

## Historical Review

# Diversifying Nigeria's petroleum industry

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The petroleum industry in Nigeria has brought unprecedented changes to the Nigerian economy, particularly in the past five decades when it replaced agriculture as the cornerstone of the Nigeria economy. The oil industry has risen to the commanding heights of the Nigerian economy, contributing the lion share to gross domestic product and accounting for the bulk of federal government revenue and foreign exchange earnings since early 1970. However, Nigeria's considerable endowment in fossil fuel has not translated into an enviable economic performance; rather, the nation's mono-cultural has assumed a precarious dimension in the past decades susceptible to the vagaries of the international oil markets. Nigeria's extreme reliance on the crude oil market has triggered structural difficulties for the economy, as earnings from crude oil fluctuate along with market trends which are exacerbated by the country's neglect of other productive sectors of the economy. This negative trend has persisted despite various economic reforms embraced by successive Nigerian governments since 1980. Unless the country deepens its economic reform initiatives to include effective diversification of the petroleum sector, the performance of the economy will continue its unimpressive trend. Diversification of the economy should also extend beyond the Petroleum sector so that the country can become a major force in the emergent global economic order of the 21<sup>st</sup> century. Policy makers should develop the nation's vast resources in the agricultural and solid mineral sectors for the global markets and reap the benefits that accompany economic diversification.

**Key words:** Crude oil, natural gas reserve, minerals, environmental effect, export diversification.

## INTRODUCTION

The growth of petroleum industry in Nigeria appears to have brought dramatic changes in the structure of the economy since 1970. In less than a decade, agriculture's share of gross domestic product (GDP) declined from roughly one-half to less than 30% and its erstwhile preeminence as generators of state revenue and foreign exchange all but vanished.

Crude oil become one of the world's most strategic natural resources required as a crucial input in contemporary economic activities. A versatile, non-renewable natural resource, crude oil is a highly demanded commodity in both rich and poor countries, providing about 50% of the global energy requirements (Anyanwu et al., 1997, Igbatayo, 2004). Crude oil consists of a mixture of many substances, mainly hydrocarbons with other elements, including sulphur, nitrogen and oxygen.

The operation of Petroleum industry is divided into the upstream (exploration and production) and downstream sector (refining, marketing and servicing).

Crude oil and gas have assumed a predominant role in the global economic framework, providing much of the energy that drives the economy in both industrialized and developing countries. Oil deposits are distributed around the world, existing in large quantities in various continents. Huge production takes is taking place in Alaska, Texas, the Gulf of Mexico, Venezuela and Brazil in South America. The North Sea produces crude oil, as well as the Arabian Peninsula; there are proven oil reserves that make the region the world's most predominant producer of the commodity. In Africa, huge oil reserves also exist in the Niger Delta, as well as in the Gulf of Guinea, where Nigeria, Cameroon and Angola are major producers of the commodity.

In view of the strategic nature of the Petroleum Industry as the predominant source of global energy, it has become a prime source of revenue generation to many countries, particularly in the developing world. In this res-

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**Table 1.** Growth rates and contributions to Nigeria's GDP growth by sector (2001 – 2004).

Sector	Average annual Growth Rate (%)				Share of GDP in 2004(%)	Share Contribution of GDP in 2004(%)
	2001	2002	2003	2004		
Agriculture	4.0	5.0	5.0	6.0	51.5	3.08
Industry	2.0	1.0	1.0	3.0	20.7	1b.33
Manufacturing	0.0	-4.0	4.0	4.0	-	-
Building and Construction	6.0	6.0	4.0	4.0	2.1	0.08
Wholesale trade	1.0	3.0	2.0	2.0	11.0	0.23
Retail trade	4.0	4.0	4.0	4.0	28.1	1.123.84

Sources: UNECA, 2005.

respect, the organization of Petroleum Exporting Countries (OPEC), which comprises eleven countries from the developing world, has played a leading role in the global oil industry, promoting market stability and ensuring a steady flow of revenue accruing to member countries of the cartel. The emergence of oil as a major commodity in the global market has transformed the economies of major producers of the commodity in the developing world. In some cases, it has served to boost economic growth and accelerated development, in others, it has heralded structural difficulties which have undermined economic performance and compounded development trends, with little real benefits for the majority of the people in the countries concerned (World Bank, 2000; UNECA, 2005).

