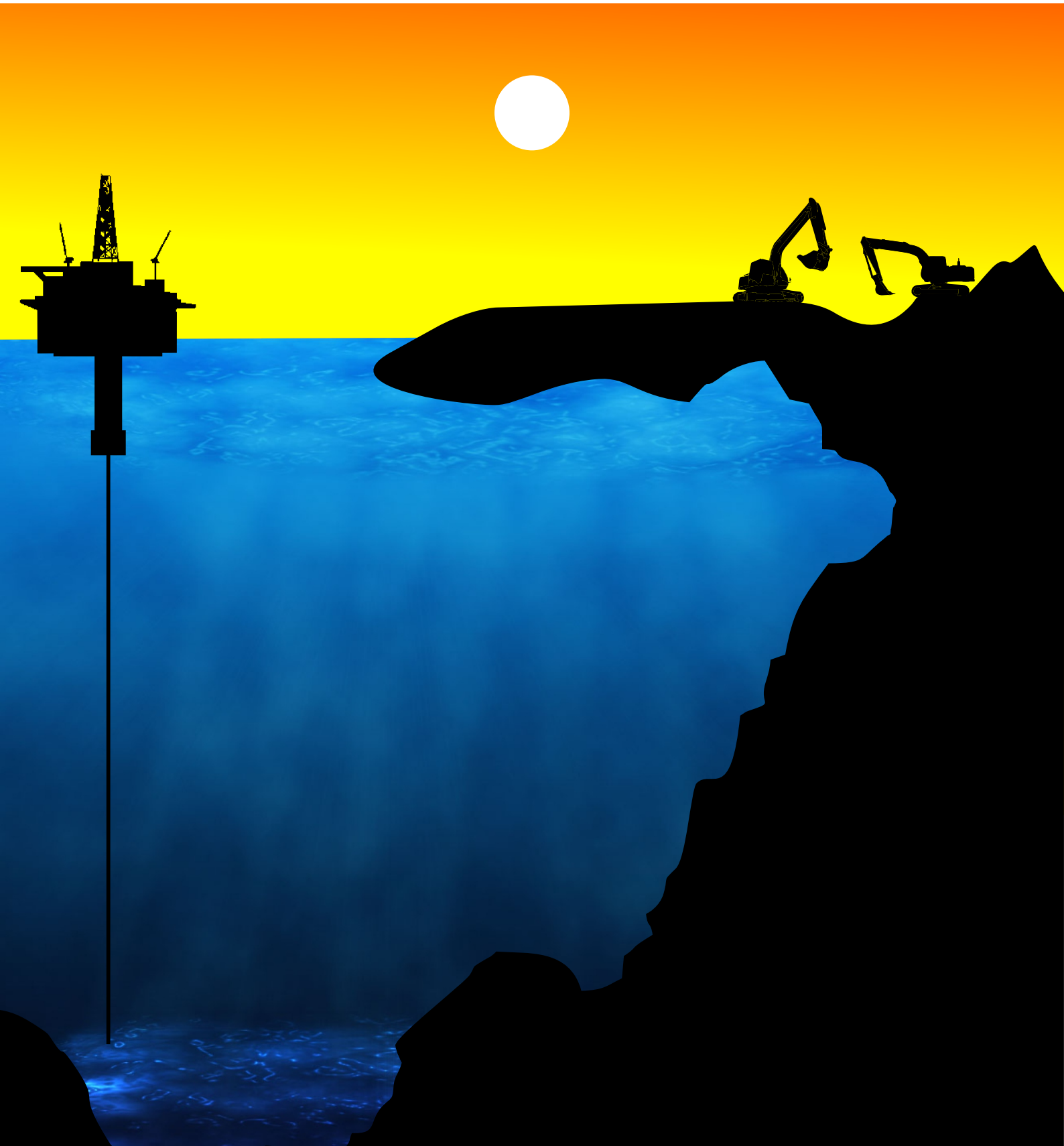
Framework for Harnessing the **Extractive Industries** for

Inclusive Growth and Development in Nigeria

Empowering lives.
Resilient nations.



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Overview

Background

The centrality of harnessing Nigeria's diversified mineral resource endowments efficiently along the value chain has been brought to the fore of public agenda with the rebased Gross Domestic Product (GDP) statistics released in 2013.The new GDP data which showed significant diversification of the economy from dependence on agriculture and oil and gas, as well as the collapse in Nigeria's crude oil export to the US due to the recent rapid development of shale oil and gas in the US seemingly come at an opportune time. These two different events will provide new economic opportunities that investors and entrepreneurs can leverage on both in the mineral and other sectors, in support of sustained economic growth and inclusive development.

There is optimistic expectation that the solid minerals sector can become a major player in the diversification of the economy, transiting from dependence on oil and gas and agriculture, as well as serving as an engine of growth of the Nigerian economy, and promoting an inclusive development in the coming decades. This viewpoint is evident in the emergence of the Minerals and Mining Act of 2007, the Minerals and Mining Regulations of 2011, the Roadmap for Solid Minerals by the Ministry of Solid Minerals and Steel, and the Presidential Retreat on Solid Minerals in 2013, which brought together all stakeholders in the sector to harmonize views and strategies on the opportunities in and challenges to optimal development of the minerals and metallurgy sector in Nigeria. The emerging reversal of fortune in the sector, following its collapse for more than three decades and the recent optimism among stakeholders are premised on the significantly improved business environment, including the unique opportunities that the significant policy and institutional reforms of recent years are embodied in the Minerals and Mining Act of 2007 and the Minerals and Mining Regulations of 2011. These have created exploitation of mineral resources along the value chain.

In the quest for sustained economic growth and inclusive development, important strides have been made to make the business environment more conducive for a robust development of the sector. However, at this initial stage in the current effort to harness solid minerals for sustainable and inclusive growth and development, six key issues are worthy of attention.

First is the effectiveness and efficiency of entrepreneurs and investors in converting the numerous opportunities that will emerge in harnessing mineral resources and related economic activities to achieve significant job creation, income generation, poverty alleviation and inclusive economic growth and development, given the diverse and significant risks and uncertainties that exist in the sector.

Second is the extent to which domestic and foreign entrepreneurs will be involved either individually or as joint ventures in the process of developing the sector along its value chain to strengthen economic diversification through effective backward and forward linkages with the rest of the economy.

Third is need to bridge the sharp contrast and wide gap between the high capital intensity of modern mining production activities that the sector requires for significant value addition as well as the rudimentary nature of technology and hazardous and small-scale low-profit operations in artisanal mining, which currently dominates the sector. Access to modern technology, skills and finance are major factors in the gap.

