EFFECT OF TRANSACTION COSTS ON RICE PRODUCTION OUTPUT AND FUEL HIKE NEXUS IN KADUNA STATE, NIGERIA

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ABSTRACT
The study intends to analyse the effect of transaction costs on rice production output during fuel hike in Kaduna state, Nigeria. Primary data were collected from the rice farmers with the aid of structured questionnaire and interview schedule in 2018 farming season. A multistage sampling procedure was employed in selecting 523 rice farmers. The analytical tools used in this study include descriptive statistics, multiple regression, perception index and coping strategy index. The result showed that farmers perceived cost of transportation as most critical in fuel price increase. The t-test results indicated that there were statistically significant differences between prices of inputs during and after the fuel hike at 1 % level of probability except credit that was not statistically significant. The results of regression coefficients obtained from the multiple regression analysis revealed that the average output price is positively related to the cost of seeds ($p<0.10$) and transportation ($p<0.01$). These imply that as the cost of these variables increase, the average produce price of the output also increases. On the other hand, the average produce price of the output is negatively related to the cost of Labour ($p<0.05$) and credit access ($p<0.01$). That is, as the values of these variables increase, the average price of the output decreases. There is need for policies and strategies which promote stable and sustainable fuel price regime to reduce frequent price hike. There is need for more access to credit by farmers through credit schemes to help farmers afford inputs for rice production.
Keywords: Fuel hike, rice, transportation, Nigeria

INTRODUCTION
Rice has been identified as a major staple food and cash crop in Nigeria. Its consumption in the past decade has increased significantly and exceeds local production (Aina *et al*., 2015). This gap between production and consumption was met by importation until the ban on rice importation recently (Food and Agriculture Organization, FAO, 2017). This policy has led to an increase in rice production across the country. However, this attempt to increase local production of rice has been met by several constraints, prominent amongst which is increasing cost of fuel in Nigeria (Oladimeji & Abdulsalam 2014). Despite being a major oil producing country, Nigeria imports refined petroleum products due to dysfunctional and inefficient refineries. Agricultural production is energy intensive and therefore sensitive to changes in energy prices caused by world oil market or national policies such as withdrawal of oil subsidies (Sands & Westcott, 2011; Oladimeji et al. 2018) and other macroeconomic problems such as inflation. The petroleum industry has a lot of influence on agricultural productivity in Nigeria (Binuomote & Odeniyi, 2013) because it is the major source of energy which drives the economy. However, agriculture being a primary sector of the Nigerian economy is adjudged by several researches to be more prone to fuel scarcity removal because of its link to the development of other sectors of the economy (Akinyemi et al. 2017). The role of energy, more importantly petroleum products is very crucial in agricultural production in Nigeria context. For example transport which is fuel or diesel

driving affects the basic function of input supply, production, distribution, marketing and consumption.

Studies have linked lower agricultural output, lower incomes for farmers and increased prices of agricultural produce to rising cost of petroleum products (Sands & Westcott, 2011; Ocheni, 2015). Major negative impacts of fuel price increase are identified as increased transportation cost, double digit inflation, higher costs of food and essential services (Binuomote & Odeniyi, 2013; Aina et al. 2015). A consequence of these may result in high cost of agricultural inputs in the country at large and the study area in particular, with severe economic implications. It is pertinent to mention that the volatile oil prices due to low stocks and supply disruptions in the international oil market result in significant and negative impact on rice production in Nigeria (Ocheni, 2015). As a low income country with a high dependence on importation of goods and services, successive governments have tried to reform the energy industry through oil subsidy withdrawal and diversification of the economy to reduce overdependence on crude oil exports (Akinyemi et al. 2017). High cost of fuel due to fuel subsidy removal or occasion scarcity has resulted in hikes in food stuff prices, lower household incomes and diminishing consumer spending (Aina *et al*., 2015; Ocheni, 2015).
In the last decade, the cost of fuel and other energy sources in Nigeria has, on a rising trend (Fig. 1), become increasingly volatile, and this instability has had a notably adverse effect on the viability of agricultural production. Both small and mechanized farmers in Nigeria complain of arbitrary increased prices and scarcity of fuel making it a key impediment to agricultural production (Oladimeji *et al.*, 2018). The implication of its volatility was unprecedented increase in prices of petrol (gasoline) and diesel from about ₦3.25K / litre (0.19USD) and ₦3 / litre (0.17USD) respectively in 1993 to ₦145 (0.45USD) and ₦170 (0.53USD) in year 2017 (Petroleum Product Marketing Company, 2018).