The major objective of this paper is to shed light on the imperatives for economic diversification within and outside Nigeria's petroleum industry in the 21<sup>st</sup> century.

### Historical perspectives of Nigeria's petroleum industry

Although the search for oil deposits started in Nigeria in 1908, records show that Shell Darcy drilled the first well in 1938 (Aigbedion, 2004, Anyawu et al., 1997). In 1955, Mobil Exploration incorporated received concession over the whole of the former Northern region of Nigeria, where the company carried out relevant geological survey. It also drilled some wells in Western Nigeria before abandoning its concession in 1961.

Shell petroleum discovered oil in commercial quantity in Nigeria in 1956 and began production of the commodity immediately thereafter. Apart from the initial discovery of oil at Oloibiri in the Niger Delta further discoveries at Afam and Bomu confirmed Nigeria's status as a major oil-producing nation. The petroleum industry grows rapidly from 1960 and subsequently in 1970; it has replaced agriculture which was the cornerstone of the nation's economy (Obadan, 1998). The manifestation of the Nigerian petroleum industry includes one of the World's largest proven reserves and of the production in excess of 2 million barrels (Van Buren, 2001). At the top of the petroleum industry is the federal Government-owned parastatal, Nigeria National Petroleum Corporation (NNPC) that operates a Joint Venture (JV) agreement with trace

other foreign multi-national oil companies in Nigeria to produce both the nation's crude oil and gas. The nation four refineries, which produce petroleum products and derivatives for the nation's domestic consumption was sold by the administration of chief Olusegun Obasanjo due to its privatization policy in early 2007.

### The Nigerian economy and the petroleum industry: contemporary trends and developments

The petroleum industry has assumed a primate position in the Nigerian economy accounting for 80% of the nation's GDP in the recent times (Lukeman, 2003). The industry has also pushed Nigeria to the forefront of the global industry, making the country the 6<sup>th</sup> largest exporting and 7<sup>th</sup> largest producer of oil in the world. Revenue from petroleum sector comprising export earning, petroleum profits tax and royalties has grown steadily over the years. Between 1970 and 1998, earning from oil rose from 75.3% to a peak of 84.1% of the total federally generated revenue (CBN, 1998).

Also, IMF estimates showed, Nigeria's earnings from crude oil increases from US \$8,500 billion in 1989, and to \$10.600 billion in 1990. By 1995, these earnings had declined to \$7,001 billion and declining further to \$5.276 billion in 1998. However, crude oil prices have increased steadily in the new millenium following the implementation of strict production quotas imposed by OPEC on member-countries to stem the flow of excess crude oil in the global marketplace.

As a result of the dominant role played by the oil sector in the nation's economy, economic performance has been linked to oil prices in the past three decades. This rather unenviable development has inspired the current administration to diversify the nation's economy away from its dependence on crude oil by harnessing natural gas, bitumen and other solid minerals. In year 2000, thanks to the oil windfall, the growth rate of oil GDP improved by 4.8 % compared with the previous year. The unexpected boom in the international market helped to propel the growth performance of the entire economy (UNECA, 2005). Oil prices rose from \$18.00 a barrel in 1999 to \$28.00 in 2000. Also, OPEC quota for Nigeria increased from 1.885 million barrels a day in March to

**Table 2.** Crude oil production, export and domestic consumption (selected year) 1975 – 2002 (000 barrels).

Year	Production	Export	Export %	Domestic consumption	Domestic consumption %
1975	495,689	483,455	96.91	12,234	3.09
1980	760,148	627,636	95.06	32,510	4.92
1985	860,117	656,260	86.34	103,857	13.66
1990	847,088	485,580	88.94	60,508	11.06
1995	960,559	548,249	83.00	112,310	17.00
2000	970,400	716,900	86.23	98,370	13.77
2002	10,000,710	973,340	90.63	150,370	11.37

Source: Extracts from Ibiyemi, 2004.

2.033 million in April, 2,091 million in July, 2,157 million in October and 2,178 million in November. Of the total daily production, around 1.88 million barrels a day were exported from 1.66 million in 1999.

