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Effect of Importation Ban on Rice Production in Bade Local Government Area of Yobe State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author IYL wrote the protocol. Author MBU did the literature search. Authors MA and ALA collected and analysed the data while author EOO wrote the first and final draft of the report. All authors read and approved the final manuscript.

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ABSTRACT

Aim: The study was conducted to evaluate the effect of the importation ban on rice production in Bade Local Government Area of Yobe State, Nigeria.

Methodology: A two-stage sampling procedure was used to select 110 respondents. The study used a structured questionnaire and oral interview to collect data from rice farmers on socioeconomic characteristics, change in input utilization, access to factors of production, adoption of new ideas and practices, and change in rice production. Data were analyzed using means, frequency counts, percentages, correlation analysis and z-test. The study was conducted between February and June in the year 2021.

Results: The findings revealed that 36.6% of the respondents were within the age range of 31-40 years while the mean age was 38.62 years. The majority (90.1%) were males and the majority (80.2%) were married. Only 14.9% of the respondents did not acquire formal education. There was a great increase in the utilisation of herbicides (mean=4.47), water pumps (mean=4.58), fertilizers (mean =4.62) and seeds (mean =4.79). Access to credits (mean =1.27), pesticides (mean =1.56), knapsack sprayers (mean =1.71), water pumps (mean =1.76), fertilizers (mean =1.81) and

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farmlands (mean =1.89) was high but access to subsidies (mean =0.70) and extension services (mean =0.69) was low. There was significant positive correlation between age ($r=0.56$, $p=0.00$), income, ($r=0.43$, $p= 0.00$), size of farm holding, ($r=0.30$, $p= 0.02$), household size ($r=0.23$, $p= 0.02$), change in input utilisation ($r=0.22$, $p=0.03$) and change in rice production. A significant difference existed between the quantity of rice produced before the ban and after the ban ($z=-4.54$, $p<0.05$).

Conclusion: The importation ban policy of the Federal Government of Nigeria caused a substantial increase in paddy rice production. The study recommended that the government proactive measure on rice importation ban should be sustained to make the country self-sufficient in rice production.

Keywords: Ban; change; post-importation; rice production.

1. INTRODUCTION

In the 1960s Nigerians were used to servings of rice at banquets and celebrations but now rice has become a common household diet. It is cultivated in all agro-ecosystems although in varying degrees [1]. In urban areas in Nigeria, annual rice consumption increased from 8 kg per capita in 1960 to 27 kg per capita in 2007 [2]. The increase in demand for rice was attributed to population growth, rising incomes, rising per capita consumption and urbanization [1]. Demand outstrips production over the years despite the potentials of Nigeria to be self-sufficient in rice production [3]. Over 36 years of efforts by the Federal Government of Nigeria to grow rice production has not produced a desirable result [4]. The steady increase in rice consumption in Nigeria which widened demand-supply gaps made rice importation a favoured choice, thus causing a substantial loss in foreign exchange amounting to ₦365 billion [5]. Despite the local production deficit, Nigeria can boost rice production in the five rice-growing ecosystems, meet domestic demand and become a net exporter of rice in the long run with the right policy formulation and implementation.

In August 2019, the Federal Government of Nigeria implemented a border closure policy which comprises a ban on rice importation [6]. Its publicity and a sharp increase in the price of rice in the wake of the ban generated mixed reactions. Farmers and processors welcomed the policy while consumers opined that the policy was ill-timed. The well-intentioned policy is geared towards an increase in domestic rice production, provision of jobs, reduction in poverty level and development of the Nigerian economy. The ban implies that the rice supply-demand gap has widened, hence rice producers and other stakeholders need to work towards boosting rice production. In a bid to address the problem of insufficient rice production, research institutes (IITA and NCRI) had introduced higher-yielding

rice varieties. The varieties released for cultivation in lowland are FARO-44 (SIPPI), FARO-52 (WITA 4) FARO-57 (Tox 4004) FARO-51 (cisadane), FARO-35 and ITA (212). Others such as FARO-55 (Nerica), FARO-56 (Nerica-2) and FARO-46 (ITA 150) are all upland varieties [7]. Rice Farmers Association of Nigeria (RIFAN) made demands on governments to put in place the provision of extension services, subsidised inputs, credit facilities and modern processing facilities [8].