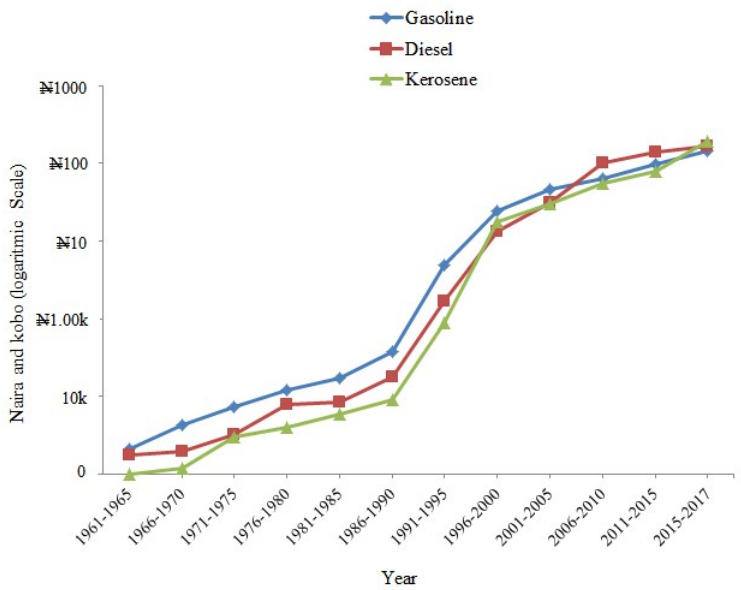

Figure 1: Trend in Nigeria's fuel increments (1961-2017), Source: NNPC, 2017
Therefore, rice farmers are affected by lower incomes, inflation, high cost of farm inputs and transportation due to increase in fuel prices. This has the potential to affect the cost of their output and productivity in general. For example, Ocheni (2015) and Akinyemi *et al.,* (2017) attributed increase in agricultural produce to high cost of transportation due oil subsidy removal and scarcity. This is the thrust of the study. A casual observation of rice production

in the study area prompts this research question; what are the effects of transaction costs on rice production during fuel hike in Kaduna state, Nigeria?

Hypotheses: There is no statistical significance / relationship between

(i) fuel price increase and rice production.

(ii) transaction cost and rice production.

(iii) price of inputs during and before or after fuel price hike

METHODOLOGY

The study was conducted in Kaduna State, Nigeria in 2017 / 2018 farming season before and during petroleum scarcity period. The population is projected to 9,136,475 million people in 2019 based on 3.2% annual population growth rate. The State has 23 Local Government Areas (LGAs). The State lies between Latitude 9^0 N and 12^0 N and Longitudes 6^0 E and 9^0 E of the Prime Meridian. It has a total land area of 48,473.2 Square kilometres (NPC, 2006). The mean annual rainfall is 1,524 mm which spreads within 7 to 9 months in a year with an annual temperature ranges between 14.6 ^{0}C and 36 ^{0}C. The soil and the climate favour the production of a wide variety of crops such as rice (National Agricultural Extension and Research Liaison Services, NAERLS, 2011). Majority (80%) of the indigenous population in Kaduna state are peasant farmers who are involved in producing both cash and food crops (KADP, 2007). The state has a northern guinea savannah in the north and a southern guinea savannah in the south with virtually the three classes of soil; clay, loamy and sandy. During the dry season, a substantial percentage of farming households in the state are engaged with irrigating rice and vegetable farming along some major rivers and dams such as Kangimi, Bogoma and Zaria dams (KADP, 2014).

