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Impact of agricultural export on food security in Nigeria

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Abstract

This paper examined the impact of agricultural export on Nigeria's food security and also the structural factors influencing the food deficit profile of Nigeria. The data used in this study were obtained from secondary sources. The bulk of the data were collected from available information over the 1970 – 1999 period from various publications, trade figures from the financial and economic reviews, statistical bulletin of the Federal Office of Statistics (FOS) various issues, annual reports and statement of account and monthly report by the Central Bank of Nigeria. (CBN). The methods of data analysis used are: Descriptive Analysis, Multiple Regression Analysis, and Growth Rate Analysis. The result of this study brings into focus the need to increase the total domestic production of food to achieve food security in Nigeria. The household purchasing power will improve if food accessibility and availability is improved. This will reduce drastically the percentage of income spent on food. The overall findings particularly the trend on import and export earnings and the instability of staple food prices suggest that transitory food insecurity is a potential problem in Nigeria.

Key words: Agricultural export, food aid, food security, income level, food import, food demand.

Introduction

Agriculture is central to the economic performance of sub-Saharan Africa (SSA) countries, and it is a source of livelihood for their inhabitants. It serves as a source of income, employment development and export earnings[1]. Policy makers and economic planners inside and outside the continent of Africa in both pre-colonial and post colonial times created money economics systems in which production was geared towards markets for commodity export such as coffee, cotton, rubber and a host of others, while consumption stimulated the demand for imports. This approach encouraged the SSA countries to devote a larger portion of their land to mono-culture, placing emphasis on the production of one or two major export crops for the world market in whose pricing decisions and rules of operation they do not participate. Agriculture has been in crisis throughout of SSA. The real price of the major agricultural commodities traded in the world market has shown a steady decline over the years. According to the global coalition for Africa, revenues from some major export commodities fell by almost 50%, despite a rise in volume terms and this has subsequently led to hunger, poverty and malnutrition in most of SSA.

SSA's standing in World market as measured by market share is steadily declining, going from 4.7% in 1980 to 1.9% in 1991. Between 1980 and 1984, the region's market share of cocoa, cotton and coffee fell by 33%, 29%, 13% respectively[1]. As a result of the international specialization the economic performance of the region over the years has been very deplorable and disappointing, and this can be attributed to the growing expenditure on food import and failing export earnings which has brought with it a deep economic mess and a growing balance of payment deficit coupled with rising external debts.

Despite the involvement of SSA countries in international trade, hunger, malnutrition, unemployment and poverty continue to stake a turn for the worse thereby leading to food security problems. The region is now experiencing serious food shortages and problems as opposed to economic gains from international specializations; hence the classical notion of deriving maximum benefits from international specializations can be questioned.

SSA countries became vulnerable to food insecurity not because of droughts and other unforeseen circumstances, but because of the constant rape and pillage of the peasantry and the international environment in the name of export, which is supposed to lead to development. The SSA countries have failed to diversify their export portfolios through the manufacture of their own goods and services as in the case in other developing countries of the world such as Latin America and Asia are currently doing.

Food Imports

The pattern of growth of food imports into Nigeria seemed to have assumed a reverse posture to that of food export. Where food exports declined from a very strong base, food imports began from a very small base and grew rapidly from the early 1970s. In order to explain the very rapid growth in food import volume into Nigeria, one will have to explain whether food importation was playing a positive and complementary role with domestic food production in improving local diets or replacing a potential output, which had been exploited. The period is segmented into two parts. 1970 – 1985 period and 1986 – 1995 period.

In the first period, food importation seemed to have played a complementary role in the total food supply. Two broad groups

of commodities dominated the import basket, cereals, which were not produced in Nigeria, and the other group was processed foods like vegetables and fruits, sugar and livestock. This was done to improve the local diets of people.