Fourth is how to scale up the technological capacity and skill development of domestic mining enterprises, which are largely artisanal and small-scale, in the drive for employment generation and inclusive growth and development.

Fifth is the social and environmental sustainability of the approach to exploiting natural resource wealth, given the country's sad history and legacy of the harnessing of oil and natural gas, another extractive industry.

Sixth is the capacity of the government and

other stakeholders to deal with these key and related issues, especially by de-risking the sector.

The efficient implementation of measures to deal with these and related issues will be critical for achieving inclusive growth and development based partly on developing solid mineral resources to grow the economy, anchored on adding more value locally through the development of downstream activities and ancillary industries, and their integration with the rest of the economy. This report provides some insights on these key issues, albeit, in a highly stylized form, given the limited scope of the study.

Arguably, developing solid mineral resources to grow the economy by adding more value locally, through the development of downstream activities and ancillary industries, as well as their integration with the rest of the economy, would yield significant positive social and economic payoffs to the economy and the people of Nigeria. The payoffs will include sustained industrial development and economic growth, higher government revenues from tax and non-tax revenues from the sector, infrastructural development linked to mining activities, higher employment opportunities for young people, and overall, greater economic prosperity and well-being of the population. Furthermore, greater internalization of the benefits through local content would not only yield significant net positive social, economic and technological payoffs but also increase the likelihood of Nigeria becoming one of Africa's most thriving mining and metallurgical hubs.

However, from the experience with oil and gas exploitation, though harnessing natural resources may bring significant positive net economic and social benefits, they also have the potential to generate significant adverse social and environmental consequences. Admittedly, the diverse experiences of both mature and emerging mineral producing and exporting countries, especially in sub-Saharan Africa, point to a more complex relationship between exploitation of non-renewable natural resource endowments on the one hand, and sustained economic prosperity and robust economic and fiscal performance and governance on the other. Their experiences show that mineral wealth can be a very mixed blessing.

Extractive industry development focusing on minerals and metals sector development, as currently envisaged by the government and industry stakeholders, will bring novel and possibly more complex challenges than have ever being faced by entrepreneurs, investors, producers, politicians, policy makers, civil society, local communities and the people at large. But, if the economic, social, environmental and political/-governance problems associated with extractive industries are deftly handled, the outcomes will be positive and contribute significantly to achieving job creation, income generation, inclusive economic growth and sustainable development.

Sustainable development of the extractive industry is one of the keys for unlocking the enormous growth potentials of the economy and advancing Nigeria significantly up the global economic and social development ladder in the next two decades.

Nigeria desires to achieve the human development goal of a wealthier, healthier, and better-educated citizenry within the next generation, driven by wider diversification of the economy and anchored partly by a vibrant mineral sector development. In this new economic scenario, Nigerians will be active players as owners of vibrant and profitable mining firms, adding value to mineral products and providing skilled workers and managers in a more robust minerals and metallurgy sector. The mechanism as well as policy and institutional frameworks to achieve this goal, will perhaps be one of the most profound questions on the sustainable development agenda in Nigeria in the coming decades.

Study Objectives and Approach

The main objective of this study is to develop a framework that will help to harness the extractive industry, especially the solid mineral resources to support economic growth and inclusive development in Nigeria. Other more specific objectives are:

- A descriptive analysis of the sector in Nigeria in the context of domestic and global economic and financial developments as necessary background

to the discussion.

- Analysis of key findings on developments in the sector based on a limited survey and interview of key stakeholders in the mining and metals sector.
- Empirical analysis of forward and backward linkages between mining, metals and the rest of the economy based on an economy-wide general equilibrium framework. The aim is to explore, in greater depth, issues associated with the ultimate objective of achieving economic diversification and sustainable development propelled by greater integration of the mineral sector with the rest of the economy. In the context of inclusive development, identification of the economy-wide effects of solid minerals and the metals sector development is an essential element in the strategy to achieve a more robust and diversified economy.

The methodological approaches adopted to achieve the objectives of the study are four-fold. They include: desk study; design, testing and analysis of sample survey data and interview of key stakeholders in the sector; the construction of a Social Accounting Matrix to reflect demand and supply characteristics and linkages in the Nigerian economy with a focus on issues of inclusive growth and development; and the development of a general equilibrium model to explore the effects of integrating extractive industry development into the development of the Nigerian economy. Despite its limited scope, the value addition of this report is in identifying and exploring some key issues missing in the policy debate on harnessing extractive industry resources for inclusive growth and development in Nigeria

Stakeholders' Survey Results

The exploratory research design is adopted for this study. Mining companies were visited in different locations across the 14 states of the federation, namely, Kwara, Kogi, Ebonyi, Ekiti, Gombe, Oyo, Enugu, Osun, Edo, Sokoto, Niger, Plateau, Zamfara and Bauchi. These locations were purposively selected based on information retrieved from the inception of study, and discussions with the President of the Nigerian Miners Association. Specifically, a list of the key minerals in each of the states was provided. Further to this, contact was made with key members of the Miners Association in the respective states.

The population of this study comprised two categories of mining companies, namely, the commercial and artisanal ones. However, the larger proportion of companies on the field was small-scale/artisanal enterprises. These companies are characterized by primitive exploration technology, poor working conditions, and substantial uncertainty on returns from their exploration efforts among other features.

The primary data was collected through a detailed questionnaire administered to the mining companies. The data was analysed on the basis of the core objective of the study which is to explore options for harnessing the potential of the mining sector to contribute to national economic development. The emphasis in the survey was however on the operators in the sector. The core of the exercise was to gauge their opinions on issues, such as the role of government within the sector, the effects of legislation/regulations, profitability of their business ventures, and mining company-host community interactions to mention a few.

The results of the survey reconfirmed what we generally know about the current conditions in the sector. Furthermore, it brings into perspective the diverse views of industry stakeholders about the economic, financial, political, social, and institutional constraints that confront optimal development of the extractive sector in general and the mining sub-sector in particular.

Key findings include the following:

1. Mining activities in the solid mineral sector in Nigeria are largely dominated by small-to medium-scale miners who largely depend on the traditional mining practices. The result of the survey shows that 87.5 per cent of the operators are small-to medium-scale miners, while 12.5 per cent are large enterprises.
2. About 90 per cent of the respondents were reported to have from adequate to very adequate staff strength. This is because, most skilled artisanal miners are easily mobilized to where there is a large occurrence of solid minerals and as soon as the deposit is

depleted, they move to another site or find something else to do till huge deposits are discovered again. Due to this on-and-off employment pattern, industry workers are not tenured at the small-scale miner level particularly for miners in the precious and ornamental gem stones.