Therefore, the study was undertaken to evaluate the effect of importation ban on rice production in Bade LGA of Yobe State in Nigeria. The study answered the following research questions: 1). What are the socioeconomic characteristics of rice farmers in the study area? 2). Has there been a change in the level of input utilization? 3). What is the level of access of rice farmers to factors of production? 4). What new ideas/practices have been adopted by rice farmers to boost rice production? 5) Has there been a change in rice production? The following hypotheses stated in null form were tested in the study: 1). There is no significant relationship between socioeconomic characteristics and change in rice production; 2). There is no significant relationship between access to factors of production and change in rice production; 3). There is no significant relationship between adoption of ideas/practices and change in rice production; 4). There is no significant relationship between change in input utilization and change in rice production, and 5). There is no significant difference between rice production before the ban (2019) and rice production after the ban (2021).

2. MATERIALS AND METHODS

The study was conducted in Bade Local Government Area (LGA) in Yobe State, north-eastern Nigeria, which has its headquarters in Gashua. It is bounded by Jakusko from the

south, Bursari from the east, Yusufari from the north and Karasuwa from the west. Its coordinates are 12°52'N 10°58'E It has an area of 772 km² and a population of 139,782 at the 2006 census [9]. Gashua lies near the Yobe River a few miles below the convergence of the Hadejia River and the Jama'are River. The average elevation is about 299m. The hottest months are March and April with a temperature range of 38°-40° Celsius. In the rainy season, June-September, temperatures fall to 23-28° Celsius, with rainfall of 500 to 1000mm [9]. It is an agrarian community where people produce many varieties of crops like millet, sorghum, cowpea, wheat, soybeans and rice and engage in trading. They cultivate both rain-fed and irrigation crops; irrigated land is used to produce vegetables and rice. Rice has become a popular economic crop in Bade Local Government Area. It is cultivated twice in a year on irrigated land between February and June, and as rain-fed crop between June and September. The cropping system adopted is mono-cropping.

The sample for this research was taken from the population of rice farmers in Bade LGA of Yobe State. The LGA comprises (10) political wards namely: Sarkin Hausawa, Lawan Musa, Lawan Fannami, Zango, Katuzu, Sabongari, Gwio-Kura, Dagona, Usur/Dawayo and Sugum/Tagali. A two-stage sampling procedure was adopted in selecting the sample for the study. First, five political wards (50 per cent) were selected using a simple random sampling technique. Second, from the list of rice farmers in the selected political wards, 25 per cent of rice farmers were selected by simple random sampling technique giving a total of one hundred and ten (110) respondents. A structured questionnaire was used to collect data from literate respondents while an oral interview was conducted to collect information from illiterate ones between February and June in the year 2021 during the cultivation and harvest of swampy rice under irrigation system. One hundred and one (101) copies of the questionnaire, which represented 91.8 per cent, were found useable for the study.

Change in rice production post-importation ban was measured by asking the respondents to provide the quantity of paddy rice they produced before the ban (2019) and quantity of paddy rice they produced at the time (2021) of collecting data for the study in bags and subsequently converted to kg by multiplying with 51kg which was the average weight of a bag of paddy rice. The difference between the quantity of paddy

