Socio – Economic Factors that Affect Sorghum Production in Adamawa State, Nigeria

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Abstract: *The study examines the socio-economic characteristics affecting sorghum production in Adamawa State. Data were collected from 240 farmers with the help of structured schedule, using random and purposive sampling. The result reveals that male farmers dominate the enterprise, mostly married with a small family size; most of them attended one form of education or other, with a small farm size. The coefficient of gender, age, education and credit variables were estimated to be negative and statistically significant*

Keywords: Socio-Economic, Sorghum, Inefficiency Effect, Adamawa, Nigeria

1. Introduction

Agricultural industry was accorded scanty attention after the discovery of oil in commercial quantity in Nigeria. This has created a gap between the demand and supply of domestic food requirements. Consequently, the country has found it increasingly difficult to feed her teeming population and supply the local industries from the domestically produced food and raw materials. The annual widening gap between food and raw materials demand and supply in the country gave room for concern (Igben 1988, Zalkuwi et al 2014)

Sorghum is the fifth most important cereal crop grown in the World and the third most important crop. It is a coarse upright growing grass used as food, livestock feeds and fencing houses. In many parts of the world sorghum has been used in food products and various food items; malted beverage, cake, ethanol, bread, cookies and brewery are made from this grain. Traditional food preparation of sorghum is quite varied. Boiled sorghum is one of the simplest utilization of sorghum; corn grains are normally desired for this type of food product. The whole grain may be grinded into flour fine particle product or flour, which is then used in various traditional foods. Nigeria is the largest producer of sorghum in West Africa accounting for about 71% of the total regional sorghum output. Sorghum is the 3rd cereal in terms of quantity of production in Nigeria. Production declined since 2014 due to the strong reduction of both area harvested and yields. Sorghum is considered as a thinly traded commodity owing to the small amount of exports and imports

Socioeconomic factors (age, marital status, education, household size, farm size, social participation and so on) are important factors affecting productivity level in Nigeria. Therefore their effect will help policy makers in the country to make more informed decisions in improving production and livelihood of the farmers. The major objective of this study was to examine the socio-economic factors influencing sorghum production.

2. Methodology

Adamawa State based on their production level was selected purposively. The state has twenty-one Local Government Areas (LGA) which are categorized into four agricultural zones; South West, Central, North West and North East Zone. Twenty percent of total LGA i.e four LGA were purposively selected from each zone, comprise Viz; Ganye, Guyuk, Mubi South and Girei.

Selection of district
Ten percent (one) district from each LGA was selected purposively on the basis of highest sorghum production. Thus total 4 districts were selected

Selection of villages
A list of all villages in the four districts was prepared on the basis of sorghum production, 10 percent of the villages having the highest sorghum production in each district were selected, and then 10 percent of the farmers were selected randomly to give a total of 240 farmers.

Collection of data
Primary data was collected from 240 sorghum farmers from Adamawa state, Nigeria. The main instrument that was used for collecting the data was structured schedule for the period of July 2013-December 2013. The descriptive statistics and the frontier stochastic production function were used for the analysis of data.
The inefficiency model is defined by,
$$U_i = \delta_o + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_5 Z_5 + \delta_5 Z_5 + \delta_6 Z_6 + \delta_7 Z_7$$
Where,
U_i = inefficiency effect
Z_1 = Age of farmer (in years)
Z_2 = Literacy level (in years)
Z_3 = Farming experience (in years)
Z_5 = Extension contact (1 contacted, 0 otherwise)
Z_5 = Gender of the farmer (1 female and 0 for female)
Z_6 = Family size (total number of person in household)
Z_7 = Access to formal credit (binary)

3. Result and Discussion

Socioeconomic Characteristics of the Respondents

Socioeconomic characteristics is an economic and sociological combination of total measure of a person's economic and social position relative to others, based on experience, gender, age, marital status, household size,

education, among others. These characteristics as they relate to the respondents are discussed below.

