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# CENTRAL BANK OF NIGERIA



RESEARCH DEPARTMENT OCCASIONAL PAPER NO. 23

## **ANALYSIS OF INTERSECTORAL LINKAGES BETWEEN AGRICULTURE AND INDUSTRY IN NIGERIA**

*By*

**M. I. ABUDU**

*Principal Economist Research Department  
Central Bank of Nigeria*

JUNE, 1999.

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**M. I. ABUDU  
PRINCIPAL ECONOMIST  
RESEARCH DEPARTMENT  
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JUNE, 1999.

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# ANALYSIS OF INTERSECTORAL LINKAGE BETWEEN AGRICULTURE AND INDUSTRY IN NIGERIA

by

M. I. Abudu\*

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*This paper uses time series data to analyse the relationship between agricultural growth and industrial performance for the three-decade period 1966 - 1995. Agricultural growth influences industry in many ways. It provides the raw materials needed by industry; it creates direct demand for the output of consumption goods of industries and indirect demand for the output of basic and capital goods industries. Analysing the input-output coefficients, the paper found that most primary and secondary commodity groups have weak backward and forward linkages, while the quantitative relationships between agricultural growth and industrial performance were non-significant, even when lagged. However, the link between industrial growth and the food component of agricultural growth rate emerges positive, as food is expected to play a significant role during the agroindustrial transformation processes. Power generation, as expected, positively influenced industrial performance, while transport infrastructures and capital goods industries have negligible impact as a result of poor performance of these sectors. The policy implications of the analysis include the need to build and expand the capital goods-production capacity of the economy; enhance power generation and distribution, drastic improvement in transport infrastructures, especially roads; research and development of local raw materials, including storage/preservation; integrated agroindustrial planning and better investment information management.*

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## 1.0 INTRODUCTION

Changes in the relative importance of agriculture and industry have been recognised as the core of the process of growth. In industry, it is the role of manufacturing sector that appears to be the strategic factor in modern economic growth. One of the central issues confronting many developing countries is sectoral

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balance: determining which area of development will contribute most to the economy as a whole.

Except for few countries, the discernible patterns are overwhelmingly agricultural and industrial interdependence. Agriculture provided the needed surplus for industrialisation processes in most developed industrial countries and lately in South Asian and Latin American countries. The industrial sector adds to the demand for goods produced by the agricultural sector and this may raise productivity in agriculture. Higher agricultural productivity will provide capital and markets for new industries, while industries will absorb the surplus labour which agriculture must release in its process of improvement. Indeed, a characteristic difference between developed and developing countries is in the relative importance of agriculture and industry in their economies.

Before and immediately after independence in 1960, agriculture was the mainstay of the Nigerian economy, accounting for more than one-half of the Gross Domestic Product (GDP) and more than three-quarter of exports earnings. The contribution of agriculture to GDP moved from 50 per cent in 1970 to 38.8 per cent in 1991 and by 1995 this has declined further to only 32 per cent, (see Table 1). In fact, by mid-1980s, Nigeria has moved from a position of self-sufficiency in basic foodstuffs to one of heavy dependence on imports, as much emphasis was shifted to the petroleum sector. Thus, the observed drop of relative share of agriculture in aggregate output reflects the period of windfall from petroleum income when farm production was depressed by the massive urban boom and movement of rural workforce to cities.

On the other hand, emphasis on industrialisation as a means of diversifying production patterns and expanding the production base was initially based on import-substitution and semi-processing of cash crops for export, and later on the establishment of light intermediate and heavy industrial complexes in the 70s and 80s. Consequently, the manufacturing sub-sector accounted for about 4 per cent of GDP in 1977 and by 1982 it has increased to 11.2 per cent after which it declined to an annual average of less than 10 per cent between 1983 and 1995. Struthers (1990) described this simultaneous decline in agriculture and industry as 'Dutch Disease' (the premature shrinkage of agriculture and under expansion of competitive manufacture) which could be attributed to poor linkage between the sectors, despite the huge earnings from the petroleum sector. Moreover when the two sectors wait for each other to perform the thrusts and feedbacks expected of them, the pace of economic growth tends to slow down or stagnate.

The objective of this paper is therefore to analyse the agricultural and industrial production growth rates in order to determine if the performance of the agricultural sector influences the growth and performance of the industrial sector. Other important components of the linkages such as power generation and price effects would be examined. The importance of such issues as land distribution and tenure practices, including rural development which are essential for effective optimisation of agro-industrial linkages will not be explicitly discussed. Although exploratory, understanding the extent of the linkage and other factors influencing it would enable adequate policy focus to be evolved to strengthen an agricultural industrial development strategy which would simultaneously create effective internal demand and promote trade diversification vital for sustainable economic growth and development. If the production system could be appropriately modeled, with full specification of the parameters of the structural relations, it would be possible for the experts and authorities to manipulate the process to facilitate policy intervention.<sup>1</sup>

The rest of the paper consists of discussion of the salient features of agricultural and industrial growth in Section 2, while Section 3 looks at the theoretical and analytical framework and the estimation of the linkages. Section 4 gives recommendations for strengthening the linkages while Section 5 summarises and concludes the paper.

## **2.0 SALIENT FEATURES OF INDUSTRIAL AND AGRICULTURAL GROWTH**

On attaining independence in 1960, the agricultural sector maintained its dominant position as the major foreign exchange earner. The sector accounted for more than half of the GDP and provided enough food for the teeming population. Traditional small holder farmers, who use simple techniques of production and the bush-fallow system of cultivation, account for about two-thirds of Nigeria's total agricultural production.

Cash crops (mainly palm kernels, coffee, cotton, cocoa, rubber and groundnut) have declined both in volume and contribution to the economic growth of the country. The abolition of six federal Commodity Boards in 1986 improved the production of cash crops but remained much lower than the levels achieved in the 1960s and early 1970s, (Africa South of the Sahara, 1993).

## 2.1 Industrial Sector:

Table 2 provides data on year-to-year and five yearly average growth rates of industrial and agricultural production, including their main components. The highest industrial growth rate was achieved during the period 1966-70 when the sector recorded an average growth rate of 25.9 per cent, compared with 12.4 and 13.4 per cent achieved in the preceding periods of 1971/75 when the country was just recovering from the devastating effect of the Civil War. This period of highest industrial growth coincided with the oil boom when importation of both industrial machinery and raw materials were easily financed from the huge earnings from the petroleum sector. The period 1981/85, however, witnessed a sharp decline of 2.8 per cent in industrial growth which was fueled by the sharp fall in earnings from petroleum export as a result of the oil shock of the 70s.