rice produced after the ban (2021) and the quantity of paddy rice produced before the ban (2019) gives the measure of change in paddy rice production post-importation ban. Change in input utilization was measured by asking the respondents to indicate the extent and direction of change in input utilization on a five-point rating scale of increased greatly, increased slightly, remained the same, decreased slightly and decreased greatly which attracted scores of 5,4,3,2 and 1 respectively. Access to factors of production was measured by asking the respondent to indicate the extent of access to factors of production such as farmland, fertilizers, pesticides, credits, subsidies, extension information equipment on a three-point rating scale of 'always', 'occasionally' and 'never' which attracted scores of 2,1 and 0 respectively. Adoption of new ideas/practices was measured by asking the respondents to indicate new ideas or practices they have adopted during the planting season the data was being collected as adopted (Yes=1) and not adopted (No=0). Objectives 1, 2, 3, 4, and 5 were analysed with mean, frequency counts and percentages (descriptive statistical tools) while hypotheses 1, 2, 3, and 4 were analysed with Pearson Product Moment Correlation and 5 using z-test at 0.05 level of significance (inferential statistical tool).

3. RESULTS AND DISCUSSION

3.1 Socioeconomic Characteristics of the Respondents

Table 1 reveals that 25.7% of the respondents were between the ages of 21-30 years while 36.6% were between the ages of 31-40 years. The mean age was 38.62 years. The finding is similar to the finding reported by [10] in which the majority of rice farmers fell within the age range of 20 and 40 years. The finding implies that the rice farmers are young and active with the physical and mental abilities to contribute to the growth of the rice production sub-sector of the economy. Table 1 also shows that 90.1% of the respondents were males while 9.9% were females. Therefore, rice production in the study area was dominated by male farmers which could be explained by tediousness of rice production. The finding aligns with the finding of [10] who reported that rice farming was dominated by male rice farmers. Furthermore, Table 1 reveals that the majority (80.2%) of the respondents were married while 17.8% were single. This implies that married farmers have the responsibility of providing food for the families

and meeting other household needs. The finding agrees with the finding reported by [11] that the majority of rice producers were married. Also, Table 1 reveals that 14.9% had primary education, 27.7% had secondary education and 42.6% had tertiary education comprising college of education, polytechnic or university education. This means that majority of rice farmers are educated. Education enhances farmers' ability to acquire and use agricultural information to boost production. The finding agrees with the finding of [12] who reported that the majority of rice farmers were educated but disagrees with the finding of [13] who reported a low level of formal education among rice farmers in their study. Moreover, Table 1 reveals that most (55.4%) of the respondents had 1-10 years of experience in rice farming, 27.8% had 11-20 years of experience while 6.9% had 21 to 30 years of experience. The mean year of experience in rice farming was 12.87. The finding agrees with the finding of [13] about the long period of farming experience of rice farmers. Hence, respondents had sufficient years of experience which can enhance their perception of any external supports to boost rice production. Table 1 shows that the majority (67.3%) of the respondents had household sizes ranging from 1 to 10, 25.8% had household sizes of 11 to 20 while 5.9% had between 21 and 30. The mean household size was 9.00. This implies that the respondents had a large household size which could be explained by the culture and religion which permit the practice of polygamy in the area. Large household size can make family labour available for rice farming. Furthermore, results in Table 1 show that the majority (71.3%) of the respondents had between 0.01 to 5 hectares of farm holding, 15.8% had between 6 to 10 hectares while 6.0% had between 11-15 hectares. The mean size of farm holding was 5.48 hectares. This implies that the respondents are mostly smallholder rice farmers. The finding agrees with the finding of [2] who reported that most rice farmers in Nigeria are small farmers. Results in Table 1 further show that 18.8% had a membership of producers' association while the majority (81.2%) were non-members. The finding disagrees with the finding of [12] who reported that the majority of rice farmers in their study belonged to cooperative associations. The implication is that non-members of the producers association would not be able to benefit from government support services that are channelled through such associations as RIFAN (Rice Farmers Association of Nigeria). Furthermore, the estimated annual income of 55.4% of the respondents was ₦40,000-₦440,000, 32.7% of

the respondents had between ₦440,001 and ₦840,000 while 11.9% of the respondents had ₦840,001 and above. The mean annual income was ₦456,504.95. The income from rice farming of the majority of farmers was modest hence the need to enhance rice production through the adoption of best practices.

