Comparison of Socio-Economic Characteristics of Farmers Growing Local and Improved Maize Varieties in Selected Local Government Areas of Zamfara State, Nigeria

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Abstract

The study examined and compared the socio-economic characteristics of farmers that grow local and improved maize varieties in selected Local Government Areas (LGAs) of Zamfara State. Seven LGAs were purposively selected for the study based on the preponderance of maize production in the local government areas. Two districts were randomly selected from each of the seven LGAs and two villages were also randomly selected from each of the sampled districts. Through the use of simple random sampling, ten farmers (five each for local and improved maize varieties) were selected from each of the villages, and this gave a total of 280 farmers as the sample size. Data were collected using a structured questionnaire. Data were analyzed using descriptive statistics by computation of frequency and percentage, Means, Standard Deviation and t-test. The study showed that improved maize varieties' farmers had more farming experience (29.66 years) than the local maize varieties farmers (24.89 years) and the difference between the two was significant at 1%. No significant difference was obtained between the two categories of farmers in age, household size and farm size. It was concluded from the result that farming experience plays a significant role in the adoption of new technology by farmers in the area. In order to increase the rate of technology adoption in the area, therefore, it is recommended that experience in farming should be given utmost attention.

Keywords: *Socio-economic characteristics; Maize varieties; Adoption; Farmers*

Introduction

Maize (Zea mays) ranks first after rice (paddy) in the global production of cereals crops (Ajao *et al.,* 2005). The global maize production in 2005 stood at 147.01 million hectares with a total production of 692.03 million tones, giving 4.71 tones per hectare. In Nigeria 4.47 million hectares were under maize cultivation with production of 4.78 million tones per annum, giving a yield of 1.07 tones per hectare (FAO, 2005). The demand for maize as a result of the various domestic uses shows that a domestic demand of 3.5 million metric tons outstrip supply production of 2.0 million metric tones per annum (Akande, 1994).

Abdul-Karim *et al.* (2004) reported that global maize utilization in 1996 totaled 579 million tones with 387 million tones used as animal feed. The researcher further explained that the use of maize for direct human consumption has remained stable at about 100 million tones per annum since 1988. They also reported that in 1996, 97 million tones were used for direct human consumption, as roasted ears, breakfast cereal, pudding, soup, fermented paste, couscous and alcohol. Onwueme (1979) reported that in Nigeria, maize is fast becoming the staple food of the citizenry. He further explained that in the early seventies dominant staple crops were sorghum (Guinea corn) in the north and cassava in both the western and eastern regions. Akinyosoye (1986) reported that maize may be boiled, roasted on the cob; the grains can be cooked fresh, or the dry grain can be made into popcorn "Guguru" and eaten with roasted groundnut. It can also be

made into pap, which is suitable for feeding children, and can also be fed to farm animals such as cattle, sheep and goats when it is young and fresh, and this is called forage maize.

Zamfara state is blessed with a vast area of land that is suitable for production of crops. Maize in Zamfara state is gradually replacing Guinea corn that used to be the most staple food in the state. Maize is widely cultivated, marketed and consumed by the people in the state. The grain is consumed by human and the maize stalk consumed by livestock. The improved maize varieties cultivated by farmers, in the area includes Quality Protein Maize (QPM), Extra Early White, Extra Early Yellow, Oba super I Oba super II and Oba 98. The local maize varieties cultivated in the area included 'Yargara White and Yellow. Other food crops grown in the area are Millet, Rice, Guinea corn. Cassava. Groundnut, sweet potatoes and cowpea (ZSG, 2006). Even though a lot of research on farmers' characteristics that influence technology adoption in maize production have been conducted in other areas, a lot more research is needed on the comparison of the socio-economic characteristics between farmers growing improved and local varieties of maize.