Although oil is largely an enclave sector in Nigeria, having a few forward and backward linkages with the rest of the economy, however, it remains a decisive force for economic performance. Its impact is transmitted through the income effect, mediated through public spending and imports. In recent times, oil GDP is clearly more volatile than non-oil GDP. Due to the volatility of oil prices, the sector often experiences rapid growth in value added on year followed by an equally rapid decline in the next, with the trend usually reflected in volatile growth for the economy as a whole. Table 1 shows the contribution of various sectors to the nations between 2001 and 2004.

### The state of Nigeria's crude oil industry

Although crude oil was discovered in commercial quantity in Nigeria since 1956, the sector did not achieve its pre-eminent status until mid- 1970s, when it replaced agriculture as the pillar of the Nigerian economy. By this time, crude oil sector had become a dominant force and determinant of the nation's economic growth. As a result of the dramatic increases of global oil prices which trailed the 1973 Arab-Israeli war, Nigeria's export earnings grew phenomenally from 395,843.00 barrels in 1970 to 660,400 (barrel) in 1975 (Anyanwu et al., 1997). Since the 1970s, activities in the nation's upstream sub-sector have been influenced by market trends funding constraints, as well as restiveness in the nation's oil producing communities of the Niger Delta, which have been undermined by endemic violence in recent times (UNDP, 2001). Despite the various constraints faced by the nation's upstream sub- sector, the industry has produced some encouraging developments. The nation's crude oil reserves, which was put at 28 billion barrels at the beginning of 2001, increased to 32 billion barrels by the beginning of 2002 and is projected to grow up to 40 billion barrels by the year 2010 (Aigbedion, 2004; Lukeman, 2003). Nigeria's crude oil productivity is also expected to grow from its current level of 3.3 million barrels per day to 4 million

barrels by the year 2010. These figures exclude condensates and NGL volumes. Which together are currently in excess of 400 thousand barrels per day, according to industry analysts. The nation's crude oil reserve has recorded a significant surge in recent times due to positive developments in the deep offshore areas of the Niger Delta. Some of the new fields include: Bonga field belonging to Shell Nigeria Exploration Company (SNEPCO's); Erha field (Exxon Mobil); Abo field (Agips); Agbami field (Chevron-Texaco) and Amenam/Kpomo field (Elf Petroleum). Table 2 shows crude oil production, export and domestic consumption of Nigeria between 1970 and 2002.

### Current challenges of the downstream sub-sector

The nation's downstream sub-section of the oil industry comprises activities relating to the distribution and marketing of petroleum products and derivatives throughout the country. The sub-sector is particularly volatile in recent times due to government's policy on deregulation of the industry, which has removed price control mechanisms that have undermined the growth of the sub- sector in previous years. The sub-sector has also been constrained by the unenviable state of the nation's refineries, which have been producing at minimal capacities in the past few years, despite huge expenses incurred on turn-around- maintenance of the crisis-ridden refineries. This development has led to massive importation of petroleum products to fill demand gaps that exist in domestic consumption. However, the huge cost associated with importation of petroleum products is a major reason for government emergent deregulation and the hike in prices of petroleum products from 26 to 48 % at the end of 2003. The government has also signified its intention to relinquish its holding in the nation's refineries and make its percentage holding available to the private investors. This is expected to complement its efforts toward complete deregulation of Nigeria's oil industry.

The downstream sector of Nigeria's petroleum industry is at once volatile but laden with economic opportunities. The sector is characterized by supply uncertainty, fueled by the mismanagement of the nation's refineries endemic corruption, lack of transparency, direct government inter-

ference and bureaucratic processes. Despite the nation's huge endowment of crude oil and gas, and the extensive infrastructures available in the sector for distribution and marketing of petroleum products, the downstream sector has been hit by increase instability, hallmarked by a dearth of product to supply. Particularly, this problem became noticeable in the late ten years. This has led to massive importation of petroleum products by government and major oil marketers in Nigeria. Until recently, the sector was heavily regulated, with government maintaining a monopoly of supply of petroleum products. However, in line with the nation's economic reform agenda, which was launched in the 1980 and 1990s, policy makers have embarked on a regime of deregulation of the sector, allowing private stakeholders to complement the government efforts in developing the industry.