A multistage sampling procedure was employed in selecting 523 rice farmers. In the first stage, five Local Government Areas: Sabon Gari, Giwa, Kudan, Soba and Zaria were purposively chosen largely due to intensity of rice production in their villages based on reconnaissance survey with Kaduna State Agricultural Development Programme. Thereafter, one village each with intense rice production and formidable agricultural social organisation was randomly selected from the list of the rice producing villages in each LGA. The randomly selected villages were Bomo, Biye, Likoro, Yakasai and Zaria. Lastly, 523 rice farmers (50%) were randomly selected from sample frame of 1046 rice farmers. Primary data including socio-economic characteristics and production data were collected from the rice farmers in the 2018 farming season with the aid of structured questionnaire and interview schedule.

The analytical tools that were used in this study include descriptive statistics, t-statistics, multiple regression, perception and coping strategy indices. Multiple regression was used to estimate the effect of transaction costs on rice output.

The multiple regression equation was expressed implicitly as

$$Y= b_0 + b_1 X_1 + bnXn + e \quad (1)$$

Where: Y= price of rice output per ha (kg), Xi = independent variables, b_1, b_n = regression coefficients (slopes), b_0 = intercept and e = error

Explicitly, the equation was expressed as:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_{4+}\ldots\ldots\ldots\ldots\ldots\ldots + b_8 X_8 + e \quad (2)$$

Where: Y= price of rice output (₦), b_0 = intercept, X_1= seed (₦), X_2= fertilizer (₦), X_3= agrochemical (₦), X_4= labour (₦), X_5= land (₦) and X_6 = transportation (₦), X_7 = fuel price (₦) and X_8 = credit (₦)

The Likert scale test was used to analyse respondents' perceptions on fuel price increase. It is a scale which was rated 1 for mild, 2 for moderate, 3 for severe and 4 for very severe while farmers' coping strategy index was achieved using the rank scoring method, expressed as equation 3:

$$\text{Mean score} = \frac{\Sigma(\text{scale grade} \times \text{corresponding responses})}{\text{Total number of respondents}}$$

RESULTS AND DISCUSSION

Socio-economic characteristics of rice farmers

The distribution according to the socio-economic characteristics of rice farmers is presented in Table 1.

Table 1: Distribution of socio-economic characteristics of rice farmers n= 523

Variables	Range	F	%	Min.	Max.	Mean	CV (%)
Age (years)	20 – 29	103	19.69	20	63	41	8.29
	30 – 39	174	33.27				
	40 – 49	197	37.67				
	50 & above	49	9.37				
Sex (dummy)	Male	417	79.73				
	Female	106	20.27				
Marital status	Single	15	2.87				
	Married	465	88.91				
	Divorced	13	2.49				
	Widowed	30	5.74				
Household size (number)	1-5	87	16.64	3	32	9	19.05
	6-10	228	43.59				
	11-15	155	29.64				
	15 & above	53	10.13				
Education (level)	No formal	118	22.56	0	15	8.9	31.20
	Adult	27	5.16				
	Primary	174	33.27				
	Secondary	162	30.98				
	Tertiary	42	8.03				
Farming experience (years)	1-5	121	23.13	3	29	14	26.04
	6-10	106	20.27				
	11 & above	296	56.60				
Source of credit	Banks	10	7.2				
	Cooperative	70	50.7				
	Lenders	10	7.2				
	Relative	28	20.3				
	Others	20	14.5				
Farm size (hectare)	0.1-1.5	38	27.5				
	1.6-2.0	60	43.5				
	2.1- 2.5	30	21.7				
	2.6 and above	10	7.3				

Source: Field Survey, 2018; Min: minimum, Max: maximum, CV: coefficient of variation