However, the Structural Adjustment Programme (SAP) embarked upon in late 1986 by the Government to stabilise the economy had a salutary effect on the industrial sector as the sector recorded an annual average growth of 10.4 per cent between 1986 and 1990, with positive growth rates in each of the years. The pace continued but at a decreasing rate, accounted for by sharp fall in the manufacturing component, which experienced very low capacity utilisation as a result of lack of raw materials, spare parts and other production bottlenecks. For instance, the annual average growth rate of the manufacturing component increased from 14.4 per cent during 1971/75 to 19.4 and 17.6 per cent during 1976/80 and 1981/85 periods, respectively. Thereafter the rate of growth of this sub-sector decelerated as a result of factors enumerated above. Indeed, for the first time during the period of analysis, this sub-sector recorded a negative growth rate of 2.4 per cent compared with all industry average growth rate of 4.8 per cent.

The year-to-year changes have been quite uneven in the industrial sector. During 1966-70, the highest rate of growth for the sector as a whole was 85.6 per cent in 1969 and the lowest was minus 22.7 per cent in 1968. In the 1976/80 the highest and lowest growth rates achieved were 33.1 and - 1.1 per cent, respectively. Similar movements were recorded in other periods and in the manufacturing sub-sector. The all-industrial annual average growth rate of 10.7 per cent for the 30-year period was less than the manufacturing sub-sector average growth rate of 12.2 per cent.

The government has reacted to the declining trends in manufacturing output by the creation of the Raw Materials Research and Development Council and a Raw Materials Data Bank. Through these institutions and others, the government

hopes to improve the capacity utilization through available local raw materials.

Manufacturing using raw materials from local sources were at a strong advantage after the 1986 reforms. By 1989, manufacturers with locally sourced inputs achieved relatively high levels of capacity utilization: tyres (59.8%), leather products (60.3%), beer and stout (53.4%), textiles (60%) and industrial chemicals (46%) - see Table 3. Agro-business grew rapidly due to the government policy of self-sufficiency in food production. Sugar refining, textiles, brewing, rubber, fertilizers, footwear, paper, cigarettes and general food processing industries have continued to record reasonable levels of capacity utilization rates.

## 2.2 Agricultural Sector

Against this background of industrial performance, it may be worthwhile to see whether developments in agricultural sector paralleled those in industry. While the industrial sector recorded modest growth between 1969 and 1980, the agricultural sector recorded average declines of 2.9 and 2.3 per cent for the periods 1971/75 and 1976/80, respectively. Similarly, the staples (food) sub-sector, which was expected to provide basic food items during the process of transformation, recorded even sharper declines of 4.4 and 6.7 per cent for the two respective periods, thus emphasizing the neglect suffered by the agricultural sector during the oil boom period. The situation reversed during the period prior to the introduction of the SAP and during the first five years of the Programme. However, this limited success could not be sustained as the average growth rate in agricultural production declined from 10.0 per cent in the 1986/90 period to 4.7 per cent during 1991/95. The food sub-sector experienced a much higher average growth rate than all-agricultural index, especially at the commencement of the SAP in 1986 and even after. With the abolition of the Commodity Boards and the institution of SAP, with agriculture as the key components of the programme, agricultural production improved. River basins and States Agricultural Development Programmes and other institutional reforms have brought agriculture to the forefront in the country's developmental efforts. Removal of restriction on agricultural pricing, coupled with the renewed focus on small farm holders who produce about 90 per cent of food consumed in the country has renewed optimism about the future of agriculture.

In addition to growth rates discussed above, the variability of annual growth rates is much higher in agriculture (c.v. 2.4) than in industry (c.v. 0.8) and more specifically in manufacturing sub-sector (c.v. 0.6) - see Table 4. Similarly, the variability of growth rates over the years, though mixed, has shown tendency to be higher in the agricultural sector.



### 2.3 An Assessment

From the data on agricultural and industrial production analysed above, it could be observed that movements in the two sectors were dissimilar and in fact opposite in most periods, for example 1971/75, 1976/80 and even 1981/85. Although there appears to be an opposite movement between industrial growth and agricultural performance, one should not, *a priori*, expect industrial production to be a simple reflection of agricultural production. Industrial growth is fueled by many factors that are not directly influenced by agriculture. For instance, the direct effect of agricultural growth on the industrial sector during the period of import-substitution industrial strategy would be expected to be minimal. Furthermore, raw data may hide some of the influences of agriculture on industrial performance because of the lags involved. Also, there are several links between agriculture and industry. It is possible that whereas some may lead to increase in industrial production, others may decrease it. In some cases, government policy may partly offset the effects. For instance, the devaluation of the naira was expected to stimulate both local and exportable goods, while reducing imports on certain raw materials, but the phenomenal increases in prices have both dampened demand for consumer goods and increased the prices of locally produced raw materials. Some of these influences will be investigated in later sections.

## 3.0 THEORETICAL AND ANALYTICAL FRAMEWORK

### 3.1 Theoretical Framework

Mutual interdependence of agriculture and industry in the process of development forms a widely accepted postulate of development economics. The fortunes of agriculture and industry are closely interwoven in that the expansion of industry depends to a large extent on improvements in agricultural productivity which depends on adequate supplies of industrial inputs, especially the provision of consumer goods to act as incentives to peasant farmers to increase agricultural surplus.

The importance of transferring agricultural surpluses to support industrialization had forced some countries to resort to compulsory taxation. In Japan, between 1880 and 1900, the land tax provided approximately 80 per cent of central government taxation, and in Russia forced extraction of agricultural surplus through expropriation was common. Industrialization in Western Europe and particularly in England, was financed to a large extent by surpluses generated on the land, but transferred voluntarily through a rapidly expanding banking system



(Thirwal, 1986). In Nigeria, the defunct regional Marketing Boards provided between 30 and 60 per cent of funds needed to finance development projects, including industrial projects. Developing countries today, despite their access to foreign sources of capital, must rely heavily on extracting surplus from agriculture to finance industrialisation, which involves the interaction of technology, specialization and trade. This interaction provokes structural changes within economies. Higher agricultural productivity is needed to accommodate such shift (F.A.O. 1966; World Development Report, 1987).