Poor maintenance of Nigeria three refineries located in Warri, Port Harcourt and Kaduna with a combined installed capacity of 445,000 bpd, led to a drastic fall production level to 15 % of the total installed capacity in 2004. The sudden closure of the Kaduna and Warri refineries during this period (to allow for the turn around maintenance (TAM) contributed to the decrease in production (Ibiyemi, 2004). During this period, sharp practices thrived in the industry with independent marketers arbitrarily hiking prices beyond approved rates, also, product adulteration, diversion, bunkering, and other illegal acts was very common. Indeed, official prices rose sharply from 26 to 75 (naira) per liter between 2002 and 2007.

The incessant instability of the downstream sector inspired a radical policy shift on the part of the federal government. Consequently, in 2003 the Petroleum Products Pricing Regulatory Agency (PPRA) announced a programme of deregulation for the sector. This programme aimed at stimulating adequate supply of petroleum products, fostering appropriate pricing mechanisms and eliminating sharp practices in the industry. The policy framework discontinued government monopoly on the importation of petroleum products, thereby opening the investment field for private investor and stakeholders in the industry to source their products within and outside Nigeria. Despite this, the Government's programme of deregulation of the sector later assumed a controversial dimension in view of the price increases affected on petroleum products. For example, the price of premium motor spirit (PMS) was increased from 26.00 to 43.00 (naira) in 2003. The major defect of this policy shift allows independent marketers to determine prices of petroleum products in line with their cost of supplies. This development generated a deep concern, particularly in the ranks of organized labour, which saw the policy shift as capitulation of government to the demands of oil marketers against the interest of consumers.

Despite robust opposition to government's deregulation of the Nigeria downstream sector, the reform agenda has continued unabated. As a result, the nation's refineries are being offered to investor, while a number of private

refineries are being approved to commence business in Nigeria. Moreover, industry analysts have arrived at a consensus that allowing private investors to own and operate refineries in Nigeria's oil industry would revolutionize the sector and erasing government monopoly on the refineries. There is also a widespread agreement that deregulation of the industry, in the long run will foster price stability and generate a regular supply of petroleum products. This trend should usher in a new dawn in the downstream sector and generate growth, prosperity and sustainable development in the nation's most strategic industry.

### Emergence of Nigeria's natural gas industry

Natural gas is a gaseous mixture of light hydrocarbons found in sedimentary rock formation, in the same location as crude oil (Ezigbo, 2003). Nigeria's gas reserves are currently estimated at over 159 trillion cubic feet; split 50:50 between associated and non-associated gas. The country's reserve also ranks seventh in the world and second in Africa and has become a key member of the International Gas Union (IGU). Natural gas is acclaimed as a versatile and efficient fuel commonly used for space and water heating, process heat for industries, electricity generation, cooking, mechanical power and transportation.

Natural gas emerged in Nigeria as a key energy resource, when it was first discovered in 1958 during exploration for crude oil (Osezua, 2002). However, as government gave incentives to increase the nation's oil reserve base, the gas reserve also grew over the years. In the early stage of the Nigeria gas industry, there was little or no market for the commodity, as the oil companies had little or no interest in gas utilization. Also there was little regulation then governing the utilization of natural gas. By 1963, however, the development of natural gas started with the sale of gas to industries around the gas fields in Ughelli and Aba. The volumes of gas produced in excess of industry requirement were consequently flared; but the policy makers adopted various statutory measures aimed at utilizing associated gas encountered in the process of

**Table 3.** Natural gas production and utilization in Nigeria 1970-2000 (10<sup>6</sup> Cubic Meters).

Year	Production	Flaring	Utilization
1970	8.039	7.957	72
1975	18.656	18.333	323
1980	24.551	22.904	1.647
1985	18.589	14.846	3.723
1990	29.163	21.820	6.343
1995	32.980	26.070	6.910
1998	36.105	24.202	6.910
1999	43.636	23.362	21.274
2000	42.732	24.255	18.477

Source: (FOS, Annual Abstract of Statistics).

production. This includes the Petroleum act 1969, Petroleum Act Amendment Decree 16 of 1973, as well as associated Gas re-injection Decree 19 of 1979, and the associated gas re-injection amendment Decree 7 of 1985. These decrees impose a penalty for flaring of natural gas; also, the legislative frameworks were aimed at promoting investment in the natural gas sector, which began to materialize in the 1980s. The Federal government subsequently formed the national gas transmission and distribution called Nigeria Gas Company (NGC) to take charge fully of the gas activities in Nigeria. By the 1990s, the nation's gas infrastructure had spread across the Niger delta, delivering to the major load centers in Lagos, Ajaokuta, Warri, Port Harcourt, Ughelli and Aba (Osazua, 2002). The emergence of an enabling environment for the gas industry in the 1990s generated significant investments in the upstream, with the following two notable projects being launched: OSO NGL plant and Escravos gas, and both plant producing LPG and NGL. In order to develop the downstream operations, government created gas distribution economic zones in 1995. The zones formed the basis for a competitive tendering in 1996 and they include the following: Greater Lagos Industrial Area, Agbara, Otta, Aba-Owerri, Ikorodu, Epe, Lekki and Port Harcourt.