3.2 Respondents' Change in Input Utilisation

Table 2 shows that 83.2% of the respondents indicated there was a great increase in the utilisation of seeds (FARO 43, FARO 44, FARO 46) while 70.3% indicated a great increase in the utilisation of fertilizers (Urea, NPK 20:10:10). Table 2 further shows that 53.0% of the respondents indicated a great increase in the utilisation of pesticides (Renova). On the use of knapsack sprayer, 52.5% of respondents indicated a great increase. Also, Table 2 further reveals that 59.4% of the respondents indicated a great increase in the utilisation of herbicides (Round Up, Force Up, Paraforce, Butachlor). On water pump utilisation, 73.3% indicated a great increase while 15.8% indicated a slight increase. The mean values as shown in Table 2 reveal that there were great increases in the utilisation of seeds (mean= 4.79), fertilizers (mean=4.62), herbicides (mean = 4.47) and water pump (mean= 4.58) and there were slight increases in the utilisation of pesticides (mean=4.26) and knapsack sprayers (mean=4.38).

3.3 Respondents' Access to Factors of Production

Table 3 shows that 90.1% of the respondents always had access to farmlands while 83.2% always had access to fertilizers. On pesticides, 61.4% always had access to pesticides. Furthermore, Table 3 reveals that 41.6% of the respondents always had access to credits. Forty point six per cent (40.6%) of the respondents occasionally had access to subsidies. Also, Table 3 shows that 35.6% of the respondents occasionally had access to extension services. Eighty point two (80.2%) always had access to water pumps while 75.2% always had access to knapsack sprayers. Moreover, the mean values of access to factors of production in Table 3 reveal that access to farmlands (mean = 1.89), fertilizers (mean = 1.81), pesticides (mean = 1.56), credits (mean = 1.27), water pumps (mean = 1.76) and knapsack sprayers (mean = 1.71) was high. However, access to subsidies (mean = 0.70) and extension services (mean = 0.69) was

low. Low access to extension services implies that there may be low adoption of rice technologies (improved agronomic practices). Extension is an important input in influencing the farmers to adopt best practices of rice production.

Table 1. Socioeconomic characteristics of respondents (n=101)

Variables	Frequency	Percentage	Mean	Standard deviation
Age				
10-20 years	3	3.0		
21-30 years	26	25.7		
31-40 years	37	36.6	38.62	11.69
41-50 years	19	18.9		
51-60 years	11	10.8		
61-70 years	05	5.0		
Sex				
Male	91	90.1		
Female	10	9.9		
Marital status				
Married	81	80.2		
Single	18	17.8		
Widow/widower/separated	2	2.0		
Education qualification				
No formal education	15	14.9		
Primary education	15	14.9		
Secondary education	28	27.7		
Tertiary education	43	42.6		
Years of experience in rice farming				
1-10	56	55.4		
11-20	28	27.8		
21-30	07	6.9	12.87	10.57
31-40	07	6.9		
41 and above	03	3.0		
Household size				
1-10	68	67.3		
11-20	26	25.8		
21-30	06	5.9	9.0	6.85
31 and above	01	1.0		
Size of farm holdings				
0.01-5	72	71.3		
6-10	16	15.8		
11-15	06	6.0	5.48	4.88
16-20	07	6.9		
Membership of producer's association (RIFAN)				
Member	19	18.8		
Non-member	82	81.2		
Estimated annual income ₦)				
40,000-440,000	56	55.4		
440,001-840,000	33	32.7	456,504.95	353,069
840,001-above	12	11.9		

Source: Field Survey, 2021

Table 2. Respondents' change in input utilization (n=101)