Hirschman (1958) in his discussion of linkages in the context of unbalanced growth hypothesis, argues that assigning priority to high linkage industries will generate higher growth rates in the underdeveloped countries. Chenery and Watanabe (1958) provided an approach to the measurement of linkages through input-output analysis and some of their methodologies are widely used to measure interindustry linkages. Olofin and Iyaniwura (1983) analysed the intersectoral linkages in the Nigerian economy, using the 1970, 50 by 50 Input-Output Tables. In general, they found low linkages in the economy. In particular, their analysis revealed a high backward linkages for such sectors as footwear, vegetable oil milling, leather, plastic products, metal furniture, tanneries, cement, paints, etc., which are secondary sectors that depend on the other sectors for their inputs. Low backward linkage sectors include transport, agriculture, electricity, forestry, livestock, fishing, oil (petroleum) and communication, which are predominantly primary sectors that do not depend on other sectors for their inputs. The low backward linkage of these sectors was attributed to high import-content of goods locally produced and traded as a result of the absence of capital and intermediate goods sectors, in addition to the high direct consumer oriented nature of the Nigerian economy. In other words, there was no key sectors which were highly dependent on output levels in the economy and at the same time being in a position to influence output levels in other sectors within the economy. The authors recommended the promotion of industries that would not only increase local processing of the output of the primary sector (backward linkage) but also produce capital and other intermediate input for use by other sectors (forward linkage).

Although the channels through which agricultural performance influences industrial growth are many and diffuse, five can, however, be delineated (Ranarajan, 1982).

First, because agriculture requires industrial inputs such as fertilizer, herbicides, insecticides, etc., growth in agriculture generates demand for such

industrial products and this link become stronger with increased productivity in agriculture through changes in technology. Second, agriculture supplies the raw materials needed by agro-based industries. Third, agriculture influence the output of industries producing consumer goods such as leather, clothing, sugar, edible oils, etc., through demand. A rise in the income of producers of agricultural commodities, through perhaps, increased production or prices, will increase disposable income of this group, all things being equal. It should be noted that rise in prices of agricultural products, especially food items, may in fact reduce consumption of consumer goods among the poor where food forms a sizeable part of the total budget. Fourth, a rise in agricultural production may increase government revenue through indirect taxation and improved earnings by national carriers such as railway. An increase in the terms of trade in favour of agriculture may promote rural household savings and investment. It should be noted that while some channels emphasize the link between agriculture and industry on the supply side, others stress the link on the demand side.

In his study on the influence of agriculture on industrial growth in India, based on production, demand and savings and investment linkages, Ranarajan found that agriculture exercises a reasonably strong influence on the growth of industry. Simulations show that a 1 per cent growth rate in agriculture can by itself generate a rate of growth of 0.5 per cent in industry, a remarkable result considering that industrial growth is not totally dependent on what happens in agriculture. However, because the ability to raise the agricultural growth rate is limited, industry cannot rely on agriculture alone to stimulate growth, he concluded.

Ashok, (1990) used national, regional and sub-regional time series and cross-sectional data to show that the direct statistical relationship between agricultural and industrial growth in India was weaker than would be expected. His estimation of non-agricultural variables (power generation, growth in basic goods industry, etc.) indicates a significant, though weak, influence and thus recommends appropriate policy in these areas if agroindustrial linkages is to improve in that country.

Analysing the linkages in Brazil, Carvalho (1991) found that changes in the agricultural sector affect the performance of the industrial sector, though the particular methodology adopted in the analysis was not stated. Similarly, Amara (1990), observes that industrialization in Algeria has been accompanied by a rapid rise in the demand for food and increases in agricultural prices, creating profitable outlets for agriculture and thus increasing purchases of industrially produced goods.

The declining terms of trade in the world market for primary products and the consequent effects on the domestic economy prompted many African countries to partly process these products in order to increase their value. Specifically, if prices for semi-processed or processed commodities behave differently than those for the primary form, then shifting the structure of exports will alter the level and stability of export earnings. If the semi-processed or processed commodities are more stable and also have greater secular increase (or less of a decrease), then this would be a further attraction for natural resource-based industrialization strategies (Yeates, 1991). This strategy of adding value to natural resources for exports was adopted by Cote d'Ivoire with success (Traore, 1990). Similarly, Malawi, a relatively small country with little apparent industrial potential, achieved a GDP growth rate of 80 per cent over the decade 1970/80. This economic growth was export-led and based on natural resources (Livingstone, 1984).

Although most African countries are endowed with a variety of resources in the agricultural, forestry, marine and mineral sub-sectors, the bulk are exported outside the region with little processing. Consequently, the ratio of processed to unprocessed commodity export is much lower than for other developing regions. Thus, although developing countries as a whole processed locally about 70 per cent of their cotton, the figure for Africa is about 40 per cent; for cocoa the ratio is about 11 per cent compared with 28 per cent for other developing countries; and for iron ore the corresponding figures are 7 per cent and 40 per cent, respectively.<sup>2</sup>

Ohiorhenuan (1978), questioned the relevance and usefulness of input-output tool in developing non-market economies where linkages are weak, the reason being that a great deal of output goes directly to meet final demand, or else exported. However, like any other tool of economic analysis, the input-output method of measuring intersectoral activities is not infallible and has its limitations.<sup>3</sup> Besides the economies of most developing countries have undergone structural changes in line with most market economies.

### 3.2 Analytical Methodology

The Input-Output technique will be used to measure the influence of agriculture on industrial growth, based on the 1990, 50 X 50 Input-Output table with its transformation. The Input-Output analysis offers the possibility of providing a set of consistent projections indicating broadly the structure of the economy. It also shows the disaggregated structural changes that must occur in the process of

growth. Through the Input-Output technique, it would be possible to estimate the production linkages, i.e. the backward and forward linkages between the agricultural and industrial sectors. Backward linkages refer to where an industry gets its inputs from and forward linkages refer to where an industry's output goes. Specifications follow that of Chenery and Watanabe (1958):

$$U_j = \frac{\sum_i X_{ij}}{X_j} \dots\dots\dots(1)$$

$$W_i = \frac{\sum_j X_{ij}}{X_i + M_i} \dots\dots\dots(2)$$

- Where  $U_j$  = backward linkage of sector  $j$
- $W_i$  = forward linkage of sector  $i$
- $X_{ij}$  = total flow from sector  $i$  to sector  $j$
- $X_j$  = domestic input or output of sector  $j$
- $M_i$  = imports of type  $i$

Thus  $U_j$  is the ratio of intermediate to total inputs, and  $W_i$  the ratio of intermediate to total output.

3.2.1 **Backward and Forward Linkages**

Table 5 shows the backward and forward linkages of the Nigerian economy in 1990. The table reveals a high backward linkages for such sectors as textiles, footwear and leather, wood, paper, drugs and chemicals, fabricated metal, which are secondary sectors that depend on other sectors for their inputs. Low backward linkage sectors include agriculture, livestock, fishing, forestry, crude petroleum, other mining, building and construction and communications which are predominantly primary sectors that do not depend on other sectors for their inputs. Except for forestry and refineries, these primary sectors also have low forward linkages, reflecting the relatively underdeveloped state of the economy. The food sector has a relatively moderate backward linkage as this sector depends on other sectors for its inputs. Its low forward linkage is explained by the nature of its products: they go overwhelmingly to private consumption, the same characteristics for textiles, footwear, paper etc.