3. The survey results show that only 17.5 per cent of the mining site surveyed opened for 12 months in the last one year. Another 22.5 per cent opened for between 7 and 9 months in the last one year, while 12.5 per cent opened for between 3 and 6 months.
4. Constraints facing miners are equipment breakdown, shortage of raw materials, financial constraints, shortage of electricity and skilled manpower.
5. In terms of capacity utilization, 77.5 per cent of the respondents rated their capacity utilization to be average and above. Another 7.5 per cent rated their capacity utilization as excellent, while 15.0 per cent rated it as below average.
6. In terms of sales performance over the last three years, 20.0 per cent of the respondents rated their sales performance high. Majority of those surveyed rated sales performance as average.
7. As for additional or new investment, in the last one to two years, only 40 per cent of the enterprises surveyed had undertaken a major investment. Key investment was in installation of new locally made plant and equipment (7.5 per cent)and transportation equipment (5 per cent). The other investments are installation of imported new plant and equipment, installation of imported refurbished plant and equipment, replacement of old plant and equipment, and purchase of generator with 2.5 per cent, respectively.
8. About 62.5 per cent of the respondents consider labour relations in the industry as decent or good, and 37.5 per cent think it is poor.
9. On the current revenue sharing arrangement between the government and the mining firms, some 10.0 per cent among the respondents consider it good, another 27.5 per cent thinks it is fair, and about 20.0 per cent think it is unfair.
10. The survey result shows that access to financial services is ranked as the most important critical success factor in the sector, scoring 35 per cent. This is followed by infrastructure at 30 per cent. In the third place is host community relationship with 22.5 per cent, followed by legal and regulatory frameworks with 20 per cent. The fifth most important key success factor is shared between cost of capital and education and training with a score of 17.5 per cent, respectively. In the sixth place are cost of operations and supply-customer relationship, scoring 15 per cent respectively. The seventh most important success factor is export infrastructure for minerals, with a score of 12.5 per cent; and the eighth being business services supply, government business partnership, government policy and implementation, and corporate social responsibility, with a score of 10.0 per cent respectively.
11. The survey also examined the key legal, regulatory, institutional, policy, technical, and financial challenges facing the effort to sustainably develop the extractive (solid minerals) resources and asked stakeholders their solutions to these challenges as operators in the sector.
12. The survey results show that 32.5 per cent of the artisanal miners surveyed considered bureaucratic bottlenecks in government processes a key challenge. Bureaucratic bottleneck manifests in cumbersome registration process, cumbersome site negotiation, difficult licensing handling process, community law against mining such as excessive power of host community to issue of letters of consent, cumbersome registration process, poor implementation of regulations, awarding of licenses to people without mining skills and expertise and poor policy communication to prospective miners. This bureaucratic nature may not be unconnected with the inadequacy of the policy measures to modernize the operations in the mining sector. The reason for the

inadequate policy measure and enforcement may be explained by the country's over-reliance on the oil sector which attracted huge investment in the past, compared to solid minerals and agriculture.

13. As part of the key legal and regulatory challenges, about 15.0 per cent of the respondents identified cost of procuring license. The other challenges include abandonment of the sector, implying that government investment in the sector is low with 10.0 per cent of the respondents identifying this challenge and another 7.5 per cent indicating poor policy implementation as a challenge.
14. A majority of the respondents suggested solutions that include government support in the form of reform of the legal and regulatory frameworks in the sector and also ensuring friendly community law, adequate implementation of regulations, making information available on the legal framework to all stakeholders, reduction in tax on mining company and strengthening of the Mining Cadastre Office. Another 27.5 per cent respondents proposed easy access to license by simplifying licensing procedures through decentralization. About 12.5 per cent considered host community support as a key solution to developing the sector.
15. The survey result shows that 35.0 per cent of the miners identified failure of government to provide adequate infrastructure and finance. Another 15.0 per cent of the respondents identified host community relationship in the area of compensation to the communities as the key institutional challenge. Over the years, the miner-host community relationship has been a major issue in the development of the minerals sector in Nigeria. The poor management of community relationships by miners often leads to violence that constrain mining operations. Other institutional challenges identified include weak tax administration that often leads to multiple taxes, levies and rates (7.5 per cent); poor training institution for mining operators (15.0 per cent), and mandatory formation of mining cooperative society without proper guidelines, as well as poor policy design for the sector (2.5 per cent). About 40.0 per cent of the respondents proposed tax reduction, while another 22.5 per cent proposed provision of adequate security to check host community hostilities and threat.
16. Some other suggested solutions were education of the host community by the Ministry of Mines and Power on the need for cooperation, establishment of a specialized bank for the mining sector, proper survey of all minerals in the country, establishment of a mechanism to secure mining site from communities, strengthening of the Nigerian Geographical Survey Agency Laboratory in Enugu, and establishment of a functional Nigerian Institute of Mining Geoscience.
17. A significant proportion of the artisanal mining company surveyed responded that they faced key policy challenges, such as delay in issuance of licenses, too many licensing rules and regulations, poor implementation, poor policy design, non-communication of changes to policy implementers in the sector, lack of policy consistency, and weak policy coordination.
18. About 37.5 per cent of respondents proposed effective policy implementation as a solution, while 20.0 per cent suggested good policy design that meets international best practice in the industry, and adequate implementation.
19. Artisanal miners identified lack of mining equipment, such as compressor for drilling, engine to pump water, and safety wears as the basic technical equipment required. Inability to forecast weather or having access to weather report is also considered a key technical challenge. This is followed by lack of basic training centres for miners on how to improve production. Others identified lack of expertise on how to locate mineral deposits and lack of equipment and skill to test samples. As many as 27.5 per cent of the respondents surveyed proposed availability and access to mining equipment as solution, while 30.0

per cent proposed skills development through training in the use of modern mining equipment, and establishment of mining department in all tertiary institutions for training, research and innovation.

