Comparative Analysis of Socio-Economic Determinants of Rain-fed Maize Production in Jaunpur District Uttar Pradesh, India and Adamawa State, Nigeria

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Abstract: This present study conducted in Adamawa state and Jaunpur district has effectively reported the socio-economic determinants in rain-fed maize production in the areas. The major findings showed that rain-fed maize production was dominated by young energetic men who are literate, well experienced and practice farming as their major occupation in the study areas. The results of the multiple regression analysis showed that gender, age, marital status, literacy level, farming experience and household size had positively influenced the output of maize in Adamawa state. Similarly, four variables (gender, marital status, literacy level and main occupation) of the estimated variables in Jaunpur district had positively influenced the output of rain-fed maize. The study suggests the need to prioritize researches in socio-economic determinants of rain-fed maize to increase productivity and income of farmers in the study areas.

Keywords: Adamawa state, Jaunpur district, Maize, Multiple regression, Socio-economic.

Introduction

The word socio-economics is sometimes used as an Umbrella term with different usages. The term social economics may refer broadly to the "use of economics in the study of society". More narrowly, contemporary practice consider behavioral interactions of individuals and groups through social capital and social "markets" (not excluding, for example sorting by marriage) and the formation of social norms. In the latter, it studies the relation of economics to social values (Wikipedia, 2018).

In Nigeria maize production is predominantly a rain-fed crop and widely grown at different ecological zones, particularly in the northern part of the country. It is one of the major important cereal crops and has been in the diet of Nigerians for centuries. Nigeria's maize production had a humble beginning; it stayed around one million ha through the early 1980s. Accelerated growth started in the mid-1980s, when hybrids were introduced, exceeding the 5 million ha mark in the mid-1990s, following the introduction of early varieties; it declined or remained slow during the late 2000s, mainly due to drought and erratic rainfall, but picked up thereafter. Currently it occupies the largest area of cultivated land in the country (Ryan, 2015).

In India maize is essentially a warm weather (Kharif) crop about 60 per cent of total net sown area comes under rain-fed lands. Rain-fed crops account for 48 per cent area under food crops and 52 per cent under non-food crops. India ranks first among the rain-fed agricultural countries of the world in terms of both extent and value of produce. Due to population pressure on agricultural lands, the poverty is concentrated in rain-fed regions. The climate in India's rain-fed regions is characterized by complex climatic deficiencies, manifested as water scarcity for rain-fed crop production. The climate is largely semi-arid and dry sub-humid with a short (occasionally intense) wet season followed by long dry season. Rainfall is highly unreliable, both in time and space, with strong risks of dry spells at critical growth stages even during good rainfall years. The fluctuations are due to numerous factors affecting the monsoonal climate including the atmospheric circulation. (http://www.gktoday.in/rainfed-agriculture-in-india/)

Rain-fed maize production would be enhanced by increasing the effective rainfall usage through improved water management, increase crop yields through agricultural research or through reform policies and increase investment in rain-fed areas as well as proper understanding of socio-economic characteristics of the farmers. Therefore, the present study is an attempt to highlight various issues and challenges related to socio-economic determinants in rain-fed maize production: A case of Jaunpur District Uttar Pradesh, India and Adamawa State, Nigeria.

Methodology

The study was carried out in Adamawa State, North Eastern part of Nigeria and Jaunpur district Uttar Pradesh, India. They were selected purposively based on the level of rain-fed maize production in the areas.

Two out of the 21 local government areas of Adamawa state (Fufore and Ganye) and Baksha and Sirkoni of 21 developmental blocks of Jaunpur districts were purposively selected for the study, on the basis of their maximum production of maize under rain-fed condition.

Eight villages from Fufore and Baksha and seven from Ganye and Sirkoni were purposively selected from each of the sampled local government areas and blocks respectively for the study, on the basis of their maximum area under rain-fed condition. Thereafter, a list of rain-fed maize farmers was prepared for each sampled villages and a total of 280 rain-fed maize farmers were randomly selected using random table.

Data Collection

The study employed primary data for 2014-2015 (Kharif maize) in the study areas. From randomly selected 280 respondents, primary data related to socio-economic parameters were collected through personal interview using pretested schedule in the study areas. Secondary data were collected from relevant published research articles.