Policy makers have intensified effort in recent times to spur the growth and development of the gas industry Nigeria Government plans; to integrate all gas transmission systems in the country with the extensions of the systems made to the Northern state of Bornu in the Northeast and Sokoto in the Northwest, as well as the central industry state of Kano. However, in order to monetize gas resources and achieve a flare-out policy by 2010, the Federal Government has launched a number of gas utilization projects. These include the approval of power generating plants at Okitipupa in Ondo state (760 mw), Papalanto in Ogun state (760 mw), Oron in Akwa Ibom State (120 mw) Ajaokuta in Kogi state (1000 mw) and Abuja (F.C.T) (1000 mw). Apart from power generation, there is ample commercial opportunity for the utilization of natural gas, and fuel as feed stock for cement and fertilizer plants, glass manufacturing industries, food and beverage companies. Furthermore, investment opportunities also exist in Nigeria for the utilization of natural gas in the following areas: (a) Natural gas liquid extraction plants and (b) Compressed natural gas as a automotive fuel.

The nation's abundant gas reserve provides investors with an opportunity to become partners in Nigeria's emerging gas Industry. In spite of Nigeria's enormous endowment in crude oil, the nation is predominantly a natural gas producing economy. Nigeria possesses the largest deposits of natural gas in Africa, with proven reserves assessed at more located with 2,800,000 MCU m, most of which is located with petroleum deposits in and around the Niger Delta. Probable gas reserves were estimated to be 18,00,000 MCu m (Van Buren, 2001). The bulk of

natural gas produced in Nigeria is associated with crude oil, thereby following the trend in crude oil production. Total gas output at 8.039 MMm<sup>3</sup> in 1970 peaked at 27.619 MMm<sup>3</sup> in the 1993. It subsequently maintained an upward increase trend in the 1990, which average 319 065 MMm<sup>3</sup> in the period 1990 - 1995 (Central Bank, 1998). Owing to high cost of recovery and lack of steady domestic market, most of the associated gas has been flared with the concomitant serious environmental effect on the oil producing communities. The proportion of total gas flared, which was 90 - 99% prior to 1980 has reduced drastically by 2000 due to the policy of the Federal Government that aims to abolish gas flaring by 2008. As a result of huge opportunities in both domestic and export markets, the prospects exist for Nigeria to monetize its enormous natural gas resources and earn sufficient revenue from the commodity comparable to its earnings from crude oil by the end of this decade (Lukeman, 2003). Table 3 shows the trend in natural gas production utilization between 1970 and 2000. The growth in the nineties reflects the emerging opportunities both in the domestic and export markets.

### Exploring export markets for the gas industry

Although existing global markets for natural gas is not as developed as that of crude oil, they are steady export markets for Nigeria's natural gas in the industrialized countries such North America and Europe. Export market opportunities also exist in the West Africa sub-region. In order to capture lucrative export markets for Nigeria's natural gas, the federal Government in collaboration with its partners has embarked upon an expansion of Nigeria liquefied natural gas (NLNG), with the aim of boosting its export earnings. Other Liquefied Natural Gas (LNG) projects that have been proposed by the Federal government include, the Western Niger Delta Liquefied Natural Gas (WNDLN), Statoil Floating Liquefied Natural gas (FLNG), Brass Floating Liquefied Natural Gas (FLNG) and Shell Floating Liquefied Natural Gas (FLNG).