The second period 1986 – 1995 witnessed rapid growth in food demand and a significant increase in both food production and food export earnings, which increased over the years. Food imports are taking an increasing share of total export earnings. In 1970, the food import value was as low as ₦ 57.7m and by 1978 it had increased to ₦1027.6m, but this declined the following year. In summary, due to the oil boom of the early 1970s, there were fluctuations in the food import value and so it increased in some years and decreased in other years. The same occurred in the 1980s where there was no significant increase or decrease in the import value. In 1986 (SAP) there was a fall in the import value due to the policies implemented that affected imports. By 1991, there was a substantial increase of ₦2610.6m between 1990 and 1991 and by 1995; food import value reached its peak of ₦76818.9m.

Food Aid

Aid programs provide people in need with food rather than cash because the food is nutritionally more effective. At its founding, four basic principles governed food aid activity. Food aid should: directly feed hungry people, bring additional food to recipient countries provided from the donor's surplus stock and be given under short-term commitment sensitive to the political and economic goals of donors. During the 1980s food aid to SSA averaged about one-fifth of imports however, Nigeria's food problems are still not as bad as other African countries such as mentioned earlier, in fact in these other African countries. Food aid has in fact done nothing on the average to accelerate the long run rate of growth and has done nothing to reduce the incidence of hunger and malnutrition in these developing countries.

Food Demand

Food demand is determined by consumption pattern of the population. To understand the food consumption pattern, a consumption survey is conducted. A consumption survey is the information collected on the kinds and quantities of food items consumed in selected households, which replicate the entire population. However, over the years it has been difficult for less developed countries to conduct this survey because of the huge cost involved and the need to have an educated population. The major determinant of food consumption is the protein and calorie intake per day of the population. The other determinants are income level of the people, and price level.

Income Level

Income is another major determinant of food consumption and the nutritional status of the individual. Income levels determine the quantities of food consumed and the composition of the diet. As the basis of the household purchasing power and thus command over the food available in the market, income is a major factor that determines food security particularly, households that are not food buyers. At a lower income level, a

high proportion or income is allocated to food while at higher income level; expenditure fall less on food consumption. At this low level of income, the diet is dominated by cereals and starchy foods which are relatively cheaper while at a higher income level, there is a marked shift in food consumption to sugar, fruits, vegetables and livestock products[2]. There is a high degree of income inequality, which has serious nutritional impact on the bulk of the population. This can be seen in the income disparity between the urban and rural areas of the country. The pattern of income distribution in Nigeria shows that within the urban and rural sectors, there are large number of people who suffer in terms of inadequate food intake and malnutrition.

The real per capita income PCI (GDP at 84 factor cost/total population) fluctuates over the years. For instance in 1970, real PCI was approximately ₦818 and increased till 1974 at ₦1127. It fell again the following year and by 1980, the PCI has increased again. From the early 1980s through the 1990s, there has been no particular trend and by 1995, it had fallen to ₦927. From the table, it can be sent hat the early 1970s to 980s recorded high levels of real PCI and the highest level of income was recorded in 1974, which is attributed to the oil boom of the early 1970s. The decline in the real PCI was highlighted as a problem by the World Development report of 1988. It was shown that in 1980, 14 million Nigerians of the total population suffered from food insecurity and this showed that the incomes of most families were no longer adequate for the basic sustenance of life.

Hunger is the most immediate, most visible and most compelling symptom of a region with agricultural per-eminence. In most SSA countries, domestic product of food is not up to the consumption level and as such is inadequate in feeding the whole population. Over the decade, SSA countries have been significant net importers of food notably cereals. In 1989 for instance, the total volume of cereals imported was 8.2 million tons. This further jumped to 11.4 million tons in 1991[2]. In terms of values, the region's annual food imports are equivalent to roughly 30% of its agricultural export earnings. The dependency ratio of food importation has increased greatly and the inability to cope with the rising food imports has led to a mounting volume of food aid into this region. This has helped to avert short-term losses of life in some African countries. According to statistical records, at least 100 million people of the SSA are on the verge of starvation. The Central Bank of Nigeria[3] shows that about 20% of the region's population is undernourished i.e. their dietary energy supply has fallen below the level required. Development is about the people and for a country to experience economic development; the people have to be taken care of. Improvement is the access to food but hunger and chronic malnutrition continue to create serious problems for the people as a result of the fall in per capita calorie level needed for adequate nutrition[2]. For instance in Nigeria, during the periods between 1970 and 1979, the average annual deficit in per capita daily calorie intake was 24.5% while within the periods 1980-1989 and 1990-1994, it became 23.58% and 8.35% respectively[3,4]. The food crisis situation has led to a tremendous increase in the price of food over the years and great deterioration in the living standards of many families in the region. In Nigeria for instance, where the aggregate