Methodology

The Study Area: The study was conducted in Zamfara State, located in the Northwestern part of Nigeria. The area is geographically located between latitudes 10º 50' N

and 13º 38' N and longitudes 40º 16' E and 70º 13' E, and the state covers a land area of 38,418sq. km (ZSG, 2006). The climate is characterized by a long hot dry season usually lasting from September to May and a short warm wet (rainy) season that usually starts in mid- May and ends in September. The mean annual rainfall is about 900mm. Mean annual temperature is about 30°C with a maximum of 42°C in April - May. Average relative humidity is 50% and annual mean evaporation is 6%. Harmattan also lasts from November-March (Rabi'u *et al*., 2006). The area has abundant grasses for animal grazing and characterized by scattered trees, Baobab, Bean seed, Mango and Neem trees. The inhabitants of the area also engage in trading, rearing and fishing (ZSG, 2006).

Sampling Procedure and Sample Size: The survey was conducted in seven (7) purposively selected Local Government Areas of Zamfara State out of the fourteen (14) existing ones. These are Talata Mafara, Bungudu, Maru, Bukkuyum, Tsafe, Gusau and Anka Local Government Areas which were selected for abundance of maize production in the areas. Two (2) districts were randomly selected from each of the chosen seven Local Government Areas, and this gave a total of fourteen districts. Two (2) villages in each of the 14 districts were randomly selected. This gave a total of twenty-eight (28) villages (required) for the research. Names of farmers using improved maize varieties were obtained from Zamfara Comprehensive Agricultural Revolution Programme (ZACAREP) while farmers using local maize varieties were identified by local leaders, in order to serve as sampling frame. Five (5) farmers who grew improved maize variety and 5 farmers who grew local maize variety from each of the twenty-eight villages were randomly selected. This gave a total of two hundred and eighty (280) maize farmers as sample size for the research.

Data Collection: The data were collected from the farmers through the use of structured questionnaire. The data were collected during the 2007 cropping season only. Since 2007, there has been no any research similar to this conducted involving local and improved maize varieties comparing socio-economic characteristics of the farmers, therefore this research can still be useful as a reference material in the area the study was conducted. The Data were collected on the ages of the respondents, occupation, levels of education, experience in farming, household sizes and farm size.

Data Analysis: The data obtained from the field survey of improved and local maize varieties production in the study area were analyzed by the use of descriptive statistics such as frequency and percentage, mean, standard deviation. The t-test tool was used to evaluate the mean difference. Mean is the average of a series of figures or values and it was obtained in this study by dividing the sum of these figures by the total number of the figures or values (Ewa and Agu, 2004).

Results and Discussion

The socioeconomic characteristics of the farmers studied include Age, marital status, major occupation, level of education attained, experience in farming and household size. Table 1 showed Age of the respondent. Age is one of the important factors, which determine the amount of farm work that can be performed by an individual. It was asserted that, age of the household head was an important factor in the decision to adopt new technology or not by household head in Kaduna and Osun States in Nigeria (Akande *et al.,* 2003). The distribution of the farmers according to age is presented in Table 1. The result showed that, the improved maize farmers are older than the local maize farmers as shown by their average years; thus, 42 and 44 years for local and improved maize farmers, respectively. Their standard deviations were 10.62 and 10.09 for local and improved maize varieties farmers respectively, which showed that standard deviation of local maize varieties farmers was greater than that of improved maize varieties farmers. This implies that the ages in farmers produced local maize varieties varied more widely from their mean compared to the farmers that produced improved maize varieties. Using t-test it was found out that t-cal. (1.23) <t-tab (2.58). This implied that the difference in the means of their ages was not significant statistically even at 5% level. The family is one of the important sources of labour for farm work, because it determines the family size of the farmers and subsequently determines the number of people expected to work on the farm. The distribution of the farmers according to marital status is presented in Table 2.

Table 2 showed that majority (97%) of the farmers in the study area were married. This had to do with the religious and cultural factors in the area that those that were married had more recognition than the unmarried people. This virtually showed that, with few exceptions, all farmers in the study area were married. The occupation of the respondents involves personal activity that is conducted by an individual to derive a certain benefit to enable the individual sustains a living. The significant secondary occupation to maize production, was to allow for more sources of income that could be used either to expand more maize production or use it to solve other domestic problems without necessarily using what was obtained from maize farming. Table 3 showed the distribution of the farmers according to their occupation. The result indicated that the majority of both the two sets of farmers in the study area representing 55.71 and 52.14% for local and improved maize varieties', respectively, are engaged in farming than any other occupation. The result showed that improved maize varieties' farmers had a greater number of civil servants than the local maize varieties farmers (Table 3). This showed a guarantee for a certain amount of income every month and this might have helped them to go for new technology that involved the use of modern farm inputs that were costly. This therefore