The much vaunted bedrock of the nation's industrial take-off, the iron and steel sector, portrayed a moderate backward linkage but poor forward linkage, a direct consequence of the absence of capital and intermediate goods sectors. As was the case in Olofin and Iyaniwura (1983), the low linkages could be attributed to the high consumer-oriented nature of the Nigerian economy as well as the absence of capital and intermediate goods sectors, which are expected to propel the economy into the industrial age. It should be noted that about 20 years after the above cited study was carried out, there appears to be little or no change in the production structure of the economy as revealed by the Input-Output analysis.

### 3.2.2 Time-Series Analysis

In order to determine the nature of the relationship between agricultural and industrial growth, a time series analysis of annual growth rates of the two sectors for 30 years (1966-1995) will be carried out on an OLS method. Further, a decomposition of the industrial sector to isolate manufacturing sub-sector will be carried out. Also, the influence of food (staples) component of agriculture on industrial development will be investigated as food is expected to provide the needed food-wage stimulus in the process of industrialization. The results of these analysis together with earlier analysis in Section 2.0, will form the basis for further investigation into other determinants of industrial growth.

Most of the analysis that follows draws heavily on the study by Ashok (1990) as there appears to be no detailed study on the subject matter in Nigeria. A set of linear equations as specified below is used to determine whether the dominant direction of causation runs from agricultural to industrial growth as postulated by economic growth theory.

$$G_{nd} = 11.33 - 0.175G_{ag} \dots\dots\dots (3a)$$

(2.91) (-0.433) Adj. R<sup>2</sup> = -0.03; D-W = 1.6

$$G_{mf} = 12.73 - 0.3012G_{ag} \dots\dots\dots (3b)$$

(5.01) (-1.14) Adj. R<sup>2</sup> = 0.01; D-W = 2.0

$$G_{nd} = 8.303 + 0.476G_{fd} \dots\dots\dots (3c)$$

(2.147) (1.918) Adj. R<sup>2</sup> = 0.09; D-W = 1.6

$$G_{mf} = 12.25 - 0.0177G_{fd} \dots\dots\dots (3d)$$

(4.48)            (-0.10) Adj. R<sup>2</sup> = 0.04; D-W = 2.0  
(Figures in parantheses are t-statistic)

- Where  $G_{nd}$  = annual growth rate of overall industry  
 $G_{nf}$  = annual growth rate of manufacturing sub-sector  
 $G_{ag}$  = annual growth rate of agricultural sector  
 $G_{fd}$  = annual growth rate of food (staples) sub-sector

The correlation between the agricultural growth rate and the growth rate of the overall industrial sector and also between the former and growth in the manufacturing sub-sector are both non-significant for the three-decade period. However, the correlation between the growth in the industrial sector and the growth in the food component of agriculture turned out to be positive and significant, indicating the importance of food in agroindustrial development of an agrarian economy. The manufacturing/food regression portrayed a weak and negative relationship. The above results and observations conform to earlier analysis in Section 2 and the Input-Output estimates presented above.

### 3.2.3 Possible Explanations Lag and Price Effects

In this section, we intend to investigate the reasons for the weak links between the two sectors. First, we investigate whether there is time lag between agricultural production and industrial performance and the manufacturing sub-sector in particular by lagging agricultural growth rate by one year and two-year period, respectively. Second, the relationships so far estimated were based on agricultural and industrial growth in output at constant prices. To incorporate the relative behaviour of prices in the two sectors, it is necessary to calculate and incorporate the movement in prices through terms of trade of industry with respect to agriculture. Terms of trade is defined as the ratio of the price of agricultural commodities to the price of manufactured finished products. In the absence of such data, however, price movements as reflected in the consumer price index would be used. The impact of any slack in the supply of food is initially reflected in consumer prices, which in turn affect real wages with subsequent demand for higher money wages with its repercussion on industrial costs. The effects of lags and changes in consumer prices were tested under the general form equations of

$$G_{nd} = f(G_{ag}, G_{pr}, F_d, w) \dots\dots\dots(4a)$$



$$Gmf = f(Gag, Gpr, Fd, w).....(4b)$$

both lagged one and two years, respectively, and the estimates that produced the best results and are given below:

$$\begin{aligned} Gnd &= 8.576 - 1.182G_{ag} - 0.045Gpr + 0.996Fd.....(4a) \\ &\quad (1.628) \quad (-2.352) \quad (-0.252) \quad (3.161) \\ &\quad \text{Adj.}R^2 = 0.2; D-W=1.5 \end{aligned}$$

$$\begin{aligned} Gmf &= 19.485 + 0.334Gag(t-1) - 0.298Gpr(t-1) - 0.349Fd(t-1).....(4b) \\ &\quad (4.953) \quad (0.915) \quad (-2.029) \quad (-1.535) \\ &\quad \text{Adj.}R^2 = 0.1; D-W = 2.4 \end{aligned}$$

where  $G_{pr}$  is the annual percentage increase in the consumer price index,  $Gnd$ ,  $Gmf$  and  $G_{ag}$  are as defined previously;  $Fd$  is annual growth rate of staples. Figures in parantheses are t-statistic.

The two equations show weak relationship. In both cases, however, the relationship is negative as regards changes in consumer price, indicating the depressive influence of changes in consumer prices on the manufacturing sub-sector. Thus to maintain price stability, greater agricultural output must be a policy focus in planning. In addition equitable distribution of agricultural output, especially its food component, should be encouraged so as to reduce the depressive effect of rising consumer prices on agro-industrial performance. In general, the explanatory variables in the lag and price equations were not high enough as explanation for the observed weak linkage.

#### 3.2.4 Non-Agricultural Determinants of Industrial Growth

From the analysis so far, it is obvious that buoyant agricultural growth may not necessarily lead to similar industrial performance. That is, though agricultural growth is a necessary condition for achieving rapid industrialization, this by itself may not be sufficient. The existence of other complementary conditions in the industrial sector may be vital for higher industrial growth. To keep down the number of variables constrained by availability of data, four variables; rate of agricultural growth, rate of growth of power generation, rate of growth of capital goods industries and rate of growth of transport infrastructure, with appropriate lags, were tested (results no shown) as non-agricultural determinants of the pace of industrial growth.

The capital goods industry and transport infrastructure performed poorly as explanatory variables for the poor agroindustrial linkage with weak coefficient and t-values. However, the regression coefficient of growth of power generation shows positive values, especially in the manufacturing sub-sector with higher, though weak explanatory variables. Thus, the importance of growth in power generation as a determinant of industrial growth cannot be overemphasised.