Analytical Tools

Descriptive statistics as well as multiple regression analysis was used to assess the socio-economic status of the respondents.

The implicit form of the model is mathematically represented as:

Y = F (G, AG, MS, LL, FE, MO, FS, EC, CA)

Where: Y output of maize (kg), G Gender (1 for male & 0 for female), AG Farmers Age (years), MS Marital Status , LL Literacy Level (years), FE Farming Experience, MO Main Occupation, FS Family Size (number), EC Extension Contacts (1 contacted, 0 otherwise), CA Credit Availability (1 accessed credit, 0 otherwise).

Result and Discussions

Gender Distribution of Respondents

The distribution of the respondents according to gender is presented in Table 1. The result reveals that majority of the farmers 69.29 and 52.14 per cent were male while 30.71 and 47.86 per cent of them were female in Adamawa state and Jaunpur district respectively; this indicates that there were more male in maize production than their female counterpart. This can be attributed to the fact that men always have right to land as a productive resource than women and often stronger, active and have the potential to work for long hours on the farm than female fellow. It also implies that majority of the women have multiple roles which are likely to hinder their effective participation in maize production; Ezumah (1995) found that reproduction and domestic responsibilities impinge on women's time and mobility. The result corroborates the findings of Usman *et al.* (2015) who also found that male dominated white maize production in Fufore local government area of Adamawa state, Nigeria.

Distribution of the Respondents According to Age

The age distribution of the respondents is presented in Table 1. The table reveals that 52.86% of the sampled rain-fed maize farmers were within the age range of 21-40 years in Adamawa state and more than half (65.75%) fall within 41 years and above in Jaunpur district. The result clearly reveals that majority of the farmers were young people with a mean age of 38.34 and 44.02 years respectively in Adamawa state and Jaunpur district, respectively. The reason could be that younger farmers are more agile, energetic, aggressive in farming; capable of making good production decision and have potential for greater productivity (panin, 2009). These groups of people are likely to be more efficient in agricultural production than older farmers. This category of farmers would be able to put in a lot of effort to raise the level of efficiency, given a contributory

policy environment. This result follows the assertion of Olaniyi (2012) who had earlier reported that this category of youth is considered to be matured and more productive in economic enterprises.

Distribution of the respondents according to marital status

The distribution of the respondents according to marital status is presented in Table 1. The table shows that greater proportion 74.28 and 82.86 per cent of the respondents were married in Adamawa state and Jaunpur district respectively. This implies that married people were more involved in rain-fed maize production than other categories of marital status. This is because married men and women have greater household responsibilities and seek various ways to feed their families. The finding is in line with Umunna (2010) who reported that married farmers were likely to be under pressure to produce more, not only for family consumption but also for sale.

Educational level of respondents

The distribution of the respondents according to their level of education is presented in Table 1. The result shows that (39.29%) of the farmers had no formal education while 60.71% had one form of formal education in Adamawa state and they may be engaged in rain-fed maize production probably because of absence of alternative job opportunities. Similarly, 25.71% of the farmers had no formal education while 74.29% had one form of formal education or the other in Jaunpur district. This means that majority of the farmers were literate and have better chance of understanding and adopting new technological innovation and methods of production; hence are likely to be efficient in their production. The result corroborates the findings of Olaniyi (2012) who reported high level of literacy among rural youth would immensely contribute to their innovativeness and adoption of various farm technologies as well as influence the use of agricultural information.

Table 1: Socio – economic determinants of rain-fed maize production

Factors	Jaunpur District Frequency	Percentage	Adamawa State Frequency	Percentage
Gender				
Male	73	52.14	97	69.29
Female	67	47.86	43	30.71
Total	**140**	**100.00**	**140**	**100.00**
Age (years)				
≤20	03	2.10	06	4.28
21-40	45	32.15	74	52.86
≥41	92	65.75	60	42.86
Total	**140**	**100.00**	**140**	**100.00**
Mean	**44.02**		**38.34**	
Marital status				
Married	116	82.86	104	74.28
Single	10	7.14	18	12.86
Widow	14	10.00	18	12.86
Total	**140**	**100**	**140**	**100.00**
Literacy level				
No formal Edu.	36	25.71	55	39.29
Formal education	104	74.29	85	60.71
Total	**140**	**100.00**	**140**	**100.00**
Experience (years)				
≤20	56	40.00	62	44.28
21-40	61	43.57	62	44.29
≥41	23	16.43	16	11.43
Total	**140**	**100.00**	**140**	**100.00**
Mean	**24.62**		**14.56**	