consumer price index for food is 24.5% in 1976 and came plunging to 11.75% in 1994[3]. Africa Development Bank[4] shows that in 1980, almost 14 million Nigerians or 17% of the total population suffered from food insecurity. Since SSA is among the World's most land rich areas and since the vast majority of the population is composed of agricultural producers, agriculture provides about 70% of total employment. It is the development of commercialized agricultural export, which has resulted in the neglected state of domestic food production and the need for cheap food imports that ahs resulted in food shortage in the region. Hence food security problem is contemporary to which this study sets out to investigate. The overall objective of the study is to use available data on agricultural products to investigate the impact of exports on food security in Nigeria. Specifically the aims of the study are:

·To assess the impact of certain factors on food security in Nigeria.
·To examine and analy se the food security profile in Nigeria.
·To examine the effect of time on the food security index.
·To forecast the food security situation in Nigeria for the next five years.

Materials and Methods

This study reviewed a period of thirty years and examined the factors that influence food insecurity as well as determined the link between poverty and food insecurity. It is established in the literature review that there is a close relationship between domestic food production, regional and local food availability and household food security[5]. Odusola[6] also indicated that real per capita income is also a determinant of food security and food consumption, hence any model that is used to capture the food security problem must include the per capita income.

It is also known that food security essentials are the availability of food and the ability to acquire it through trade, production or both, hence, national food security involves an overall availability of food that is sufficient to meet the population's overall food needs.

However, the International Fund for Agricultural Development (IFAD) has developed the food security index (FSI) which combines food production and consumption variables to measures national composite food security.

The data used in this study were obtained from secondary sources. The bulk of the data were collected from available information over the 1970 – 1999 period from various publications, trade figures from the financial and economic reviews, statistical bulletin of the Federal Office of Statistics (FOS) various issues, annual reports and statement of account and monthly report by the Central Bank of Nigeria. (CBN). The methods of data analysis used are:

1. Descriptive Analysis
2. Multiple Regression Analysis
3. Growth Rate Analysis

Descriptive analysis: This involves the graphical method generally accepted for showing studies involving time series data. This method was used to analyze the trend in Food Security Index against time i.e. from 1970 – 1999. The graphs will be plotted to show FSI over time.

Multiple regression analysis: A single equation model is applied food security index (FSI) is measured by the deficit in per capita calorie intake, food export earnings, food imports real capita income, total domestic production of food, inflation and time.
The general form of the model is expressed thus:

$$FSI = F (FEXP, FIP, RPCI, TDOF, INFL, T)\text{-eq (1)}$$

where:

FSI = Deficit in per capita daily calorie intake (kilocal) a measure of food security or insecurity
FEXP = Food export earnings (N million)
FIP = Food import (N million)
RPCI = Real per capita income (N)
TDOF = Total domestic output of food (metric ton)
INFL = Inflation
T = Time
Logically, a decline or increase in the domestic food output, food export earnings, food imports, real capita income, inflation and time is expected to result in an increase or decline in food insecurity.

Symbolically, these a-priori expectations require that $A_1, A_2, A_3, A_4, A_5, A_6, < 0$

Four functional forms were used based on the above functions

The linear functions
$$Y = b_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + U_1$$

Exponential Function:
$$Log\ Y = b_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + U_1$$

Double Log
$$Log\ Y = b_o + b_1\ log\ X_1 + b_2\ logX_2 + b_3\ logX_3 + b_4\ logX_4 + b_5\ logX_5 + b_6\ logX_6 + U_1$$

Semi-log
$$Y = b_o + b_1\ log\ X_1 + b_2\ logX_2 + b_3\ logX_3 + b_4\ logX_4 + b_5\ logX_5 + b_6\ logX_6 + U_1$$

From the above functional forms, the model with the best fit was then chosen for the estimation of the data (Table 1). The fitness of that functional form will depend on its conformity with econometric criteria, which calls for all examination of the pattern of residual errors for possible violation of basic assumption concerning it and the magnitude of the sum squares of errors in different equations.