The poor performance of capital goods growth could be explained by the underdeveloped nature of this sector exemplified by underutilised capacity in the iron and steel and the machine tools and foundry branches. Similarly, the poor performance of infrastructures is not surprising as the poor road network in the rural areas where the bulk of agricultural products are produced is a well known fact.

### 3.2.5 Agro-Industrial Growth and Aggregate Growth Performance

This section of the paper assesses whether a balance between the pace of growth in the agricultural and industrial sectors is associated with a faster pace of overall economic growth as would follow from the balanced growth thesis, or vice versa. There are many definitions of balance growth. While to some the concept of balanced growth implies equality in sectoral rates of growth; others accept variations in keeping with income elasticity of demand. In this paper the agroindustrial growth imbalance will be measured as the square of the gap between agricultural and industrial growth rates. Following the procedure adopted by Ashok Mathur ( 1990), the efficiency of balanced vis-a-vis unbalanced agroindustrial growth is measured by the relationship between agroindustrial growth gap and overall economic growth. If balanced agroindustrial growth is conducive to higher economic growth, one would expect to observe a negative relationship between agroindustrial growth gap and lagged rate of growth of the economy, and vice-versa. The results of the non-lagged and one and two-year lagged regressions are given below:

$$\begin{array}{rcll} \text{GDP}_{(t)} & = & 1.78 & +0.0028\text{G}_{\text{an}(t)} \dots\dots\dots(5a) \\ & & (1.002) & (3.036) \qquad R^2 = 0.3; D-W=1.7 \end{array}$$

$$\begin{array}{rcll} \text{GDP}_{(t)} & = & 2.242 & +0.00237\text{G}_{\text{an}(t-1)} \dots\dots\dots (5b) \\ & & (1.179) & (2.461) \text{ Adj. } R^2 = 0.2; D-W = 1.9 \end{array}$$



$$\text{GDP}_{(t)} = 3.490 + 0.00144\text{G}_{\text{an}(t-2)} \dots\dots\dots(5c)$$

(1.773)                      (1.465) Adj.  $R_2 = 0.05$ ; D-W=1.6

Where  $\text{GDP}_{(t)}$  is the annual growth rate of Gross Domestic Product in year (t) and  $\text{G}_{\text{an}(t)} = \{ \text{G}_{\text{ag}(t)} - \text{G}_{\text{nd}(t)} \}^2$  is the agro-industrial growth gap in year (t).

Both the lagged and non-lagged relationships are positive and statistically significant though become weaker as the length of lag increases. There is thus same evidence to suggest that the imbalance in agroindustrial growth rate has not been conducive to faster economic growth as postulated by the balance growth thesis.

#### 4.0 POLICY APPROACHES TO AGRO-INDUSTRIAL LINKAGES

The rather poor statistical relationships between agricultural and industrial growth observed so far does not, however, diminish the importance of sustained agricultural growth in accelerating the pace of industrial development. Rather, it indicates that an agricultural-led strategy of development may not, by itself, succeed unless suitable complementary measures are taken to build and expand the capital goods-producing capacity of the economy in addition to achieving adequate power supply and transport infrastructural facilities. Further, institutional finance for industry is important.

High productivity should be maintained in the agricultural sector through a proper mix of large and small irrigation system, well spread throughout the country. This will ensure dried season farming, already well entrenched in some parts of the country, in addition to minimising the devastating impact of drought. Also high agricultural growth has important implications for price stabilization policy.

Other policy perspectives are:

1. **Technology:** The dependence of agriculture on industry for inputs hinges on the technology used in agriculture, while the dependence of industry on agriculture for inputs hinges on the growth of processing industries, which in turn depends on income level and perhaps export demand. In the long run, there is need to invest heavily in the intermediate goods industries and research into the

preservation and utilization of the abundant natural resources of the country. In this respect, research institutes such as the Raw Materials Research and Development Council (RMRDC) should be adequately funded. The continued decline in prices and demand for primary commodities in the world market calls for more positive response from the developing countries. As depicted in the patterns of consumption forecast in the 1980s, the decline may continue because of low prices and poor income-elasticity of demand for commodities compared with manufactures, the general shifts of GDP towards service sector which consumes a smaller volume of raw materials and other factors.

Furthermore, factor availability should guide the production techniques where choice of technology is applicable. In Nigeria where unskilled labour is plentiful and capital scarce, labour-intensive industries or labour-intensive techniques within a given industry should be preferable, at least in the short-run. This method would allow for the training of skilled manpower that are essential for a competitive export-oriented sector. The use of primitive implements by the peasant farmers because of cost and ignorance on the advantages of modern implements requires serious attention. A system of subsidy and hiring of these modern farming implements should be strengthened and any bottleneck removed.

2. **Strengthening Infrastructural Facilities:** The underdeveloped infrastructural facilities in the country is an obstacle to the rapid expansion and development of a viable agro-industrial sub-sector. These two sectors require transportation of large volumes of raw materials and the poor state and management of ports, railway systems and roads add to score of daily operational problems. Adequate and reliable electricity and water supply will reduce cost of production and improve capacity utilization.

3. **Integrated Planning of Agriculture and Industry:** The interdependence of agriculture and industry should be reflected in economic planning by the government. Plantation system whereby the production, processing and marketing of certain agricultural raw materials are carried out by the same enterprise should be encouraged. This is especially so if the raw materials are perishable or because of substantial loss in weight or bulk during processing. This means siting industries using bulky and perishable raw materials in the locality where they are sourced.

Vertical integration based on contracts between producers and processors are quite common methods of ensuring continuous supply of raw materials for intensive capacity utilization. Incentives such as acquisition of land, capital allowances, tax rebates, etc. used during the initial phase of the adjustment programme should be revived and selective prohibition of imported but locally available raw materials imposed. The initial effect might be reduced capacities but this will reverse in the long run.

**4. Government's Role:** Apart from the provision of infrastructural facilities, government must define and protect private ownership, guarantee against arbitrary seizure or punitive laws, allow individuals to associate freely and make enforceable contracts and be transparent in the interpretation and enforcement of these law. A stable and well organised society is a *sin qua non* for foreign investment flows. Technical assistance from international agencies on feasibility studies, training of manpower, etc. should be sought. As in the newly industrialising countries, protection is needed for the agro-based industries in terms of subsidies, tax relief, tariff etc.

Where private initiatives are not forthcoming, joint venture between the government and foreign and local investors should be considered. The advantage of this is that the foreign partners will bring in the initial foreign exchange components of the venture and provide technical and managerial skills. The government should withdraw after an agreed period of operation.