The distribution of socio-economic characteristics of rice farmers is highlighted in Table 1. The mean age of the farmers was 41 years with covariance of 8.29%. The result indicates that majority of the respondents (90.5%) are within 20 - 49 years old. This implies that the rice farmers are agile and active to withstand the rigorous activities involved in rice production, harvest and processing. The effects of age on farmers' productivity are diverse and this may be positive or negative. For example, younger farmers are more flexible, have less aversion to risks and are likely to invest more in long term sustainable production techniques, while older farmers may take fewer risks (Aminu, 2014; Addison *et al.*, 2016). On the other hand, older farmers with more experience and knowledge of the history of the land are likely to adopt and maintain sustainable cultural practices (Aminu, 2014).

The sex distribution of the rice farmers indicates that majority are male (79.7%) in the study area. The low percentage of female participation in rice production in the study area may be attributed to cultural and religious orientation of the people. For example, female sequestration and rights to property have been found to have profound effects on level of participation in agricultural production in the study area (Pandey *et al.*, 2010). The dominant of male could also be attributed to the current practice of purdah (women in seclusion) as the people in the area are predominantly Muslims. However, in rice production, women have been found to be more actively involved in farm labour such as pre-planting, harvesting, processing and marketing of the produce (Pandey *et al*., 2010; Addison *et al.,* 2016).

Result from Table 1 also shows that the majority of the respondents (89.1%) are married. This implies that married people are more involved in rice production and it may be because of the added responsibilities of cater for their families (Igboji *et al*., 2015). The mean household size of the respondents was 9 members per households with 6-10 been the modal class. The large households are often influenced by cultural and religious factors such as early marriages and polygamy and often serve as reliable sources of farm labour *ceteris paribus* (Pandey *et al*., 2010; Aminu, 2014; Addison *et al*., 2016). However, large family size may only be a financial burden and not necessarily contribute to the resource pool of the farm family because not all family members such as very young children are full time farm workers. This is also supported by studies which show that an increase in household size means more people to feed and indirectly reduces income per head and creates a cycle of poverty in such households (Onu, 2013).

The level of education result indicates that majority of the respondents (61%) had less than secondary education. Implications of low level of formal education among farmers include limited knowledge and slow adoption of new technology. Gasarah and Aye, (2015) found that literacy level of farmers positively influenced the intensity of the use of fertilizer. This agrees with several studies which have found that better educated farmers are more likely to adopt more efficient technologies (Junge *et al.,* 2008). The higher the level of education, the greater the farmer's potentials for adoption of improved farming activities which would lead to increased output of rice (Ohen & Ajah, 2015).

The farming experience also presented in Table 1 with mean experience of 14 years shows that more than half (56.52%) have been engaged in rice production for at least 11 years. This is supported by studies which have found that length of years of farming gives a practical indication of the experiential knowledge acquired over the years on how best to overcome problems associated with rice production (Iheke & Chikezie, 2016). However, longer years of farming experience might enhance farmers' production skills but ageing and longer years of farming experience may make farmers resistant and hardened to adopting new innovations and technologies.

The respondents' source of credit reveals that rice farmers depend largely on informal credit sources (78%) and about 51% of the respondents sourced their credits from cooperative societies. High interest rates and non-availability of collateral may be responsible for inability

of rice farmers to access loans from formal sources such as banks. This has implications for productivity because access to credit increases farmers' income, quality and quantity of farm products. This inability to access credit might be a key factor for about 92.7% of respondents cultivating maximum of 2.5 hectares.