Other export-oriented projects that are vigorously being pursued are the West African Gas Pipeline (WAGP) and the proposed Trans-Saharan Gas Pipeline Project, which is a subject of discount between Niger and Algeria for sometime now. As a result of these activities, an average of 60% of the total gas produced in Nigeria is being utilized daily by the end of 2003, compared to 51% in 2002, this stands at 1.32 billion standard cubic feet per cent (bscf/d) of the 2.2 bscf/d gas produced in 2006. Thus, the increase in gas utilization stems from the commencement of exportation of Liquefied Natural Gas (LNG) by the third train of the NLNG in 2002, and the Liquefied Petroleum Gas (LPG) in April 2003 (Ibiyemi 2004). From the observation, we thus conclude that the emergence of Nigeria's natural gas industry holds the key to the diversification of the nation's oil industry. This trend has the potential to increase foreign exchange reserves

and reduce the nation's vulnerability to incessant instability associated with crude oil prices.

### Imperative for export diversification

Nigeria's contemporary development has been sustained by extreme dependence on one single primary commodity, that is oil, and it account for more than 95% of the export earnings. Also, crude oil also contributes more than two-thirds of government revenue and 12% of the GDP (UNDP, 2000). Extreme dependence of the Nigerian economy on crude oil has rendered it most vulnerable to the instability of market forces with grave implications to the nation's economic growth and development. Therefore, in order to foster economic stability and become a full partner in the global economy of the 21<sup>st</sup> century, Nigeria must embark on export diversification and take advantage of its huge stock of natural resources. Nigeria's diversification approach should cover production and export, including agro-processing, manufacturing and services. It should also extend to non-traditional agricultural goods and eventually non-traditional industrial products (World Bank 2000a).

Export diversification is important for two main reasons, first, export receipts are needed to finance imports of consumer for the, intermediate and capital goods. Reliance on exportation of traditional commodities is fraught with dangers associated with price volatility, and the long-term decline in the prices of primary commodities. Secondly, there is need to penetrate dynamic markets in the developed and emerging economies may provide the best avenue to attract high and productive and accelerated development.

### Purring agriculture for global markets

During Nigeria's political independence in 1960, agriculture was the mainstay of the nation's economy, providing food to feed the population and fetching the bulk of the nation's foreign exchange earnings. However, the emergence of crude oil since the early 1970s has changed the nation's economic profile, marginalizing agriculture in favour of the petroleum industry. In order to enhance the nation's economic growth, it is necessary to diversify the economy into non-traditional exports. There-by reducing vulnerability to price instability associated with the crude oil markets. In the agricultural sectors, diversification could be horizontal or vertical. These require processing primary agricultural commodities into intermediate and finished products, with considerable value-added. This process is expected to fetch higher export earnings with such commodities as cocoa, cotton, palm produce, rubber, etc. Also, export diversification into non-traditional agricultural commodities can become a veritable source of foreign exchange earnings. This may include exportation of cut flowers, fruits, vegetables, herbs and several sea foods. These agricultural commodities have a high

dynamic potential because of their high unit value and high elasticity demand. Therefore, successful diversification into such products generally requires introduction of new technologies. If these are put in place, positive linkages may be created with domestic industry in food, beverages and tobacco sector which are likely to spur export orientation, as well as the emergence of domestic firms processing agricultural commodities that may eventually become large enough to compete in international markets (UNCTAD, 1998). Despite agriculture's crucial position in the national economy, it has remained below its production potential, particularly in the past three decades. This negative trend is reflected in the under-capitalization, which accounts for its lack of competitiveness in the global markets. However, this unenviable position can be reversed by injecting additional resources into the agricultural sector from the windfall earnings that accrue to the petroleum industry from time to time. For example, in the aftermath of the recent crisis in the Middle East, where American-led coalition forces invaded Iraq in 2003, oil prices have reacted sharply, rising in recent times beyond \$40 (USD) per barrel to the current price of \$83 (USD) per barrel in September 2007. Additional resources generated from the windfall can provide the nation's agricultural sector with the support it needs to tackle food insecurity, and foster export diversification. More resources from the oil industry should be used to boost agricultural development, targeting small-scale farmers, who are responsible for the bulk of the nation's staple foods and export crops. New resources for the nation's agricultural sector can be tailored to assist small-scale farmers and their organizations through the following schemes: (a) Micro-credit programmes, (b) Provision of agricultural inputs with subsidies where necessary, (c) Additional funding to assist the nation's agricultural rese-