Table 1: Socioeconomic Characteristic of the Respondents

| Factors	Frequencies	Percentage
Gender		
Male	168	70
Female	72	30
Total	240	100
Age Interval (years)		
≤ 30	80	33.5
31-60	142	58
>60	18	8.5
Mean	37.2	
Total	240	100
Marital status		
Married	172	71.7
Single	68	28.3
Total	240	100
Household size		
01-04	116	48.3
05-09	88	36.4
>9	36	15
Total	240	100
Educational level		
No formal education	81	34
One form of formal education	159	66
Total	240	100
Types of occupation		
Farming	180	75
Others	80	25
Total	240	100
Farming experience (years)		
01-5	98	40.8
6-15	88	36.7
>16	42	22.5
Total	240	100
Farm size (ha)		
≤ 2.0	136	56.7
2.1-5.9	84	35
≥ 6.0	20	8.3
Total	240	100
Land acquisition		
Inheritance	192	**80**
Other source	43	20
Total	240	100
Access to credit		
Yes	12	**5**
No	228	95
Total	240	100
Extension		
Yes	54	22.5
No	186	77.5
TOTAL	**240**	**100**

Gender Distribution of Respondents

The distribution of the respondents by gender is presented in Table 1. The table reveals that 85% of the respondents were males, while females constituted 36%. This study reveals that food crop production in the study area is mostly undertaken by the male gender. The dominance of the male in the sorghum production activities may be due to the fact that it involves more fatigue and stress, and the low percentage of women participating in the sorghum farming may also be explained by socio-cultural factors affecting

women, stress involved and the fatigue involved and not as a result of technical and managerial inefficiency. Furthermore, male farmers are the most beneficiaries of subsidized fertilizer sales in the study area. This conforms to the assertion by Phillis and Umebali (2008) that agricultural policies do not explicitly recognized the role of women farmers. Consequently, development assistance is usually directed to male farmers, regarding women's work on farm as simply "what women do" hence their contribution have remained invisible
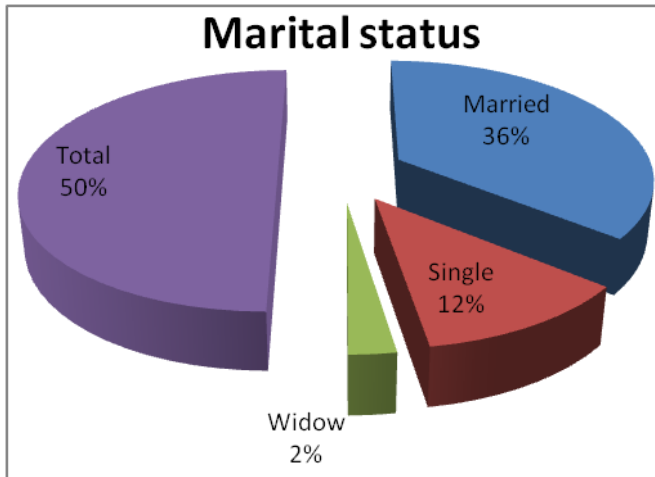
Age Distribution of Respondents

The age distribution of the respondents is presented in Table 1. The distribution shows that about 33.30% of the respondents were not more than 30 years of age, while over 59% were between 31 and 50 years of age. Only about 8% were over 50 years of age. The mean age of the respondents is 37 years with standard deviation of about 10 years, an indication of significant variation in age of the respondents who are relatively young and physically active. This has direct bearing on the availability of able-bodied manpower for primary production. Moreover, age influences the ability to seek and obtain off-farm jobs and income, which could increase farmers' income and ultimately their production capacity. Maurice (2005), Amaza *et al*. (2006) and Zalkuwi(2012) reported a significant relationship between farmers' age and efficiency in agricultural production where younger farmers have the tendency to operate more efficiently than older farmers.
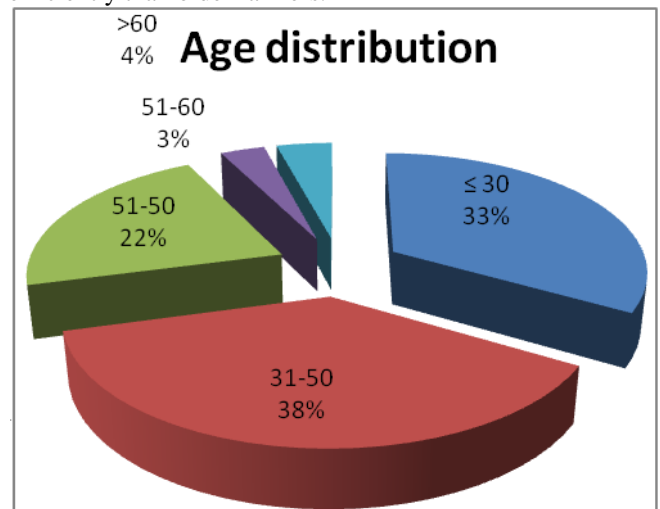
Marital Status of Respondents