showed that there, was more certainty for source of income for the improved maize varieties farmers, which was not the case in local maize varieties farmers. Exactly 35 per cent civil servants of improved maize varieties' farmers showed closeness to government and its agricultural development programmes and that might have influenced adoption decision of the farmers to cultivate the improved maize varieties. The result showed that there were more farmers for the local maize varieties who participated in other business besides farming to serve as source of income either for maize production or solving other domestic problems.

The educational level of a farmer determines his ability to read and understand useful information and instruction that could assist the farmer to adopt new technologies. If a farmer can read past documents that explained advantages of a new technology, he is more likely to go for such new innovation than a farmer who cannot read past documents containing relevant information. Table 4 showed the level of education attained by the farmers. The result in Table 2 indicated that 40 and 35.714 per cent of local and improved maize variety farmers respectively did not attend any form of formal Education. Exactly 64.286 and 60 percent for the improved and local varieties maize farmers respectively had formal education at primary, secondary and tertiary levels; thus, are able to read and understand other agricultural recommendations that could help them to Improve upon their farming operations. The result showed that there were a greater number of educated farmers that produced improved maize varieties, and they were more educated as shown in Table 4. Educational level influenced the readiness to understand and adopt to cultivating new variety of maize to enhance increased maize productivity. This agreed with research reported in Ghana that, better educated farmers adopt new technology more than less educated farmers (Morris et al., 1999). This refers to the number of years an individual farmer has been in farming. It is one of the socio-economic factors upon which agricultural production depends. Prior knowledge is always an important thing that helps in understanding and accepting a related idea. With more years of experience in farming might have exposed the farmer to many new technologies been introduced to him in the previous years that could help him relate the previous knowledge with the present. Table 5 showed the distribution of the farmers according to farming experience.

The result in Table 2 showed that 88.57 and 73.57 per cent of improved and local varieties maize farmers respectively had 16 and above years in farming. Exactly 18.57 and 7.14 per cent of local and improved varieties maize farmers respectively had 11-15 years in farming. It is indicated that, the improved maize varieties farmers had more years of farming experience than the local maize varieties farmers, thus, had an average of 29 and 24 years for improved and local maize varieties farmers,

respectively. Using t-test it was found out that t-cal (4.770) >t - tab (2.587). This implied that the difference in the means of their years of experience in farming was significant (p=0.001). This showed that, years of experience in farming had assisted the farmers to adopt to improved maize varieties to enhance increased maize productivity per hectare. The household size of the farmers determines the contribution of family members in the farming operations. This determines the number of the family members in a household that could contribute for the family labour on the farm. Table 6 shows the distribution of household size of the respondent.

The result in Table 2 showed that, on average improved maize varieties farmers had more household size than the local maize varieties farmers, thus, 10 and 9 for improved and local maize varieties farmers respectively. Their standard deviation was 4.92 and 6.11 for local and improved maize varieties farmers respectively. This implies that, local maize varieties farmers had family size that clustered more around their mean compared to the improved maize varieties farmers. Using t-test, it was found out that t-ca (1.26) <t-tab (2.58). This implies that the difference in the means of their family sizes was not significant statistically even at 5% level.

The result in Table I showed nonsignificant difference in age of the local and improved maize varieties producers. This finding agreed with the finding of Morris et al. (1999) who observed that modern maize varieties adopters and non-adopters in Ghana were not significantly different in terms of their ages. The result (Table 2) indicates difference (p<0.01) in years of farming experience between local and improved maize varieties farmers. The improved maize variety farmers had more years of farming experience than the local maize variety farmers. Thus, 29years and 24years for improved and local maize variety farmers, respectively. It should be known that farmers with more years of experience tend to be in a better position to acquire modern inputs and farming technologies. This showed that years of experience in farming had assisted the farmers to adapt to improved maize varieties. This finding is consistent with the finding of Morris et al. (1999) that years of experience in maize production significantly affected the adoption of modern maize varieties in Ghana. The result in Table 7 also showed that, household size and farm size were not significantly different between the adopters of improved and local maize varieties. This result contradicts the findings of Morris et al. (1999); and Akande et al. (2003) that farmers who owned more sized farms adopted new technology (such as improved maize variety) more than those with small sized farmlands. This was because in the study area the major means of acquiring farmland for maize cultivation were inheritance and communal ownership, therefore, both farmers had equal access to farmland for cultivation.