20. As indicated by majority of the respondents, a key financial challenge is inadequate access to loan facilities to procure site equipment on a long-term basis. They indicate that banks favour short-term loans as opposed to long-term financing required in the mining sector. Other financial challenges are poor financial management by miners, unwillingness of banks to fund the sector, and high cost of capital. They suggested adequate financial support to investors in the sector through a specialized bank as obtained in the agricultural sector or housing. As part of the proposed solutions, 42.5 per cent of the respondents identified government intervention funds and another 30.0 per cent proposed easy access to fund/credit facilities. Other proposed solutions include availability of long-term loans, tax reduction, establishment of mining banks to provide long-term loans at concessional rate, offering of financial management training to small-scale miners by the banking institutions, and provision of government subsidy for the procurement of mining equipment.
21. The findings of this survey on harnessing the potential of the mining sector to contribute to national economic development show that the sector is largely characterized by low exploration technology, poor working conditions, substantial uncertainty on returns from exploration efforts, and hostile community relations, among others.
22. A review of the Minerals and Mining Act of 2007 adequate and reflects international best practices in modernizing the sector. However, the enforcement of the rules of the game has been very poor, thus exacerbating the problems in the sector. There is, therefore, a need for determined efforts and a change of attitude by the agencies charged with ensuring policy compliance and enforcement in the minerals sector to harness its potential contribution to national economic growth and job creation.
23. Areas in the sector needing serious attention by the regulatory authorities are institutional reforms, funding mechanism, tax incentives, exploration and marketing, training and skills development, incentives for research and innovation to find more uses for the various minerals, labour and safety issues, environmental impact, and managing host-community relations.

Linking the Minerals and Metals Sector with the Rest of the Economy: Empirical Results

In interpreting the empirical results, it is important to state that the share or contribution of the minerals sector in GDP is currently small in Nigeria. This is due partly to the collapse in the sector and the high level of its informalization of the sector. The implication of this is that the current data on the minerals sector may actually understate its contributions to the economy.

The study carried out simulations to evaluate the overall impacts of the linkages between the minerals sector and the rest of the economy with a focus on: macroeconomic variables, sectoral output and household income and welfare. The results are as follows:

1. ***Macroeconomic Impacts.*** The simulations (based on Simulation 3) show overall that macroeconomic impacts of minerals sector development are marginal. A combination of 5 per cent increase in productivity and 10 per cent increase in capital stock to the minerals sector will only boost overall real GDP by 0.02 per cent. It will also have positive impacts on investment which will rise by 0.11 per cent and government revenue, which is expected to increase by 0.02 per cent. This result is understandable given the current structure of the economy and poor performance of the sector since the 1970s. There is a mild impact on the

general price level proxy by the GDP deflator and wage rate which will rise by 0.02 per cent as a result of increase in demand for labour.

2. ***Sectoral Impacts***. The sectoral impacts are more dramatic. The minerals sector will witness significant growth from the above policy measures. In Simulation 3, exports of coal, metal ores and other mining will jump by 2.78 per cent, 11.45 per cent and 15.50 per cent, respectively. The increase in output in the three sectors by 2.87 per cent, 9.64 per cent and 9.24 per cent in coal, metal ores and other mining sectors will lead to a fall in imports from these three sectors, with other mining imports falling by as much as -22.80 per cent. Most sectors also benefit from the development in the minerals sector. Manufacturing exports increase by 0.15 per cent, imports decline by -0.05 per cent, while manufacturing output increases by 0.12 per cent. These effects are due to the linkage effects between the minerals sector and the manufacturing sector. The output of most sectors also increase with the exception of crude petroleum and natural gas as well as the public service sector. There is overall increase in the composite goods of all sectors in the domestic economy. This is due to the increase in goods supplied to the domestic market both from the local producers and importers. These effects, which are largely marginal, are positive for nearly all the sectors. This is due to the net effects of incomes and prices. Productivity growth and increase in capital stocks in the minerals sector are labour saving. Hence, demand for labour in these sectors decline, while the rising outputs in other non-mineral producing sectors attract the labour that are moving away from the sector.
3. ***Income and Household Consumption Effects.*** The simulations show significant impact on household incomes. In all the simulations, households experience an increase in real income. Therefore, developing the mineral producing sector will have positive income effects and both the rural and urban poor share the greater benefits from the rise in household incomes. The result shows that not all commodities will benefit from the increase in household purchasing power. The main beneficiaries are goods produced by the coal sector, the metal ores sector, the other mining sector as well as the manufacturing sector. The poor in the rural and urban sectors are also able to increase their demand for utilities.

The minerals sector outside of crude oil and gas is very small relative to the size of the Nigerian economy. Based on the 2011 Input-Output table, the sector accounts for about 0.14 per cent of value added, 0.01 per cent of domestic demand and 0.16 per cent of domestic output. A final caveat is that data is a major challenge in the sector and may have understated the relative size and contributions of the sector to the economy. However, the analysis of the economy-wide impacts of a number of policy options have shown that the minerals sector backed with the right policies can make positive and useful contributions to important macro-economic variables, sectoral production outcomes and household welfare, and ultimately, inclusive growth and development.

Challenges and Policy Issues on Sustainable Mineral Resource Development in Nigeria

The long-term domestic economic growth fundamentals and prospects, the size of the domestic market, the upward trend and prospects in the global mining sector and the enabling mining environment highlighted by the Minerals and Mining Act of 2007 are necessary but not sufficient condition for achieving robust and sustainable mineral exploitation. Despite these positive initial conditions, the quest to achieve sustainable development of the solid minerals and metals sector as an essential element in the strategy to achieve a more diversified and inclusive economy faces several challenges. Notable are the following.

I. The challenge of political commitment and institutional capacity

strengthening. When the institutional capacity is high and strengthened, the public service official is well-trained, motivated and well-paid. With high institutional capacity, the likelihood of good governance is high. In contrast, when institutional capacity is low, the public service is poorly or inadequately trained and poorly motivated. Poor governance, rent seeking and corruption are more likely to thrive. The socially most desirable option is the combination of high political commitment and high institutional capacity. Under this scenario, extensive mining sector policy reforms will be carried out and sustainable mineral wealth creation will obtain. Meeting this policy challenge involves creating the positive and negative incentives that will induce governments and public service under the prodding of civil society organizations and international development partners. Consequently, following best practises in the legal and regulatory frameworks must be backed up by a robust political commitment and institutional strengthening.

ii. Maintaining the positive enabling business environment engendered by the current reform and institutional changes in the sector to guarantee that both the country (government and the people) and the mining companies get what they bargained for. The mining game should be a win-win one for all the stakeholders. As part of maintaining an enabling environment, maintaining current macroeconomic and financial stability will remain a challenge.

iii. Making the domestic mining and metals sector competitive globally faces the challenge of inadequate human resource development, inadequate capacity building in research and development institutions charged with mining and metallurgy. Furthermore, the complementary investment to facilitate sustainable mineral exploitation, which includes infrastructure, institution building, community development, technological development, business advisory and support services, are grossly inadequate. Addressing these issues promptly will help to accelerate the development of the sector.

