology and thus the need for more training. Furthermore, farming experience was positively significant at 5% level of probability; indicating that the higher the experience of farmers, the more the training needs of farmers will be.

Similarly, the result indicated that cooperative membership was positively significant at 5% level of probability; implying that an increase in the number of cooperative memberships will lead to an increase in the number of training the farmers will require on maize cultivation. This is likely, in cooperative associations, farmers can pool their resources together and demand for training. In addition, income was positively significant at 10% level of probability; suggesting that increase in the income of farmers will likely increase the



training needs of farmers. This is expected because farmers with higher incomes can be able to afford training expenses than the low-income farmers. However, coefficient of age was negative and significant at 10% level of probability. This implies that as the age of the farmers' increases, the training needs of the farmers will decrease. Oniah *et al.* (2019) stressed that increase in age of the farmers result to decrease in the training need and use of production technologies.

Table 4: Factors Influencing Training Needs of Farmers

Variables	Coefficient	Standard error	Z-value	p> T
Age	-0.0059	0.0032	-1.82*	0.069
Gender	-0.4802	0.9854	-0.49	0.627
Level of education	0.2201	0.1010	2.18**	0.031
Farming experience	0.1579	0.0688	2.29**	0.024
Household size	-0.1616	0.2673	-0.60	0.547
Farm size	542.0314	171.6221	3.16***	0.002
Access to credit	7.26e-06	6.39e-06	1.14	0.259
Marital status	0.7129	0.8294	0.86	0.392
Cooperative membership	17468.59	7584.254	2.30**	0.023
Income	22490.52	12179.99	1.85*	0.068
Constant	27.9457	3.9239	7.12***	0.000
Number	240			
F (10,109)	1.67			
Prob> F	0.0002***			
Pseudo R-squared	0.5813			

Source: field survey, 2023

CONCLUSION AND RECOMMENDATIONS

Based on the findings, it was concluded that most of the respondent farmers were youth. Farmers need training on different areas of maize cultivation with varied training preferences. Factors that influenced the training needs of farmers were educational level, farming experience, farm size, cooperative membership and income. Areas of major training needs such as planting method, weed control, pest control, disease control and fertilizer application should be given priority in the formulation of training programme for maize cultivation.

- For effective and efficient training of maize farmers, the training programmes should be conducted during the raining seasons at the village levels on quarterly bases for short durations.
- Educational level, farming experience, farm size and cooperation membership of the farmers should be considered when designing extension plan of work and calendar of work, in order to expose farmers to different ideas and method of maize cultivation practices through training.

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