Conclusion

This study concluded that farming experience plays a significant role in the adoption of new technology by farmers in the study area. In order to increase the rate of technology in the area, therefore, it is recommended that experience in farming should be given utmost attention. There should be more effort at educating farmers about the potential benefits of the improved maize technology by establishment of extensive network for on-farm testing of modern varieties.

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Table 1: Socio-Economic Distribution of Farmers Producing Local and Improved Maize Varieties

Variable	Category	Local Maize Variety (Freq., %)	Improved Maize Variety (Freq., %)
Age Category (Years)	25–34	32 (22.86)	19 (13.57)
	35–44	54 (38.57)	47 (33.59)
	45–54	29 (20.71)	49 (35.00)
	55 and above	25 (17.86)	25 (17.86)
	Total	**140 (100)**	**140 (100)**
	Mean Age ($\bar{X}$)	42.08	44.24
	Standard Deviation (S)	10.62	10.09
	t-calculated	1.23ns	—
Marital Status	Single	4 (2.86)	1 (0.71)
	Married	136 (97.14)	139 (99.29)
	Total	**140 (100)**	**140 (100)**
Major Occupation	Farming Business	78 (55.71)	73 (52.14)
	Others*	23 (16.43)	18 (12.86)
	Civil Service	39 (27.86)	49 (35.00)
	Total	**140 (100)**	**140 (100)**
Level of Education	Nonformal	56 (40.00)	50 (35.71)
	Primary	21 (15.00)	24 (17.14)
	Secondary	42 (30.00)	29 (20.71)
	Tertiary	21 (15.00)	37 (26.42)
	Total	**140 (100)**	**140 (100)**
Farming Experience (Years)	1–5	0 (0.00)	2 (1.43)
	1–10	11 (7.86)	4 (2.86)
	11–15	26 (18.57)	10 (7.14)
	16 and above	103 (73.57)	124 (88.57)
	Total	**140 (100)**	**140 (100)**
	Mean Experience ($\bar{X}$)	24.89	29.66
	Standard Deviation (S)	10.75	11.13
Household Size	1–4	21 (15.00)	15 (10.71)
	5–9	59 (42.14)	56 (40.00)
	10–14	43 (30.71)	40 (28.57)
	15 and above	17 (12.14)	29 (20.71)
	Total	**140 (100)**	**140 (100)**
	Mean Household Size ($\bar{X}$)	9.24	10.41
	Standard Deviation (S)	4.92	6.11

Footnotes

1. "Others" under occupation include trading, crafts, and informal non-farm activities.

2. ns = Not significant.

3. All data sourced from Field Survey.

4. Means and standard deviations are presented directly under their respective variables for clarity.

Table 2: Comparison of Selected Socio-Economic Characteristics of Farmers Producing Local and Improved Maize Varieties

Characteristic	Local Variety (Mean ± SD)	Improved Variety (Mean ± SD)	t-cal	t-tab	Significance
Age (years)	42.08 ± 10.62	44.24 ± 10.09	1.23	1.96	NS
Farming Experience (years)	24.89 ± 10.73	29.66 ± 11.13	4.770*	2.587	P < 0.01*
Household Size (No.)	9.24 ± 4.92	10.41 ± 6.11	1.26	1.96	NS
Farmland Size (ha)	2.86 ± 6.17	2.72 ± 4.86	0.21	1.96	NS

Footnotes

1. *** = Significant at 1% level (p < 0.01)**

2. NS = Not significant.

3. T-tab values represent the critical values at the specified significance level.

4. Data from Field Survey.