iv. Research and information. The research data and information geo-data challenge may not seem as obvious as the other challenges. Yet they are crucial for the solid preparation required for sustainable mineral resource exploration and development policy. Poor data and inadequate or lack of research on the multi-faceted issues associated with sustainable extractive industry development policy has been the bane of good policy design in Nigeria. Operationalizing optimal mineral wealth management and sustainability into the annual budget requires the collection and in-depth analysis of information that must reflect medium- to long-term developments in the domestic and global economy and the mineral markets.

v. Political and social stability underscored by security of lives and property. Insecurity is currently a major challenge to large-scale mining effort of the country. Overcoming this challenge through economic and social empowerment of the mining communities and the country at large is an important policy challenge.

vi. Integration of the mining and metals sector into local communities, as well as the regional and the national economy. This requires a comprehensive industrial policy that has the private sector as the operational driver while the government provides the policy support. National and regional planning for optimal benefit from mineral exploitation is imperative in the context of public private partnership backed by appropriate fiscal regime and incentive system. Diversifying the economy and public finance requires stronger backward and forward linkages between the sector and the rest of the economy. Strengthening rural-urban and inter-sectoral linkages by growing mineral value chains must be seen as an essential part of the new mining and metals sector development. Greater integration of the sector with the rest of the

economy requires more coherence and coordination in national, state and local development plans.

vii. Entrepreneurial and technological constraints facing artisanal and small-scale domestic firms. Artisanal and small-scale domestic firms dominate the sector and they are labour-intensive but currently generate substantial income for low income people in the mining areas, thereby alleviating poverty. Growing them to be an important avenue for endogenizing the industry as well as providing substantial opportunities for mineral wealth and job creation (including poverty alleviation) faces significant challenges because of the current nature of their operations. There is need to provide more entrepreneurial and technological support for them to be more effective players in the sector. Overcoming the inadequate and high cost of finance for artisanal and small-scale potential miners is also a major issue that must be addressed.

viii. The resource curse remains a potential problem. However, this is increasingly being overcome with the advent of sound macroeconomic policy stance. Improved diversification of the economy and public revenues through a robust extractive industry development would help to eliminate or at least minimize this problem.

ix. Resource rent distribution among the tiers of government driven by good governance and accountability present another challenge from the public perspective. Current developments suggest significant challenges despite the corruption watchdog agencies like the Economic and Financial Crimes Commission (EFCC), Independent Corrupt Practices Commission (ICPC) and National Extractive Industry and Transparency Initiative (NEITI).

x. Though the business climate for mining has improved dramatically, the overall cost of doing business in the country remains a major challenge for investors and entrepreneurs in the sector. Nigeria remains a poor performer in business climate indicators in comparative global terms.

xi. Infrastructural challenges are substantial and pervasive. From the perspective of this study, the most serious infrastructural deficiencies are electricity, road and rail networks and port facilities. Overcoming these challenges is critical to efficient and robust harnessing of Nigeria's diverse solid mineral resources for inclusive growth and development.

xii. Low capacity utilization and productivity in the current mining sector due largely to the dominance of the sector by artisanal mining enterprises mainly characterized by minimal use of science and technology in their mining operations. Growing the sector based on more widespread use of science and technology is essential to higher capacity utilization and increased productivity on the one hand and, ultimately, sustainable development on the other.

Conclusion and Policy Recommendations

This study has attempted to provide a preliminary assessment of what is required to build a new, more diversified and environmentally sustainable economic future and inclusive development for Nigeria with robust mineral resource development strategy as the catalyst. In conclusion, as the country seeks to achieve sustainable wealth creation and economic prosperity through mineral resource development in the next two decades, the search for answers to a robust and sustainable solid mineral development strategy and implementation will involve a variety of stakeholders, politicians, government officials, industrialists, bankers, geoscientists, legislators, lawyers, and economists.

However, for the solid minerals sector to become a major player in the economy in the coming decades, with value addition along the value chain, the following key policy recommendations are proposed.

1. Provide support that will induce greater effectiveness and efficiency of entrepreneurs and investors in converting the numerous opportunities in harnessing mineral resources and related economic activities to

achieve significant job creation, income generation, poverty alleviation and inclusive economic growth and development.

2. Explore ways for effective funding of exploration work critical to the development of the sector. Given the challenge posed by this problem to robust development of mining activities, government should take the lead, and in collaboration with industry stakeholders and supported by the development partners and financial institutions, jointly explore ways for effective funding of exploration activities.
3. Collaborate and share information between the government (federal, state and local) and other stakeholders in the industry, which would help to minimize the diverse and significant political, economic, financial, technological and environmental risks and uncertainties that exist in the sector.
4. Ensure that the policy is focused on mainstreaming inclusive growth and development in the strategic development of value addition in the minerals and metals sector.
5. Emphasize the process of developing the sector along its value chain to strengthen economic diversification through effective backward and forward linkages with the rest of the economy. Addressing energy and transport infrastructure deficiencies are key issues that must be addressed.
6. Encourage youth and women as important rather than marginalized stakeholders in the sector. Education, training, technical, financial and market access support for these two key groups in the society would make the goal of significant and decent employment, income generation, inclusive economic growth and development more realizable.
7. Bridge the sharp contrast and wide gap between modern mining production activities and practises and artisanal mining, which is characterized by crude and environmentally hazardous and small-scale low profit operations. Getting a public/private partnership to facilitate access to modern technology, skills and finance for artisanal and small-scale mining to scale up their operations is a major factor in eliminating the current huge gap in the sector and making its contribution to inclusive growth and development a reality.
8. Facilitate public-private partnership to scale up the technological capacity and skill development of domestic mining enterprises, which by global industry standards are largely small-scale.
9. Monitor the social and environmental sustainability of the approach to exploiting natural resource wealth, given the country's sad history and legacy of the harnessing of extractive industry in the country.
10. Strengthen the capacity of the government and stakeholders to deal with challenges associated with the difficult environment for profitable businesses in the minerals and metals sector.
11. Ensure significant de-risking of the sector similar to what is currently emerging in the electricity sector.
12. Adhere to effective and efficient monitoring and evaluation of the 2007 Act. The rule of law and its enforcement in the sector must be to ensure a more conducive business environment which is a catalyst to the flow of the competitive capital in the global mining sector.
13. Operationalize the Solid Minerals Development Fund, which is urgently needed to bridge the huge financial resource gap in the sector, and especially to provide the long-term capital needed by artisanal and small-scale enterprises as the key drivers of inclusive growth and development, for sustained and higher productivity growth.
14. Strengthen regulatory and institutional frameworks to deal with the numerous economic, political, social and environmental challenges of significantly scaled up mining operations to global standards.