**5. Marketing and Promotion:** Synthetic and other biotechnological products are fast displacing primary products as raw material inputs. But through product differentiation, designed to change consumer preferences in favour of natural products by emphasising their "natural" characteristics, natural raw materials or their by-products could regain their prime place (Mikio, 1988, Killick, 1990).

There is need for improved marketing techniques to capture both the internal market, which is potentially very large, and the very competitive external market. Both markets are sources of growth for the agro-based industries as industrial plants can take advantage of economies of scale as amply demonstrated by Latin American countries and South Korea.

6. **Regional and Sub-Regional Cooperation:** As envisaged in the Lagos Plan of Action and the subsequent industrial Development Decade for Africa I and II, there is need for regional and sub-regional cooperation in the industrialization of the continent. This means that there should be free movement of persons and goods within the continent. Large scale production is only feasible where there are large markets.

7. **Education and Information Management:** Education spurs the process of industrialization by imparting skills, improving health etc. Investment in education is the surest way to improve the productivity of labourforce which is the main bottleneck in industrialization. To promote maximum linkage between agricultural and industrial sectors, there must be improvement in information dissemination to producers and consumers, both at the national level and at the international marketplace. There exist information gap on the available investment opportunities in the agro-based industries where profitable avenues exist.

## 5.C SUMMARY AND CONCLUSIONS

This paper tries to determine whether agricultural performance influences industrial growth in the Nigerian economy. Agricultural growth influences industry in many ways. It provides the raw materials needed by industry, especially the agro-based industries. It creates direct demand for the output of consumption goods industries and indirect demand for the output of basic and capital goods industries. In the analysis of sectoral growth rates of agriculture and industry, it was found that the coefficient of variability of average growth rates over the 30 year period was higher in agriculture than in industry, implying a more unsteady growth pattern in agriculture than in industry. Using the input-output tables of the Nigerian economy in 1990, it was found that most primary commodity group such as agriculture, livestock, fishing and forestry had low backward and forward linkages except for forestry with high forward linkage. Data covering 30 years were used to estimate the quantitative relationships between agricultural growth and industrial development and in all it was found that the statistical relationship was non-significant, even for lagged agricultural growth rates on industrial/manufacturing growth.

Another link between agricultural and industrial growth which emerged to be significant was the food component of agricultural growth rate. Similarly, there was a statistically significant positive relationship between agricultural growth and

movements in the consumer price index which could be explained by the rising prices of agricultural commodities acting as stimuli for increased productivity. However, the relationship between the manufacturing growth rate and movement in the consumer price index turned out to be negative as rising prices have a depressive influence on consumer goods. Given the objective of achieving greater price stability and avoidance of adverse impact of consumer price increase on the industrial growth rate, as well as on the incidence of poverty, an adequate rate of agricultural growth and effective management of food stocks are very important role as instruments of price stabilisation policy in the country.

Further analysis was carried to determine non-agricultural variables that influence industrial growth and it was found that growth in power generation had a positive influence on industrial growth, while growth in transport infrastructure and capital goods industries have negligible impact on industrial growth as a result of the underdeveloped state of the capital goods sector and the poor road and rail networks, respectively. And finally, the impact of the agro-industrial growth gap on the overall growth of the economy was estimated and found to be positively skewed towards unbalanced growth thesis.

To strengthen the agroindustrial linkages, it is recommended that greater emphasis being placed on the development of appropriate technology, basic and applied research in the utilization of local raw materials, improvement in infrastructural facilities (roads, rail, power etc.) and the development of capital goods industries, especially machine tools and foundry branches. Further, integrated planning of agriculture and industry is needed to improve the agro-food sub-sector, while appropriate educational skills should be a policy option to provide a well trained manpower while government involvement in areas such as the development of research findings and proper investment information management were also recommended.

In conclusion, this analysis should serve as a prelude to studies providing much more detailed and precise measurement of the relationships between agriculture and industry and their component parts. In particular, the effects of money wages and terms of trade (the ratio of the price of agricultural commodities to the price of manufactured finished products) may need to be investigated. Analysis at regional/state levels would be important for integrated sectoral planning of agriculture and industry.

**TABLE 1**  
**GROSS DOMESTIC PRODUCT AT 1984 CONSTANT FACTOR COST**  
(Percent of Total)

| Sector                         | 1981  | 1982  | 1983  | 1984  | 1985  | 1986  | 1987  | 1988  | 1989  | 1990  | 1991  | 1992  | 1993  | 1994  | 1995  |
|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Agriculture including forestry | 34.7  | 35.8  | 37.7  | 37.8  | 40.3  | 42.7  | 41.5  | 41.5  | 40.6  | 39.0  | 38.6  | 38.4  | 38.6  | 39.1  | 39.5  |
| Manufacturing                  | 9.9   | 11.2  | 8.4   | 7.8   | 8.6   | 8.0   | 8.4   | 8.7   | 8.2   | 8.2   | 8.5   | 7.9   | 7.3   | 6.9   | 6.7   |
| Crude Petroleum and gas        | 14.0  | 12.5  | 12.8  | 15.2  | 15.1  | 13.8  | 12.5  | 12.3  | 13.2  | 12.9  | 13.4  | 13.4  | 13.1  | 12.6  | 12.6  |
| Building & Construction        | 4.7   | 3.8   | 3.5   | 3.0   | 1.9   | 1.8   | 2.0   | 2.1   | 2.0   | 1.9   | 1.9   | 1.9   | 2.0   | 2.0   | 2.0   |
| Housing                        | 2.6   | 2.6   | 2.8   | 3.0   | 2.7   | 2.7   | 2.7   | 2.5   | 2.4   | 2.3   | 2.3   | 2.3   | 2.3   | 2.4   | 2.4   |
| Utilities <sup>1</sup>         | 0.7   | 0.7   | 0.8   | 0.8   | 0.7   | 0.5   | 0.6   | 0.5   | 0.5   | 0.6   | 0.5   | 0.5   | 0.6   | 0.6   | 0.6   |
| Total (percent)                | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Total (N billion)              | 70.4  | 70.2  | 66.4  | 63.0  | 68.9  | 71.1  | 70.7  | 77.8  | 83.5  | 90.3  | 94.5  | 97.9  | 99.6  | 101.0 | 103.5 |

Source: Statistical Bulletin, Central Bank of Nigeria, Abuja.