The distribution of the respondents by marital status is presented in Table 1. The table reveals that about 71.70% of the respondents were married, while about 23.30% were singles. Widows constituted the remaining 5%. The implication of marital status on agricultural production can be explained in terms of the supply of agricultural family labour. The supply of family labour would be more where the household heads are married.

Marital status

Total 50%
Married 36%
Single 12%
Widow 2%

Household Size of Respondents

The distribution of the respondents by household size is presented in Table 1. The table reveals that about 48% of the respondents have household size of up to 4 people, while about 52% have household size of 5 people and above. The mean household size is 6 which is relatively large, justifying the fact that majority of the respondents are married. The number of persons in households is very important in determining the labour available for farm-work. It also affects household income and household food requirements. Greater family size increases efficiency because most farmers are financially constrained and thus, the availability of family labour will ease hiring of labour

Educational Levels of Respondents

This is an important factor that determines the ability of an individual to understand policies or programmes that affect him. The educational distribution of the respondents is presented in Table 1. The table reveals that about 20.80% of the respondents had no formal education, 27.50 % attained primary education, 24.20% attained secondary education and 27.50% attained tertiary education. Thus, about 79% of the respondents had some form of formal education. The mean years of formal education is about 9 years while the mode is about 15, which indicates that majority of the respondents have attained at least a secondary education. This study reveals that literacy level is high among the respondents and this could have implication for agricultural production in the area. Education affects productivity through a choice of better inputs and output, and through a better utilization of existing inputs. Adoption of agricultural innovations is also easier and faster among the educated farmers than the uneducated farmers as orchestrated by Njoku (1991) and Amaza *et al*. (2006) and thus, moves them closer to the frontier output.

Main Occupation of Respondents

The primary occupation of sorghum farmers in the State is presented in Table 1 These includes farming, civil service, trading and others. About 75% of the respondents were full-time farmers, 19% were civil servants, and about 2% were traders, while about 4% are involve in other occupation. This occupational distribution of the respondents reveals that farming is the most common activity in the area. It is also clear that the agricultural sector is the highest employer of labour in the State. The implication of this situation is that there is need for increased investment in the development of the agricultural sector in order to make for increased sustainability and growth of the sector.

Farming Experience of Respondents

The distribution of the respondents by farming experience is presented in Table 1. The table reveals that about40.80% of the respondents had up to 5 years of experience in sorghum production, while about 24.2% had 6-10 years of farming experience. About 30% of the respondents had farming experience of more than 11 years. The mean years of farming experience is about 11 years while the mode is about 2. This indicates that most of the respondents were well experienced in sorghum production. This should translate into significant level of specialization and expertise in sorghum production as it could stimulate willingness in the respondents to adopt measures that could improve productivity, production and overall efficiency in food crop production. Comparable finding obtained by Shehu *et al*., (2007) who reported significant relationship between farmers productivity with farming experience.

Farm Size of Respondents

The distribution of the respondents according to farm size is presented in Table 1. The table shows that about 56.70% of the respondents cultivated up to 2 hectares of farm land, while about 35% cultivated 2.1-5.9 hectares. However, only 8.30% of the respondents cultivated 6 hectares and above. The mean farm size of the respondents is about 3 hectares. This reveals that sorghum farmers in the study area are mainly small scale farmers. According to NBS (2006) and Awoke and Okorji (2005), small scale farmers are farmers who cultivate between 0.1 and 5.99 hectares and produce on subsistence level.