In conclusion, developing solid mineral resources to grow the economy anchored on adding more value locally through the development of downstream activities and ancillary industries, as well as their integration with the rest of the economy, will yield significant positive social and economic payoffs to the economy and the

people of Nigeria. However, from our legacy of the recent past, natural resource exploitation and dependence has the capacity to bring significant positive economic and social benefits as well as result in significantly adverse economic, social and environmental consequences. Also, it should be noted that relationship between exploitation of these non-renewable mineral resource endowments and sustained economic growth and inclusive development is a complex one. It, therefore, requires innovative solutions.

Nigeria must not underrate the political, economic, social, and environmental challenges associated with mineral exploitation that are subject to the vagaries of world mineral market developments and unstable global financial and economic developments. The magnitude of the challenges associated with the feasible speed, sequencing and quality of public and private participation in harnessing mineral resources to achieve the much desired status of middle and high income economies must not be underestimated. Also, fully integrating the mineral sector in the economy through upstream and downstream value addition will optimize the sector's forward and backward linkages to the economy. The business-as-usual approach to policy design and implementation must give way to a more insightful policy and implementation stance.

1

Introduction

The main objective of this chapter is to provide an overview of the economic, political, social and environmental contexts of extractive industry in Nigeria with a focus on the magnitude and complexity of its social and economic problems. Extractive industry dependence and vulnerabilities in the context of MDGs will be highlighted. In addition, the regional and global settings as well as related issues are also discussed.

Background to the Study

Nigeria is better known for its energy mineral resources (oil and gas). Yet, it is also well endowed with a variety of strategic solid mineral resources that are widely distributed across the 36 states of the country. The most important minerals are coal, iron ore, tin ore (cassiterite), columbite, manganese, lead-zinc, uranium, gold, barite, bitumen, marble, limestone and gypsum. However, the Federal Government of Nigeria (FGN) has identified nine of the more than 34 minerals, namely, coal, iron ore, tin ore (cassiterite), manganese, lead-zinc, gold and barite as its key focal points.

The need to harness more efficiently Nigeria's significant and widely diversified mineral resource endowments has been further underscored with the rebasing of the GDP in 2013, which made Nigeria the 26th largest economy globally. The data showed significant diversification of the economy from natural resource sector dependence. The natural resource sector, agriculture, and oil and gas, have lost their dominance in the production structure. The change in the emerging structure of the economy is important in that it will provide new economic opportunities that can be leveraged upon by investors and entrepreneurs in support of sustained economic growth and inclusive development. Also, the rebased GDP figures suggest the emergence of the post-petroleum era in Nigeria. Clearly, as increased economic activities (through more robust investment and production effort) along the value chain in the mining and metallurgy sectors are strengthened, further diversification of the economy will emerge. However, it must be noted that such positive development in the mining and metallurgy sectors will also be accompanied by a range of distinctive and challenging political, regulatory, economic, social, and environmental issues for the government, industry, other stakeholders and the local population.

There is palpable optimism that the solid minerals sector can become a major player in the economy in the coming decades, with value added as much or even greater than oil and gas, and, more importantly, serve as a key driver in the quest for sustained economic growth and more inclusive development. This optimism among stakeholders is premised on the unique opportunities that the exploitation of mineral resources will offer for economic and social development. Among the major expected positive economic and social outcomes from harnessing extractive industries are the following:

i. Rapid economic growth, industrial development and greater diversification of the economy.
ii. Creation of more employment opportunities especially for young people.
iii. Appreciable reduction in poverty and other forms of human deprivation through employment generation and value creation especially for small- and medium-scale firms. In addition, there will be strengthening of fiscal and current account balances from revenues generated from the exploitation of mineral resources along the value chain.
iv. Significant closing of infrastructural gaps through mineral sector driven infrastructure spending on roads, rail and water transportation.
v. Significant improvement in the economic and social empowerment of the citizens in the mineral producing areas and states.

Indeed, this optimism at the public level is evident in the emergence of the Minerals and Mining Act of 2007, the Minerals and Mining Regulations of 2011, and the Presidential Retreat on Solid Minerals in August 2013, which brought together all stakeholders in the sector to harmonize views and strategies on the opportunities in and challenges to optimal development of the minerals and metallurgy sector in Nigeria.

However, at this initial stage in harnessing solid minerals for sustainable and inclusive growth and development, four key issues are important. First is the effectiveness and efficiency of entrepreneurs and investors in converting the numerous opportunities that will emerge in harnessing mineral resources and related economic activities to achieve significant job creation, income generation, poverty alleviation and inclusive economic growth and development, given the diverse and significant risks and uncertainties that exist in the sector. Second is the extent to which domestic and foreign entrepreneurs either individually or as joint ventures will be involved in the process of developing the sector along its value chain to strengthen economic diversification through effective backward and forward linkages with the rest of the economy. Third is exploiting natural resource wealth in a socially and environmentally sustainable way, given the country's sad history and legacy of the harnessing of oil and natural gas, another extractive industry. Fourth is the capacity of the government and other stakeholders to deal with these three key and related issues.

This study provides some answers to these key issues, albeit, in a highly stylized form, given the limited scope of the study. An overview of issues related to the design and implementation of appropriate institutional, legal and regulatory frameworks for the efficient utilization of the mineral resources to grow the economy through the development of downstream value chain activities is presented.

Arguably, developing solid mineral resources to grow the economy anchored on adding more value locally through the development of downstream activities and ancillary industries, as well as their integration with the rest of the economy, should yield significant positive social and economic payoffs to the economy and the people of Nigeria. The payoffs will include sustained industrial development and economic growth, higher government revenues from tax and non-tax revenues from the sector, infrastructural development linked to mining activities, higher employment opportunities for young people, and overall, greater economic prosperity and well-being of the population. Evidently, greater internalization of the benefits from harnessing the resources of the sector would not only yield significant net positive social, economic and technological payoffs, but also increase the likelihood of Nigeria becoming one of Africa's most thriving mining and metallurgical hubs.

However, from the experience with oil and gas exploitation, though natural resource exploitation may bring significant positive economic and social benefits, it also has the potential to generate significant adverse social and environmental consequences. The evidence from the diverse experiences of both mature and emerging mineral producing and exporting countries, especially in sub-Saharan Africa, point to a more complex relationship between the exploitation of these non-renewable natural resource endowments on the one hand, and sustained economic prosperity, robust economic and fiscal performance, and governance on the other. Their experiences show that mineral wealth can be a very mixed blessing.