Statistical criteria involve comparing the co-efficient of multiple determinations, adjusted co-efficient of multiple determinants and the statistical significance of the co-efficient.

Growth rate analysis: The growth analysis is used to show increase or decline in Nigerian Food Export. The analysis covered a period of 30 years i.e. 1970 to 1999 (Table 2). Percentages were also used to estimate the range of changes in all the variables used i.e. 1994 to 1999 in Food Export per year and the average growth rate for thirty years was also estimated.

Table 1. Food security measure and its determinants.

Year	FSI	TDOF	FIM	RPCI	FEXP	INFL
1970	2001	37.28	57.70	818.21	17.71	13.80
1971	1977	32.71	88.30	968.56	25.87	15.60
1972	1962	25.27	95.80	996.41	28.24	3.20
1973	1926	28.14	126.30	1304.11	45.57	5.40
1974	1899	34.08	154.80	1127.41	115.90	13.40
1975	1970	28.81	298.80	1068.41	99.77	33.90
1976	1840	25.95	441.70	1160.89	132.45	21.20
1977	1775	25.35	780.70	1226.84	157.63	15.40
1978	1694	23.57	1027.60	1109.02	127.61	16.60
1979	1645	23.18	952.20	1106.82	207.95	11.80
1980	1764	23.74	1437.50	1135.21	283.95	9.90
1981	1519	24.14	1819.60	825.18	220.68	20.90
1982	1619	24.67	1642.30	813.60	184.00	7.70
1983	1771	21.50	1296.70	769.38	273.90	23.20
1984	1813	37.40	843.20	719.58	234.70	39.60
1985	1886	39.91	940.60	785.91	243.80	5.50
1986	1948	41.71	811.90	806.12	442.50	5.40
1987	2168	46.27	1646.50	792.79	871.00	10.20
1988	2065	56.86	1220.00	855.64	1512.90	38.30
1989	2173	62.93	2108.90	892.99	1217.40	40.90
1990	2277	67.33	3474.50	939.11	1868.10	7.50
1991	2277	79.47	6085.10	955.89	1580.00	13.00
1992	2277	67.25	12597.20	956.33	2467.50	44.50
1993	2260	90.15	1392.90	953.52	3719.00	57.20
1994	2282	93.25	138.37	955.47	4125.70	5.70
1995	2451	98.64	152.30	927.63	14967.36	72.80
1996	2555	100.00	175.00	940.00	5687.00	29.30
1997	2601	101.23	17920.00	958.00	1452.25	15.05
1998	2656	103.23	1180.25	966.00	132.54	7.90
1999	2700	105.44	19.00	990.00	125.46	10.20
Mean	2053.70	52.98	5155.09	951.83	2270.35	22.21
Standard Deviation	320.48	30.74	6809.88	129.29	4089.70	17.99
Coefficient Variation	0.16	0.58	1.32	0.00	1.80	0.81

FSI=Deficit in per calorie food intake measured in (kilocal/day)
TDOF=Total Domestic output of food; FIM=Food Import ; RPCI=Real Per Capita Income
FEXP=Food Export ; INFL=Inflation ; T=Time (Trend)
Source:CBN Annual Reports and Economic and Financial review, statistical bulletin of the CBN.
Computation using computer facility.

Results and discussion

Growth-rate analysis: The growth rate of food security index (FSI) in Nigeria between 1994 and 1999 ranged from 7.41 to 1.66 per annum (Table 3). A huge disparity is noticed, and this can be attributed to a lot of reasons. The food production pattern has greatly changed from agriculture to crude oil; the rate of producing staples has not been very encouraging. These have been high and unstable food prices resulting in reduction in the level of food consumption.