**Table 4.** Production of principal solid minerals in Nigeria 1991 – 98 (Thousand metric tons)

Year	Cassiterite	Columbite	Coal	Clay
1991	0.145	0.036	100.0	12.2
1992	0.107	0.038	78.9	0.4
1993	0.175	0.015	27.7	0.6
1994	0.208	0.230	13.2	n.a
1995	0.204	0.037	19.5	n.a
1996	0.139	0.566	15.3	n.a
1997	0.042	0.030	20.8	n.a
1998	n.a	0.621	18.5	n.a
Average	0.146	0.196	36.7	4.4

Source: FOS Annual Abstract of Statistics, Various Issues.

arch institutes to generate novel agricultural technologies, (d) Capacity building for both private and public extension agencies to disseminate sustainable agricultural techni-

ques, (e) Fostering enduring partnerships between farmers' organizations, governmental bodies and international development agencies, (f) Developing, export markets for the nation's primary and processed agricultural commodities and (g) Upgrading social and physical infrastructure, particularly in rural areas, where they are in dismal conditions.

### Developing solid minerals for export markets

Minerals may be defined as naturally occurring substances derived from the earth's crust and upper mantle, which are of utility to man (Onah, 2001). By definition, solid minerals therefore cover such substances that exclude crude oil, gas and water. Nigeria is reputed as a richly endowed nation, with a wide array of solid minerals, which include tin ore, columbite, marble, tantalite, wolfram, gold, lead, zinc, limestone, kaolin, clay, shales, as well as radioactive minerals that, include monazite, zircon, molybdenite and barytes. Others are glass sand, bitumen sand, uranium, serpentine, phosphate, cuprite, granite, talc ore, gypsum, feldspar, bentonite, soda ash, iron ore, dolomite, etc. (Adegoke, 1991; Onah, 2001).

These mineral resources are distributed throughout Nigeria where a few of them are being exploited, usually by small-scale miners. Prior to the advent of crude oil in the early 1970s, as a major source of foreign exchange earner, the solid mineral sub-sector ranked second only to the agricultural sector as source of export earnings. The sub-sector contributed substantially to national output, accounting for about 10 % of GDP in 1970.

Production of solid minerals for the export market was undermined in the wake of the 1972 indigenization decree, which provoked an exodus of foreign multinational corporations engaged in the mining sector. This development has compounded the dwindling fortunes of the sub-sector. However, activities in the sub-sector appear to have gathered pace in recent times following various initiatives by the Federal Government to spur growth. Table 4 shows the production of major solid minerals in Nigeria during the 1990s. The low level of activities is a reflection of under investment, which is the bane of the sector.

The challenge facing the solid mineral sector is to increase its capacity to meet domestic demand and penetrate dynamic markets in advanced and newly industrializing economies. It also involves adding value to primary commodities in the sector. This is important to generate higher foreign exchange earnings aimed at diversifying the nation's balance of payment position.

Due to the severe under-capitalization of the solid mineral sector, it could hardly contribute meaningful to the nation's GDP. However, the scenario is expected to change should the sector attract investors to exploit its abundant resources. This is also expected to contribute significantly to the nation's GDP and foreign exchange earnings. However, various analysts agree that the solid mineral sector has the capacity to earn as much foreign

exchange earnings derivable from crude oil, if policy makers provide sufficient incentives to spur activities in the sector.

### Conclusion

The petroleum industry has grown steadily over the years to become the cornerstone of the nation's economy in recent times. Since the 1970s, the nation's crude oil industry has contributed immensely to the government's revenue profile. In addition to dominating other sectors, the oil industry has accounted for the bulk of the nation's revenue and foreign exchange reserves. However, its displacement of agriculture as the main stay of the economy has created structural imbalances for the economy, undermining economic performance and national development. Consequently, the economy has shown little real growth since the 1970s and has witnessed the emergence of endemic poverty in the midst of plenty. The negative economic trends have inspired economic reform within and outside the nation's oil industry. This approach involves the development of the nation's huge gas reserves and its monetization. Consequently, the nation's natural gas reserves are being developed to take advantage of export market opportunities in industrialized countries as well as the West African regional market. In order to increase the revenue base of the nation, the Government should encourage further exploration activities in the virgin basin of Nigeria such as Anambra and Chad basins, as well as the Benue trough; this can be achieved through the organization of more licensing rounds by making available open acreage's for prospective investors. Also, the Government and the organized private sector should address the social instability in the Niger Delta through the creation of employment opportunities for the youths of the region.

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