**TABLE 2**  
**ANNUAL RATES OF GROWTH IN INDUSTRIAL AND**  
**AGRICULTURAL PRODUCTION 1966 - 1995**

| <b>YEAR</b>          | <b>ALL INDUSTRIES</b> | <b>MANUFAC-<br/>TURING</b> |  | <b>ALL AGRICULTURE</b> | <b>FOOD (STAPLES)</b> |
|----------------------|-----------------------|----------------------------|--|------------------------|-----------------------|
| 1966                 | 26.4                  | 11.7                       |  | 15.5                   | 25.6                  |
| 1967                 | -11                   | 2.2                        |  | -16.4                  | 4.1                   |
| 1968                 | -22.7                 | -0.2                       |  | -0.7                   | 3.1                   |
| 1969                 | 85.6                  | 31.8                       |  | -16.1                  | 27.7                  |
| 1970                 | 51.4                  | 11.5                       |  | 14.7                   | 35.5                  |
| <b>1966 - 70 AV.</b> | <b>25.9</b>           | <b>11.4</b>                |  | <b>-0.6</b>            | <b>19.2</b>           |
| 1971                 | 32.7                  | 13.3                       |  | -9.4                   | -14.5                 |
| 1972                 | 13.7                  | 8.8                        |  | -17.7                  | -31.1                 |
| 1973                 | 16.2                  | 23.2                       |  | 8.7                    | 20.9                  |
| 1974                 | 5.2                   | 3                          |  | 16.1                   | 18.2                  |
| 1975                 | -5.8                  | 23.7                       |  | -12.1                  | -15.3                 |
| <b>1971 - 75 AV.</b> | <b>12.4</b>           | <b>14.4</b>                |  | <b>-2.9</b>            | <b>-4.4</b>           |
| 1976                 | 19.1                  | 23.2                       |  | -6.4                   | -14.2                 |
| 1977                 | 3.6                   | 6.3                        |  | -0.9                   | -5.4                  |
| 1978                 | 12.2                  | 14.4                       |  | -3.3                   | -10.4                 |
| 1979                 | 33.1                  | 47.9                       |  | -1.2                   | -5.4                  |
| 1980                 | -1.1                  | 5.2                        |  | 0.1                    | 2                     |
| <b>1976 - 80 AV.</b> | <b>13.4</b>           | <b>19.4</b>                |  | <b>2.3</b>             | <b>-6.7</b>           |
| 1981                 | -2.9                  | 14.6                       |  | 2.9                    | 1.7                   |
| 1982                 | 6.3                   | 13.1                       |  | 3.3                    | 4.6                   |
| 1983                 | -21.6                 | 28.6                       |  | -4.5                   | -2.6                  |
| 1984                 | -5                    | 12                         |  | 6.5                    | 12.4                  |
| 1985                 | 9.2                   | 19.9                       |  | 4.6                    | 3.3                   |
| <b>1981 -85 AV.</b>  | <b>-2.8</b>           | <b>17.6</b>                |  | <b>2.6</b>             | <b>3.9</b>            |
| 1986                 | 3.5                   | 3.9                        |  | 3.5                    | 6.5                   |
| 1987                 | 18                    | 33.6                       |  | 7.2                    | 14.2                  |
| 1988                 | 10.9                  | 5.3                        |  | 19.3                   | 26.7                  |
| 1989                 | 14.9                  | 14.1                       |  | 10.5                   | 12.3                  |
| 1990                 | 4.5                   | 5.6                        |  | 9.5                    | 6                     |
| <b>1986 - 90 AV.</b> | <b>10.4</b>           | <b>12.5</b>                |  | <b>10</b>              | <b>13.1</b>           |
| 1991                 | 6.3                   | 9.3                        |  | 6.8                    | 20.7                  |
| 1992                 | 7                     | 11.8                       |  | 5.4                    | 15.6                  |
| 1993                 | 12.9                  | -26.9                      |  | 4.6                    | 0.7                   |
| 1994                 | -1.9                  | -0.9                       |  | 3.3                    | 3.9                   |
| 1995                 | -0.4                  | -5.5                       |  | 3.6                    | 3.5                   |
| <b>1991 - 95 AV.</b> | <b>4.8</b>            | <b>-2.4</b>                |  | <b>4.7</b>             | <b>8.9</b>            |
| <b>AVERALL</b>       | <b>10.7</b>           | <b>12.2</b>                |  | <b>1.9</b>             | <b>5.7</b>            |

Source: Computed from Index of Agricultural and Industrial Production, Statistical Bulletin,  
Central Bank of Nigeria



TABLE 3  
AVERAGE CAPACITY UTILISATION RATES IN MANUFACTURING SUB-SECTOR 1981 - 1995

|                            | 1981  | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
|----------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Meat & Dairy Products      | n/a   | 63.6 | 48.3 | 37.8 | 37.8 | 33.1 | 33.0 | N/A  | N/A  | 39.6 | 36.0 | 41.0 | 48.0 | n/a  | n/a  |
| Vegetable & Grain Mill     | n/a   | n/a  | 30.0 | 65.7 | 51.2 | 39.4 | 42.1 | 28.7 | 31.8 | 28.8 | 34.0 | 33.9 | 31.0 | 30.5 | 43.0 |
| Bakery Products            | 55.3  | 73.9 | 60.4 | 60.9 | 42.7 | 41.5 | 38.9 | 35.1 | 31.7 | 50.3 | 57.2 | 22.9 | 19.0 | 30.0 | 32.0 |
| Sugar, Cocoa Confectioner  | 84.2  | 62.3 | 50.0 | 37.5 | 31.6 | 32.9 | 33.0 | 50.9 | 51.6 | 42.1 | 47.5 | 52.1 | 48.9 | 17.5 | 32.1 |
| Miscellaneous Food Prep.   | n/a   | n/a  | 66.1 | 49.9 | 22.5 | 32.2 | 26.4 | 30.0 | 31.0 | 52.6 | 58.7 | 43.8 | 40.7 | 26.5 | 28.5 |
| Beer & Stout               | 100.0 | 86.0 | 68.0 | 62.2 | 59.0 | 49.8 | 49.8 | 59.2 | 53.4 | 60.2 | 62.4 | 46.0 | 46.7 | 54.3 | 49.1 |
| Soft Drink                 | n/a   | 56.2 | 36.4 | 26.1 | 27.7 | 26.7 | 35.6 | 29.8 | 28.6 | 41.6 | 38.6 | 45.7 | 43.2 | 50.0 | 48.6 |
| Textiles                   | 76.9  | 73.6 | 57.4 | 46.7 | 44.6 | 41.3 | 48.0 | 54.8 | 59.7 | 39.0 | 44.2 | 49.1 | 47.4 | 46.6 | 37.7 |
| Knitting Carpets & Rugs    | n/a   | 49.5 | 46.5 | 39.5 | 27.6 | 25.0 | 20.2 | 49.2 | 60.6 | 31.3 | 35.3 | 39.8 | 35.0 | n/a  | 27.9 |
| Leather Products           | 85.0  | 71.8 | 54.0 | 36.2 | 25.5 | 33.1 | 32.9 | 45.7 | 60.3 | 46.5 | 52.5 | 56.0 | 52.0 | n/a  | n/a  |
| Leather Footwear           | 84.4  | 81.0 | n/a  | n/a  | 64.5 | 73.0 | 66.3 | 40.0 | 65.0 | 38.2 | 38.1 | 31.0 | 25.0 | n/a  | 20.3 |
| Sawmilling                 | 65.1  | 65.1 | 55.8 | 43.3 | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  | n/a  |
| Wood & Cork Products       | 80.0  | 79.8 | 56.3 | n/a  | 22.0 | 29.2 | 46.4 | 46.8 | 51.0 | 41.3 | 48.1 | 64.4 | 66.6 | 51.1 | 50.0 |
| Paper Manufacturing & Pro. | 67.6  | 55.8 | 41.6 | 37.8 | 28.6 | 28.3 | 29.1 | 41.4 | 47.0 | 41.9 | 44.5 | 49.4 | 47.7 | 23.0 | 55.0 |
| Printing & Publishing      | 75.0  | 60.8 | 60.1 | 33.6 | 45.3 | 51.3 | 54.4 | 47.9 | 46.9 | 40.5 | 54.5 | 42.0 | 37.7 | 23.0 | 35.3 |
| Total (Average)            | 73.3  | 63.6 | 49.1 | 42.0 | 37.1 | 38.9 | 40.4 | 41.5 | 42.4 | 40.3 | 42.0 | 38.1 | 42.1 | 35.3 | 38.3 |