This is quite unfavourable to the consumers who spend a greater of their income on food. The rate of food importation has been very high; since the rate of producing staples is quite low then importation is encouraged to augment the decline. The growth rate of the total domestic output of food ranges from 5.78 to 2.14 showing also a downward plunge (Table 4). This explains the neglect in the agricultural sector. More attention is advocated in this sector to boost domestic food production as this will help in alleviating food insecurity.

Growth rate of food import showed an increase and a subsequent fall (Table 5). We can explain this by saying that food import plays a very negligible role in alleviating food insecurity.

Table 3. Growth rate of food security index (FSI).

Percentage change between 1994 and 1995 =	7.41
Percentage change between 1995 and 1996 =	4.24
Percentage change between 1996 and 1997 =	1.80
Percentage change between 1997 and 1998 =	2.12
Percentage change between 1998 and 1999 =	1.66
Average Growth Rate	3.45

Table 2. Tabulation of (FSI), its determinant and growth-rate.

Year	FSI	Growth Rate	TDOF	Growth Rate	FIMP	Growth Rate	RPCI	Growth Rate	FEXP	Growth Rate
1970	2001	-	37.28	-	57.7	-	818.21	-	17.71	-
1971	1977	-0.01	32.71	-0.12	88.3	0.53	968.56	0.18	25.87	0.46
1972	1952	-0.01	25.27	-0.23	95.8	0.08	996.41	0.03	28.24	0.09
1973	1926	-0.01	28.14	0.11	126.3	0.32	1034.11	0.04	45.57	0.61
1974	1899	-0.01	34.08	0.21	154.8	0.23	1127.41	0.09	115.90	1.54
1975	1870	-0.02	28.81	-0.15	298.8	0.93	1068.41	-0.05	99.77	-0.14
1976	1840	-0.02	25.95	-0.10	441.7	0.48	1160.89	0.09	132.45	0.33
1977	1775	-0.04	25.35	-0.02	780.7	0.77	1226.84	0.06	157.63	0.19
1978	1694	-0.05	23.57	-0.07	1027.6	0.32	1109.02	-0.10	127.61	-0.90
1979	1645	-0.03	23.18	-0.02	952.2	-0.07	1106.82	0.00	207.95	0.63
1980	1784	0.08	23.74	0.02	1437.5	0.51	1135.21	0.03	283.95	0.37
1981	1519	-0.15	24.14	0.02	1819.6	0.27	825.18	-0.27	220.68	-0.22
1982	1619	0.07	24.67	0.02	1642.3	-0.10	813.60	-0.01	184.00	-0.17
1983	1771	0.09	21.50	-0.13	1296.7	-0.21	769.38	-0.05	273.39	0.49
1984	1813	0.02	37.40	0.74	843.2	-0.33	719.58	-0.06	234.70	-0.14
1985	1886	0.04	39.91	0.07	940.6	0.12	785.91	0.09	243.80	0.04
1986	1948	0.03	41.71	0.05	811.9	-0.14	806.12	0.03	442.50	0.82
1987	2168	0.11	46.27	0.11	1646.5	1.03	792.79	-0.02	871.00	0.97
1988	2065	-0.05	56.86	0.23	1220	-0.26	855.64	0.08	1512.90	0.74
1989	2173	0.05	62.93	0.11	2108.9	0.73	892.99	0.04	1217.40	-0.20
1990	2227	0.02	67.33	0.07	3474.5	0.65	939.11	0.05	1868.10	0.53
1991	2227	0.02	79.47	0.18	6085.1	0.75	955.89	0.02	1580.00	-0.15
1992	2260	0.00	87.25	0.10	12597.2	1.07	756.33	0.00	2467.50	0.56
1993	228.2	-0.01	90.15	0.03	13192.9	0.05	953.52	0.00	3719.00	0.51
1994	2451	0.01	93.25	0.03	13837	0.05	955.47	0.00	4125.70	0.11
1995	2555	0.07	98.64	0.06	88349.9	5.39	927.63	-0.03	14967.36	2.63
1996	2601	0.04	100.00	0.01	17500	-0.80	940.00	0.01	5687.00	-0.62
1997	2656	0.02	101.23	0.01	17920	0.02	958.00	0.02	1452.25	-0.74
1998	2700	0.02	103.23	0.02	18025	0.01	966.00	0.01	13254.00	8.13
1999	1999	0.02	105.44	0.02	19000	0.05	990.00	0.02	12546.00	-0.05