Input utilization	Increase greatly	Increased slightly	Remain the same	Decrease slightly	Decrease greatly	Mean	Remark
Seed	83.2	13.9	2.0	2.0	0.0	4.79	Great increase
Fertilizers	70.3	22.8	5.9	1.0	0.0	4.62	Great increase
Pesticides	53.0	22.8	20.8	2.0	1.0	4.26	Slight increase
Knapsack	52.5	33.7	13.9	0.0	0.0	4.38	Slight increase
Herbicides	59.4	27.7	12.9	0.0	0.0	4.47	Great increase
Water pumps	73.3	15.8	8.9	2.0	0.0	4.58	Great increase

Source: Field survey, 2021; Mean change in input utilization 4.5 – 5.0 (great increase), 3.5 – 4.4 (slight increase), 2.5 – 3.4 (no increase), 1.5 – 2.4 (slight decrease), 0.5 - 1.4 (great decrease)

Table 3. Respondents access to factors of Production (n=101)

Access to factor production	Always	Occasionally	Never	Mean	Remark
Farmland	90.1	8.9	1.0	1.89	High access
Fertilizers	83.2	14.9	2.0	1.81	High access
Pesticide	61.4	32.7	5.9	1.56	High access
Credits	41.6	43.6	14.9	1.27	High access
Subsidies	14.9	40.6	44.6	0.70	Low access
Extension	16.8	35.6	47.5	0.69	Low access
Water pump	80.2	15.8	4.0	1.76	High access
Knapsack sprayer	75.2	20.8	4.0	1.71	High access

Source: Field survey, 2021; Mean access to factors of production ≥ 1 (High access), Mean access of factors of production < 1 (Low access)

3.4 Respondents' Adoption of New Ideas/Practices

Table 4 on respondent's adoption of the new ideas/practices reveal that adoption of new rice varieties ranked 1st with 96.0% respondents who adopted followed by the adoption of chemicals (fertilizers, pesticides and herbicides) which ranked 2nd with 95.0% respondents who adopted. Adoption of storage facility ranked 3rd with 69.3% respondents while adoption of seedling spacing ranked 4th with 61.4% respondents. This implies that farmers were receptive to new ideas/practices and this propensity could be enhanced with repositioned extension services in Yobe State.

3.5 Respondents' Quantity of Paddy Rice Produced Before the Ban (2019) and After the Ban on Rice Importation (2020)

Table 5 on the quantity of paddy rice produced before the ban and after the ban on rice importation reveal that 16.8% of the respondents produced between 0kg and 1000kg before the ban while 5.9% of respondents produced between 0kg and 1000kg after the ban. Furthermore, 44.6% of respondents produced

between 1001kg and 2000kg of paddy rice before the ban while 25.7% of respondents produced between 1001kg and 2000kg of paddy rice after the ban. Three point zero per cent (3.0%) of respondents produced 5000kg and above of paddy rice before the ban, while 16% respondents produced 5000kg and above of paddy rice after the ban. The mean quantity of paddy rice produced before the ban was 1972.84kg while the mean quantity of paddy rice produced after the ban was 3366.51kg. Therefore, the finding suggests that there was an increase in paddy rice production following the ban on importation. The increase in paddy rice production per farm / farmer was attributed to land expansion and increased use of other agricultural inputs.

3.6 Hypotheses Testing

3.6.1 Test of the relationship between independent variables and change in rice production

Correlation analysis in Table 6 shows there was significant positive correlation between age ($r=0.56$, $p=0.00$), income, ($r=0.43$, $p=0.00$), size of farm holding ($r=0.30$, $p=0.02$), household size ($r=0.23$, $p=0.02$) and change in rice production. This implies that the more the age of farmers the

Table 4. Respondents' adoption of new ideas/practices (n=101)

Idea practice	Frequency	Percentage	Remark
Rice variety	97	96.0	1 st
Seedling spacing	62	61.4	4 th
Chemicals	96	95.0	2 nd
Storage facility	70	69.3	3 rd