However, it is important to recognize that harnessing abundant endowment of mineral resources is neither a necessary nor sufficient condition to bring about significant increase in gainful employment, income opportunities and earnings, inclusive economic growth as well as sustainable economic and social development. The diverse experiences of both mature and emerging natural resource producing and exporting countries demonstrate that natural resource exploitation has the capacity to generate adverse

economic, political, social and technological consequences when wrong policy choices are made. The potential risks have been formalized in the Dutch Disease and resource curse literature, but the scope of this study precludes extensive discussion of this issue[1]. However, the bad and the ugly side of exploiting natural resource endowment is not the whole story of harnessing natural resource endowment. South Africa, Malaysia, Australia, Canada and Norway demonstrate convincingly that with good institutions and accountability framework, harnessing of extractive industries can be a blessing rather than a curse.

Recognition of the complex interrelationship between the exploitation of natural resources and sustained economic growth and diversification, significant improvement in living standards, fiscal sustainability and governance, is an important lesson that policy makers and citizens must appreciate. Minerals sector development, as currently envisaged by the government and other stakeholders, will bring novel and possibly more complex challenges than have ever being faced by entrepreneurs, investors, producers, politicians, policy makers, civil society, local communities and the people at large. But if the economic, social, environmental and political/governance problems associated with extractive industries are deftly handled, the outcomes will be positive and contribute significantly to achieving job creation, income generation, inclusive economic growth and sustainable development. Sustainable mineral development is one of the keys for unlocking the enormous growth potentials of the Nigerian economy and advancing the country significantly up the global economic ladder in the next two decades.

Most of these countries underrated the political, economic, social, and environmental challenges associated with mineral exploitation subject to the vagaries of world mineral market developments and unstable global financial and economic developments. The magnitude of the challenges associated with the feasible speed, sequencing and quality of public sector spending of mineral export revenues to achieve the much desired status of middle and high income economies was under-estimated. The level of their institutional development was grossly inadequate to meet the numerous economic, political, social and environmental challenges that accompanied hydrocarbon exploitation. Also, most of these countries failed to fully integrate the mineral sector in their economies, as the sector remains virtually enclave economies with minimal forward and backward linkages to the economy.

Though numerous economic opportunities may exist as the sector grows, the type of questions asked, the answers provided and the policy choices made, would ultimately determine much of the economic outcomes. Too often, wrong questions, inappropriate answers and poor policy choices have produced a litany of failed economic experiments and poor economic outcomes in many countries in sub-Saharan Africa.

However, it is widely acknowledged that both upstream and downstream development of the minerals sector face peculiar economic, environmental and social challenges. For example, from the economic perspective, the minerals and metals sector is characterized by high capital intensity, extreme competitive global market conditions, high demand elasticity, high cyclical margins, high risk factors, and frequent excess capacity. New entrants, if they are to be successful and become important players in the sector, must be positioned to move down the cost curve and enhance their competitiveness through appropriate market, policy and technology interventions, especially in the globalized world of mining and metals.

Against this background, Nigeria is faced with the fundamental question of how to utilize its mineral resources to support/-drive in a sustainable way to ensure a better, efficient and secure economic future for its citizens, with minimal social disruption and degradation of the environment. Also, for the exploitation of minerals to be an efficient driver for the economic and social advancement of the generality of the population, a related question is how best to actualize the strategy to achieve inclusive growth and development.

To better appreciate and focus on the critical issues associated with sustainable exploitation of solid minerals for inclusive growth and sustainable development in Nigeria, the following key questions demand insightful responses.

1. What do we know and what do we

need to know about mineral exploitation in Nigeria?
2. What are the success or failure factors in translating mineral resource wealth into inclusive growth, sustained social and economic development?
3. What are the major risks and uncertainties that exist in the sector and how can they be minimized to ensure sustainable harnessing of mineral resources?
4. How should Nigeria develop its mineral resources to ensure that their exploitation will help strengthen inter-sectoral economic linkages anchored on domestic development of mineral, including metal and ancillary industries?
5. What are the environmental challenges to mineral resource exploitation for inclusive growth and development?
6. What are the socio-economic challenges to mineral resource exploitation for inclusive growth and development?
7. What are the policy and institutional requirements for mineral resource exploitation to be an economic and fiscal treasure rather than a 'resource curse?'
8. What will be the optimal strategy to achieve local content policy?
9. How can Nigeria internalize more of the benefits of the industry?
10. What are the institutional, social and political challenges to efficient policies that better integrate mineral sector development with the rest of the economy?

Arguably, the nature of these questions illustrates the multi-dimensional nature of the set of economic, financial, social, environmental, political, strategic and legal issues that solid mineral resource exploitation entails. Clearly, these are challenging questions that demand sound policy design and implementation. The scope of this study, however, will limit the discussion to a broad analysis of key issues in harnessing Nigeria's extractive industries for inclusive growth and sustainable development.

Nigeria must leverage on its abundant solid mineral resources to attain the goals of a wealthier, healthier, and better-educated citizenry within the next generation. However, how to achieve these human development goals and driven by wider diversification of the economy anchored in part by vibrant mineral sector development, will perhaps be one of the most profound questions on the sustainable development agenda in Nigeria in the coming decades. In this new economic scenario, Nigerians will be active players as owners of vibrant and profitable mining firms, adding value to mineral products and providing skilled workers and managers in a more robust minerals and metallurgy sector.

Nigeria is faced with the fundamental question of how to use its solid mineral resources to support/drive in a sustainable way, a better, secure and efficient economic future for its citizens, with minimal disruption to the society and the environment. The design and implementation of policies and strategies for the emergence and sustenance of a better economic, fiscal, social and environmental future, is an essential exercise to which this study intends to make some contribution.

Aims and Objectives of Study

The main objective of this study is to develop a framework that will help to answer the fundamental question of what to do for mineral resource development to be a key driver in achieving sustained economic growth and inclusive development in Nigeria. Other objectives include a good understanding of developments in the minerals sector based on a descriptive analysis of the sector in Nigeria in the context of domestic and global economic and financial development; exploration of the forward and backward linkages between mining, metals and the rest of the economy with the ultimate objective of achieving economic transformation and sustainable development propelled by greater integration of the minerals sector with the rest of the economy. Robust global mining prospects and attractive and enabling domestic mining environment are necessary but not sufficient conditions for achieving robust and sustainable mineral exploitation in Nigeria. Thus optimal development of the solid minerals and the metals sector as an essential element in the strategy to achieve a more diversified Nigerian economy is of great importance.