Real per capita income also does not have a significant effect on food insecurity in Nigeria (Table 6). The reason may be because the households spend a high percentage of their income on food and are still not unable to meet their minimum requirement.

The export earnings do not have a significant effect on food insecurity in Nigeria (Table 7). This might be explained in relation to the Nigeria's balance of payment problem where the food export earnings can no longer pay for the food imports. Consequently, the imports are acquired on credit.

Table 4: Growth rate of total domestic output of food (TDOP).

Percentage change between 1994 and 1995 = 5.78
Percentage change between 1995 and 1996 = 1.38
Percentage change between 1996 and 1997 = 1.23
Percentage change between 1997 and 1998 = 1.98
Percentage change between 1998 and 1999 = 2.14

Average G. R = 2.50

Table 5: Growth rate of food import (FIMP).

Percentage change between 1994 and 1995 =	10.07
Percentage change between 1995 and 1996 =	14.91
Percentage change between 1996 and 1997 =	2.40
Percentage change between 1997 and 1998 =	0.59
Percentage change between 1998 and 1999 =	5.41

Average G. R. = 6.68

Table 6: Growth rate of real per capita income (RPCI).

Percentage change between 1994 and 1995 =-2.91
Percentage change between 1995 and 1996 =1.33
Percentage change between 1996 and 1997 =1.92
Percentage change between 1997 and 1998 =0.84
Percentage change between 1998 and 1999 = 2.48

Table 7. Growth rate of food export (FEXP).

Percentage change between 1994 and 1995 =	262.78
Percentage change between 1995 and 1996 =-	62.00
Percentage change between 1996 and 1997 =-	74.46
Percentage change between 1997 and 1998 =	812.65
Percentage change between 1998 and 1999 =	-5.34

Average G. R. = 186.73

Interpretation of regression results: The lead equation chosen of the four functional forms fitted to the data is the exponential function (Table 8 and 9). This is because it has the least standard error of the parameter estimate, a very high Durbin-Watson (DW) value, high frequency distribution and high coefficients of determination (R^2 and R^{-2}). The Durbin-Watson is used here because it ascertains the existence or non-existence of the error of auto-correlation. The values range from 1.5 to 2.5 and any value outside this boundary indicates the presence of auto-correlation error. It is based on these econometric reasons that the DW is used in the regression. The Durbin Watson value in the result confirms that the overall model is error free. The variables are all significant as shown in the equation. It

therefore means that total domestic output of food (TDOF), Food Import (FIM), Real per Capita (RPCI) and time (T) all affect food security index (FSI). There is a positive relationship between FSI and TDOF, i.e. a change in TDOF will translate to 7.749×10^{-3} change in FSI value.

Secondly FSI and FEXP are positively related such that a change in FEXP will bring about 4.13×10^{-6} value of change in FSI. However, FIMP, RPCI< INFL and Time have negative relationships with FSI, changes in these factors will lead to 7.72×10^{-6}, 2.28×10^{-6}, 1.57×10^{-3} and 5.92×10^{-3} values of change on FSI respectively.

The R-value shows that about 93% of the variations in FSI are caused by the variables. In the equation above, the numbers in parentheses are the standard errors of the parameter estimates. D.W stands for Durbin –Watson, R^2 and R^{-2} are the squared multiple correlation coefficients or the coefficient of multiple determination.