Perceptions of Farmers on Effect of Fuel Price Increase on Rice Production

Distribution according to perception of rice farmers on effects of fuel price increase on rice production is presented in Table 2

Table 2: Perceptions of rice farmers on effects of fuel price increase on rice production

Perceived effects of fuel increase on cost of	**=1 Mild**	**=2 Moderate**	**=3 Severe**	**=4 Very severe**	$\bar{x}$ **Score**	Rank
Transportation	2	2	33	496	3.86	1
fertilizer and chemicals	5	30	54	400	3.54	2
Labour	9	12	96	364	3.48	3
Land / rent	2	4	192	280	3.46	4
Irrigation	4	8	300	120	3.13	5

A 4-point Likert scale was used to score the perceptions of farmers on the effect of fuel price increase. The results are presented in Table 2. The perception of farmers on fuel price increase demonstrates that increase in cost of transportation was most critical. This is because, transportation being a monotonous activity plays an important role in rice farming through which farm inputs and output are being transported from and out of the farm. When there is a change or increase in the price of fuel, transportation cost also increases. Ajiboye and Afolayan (2009) opined that transportation among other factors represents the most serious constraint to kolanut production in Nigeria Increase in the cost of fertilizer and chemicals ranked second. This is because increase in the price of fuel will also lead to a change or increase in the prices of farm inputs because they are also a by-product of petroleum. Increase in the cost of labour ranked third because, labour is mobile and when there is an increase in the price of fuel, transportation cost of the labourers to and from farms also increases and this will also increase the amount the charge.

Changes in Prices of Farm Inputs and Fuel Price Increase

Table 3: Descriptive statistics of production variables

Pairs	**Variables**	**Mean**	**Std. Dev.**	**Std. Mean Error**
Pair 1	Fertilizer PRD	7500.00	.000	.000
	Fertilizer PRA	6802.17	14.64	1.246
Pair 2	Seed PRD	11887.68	1592.66	135.576
	Seed PRA	10000.00	.000	.000
Pair 3	Chemicals PRD	1500.00	.000	.000
	Chemicals PRA	1273.19	44.469	3.785
Pair 4	Transport PRD	141.59	54.94	4.676
	Transport PRA	98.69	45.228	3.850
Pair 5	Labour PRD	707.25	100.10	8.521
	Labour PRA	553.62	50.05	4.261
Pair 6[a]	Fuel PRD	190.00	.00	.000
	Fuel PRA	145.00	.00	.000
Pair 7	Credit PRD	44507.25	40460.89	3444.26

	Credit PRA	49594.20	83091.07	7073.18
Pair 8	Land PRD	13818.84	18031.60	1534.95
	Land PRA	10000.00	.000	.000
Pair 9	Output PRD	19521.74	1115.37	94.95
	Output PRA	18608.70	814.42	69.33

*PRD= price during increase; PRA= price after increase (normal)

Table 3 display results for statistical parameters such as mean, standard deviation and standard mean error of the variables. The result summarizes the descriptive statistics of the variables when fuel price was sold at ₦190 (0.56USD) / litre at PRD and when the fuel price was sold at normal price of ₦145 (0.43USD) / litre. The average prices of all the variables except credit decreased when the fuel price became normal. Credit is the only variable whose average value increased; changed from ₦ 44,507.25 (130.90 USD) to ₦ 49,594.20, (145.87 USD) respectively. The average price of the produce (output) decreased from ₦ 19,521.74 per to ₦ 18,608.70 per bag when there is a decrease in the fuel price. However, the lowest value (1.246) of standard mean error of fertilizer obtained from the analysis was indicated that this farm input also plays an important role to achieving a greater output in rice production.

Paired t - test statistics

Table 4: Result of paired t - test statistics for variables

Pairs	**Variables** PRD/PRA	**Paired Differences**			**T**	**p-value**
		Mean	**Std. dev**	**Std. mean E**		
Pair 1	Fertilizer	697.83	14.64	1.25	5.09	<.000
Pair 2	Seed	1887.68	1592.66	135.58	13.92	<.000
Pair 3	Chemicals	226.81	44.46	3.79	5.93	<.000
Pair 4	Transport	42.91	16.70	1.42	3.18	<.001
Pair 5	Fuel	121.98	0.00	0.00	-	-
Pair 6	Labour	153.62	50.05	4.26	3.06	<.001
Pair 7	Credit	-5086.96	69628.47	5927.17	-.86	.392
Pair 8	Land	3818.84	18031.60	1534.95	2.49	.014
Pair 9	Output	913.04	759.161	64.62	6.01	<.000