Household size				
1-10	108	77.15	94	67.14
11-20	30	21.43	41	29.29
>20	2	1.42	05	3.57
Total	**140**	**100.00**	**140**	**100.00**
Mean	**7.00**		**8.38**	
Occupation				
Farming	97	69.29	81	57.87
Others	43	30.71	59	42.13
Total	**140**	**100.00**	**140**	**100.00**
Farm size (ha)				
≤ 1.0	120	85.71	115	82.14
1.1-3.0	17	12.14	19	13.57
≥ 3.1	03	2.15	06	4.29
Total	**140**	**100.00**	**140**	**100.00**
Mean	**0.72**		**0.82**	
Extension contacts				
Yes	20	14.29	44	31.43
No	120	85.71	96	68.57
Total	**140**	**100.00**	**140**	**100.00**
Access to credits				
Yes	110	78.57	8.00	5.71
No	30	21.43	132.0	94.29
Total	**140**	**100.00**	**140**	**100.00**

Distribution of the respondents according to farming experience

The distribution of respondents according to their farming experience in Table 1 reveals that majority of the farmers (44.29%) and (43.57%) have been producing maize for upwards of 20 years, while 44.28 and 40.00 per cent have at most 20 years of experience in Adamawa state and Jaunpur district respectively. The mean of farming experience were 14.56 and 24.62 years in Adamawa state and Jaunpur district, respectively. It can therefore, be deduced that majority of the farmers were experienced rain-fed maize growers. Also, since experience is gained with age and farming being the major occupation of most of the respondents, the number of years of experience in farming can be linked with the age of the farmer. The older the farmer, the more experienced he is and the better his understanding of farming practices. Ndaghu *et al.* (2015) also found that most (80%) of maize farmers in Safana local government area of Katsina state, Nigeria had above 10 years of farming experience. Years of farming experience were important because managerial skills of rain-fed maize farmers improved with experience; consequently, lead to improved productivity and efficiency in production.

Distribution of the respondents according to household size

The distribution of the respondents according to household size is presented in Table 1. The result shows that the mean household size were 8.38 and 7.00 in Adamawa state and Jaunpur district, respectively which implies that the members of the household may contribute immensely to family labour supply and are more likely to depend less on hired labour. Nelson (2015); Ohajianya *et al.* (2010) also reported household size as an important determinant of efficiency in maize production.

Distribution of the respondents according to occupation

The distribution of respondents according to their occupation in Table 1 reveals that 57.87 and 69.29 per cent of respondents were full-time farmers in Adamawa state and Jaunpur district respectively, this means that greater number of them depend on farming for their

livelihood. While 42.13 and 30.71 per cent of the respondents have other occupations but practice rain-fed maize farming, possibly to supplement their income. Farmers engaged in other activities often do not re-invest properly into the farming enterprise as they usually tend to diversify their income into the various activities they engaged in. This practice may not be favorable to the development of agricultural sector. Onojah (2013) in a related study in Kogi state also found maize farming as a major occupation of the respondents.

Farm size of respondents

The distribution of the respondents according to farm size is presented in Table 1. It shows that nearly all farmers (95.71%) and (97.85%) produced rain-fed maize in small farms within 3 hectares in Adamawa state and Jaunpur district respectively. The mean of farm sizes were 0.82 and 0.72 hectares in Adamawa state and Jaunpur district respectively. It shows that majority of the households were carrying out small scale subsistence production, which is a negative contributing factor to the rain-fed maize output in the study areas. Farm sizes to a greater extent determine the yield of farmers. Farmers with large farm lands will be motivated to cultivate more and therefore have higher yield. The variation in farm size was due to the fact that the most common mode of land acquisition in Adamawa state was through inheritance and the amount of land inherited depends on position of the farmer in the family and the number of wives and siblings. While rent was the most common mode in Jaunpur district. This will occlude the strength of the respondents to take loans since land is one of the major forms of collateral in the lending process. Nelson (2015); Saulos (2015), also reported farm size as an important determinant of efficiency in maize production.