The numbers in parentheses are the standard errors of estimate. The exponential equation is the best-fit equation; this is because it has a higher Durbin –Watson (DW) value and a lower value of standard error of estimate. It's co-efficient of determination are relatively high also. From the equation, it shows that time is positively related to food security index (FSI) i.e. a change in time will result to 1.326×10^{-2} value of change in FSI.

Table 8. Regression analysis results[a]

Functional forms/ variables	Linear	Exponential	Double log	Semi log
Constant	1578.31 (165.51)	7.37 (0.09)[*]	6.14 (0.51)[*]	-807.93 (1053.21)
TDOF	14.39 (1.75)[**]	$7.75\ 10^{-2}$ (0.001)[*]	0.27 (0.35)[*]	504.17 (73.40)
FIM	-9.40×10^{-3} (0.007)[*]	$-7.72\ 10^{-6}$ (0.00)[*]	$-1.6\ 10^{-2}$ (0.17)[*]	4.24 (35.19)
RPCI	-1.69×10^{-2} (0.14)[*]	$-2.28\ 10^{-6}$ (0.00)[*]	$8.67\ 10^{-2}$ (0.07)[*]	154.50 (145.5)
FEXP	1.02×10^{-2} (0.006)[*]	$4.13\ 10^{-6}$ (0.00)[*]	$2.63\ 10^{-2}$ (0.19)[*]	60.90 (40.20)
INFL	-3.61 (0.99)[*]	$-1.57\ 10$ (0.001)[*]	$-3.05\ 10$ (0.10)[*]	-72.87 (24.54)
T	-10.65 (0.88)	$-5.92\ 10$ (0.002)[*]	$-4.60\ 10^{-2}$ (0.03)[*]	-129.66 (68.44)
R^2	0.94	0.93	0.93	0.93
R^{-2}	0.93	0.91	0.91	0.91
F	63.58[*]	50.30[*]	49.26[*]	50.13[*]
DW	1.8	1.8	1.92	1.63

[a]The value in parentheses are the standard errors of the parameter estimate. [*] significant at 1% [**] significant at 5%.

Table 9. Regression result on the effect of time on FSI.

Functional Form	Constant Form	Time	R^2	R^2	D. Watson
Linear	1612.186 (76.054)	28.485 (4.284)	0.612	0.598	0.224
Exponential	7.410 (0.038)	1.326×10^{-2}	0.577	0.562	0.262

Table 10. Forecast of the Nigerian food situation for the next five years.

Year	FSI
2000	2493
2001	2526
2002	2560
2003	2594
2004	2628

Forecast of the Nigerian food situation (FSI) is presented in Table 10.

Conclusions

The result of this study brings into focus the need to increase the total domestic production of food to achieve food security in Nigeria. This will help to increase the overall output and productivity and will in turn improve food security. The shortfall in total domestic output of food encouraged importation of foreign grains and livestock product, but government policies on importation will encourage local food production and will boost food security level. The household purchasing power will improve if food accessibility and availability is improved.. This will reduce drastically the percentage of their income on food. The overall findings particularly the trend on import and export earnings and the instability of staple food prices suggest that transitory food insecurity is a potential problem in Nigeria.

Based on the interpretation of the results, it can be seen that promoting domestic food production can solve most of Nigeria's food problem. This will increase the availability of food locally as these may not be exportable commodities. This could be achieved by the provision of irrigation facilities, agricultural research, provision of credit to farmers, agricultural insurance and subsidized input. The standard of living of the people would improve, if resources committed to food imports are used for better sources of overall food security namely domestic food production. Hence food imports should be controlled and the private sector should be encouraged to invest in food production. Therefore incentives that will make farming more attractive and more profitable should be advocated. With the suggested control of food imports, export earnings should be invested in domestic food production. Instruments such as expansion of storage facilities, market regulations, provision of marketing infrastructure and information could be used to ensure reduction in fluctuation of food prices. This will help to boast the per capita income thereby increasing the household purchasing power. It should be noted that most discussion on food security examines the policy tools available to ensure domestic food availability. In terms of domestic food availability, the economic and food production policies will not solve the problem unless they are reoriented to ensure improved income and consumption for both the poor and malnourished.

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