Table 4 on the other hand summarizes the result of the t-test performed to detect the changes between variable pairs with changes in fuel price. A paired samples t - test was carried out at a 95% confidence level to evaluate the effect of each change in fuel price on the average cost of fertilizer, seed, chemicals, transportation, labour and land. The test was also used to examine the effect of fuel price on credit of farmers and the price of the output. The results of the evaluation indicated that the price of fertilizer significantly decreased from ₦ 7,500 (22.06 USD) to ₦ 6 802.17 (20.01 USD) at 5% level of significance when the fuel price dropped from ₦ 190 (0.56 USD) to ₦ 145 (0.43 USD). Similarly, the average cost of seeds also decreased significantly by a factor of ₦ 1,887.68 (5.52 USD). Furthermore, the average costs of transportation, labour and land all decreased significantly (at $p < 0.01$) with decrease in fuel price. There is however no significant change (p-value = 0.392) in credit when the fuel price changed from ₦ 190 (0.56 USD) to ₦ 145 (0.43 USD).

A significant decrease (p-value <00.05) of ₦ 913.043 (2.69 USD) in the output value was also observed. The results from the analysis indicated that the input variables such as fertilizer, seed, chemicals, transport, labour, and land have a significant effect on the cost of

rice production as fuel price increase. This is because the t-values were statistically significant which indicates significance on the effects of rice production with hike in fuel prices. However, the input (credit) indicated no impact on cost of rice production as fuel price increases.

Effect of Transaction Costs on Rice Output

Table 5: Effect transaction costs on rice output and fuel hike nexus

Variable (₦)	β	Std. Error	t-value	P > /Z/
Constant	0.374	0.260	1.441	0.151
Fertilizer	-0.480	0.567	-0.846	0.398
Seed	0.100*	0.052	1.927	0.059
Chemicals	-0.011	0.186	-0.058	0.954
Transport	0.379* * *	0.106	3.58	0.000
Labour	-0.121* *	0.060	-2.01	0.032
Credit	-0.002* * *	0.001	-2.595	0.010
Land	0.007	0.005	1.465	0.144
R^{-2}	0.509			

* * *, * * , * denote 1, 5 & 10 % statistically significant level respectively

Table 5 shows the results of regression coefficients obtained from the multiple regression analysis. The adjusted R^{-2} (0.509) implies that the explanatory variables fitted were able to explain about 51% of the variation in the output of rice. The coefficients in the model revealed that the average output price is positively related to the cost of seeds ($p<0.10$), transportation ($P<0.01$), labour ($P<0.05$) and credit ($P<0.01$). The positive and significant coefficients imply that as the cost of these variables increase, the average produce price of the output also increases. On the other hand, the average price of the output is negatively related to the cost of labour and credit. That is, as the values of these variables increase, the average produce price of the output decreases. Labour resource in rural areas tend to be a common occurrence due to rather low opportunity cost of the input.

Constraints of Rice Production

Table 6: Constraints of rice production in the study area

Constraints	Frequency	Percentage	Ranking
High cost of inputs	136	98.6	1st
Increasing cost of fuel	136	98.6	2nd
Lack of credit facilities	133	96.4	3rd
Lack of capital	132	95.7	4th
High cost of transportation	129	93.5	5th
Livestock encroachment	118	85.5	6th
insufficient labour	124	89.9	7th
Rice importation	99	71.7	8th
Poor pricing at harvest periods	87	63.0	9th
Others	72	33.8	10th

Note: Multiple responses are allowed

The constraints of rice production identified by the respondents are presented in Table 6. The result confirm that increasing cost of fuel (98.6), high cost of inputs (98.6%), lack of credit facilities (96.4%), lack of capital (95.7%), inefficient/ insufficient labour, (89.9%), high cost of transportation (93.5%), livestock encroachment (85.5%), obsolete technology (79.7%), rice importation (71.7%), poor pricing at harvest periods (63%) and low value associated with available varieties produced (52.2%) are major constraints faced by farmers in the study

area. These constraints are often interrelated. For example, lack of capital/ access to credit by farmers means farmers cannot afford farm input such fertilizers, sufficient labour and mechanized farming. Similarly, high transaction cost is a largely attributed to poor infrastructure. A poor road network increases the cost of transportation which also affects inputs used.