Distribution of the respondents according to extension contacts

The distribution of respondents according to their contacts with extension agents is presented in Table 1. The finding of the study reveals that majority (68.57%) and (85.71%) of the respondents indicates that they had no contacts with extension agents at all during the cropping season while 31.43 and 14.29 per cent had contacts with extension agents in Adamawa

state and Jaunpur district respectively. Farmers must have information about the intrinsic characteristics of improved varieties before they can consider planting them or not. Despite the fact that contacts with extension agents may probably increase the knowledge of young farmers on farm technologies innovations; majority of them were not reached with adequate information from the extension agents. This is in line with Ogunwale (2005) assertion that contacts with extension agents under Teaching and Visit (T and V) system brings about remarkable increase in knowledge of farmers about farm technologies and practices.
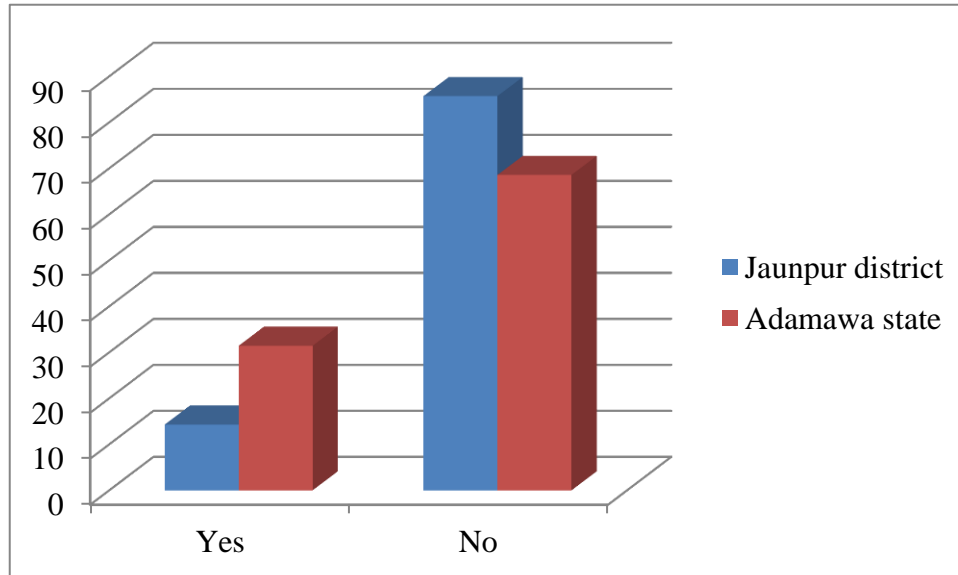

Figure 1: Extension contacts of the respondents

Distribution of the respondents according to accessibility to credit facilities

The distribution of respondents according to their accessibility to credit facilities is presented in Table 1. The finding from the study shows that majority (94.29%) of the respondents had no access to credit but depend solely on their personal saving as their source of farm credit and 5.71 per cent sourced credit from money lenders, cooperatives or banks in Adamawa state. While in Jaunpur district majority (78.57%) of the respondents had access to credit and very few and 21.43 per cent had no access to credit but depend solely on their personal saving as their source of farm credit. It can be inferred that respondents in Adamawa state do not

enjoy credit facility from financial institutions/agency. This is because financial institution such as bank and other lending agencies appears either not accessible or have stringent condition attached to their services such as high interest rate and hiding charges thereby making it inaccessible; these of course have hampered production to a large extent in the area. Anon (2009) asserted that loan is a crucial input and can be used to establish and expand farm sizes thereby increasing production.

Distribution of the respondents according to land acquisition

The distribution of respondents according to land acquisition is presented in Table 2. The table reveals that majority of the respondents (42.86%) acquired their farm land through inheritance, followed by those who rent (32.14%) then through gift (21.43%) while only 3.57% of them possessed it via purchased in Adamawa state. While rent (46.43%) and inherited (28.57%) were the major means of land acquisition in Jaunpur district. Immoderate possession of land by inheritance could lead to excessive land fragmentation as a result of population growth, hence affecting the size of land appropriated to rain-fed maize production. This implies that farm sizes cannot be expanded for maximum production. The finding supported the assertion by Adebayo *et al*. (2010) that access to productive resource especially land served as source of collateral in the acquisition of credit for farmers in Africa.