Source: Central Bank of Nigeria, Abuja.



TABLE 4  
SECTORAL GROWTH RATES

| SECTOR         | 1966 - 1970 |        | 1971 - 1975 |       | 1976 - 1980 |       | 1981 - 1985 |       | 1986 - 1990 |      | 1991 - 1995 |       | ALL<br>1966 - 1995 |      |
|----------------|-------------|--------|-------------|-------|-------------|-------|-------------|-------|-------------|------|-------------|-------|--------------------|------|
|                | g           | c.v.   | g           | c.v.  | g           | c.v.  | g           | c.v.  | ξ           | c.v. | g           | c.v.  | g                  | c.v. |
| Agriculture    | -0.60       | -23.40 | -2.90       | -4.50 | -2.30       | -1.00 | 2.60        | 1.40  | 10.90       | 0.50 | 4.70        | 0.30  | 1.90               | 2.40 |
| Food (staples) | 19.20       | 0.70   | -4.40       | -4.60 | -6.70       | -0.80 | 3.90        | 1.30  | 13.10       | 0.60 | 8.90        | 0.90  | 5.70               | 1.60 |
| All Industry   | 25.90       | 1.50   | 12.40       | 1.00  | 13.40       | 0.90  | -2.80       | -5.30 | 10.40       | 0.60 | 4.80        | 1.10  | 10.70              | 0.80 |
| Manufacturing  | 11.40       | 1.00   | 14.40       | 0.60  | 19.40       | 0.80  | 17.60       | 0.40  | 12.50       | 0.90 | -2.40       | -5.80 | 12.20              | 0.60 |

g is the average of annual growth rates

c.v. is coefficient of variation of annual growth rates during the period

Source: Computed from Index of Agricultural and Industrial Production, Statistical Bulletin,  
Central Bank of Nigeria

**TABLE 5**

**BACKWARD AND FORWARD LINKAGES  
IN THE NIGERIAN ECONOMY 1990**

|    | <b>SECTOR</b>             | <b>BACKWARD<br/>LINKAGE</b> | <b>FORWARD<br/>LINKAGE</b> |
|----|---------------------------|-----------------------------|----------------------------|
| 1  | Agriculture               | 0.1648                      | 0.1257                     |
| 2  | Livestock                 | 0.0909                      | 0.0458                     |
| 3  | Fishing                   | 0.3377                      | 0.0115                     |
| 4  | Forestry                  | 0.0403                      | 0.8229                     |
| 5  | Crude Petroleum           | 0.0418                      | 0.0788                     |
| 6  | Other Mining              | 0.3469                      | 0.4976                     |
| 7  | Food                      | 0.4911                      | 0.239                      |
| 8  | Drink Bev. & Tobacco      | 0.285                       | 0.0089                     |
| 9  | Textiles                  | 0.6056                      | 0.3941                     |
| 10 | Footwear & Leather        | 0.5704                      | 0.2158                     |
| 11 | Wood                      | 0.5797                      | 0.621                      |
| 12 | Paper                     | 0.6417                      | 0.2921                     |
| 13 | Drugs & Chem              | 0.8074                      | 0.6068                     |
| 14 | Refineries                | 0.5129                      | 0.8289                     |
| 15 | Rubber & Plastics         | 0.1931                      | 0.546                      |
| 16 | Iron & Steel              | 0.5966                      | 0.3703                     |
| 17 | Fabricated Metal          | 0.6903                      | 0.4984                     |
| 18 | Vehicle Assembly          | 0.2441                      | 0                          |
| 19 | Other Manufactures        | 0.1385                      | 0.4981                     |
| 20 | Utilities                 | 0.5211                      | 0.6678                     |
| 21 | Building & Construction   | 0.2019                      | 0.079                      |
| 22 | Transport                 | 0.4026                      | 0.584                      |
| 23 | Communications            | 0.3912                      | 0.8423                     |
| 24 | Distributive Trade        | 0.2801                      | 0.1908                     |
| 25 | Hotel & Restaurant        | 0.0148                      | 0.0563                     |
| 26 | Finance & Insurance       | 0.0064                      | 0.2108                     |
| 27 | Real Estate & Bus. Serv.  | 0.0131                      | 0.0228                     |
| 28 | Housing (Dwelling)        | 0                           | 0.5623                     |
| 29 | Commty Soc. & Pers. Serv. | 0.006                       | 0.0669                     |

Source: Calculated from the Input-Output Tables for Nigeria, Ministry of National Planning, Abuja.

## FOOTNOTES

1. Ayoola, G. B. (1997): "Trends and Patterns of Agricultural Production in Nigeria", a lecture delivered at the weekly Seminar of the Research Department, Central Bank of Nigeria, April 29.
2. United Nations, Economic Commission for Africa: "Raw Material Development: A Neglected Component of Africa's Industrialization Strategies", in *Focus on Africa Industry*, Vol. 4, No. 2, Dec. 1991, pp. 6 - 10.
3. The limitations of the input-output tables are based on the assumptions of no joint products; fixed technical coefficient (i.e. no substitutability between inputs); no external economies and diseconomies; and static technical progress. However, if input-output tables are produced at regular intervals of 5 years, they could be indicative of the interdependence between activities, especially where technical progress is slow as in many developing countries including Nigeria.

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