Lack of access to roads constrains smallholder farmers' access to markets. Limited access to markets increases farmer's vulnerability to shocks and hinders economic opportunities (FAO, 2015). Poor pricing at harvest time is a major problem for farmers because of the cut-throat activities of middle men who have ready cash and often determine the selling price of paddy rice. These traders unite to keep farm gate prices very low, buy the produce directly from the farmers and resell in the market for much higher gains (Longtau, 2003). The near absence of storage facilities for farmers aids in their exploitation by the middle men who have the cash and storage facilities. The importation / smuggling in of rice also creates a bottleneck in the pricing and marketing of the locally produced rice. Cattle encroachment and farmer herder clashes are major sources of worry to farmers as they often lose their investments when cattle illegally graze on their crops. Similarly, the poor quality of available species which attracts low prices, obsolete processing technology is also serious constraints associated with rice production (Longtau, 2003).

Farmers' Coping Strategies

Table 7: Farmers' coping strategies during fuel hike

Coping Strategy	1	2	3	4	$\bar{x}$	Rank
Use recycle improved variety of rice	1	5	60	72	3.47	1
Reduce cost of hired labour	6	18	26	88	3.42	2
Use less fuel by shortening pumping hours	3	6	60	69	3.41	3
Use manual forms/sources of energy	19	30	33	56	2.91	4
Reduce farm size	21	34	30	53	2.83	5
Use organic fertilizer	17	28	59	34	2.80	6
Use less fertilizer	20	36	61	21	2.60	7
Opt for only wetland cultivation	20	46	60	12	2.46	8
Borrowing	6	88	26	18	2.41	9

Note: 1 denote mild, 2 moderate, 3 severe, 4 very severe and $\bar{x}$ Score

A 4-point Likert scale was also used to score respondents' coping strategies adopted against the identified rice production constraints including fuel hike. The scale ranges from 1= least important, 2 = important, 3 = very important and 4 = extremely important. The results are presented in Table 7. Result shows that the use of improved variety of rice is the most frequent coping strategy while borrowing ranked the least coping strategy with a mean value of 2.41. The coping strategies have implications for sustainable rice production in the study area. For example, reducing farm size as a measure of remedying production cost affect farmer net return (Owosu, *et al*., 2017). This decline in overall production raises crop prices. Similarly, higher energy related production cost have been found to lower agricultural productivity, raise prices of output and reduce farm income (Sands & Wescott, 2011).

CONCLUSION

The study affirmed that there is a significant relationship between fuel price increase and cost of rice production because costs of inputs are negatively affected by hikes in fuel price. Transaction costs especially seed, transport, labour and credits were significant factors intricately linked with rice production.

RECOMMENDATIONS

Therefore, there is need to implement practical and sustainable rice production systems through;

1. There is need for policies and strategies which promote stable and sustainable fuel price regime to reduce frequent price hike.
2. Policies aimed at protecting local rice production are needed to improve profitability of rice production. The ban on rice importation should be sustained by tackling the menace of rice smuggling which flood markets with foreign and cheaper rice.
3. Providing more access to credit to farmers through credit schemes to help farmers afford inputs for rice production.
4. Introduction of simple and affordable technologies, improve irrigation systems and encourage private sector investments in all the processes of rice production.
5. Investment by government in essential inputs; through affordability on fuel, agro-chemicals and improved varieties of seeds.
6. There is need for policies and strategies which promote rural education, credit access and better infrastructure.

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