Table 2: Distribution of respondents according to land acquisition

Land acquisition	Jaunpur district		Adamawa state	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Inherited	40	28.57	60	42.86
Gifted	05	3.57	30	21.43
Purchased	30	21.43	05	3.57
Rented	65	46.43	45	32.14
Total	**140**	**100.00**	**140**	**100.00**

Table 3. depicts the results of regression analysis. The adjusted R square was found to be 0.472 which indicates that about 4.72 percent change in dependent variable (output of rain-fed

maize) is explained by the independent variables (gender, age, marital status, literacy level, farming experience, family size). This implies that these variables had positively influenced the output of maize in Adamawa state. Similarly, four variables (gender, marital status, literacy level and main occupation) of the estimated variables in Jaunpur district had positively influenced the output of rain-fed maize. The adjusted R square was found to be 0.499 which indicates that about 4.99 percent change in dependent variable is explained by the independent variables (Table 4).

Table 3: Socio-economic characteristics of rain-fed maize farmers in Adamawa state

Regression Statistics

Multiple R	0.710884
R Square	0.505355
Adjusted R Square	0.471548
Standard Error	3363.195
Observations	140

	Coefficients	Standard Error	t Stat	P-value
Intercept	32.9631	15.6942	6.754	0.000*
Gender	90.08672	41.73982	2.158292	0.032715**
Age	-6.18329	2.070882	2.98582	0.003367*
Marital status	-121.244	51.19642	-2.36822	0.019325**
Literacy level	1767.06	708.1304	2.495388	0.013815**
Farming experience.	199.5303	68.67361	2.905487	0.004301*
Main occupation	89.65675	735.9333	0.121827	0.903221
Family size	140.1343	65.02096	2.155217	0.032946**
Extension contacts	3.370331	663.6491	0.005078	0.995956
Credit availability	-19.9307	44.98737	-0.44303	0.65847

*Significant at 1% level, **Significant at 5% level

Table 4: Socio-economic characteristics of rain-fed maize farmers in Jaunpur District

Regression Statistics

Multiple R		0.729058		
R Square		0.531525		
Adjusted R Square		0.499106		
Standard Error		3273.019		
Observations		140		
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	57.5241	22.2514	11.254	0.00*
Gender	152.6783	44.37752	3.440442	0.000778*
Age	-1420.82	1147.162	-1.23855	0.217709
Marital status	-128.569	54.11181	-2.37598	0.01894**
Literacy level	-121.405	50.458	-2.40605	0.017501**
Farming experience	64.53801	68.47974	0.94244	0.347689
Main occupation	1581.981	847.3625	1.866947	0.064127***
Family size	108.0786	1184.195	0.091268	0.927418
Extension contacts	173.3816	660.5007	0.2625	0.793345
Credit availability	100.7182	35.76329	2.816246	0.005599

*Significant at 1% level, **Significant at 5% level; ***Significant at 10% level

Conclusion and Recommendations

The socio –economic determinants of rain-fed maize production has been analysed using multiple regression analysis. The results clearly revealed that male farmers constituted the majority of the respondents and were mostly married, with a mean age of 38.34 and 44.02 years in Adamawa state and Jaunpur district respectively. These groups of farmers are likely to be more efficient in agricultural production than older farmers. The reason could be that younger farmers are more agile, energetic and aggressive in farming. The literacy level was high as majority of them had one form of formal education or the other. Majority of the respondents were full-time farmers with a mean farming experience of 24.62 and 14.56 years in Jaunpur district and Adamawa state respectively. Nearly all farmers produced maize in small inherited farms land below 3 hectares and used personal savings to finance their rain-fed maize cultivation in Jaunpur district and Adamawa state respectively. The results of the multiple regression analysis revealed that six variables gender, age, marital status, literacy level, farming experience

and household size had positively influenced the output of maize in Adamawa state. Similarly, four variables (gender, marital status, literacy level and main occupation) of the estimated variables in Jaunpur district had positively influenced the output of rain-fed maize. The study therefore, suggests the need to prioritize researches in socio-economic determinants of rain-fed maize to increase productivity and income of farmers in the study areas.