Land Tenure System for Sorghum Production

As observed by Adebayo and Onu (1999), land ownership is one of the socio-economic characteristics of farmers which affect their productivity. Table 1 shows that 80 % of land ownership was inherited while only 20 was either leased or purchased. The implication of majority using inherited land is that it would lead to fragmentation of farmland as a result of sharing among siblings hence reducing the size of farmland for agricultural practices.

Accessibility to Credit Facilities among the Respondents

Table 1 reveals that only 5 % sorghum farmers obtained loan. The remaining 95 % sorghum producer did not obtain loan. They complained that both interest rate and transactional cost of agricultural loans were high especially from formal lenders. So their main source of capital is personal savings. This implies that most farmers might not be able to take advantage of economies of scale and hence become cost inefficient. This finding is in agreement with Stephen (2006) who reported that 96.58 % of farmers in Adamawa state depend on personal saving.

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Extension Contacts

Extension is one of the major tools through which new innovations are transferred to practicing farmers and it usually has significant effect on the economic efficiency level of farmers. The study shows that extension visit in the study area was very poor as only 22.5 % sorghum farmers were visited by extension agents and 77.5 % of sorghum farmers which constitute the majority were not visited. The use of agricultural technologies is believed to be a strategy for making small scale farmers economically viable (Bzugu and Gwary, 2005). It implies that the level of efficiency of sorghum producers might be static since the extension workers were not visiting the farmers.

Table 2: Determinants of Technical Inefficiency

Inefficiency effects	Parameter	Coefficient	t-ratio
Gender	d_1	-0.1683***	-2.7568
Marital status	d_2	-0.0220	-0.4301
Age	d_3	-0.1947**	-2.1432
Family size	d_4	-0.0087	-0.0447
Education	d_5	-0.1692***	-2.7431
Farming experience	d_6	-0.0751	-0.4737
Credit	d_7	-0.2271***	-0.3458
Extension visit	d_8	0.0188	0.2704

The inefficiency parameters include gender, marital status, age, family size, education, farming experience, credit, and extension agent. The inefficiency parameters are specific as those relating to farmers specific socio-economic characteristics and were examined by using the estimated d coefficients. According to Adebayo, (2007), a negative d coefficient indicates that the parameters have a positive effect on efficiency and vice versa.

The coefficient of gender is estimated to be negative and statistically significant at 1% level. This implies that increase in the gender by one unit will increase the efficiency of the farmers; this implies that increase in family size by one unit (Adult male) will increase the efficiency of the farmer in Sorghum production. So a male adult is more important in sorghum production than a female adult because an increase in a male adult increases efficiency

The coefficient of marital status is estimated to be negative and insignificant which implies that that an increase in the marital status increase the efficiency of Sorghum output, that is an increase in a unit of married persons in the Sorghum production increase the level of efficiency

The coefficient of farming experience is negative but insignificant, meaning that as the farming experience of sorghum farmers in the study area is an important factor but decreases their technical efficiency this might be that as they become more experience they tend to reject an new innovative thereby sticking to their old practices which might lead to decrease in their efficiency. This is in harmony with the study Zalkuwi et al (2014)

The coefficient of education variable is estimated to be negative and statistically significant at 1% level. This implies that farmers that are literate tend to be more efficient in agricultural production; this is due to their enhanced ability to acquire technical knowledge, which enhances their Agricultural productivity. It is plausible that farmers with education respond easily to the use of improved technology. This finding agrees with the study of shehu et al., (2007), as cited by Maurice (2012) who also found a positive relationship between education and technical efficiency.

The coefficient of the extension variable is estimated to be positive and insignificant. This implies that increased extension visits do not accord the farmer the opportunity to learn new improved technologies and how to acquire the needed inputs and services.

The coefficient of age is significant at 5% level and positively influences farmers' likelihood to practice crop diversification, indicating that older farmers are more likely to practice or adopt crop diversification than younger farmers. Entrepreneurial ability and farm management skills increase with experience which is a function of age. Older farmers are more likely to perceive, interpret and respond to new innovation in the context of risk management than younger farmers.

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