Source: Field survey, 2021

Table 5. Respondents' quantity of paddy production before the ban and after the ban in kg (n=101)

Before the Ban				After the Ban			
Quantity	Frequency	Percentage	Mean	Quantity	Frequency	Percentage	Mean
0-1000	17	16.8		0-1000	06	5.9	
1001-2000	45	44.6		1001-2000	26	25.7	
2001-3000	26	25.7		2001-3000	26	25.7	
3001-4000	04	4.0		3001-4000	17	16.8	
4001-5000	06	5.9		4001-5000	10	9.9	
5001 and above	03	3.0	1972.84	5001 and above	16	16.0	3366.51

Source: Field survey, 2021

Table 6. Relationship between independent variables and perceived change in rice production

Variables	r - value	p-value	Decision	Remark
Age	0.563	0.000**	S	Reject
Years of formal education	-0.022	0.831	NS	Accept
Income	0.428	0.000**	S	Reject
Years of experience	0.191	0.056	NS	Accept
Size of farm holding	0.299	0.021*	S	Reject
Household size	0.233	0.019*	S	Reject
Access to factors of production	0.092	0.360	NS	Accept
Adoption of new ideas/practice	-0.008	0.934	NS	Accept
Change in input utilization	0.215	0.031*	S	Reject

Source: Field survey, 2021; **Correlation is significant at 0.01 level; *Correlation is significant at 0.05 level

Table 7. Difference between quantities of rice produced before the ban on rice importation and after the ban

Quantity of rice produced	Mean	Standard deviation	df	Z-cal	Z-table	Remark
Before the ban on rice importation	1972.84	1291.76	200	-4.5345	1.96	Reject
After the ban on rice importation	3366.51	2805.72				

Source: Field survey, 2021

more the increase in rice production. This can be explained by the fact that with age come responsibility, experience and commitment to work. Furthermore, as income increases so is the increase in rice production, which indicates that farmers invest and expand rice production from income rise to boost rice production. Also, as farmers' size of holdings increases, there is an increase in rice production. When more land is available for farming, farmers can increase rice production. The correlation between household size and increase in rice production implies that the more the size of the household, the more the available labour which increases rice production. There existed a correlation between perceived change in input utilisation ($r=0.22$, $p=0.03$) and change in rice production. This implies that the more farmers increase their level of input utilisation the more the increase in rice production.

3.6.2 Test of Difference between quantities of rice produced before the ban (2019) on rice importation and after the ban (2021)

Z-test analysis in Table 6 shows that there was a significant difference between the quantities of rice produced before the ban on rice importation and after the ban (Z calculated 4.535 > Z tabulated 1.96). This implies that the farmers were responding to the rice importation ban policy to increase local rice production significantly.

4. CONCLUSION AND RECOMMENDATIONS

The study explored the effect of the importation ban policy on rice production among farmers in Bade LGA of Yobe State in Nigeria. It was concluded that more seeds, fertilizers, herbicides and water pumps were utilised. Farmers had high access to credits, pesticides, knapsack sprayers, water pumps, fertilizers and farmlands but low access to subsidies and extension

services. Age, income, size of farm holding, household size, and change in input utilisation influenced rice production positively. There was a significant increase in rice production in Bade Local government of Yobe state following the implementation of the policy.

Based on the findings of the study, the following recommendations were made:

1. It is recommended that the government proactive measure on rice importation ban should be sustained to make our country self-sufficient in rice production in the long run.
2. Yobe State Government should ensure that the extension service is repositioned and made available to help farmers with new ideas and practices.
3. Yobe State Government should encourage rice farmers through provision of subsidized inputs to boost local rice production, generate employment, fight poverty and boost food security.
4. Since there has been a substantial increase in rice production, processors have a critical mass of paddy rice to process which demands that they improve the processing quality to make local rice more competitive.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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