References:

[1]   Adebayo, E.F., Moses, J.D. and Olawoye. (2010), Technical Efficiency of Women Farmers inn Adamawa State. Proceedings of the *24th National Conference of Farm Management Association of Nigeria*, Faculty of Agriculture, Adamawa State University, Mubi, Nigeria, October 11-14, 2010.

[2]   Annon, I. (2009), Nigeria Vision 20: 2020. Economic Transformation, Blueprint.

[3]   Ezumah, N.N. and Domenico, C.M.D. (1995), Enhancing the Role of Women in Crop Production: A case of Igbo Women in Nigeria. *World Development Report*, **23**(10):1731-1744.

[4]   Ndaghu, N.N., Abdulsalam, Z., Abdul Rahman, S. and Abdoulaye, T. (2015), Socio-economic factors affecting adoption of early maturing maize varieties by small scale farmers in Safana Local Government Area of Katsina State, *Nigeria. Journal of Development and   Agricultural Economic*, **7**(8):273-281.

[5]   Nelson, M., Makate, C., Hanyani-Mlambo, B., Siziba, S. and Lundy, M. (2015), A Stochastic Frontier Analysis of Technical Efficiency in Smallholder Maize Production in Zimbabwe: The Post-fast-track Land Reform Outlook, *Cross Mark Journal of Cogent Economics and Finance*, **3**(1):1-14.

[6]   Ogunwale, A.B. (2005), Implementation of the training and visit system of extension service in Oyo State Agricultural Development Programme (ADP) in Nigeria. *International Journal of Applied Agriculture and Apicultural Research*, Faculty of Agricultural Sciences, Ladoke Akintola University of Technology, Ogbomoso, Nigeria. **2**(1):147– 155.

[7]   Ohajianya, D.O., Echetama, J.A., Offodile, P.O., Osuagwu, C.O., Henri-ukoha, A., Okereke, E.N. and Anyaoha, N.O. (2010), Allocative Efficiency among Maize Farmers in Imo State, Nigeria. *Report and Opinion*, **2**(12):139-147.

[8]   Olaniyi, O.A. and Adewale, J.G. (2012), Information on Maize Production among Rural Youth: A Solution for Sustainable Food Security in Nigeria. *Library Philosophy and Practice (e-journal). Paper* 724.

[9]   Onojah, C., David, A.A., Joseph J. and Olufemi, O.A. (2013), Relationship between Farmers Socio-Economic Characteristics and Maize Production in Nigeria: *Global Journal of Current Research* **1**(4):124-13.

[10]   Pannin, A. and Brummer, B. (2000), Gender differentials in resources ownership and crop productivity of small holder farmers in Africa. *Quarterly Journal of International Agriculture* **39**(1): 97-107.

[11]   Ryan, R.S. (2015), Nigeria; Grain and Feed Annual Report, United States Department of Agriculture (USDA), Global agricultural information Network, https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Grain%20and%20Feed%20Annual_Lagos_Nigeria_4-20-2015.pdf, date Accessed 15th October, 2015.

[12]   Saulos, J.C. (2015), A Survey on Technical, Allocative, and Economic Efficiency of Maize Production using the Parametric Stochastic Frontier Production Function, *Journal of Agricultural Economics and Rural Development*, **3**(6):237-245.

[13]   Umunna N. O. (2010), Personal and Socio-Economic Determinants of Agricultural Information Use by Farmers in the Agricultural Development Programme (ADP) Zones of Imo State, Nigeria. *Library Philosophy and Practice*: 1-8.

[14]   Usman, J., Zalkuwi, J., Bakari, U.M. and Hamman, M. (2015), Economics of White Maize Production in Fufore Local Government Area of Adamawa State, Nigeria *International Journal of Scientific Research and Management (IJSRM),* **3**(2):2159-2166

[15]   Wikipedia, 2018. http://en.m.wikipedia.org/wikisocioeconomics.

[16]   http://www.gktoday.in/rainfed-agriculture-in-india/