Justification for the Study

The justification for this study is three-fold. First, is the robust global mining environment evident in relatively healthy medium- to long-term growth fundamentals in the sector. This will provide significant opportunities for aspiring mineral resource-rich countries, such as Nigeria, to leverage upon to generate significant economic prosperity, wealth and job creation, greater diversification of the economy and government revenues. Second is the emerging concern and need to be proactive in reducing the prolonged dependence of the economy and government revenue on export of oil and gas following the impact of the shale oil revolution in the world energy market. The rising energy self-sufficiency in the US on the back of massive development of its shale oil and gas resources has in recent times posed significant export and revenue challenges to Nigeria's oil sale since the US was one of its major traditional customer in the western hemisphere. Overcoming this challenge, points to the greater urgency to develop other sectors in the economy with more focus on value addition in the effort to deepen inter-sectoral linkages. Third, is the recent decisive attempt by the government to diversify the economy from oil and agriculture through developing mineral sector value chains to eliminate the overdependence of the Nigerian economy on mineral resource production and export (crude oil, gas, agricultural raw materials) and the associated macroeconomic and fiscal challenges of dependence on volatile world commodity markets.

Methodological Approach

It is widely acknowledged that mineral sector development in the context of sustainable development issues is better explored both qualitatively and quantitatively within a general equilibrium analysis. The main rationale for adopting this methodological approach derives from its robustness in analysing the inter-linkages between extractive industry development and broad-based economic and social development that focus on inclusive and shared growth in Nigeria. The study would explore key issues associated with harnessing extractive industry resources and more importantly, providing insight in the design of robust policy strategies for efficient harnessing of extractive industry for inclusive growth and development in Nigeria

Therefore, to achieve the objectives stated in the previous section, it is imperative that the appropriate methodological approaches be chosen. This is what has guided the choice of the methodological approaches adopted in this section. The seven steps in the methodological approach are as follows:

- First is identification of key institutions in both the public and private sectors: Ministries, Department and Agencies (MDA), industry operators, business and professional associations, the academia, civil society organizations, communities and development agencies such as UNDP, UNIDO, African Development Bank and the World Bank. This was followed by setting up interviews with a broad range of stakeholders including federal, state and local government officials connected with mineral, mining and environmental regulatory agencies, host communities, community leaders, industry players and civil society organizations. There was also field visits to mining sites.
- The second step involved the review and evaluation of relevant national and international studies and documents on harnessing extractive industries with a focus on inclusive growth and development.
- The third step involved the design and testing of sample survey data collection instruments, inclusive of the interview protocols. The sample covered 14 of the 36 states due to budgetary and time constraints.
- The fourth step involved processing and analysis of the survey data. Findings identified during the analysis of the survey and stakeholder interview will be used to gain further insight on the key issues in the sector.
- The fifth step was the construction of a Social Accounting Matrix to reflect demand and supply characteristics and linkages of the Nigerian economy, and

focus on issues of inclusive growth and development.

- The sixth step was the development of a general equilibrium model to explore the effects of integrating extractive industry development into the growth of the Nigerian economy. Analysis of the results of the general equilibrium model helped to trace the causal relationships and interdependence between extractive industry development and other sectors in the economy. The results are presented using tables, graphs and descriptive analysis. The general equilibrium analysis was supplemented with other statistical analysis of available data.
- The seventh and final step involved an analysis of the optimum extractive industry development scenarios while identifying key technology, policy, financial and market issues and options with due consideration for inclusive and shared development.

Organization of the Report

The report is structured as follows. In Chapter 2, is an overview of the economic, political, social and environmental contexts of the extractive industry in Nigeria which focuses on the magnitude and complexity of its social and economic problems, extractive industry dependence and vulnerabilities in the context of the MDGs. The regional and global setting and related issues are also discussed in the chapter. Chapter 3 discusses the associated policy, institutional, regulatory frameworks and governance issues associated with developments in harnessing the extractive industries in Nigeria. These contextual discussions help to identify the key economic, financial, political and social challenges and constraints facing Nigeria in its effort to sustainably develop its extractive (mineral) resources. Chapter 4 provides the conceptual framework for exploring the relationship between mineral wealth and sustainable development. The focus is on economic and social linkages and environmental challenges in harnessing the extractive industries. Chapter 5 examines the key issues and challenges in unlocking sustainable wealth creation through value addition in mining and the metals sector. Chapter 6 discusses the results of survey of stakeholders in mining in Nigeria. In Chapter 7, the study presents the results of a computable general equilibrium model of the Nigerian economy that focuses on the economy-wide and sectoral level effects of development in mining and the metals sector. In Chapter 8, the study concludes with policy recommendations that will ensure sustainable mineral sector development in the country.

2

Domestic, Regional and Global Perspectives: Emerging Trends and Issues

The main objective of this chapter is to provide an overview of the economic, political, social and environmental contexts of extractive industry in Nigeria with a focus on the magnitude and complexity of its social and economic problems. Extractive industry dependence and vulnerabilities in the context of the MDGs will be highlighted. In addition, the regional and global settings as well as related issues are also discussed.

The Domestic Context: An Overview of the Key Macroeconomic Social Development Trends

The focus of the discourse here is to present an overview of the key macroeconomic and social developments in highly stylized form. The main objective is to identify the key socio-economic challenges that confront Nigeria as a means of unlocking sustainable wealth creation through sustainable harnessing of the extractive industries.

The Macroeconomic and Sectoral Development Trends

The recent economic narrative in Nigeria, which has generated considerable optimism among stakeholders about the future prospects of the economy, derives from the following positive macroeconomic trends:

i. Nigeria was one of the fastest-growing economies in the world in the past decade[2]. The remarkable growth narrative is evident in an average annual real growth rate of GDP of over 6 per cent between 2004 and 2012. In 2011, the economy grew robustly at 7.45 per cent[3]. The official forecast for 2012 is expected to be above 6.5 per cent. This is due mainly to the slow-down in world economic growth arising from the crisis in global financial markets and unstable global energy market developments. Real per capita income, which grew at over 3 per cent per annum in the last five years, is also one of the fastest in the world.

ii. There is a decoupling of economic growth from natural resources production (agriculture and crude oil and gas) to services. The tertiary sector has become the dominant sector with telecommunication and entertainment becoming important contributors to GDP. The manufacturing sector has also improved its share significantly. The extractive industries, mining and quarrying, dominated by oil and gas, have lost their pre-eminence. This is a much desired structural change given that in the past three decades, economic growth was largely driven by the production and export of crude oil and natural gas.

iii. Fiscal deficits have fallen significantly and stabilized at less than 3 per cent of GDP in recent years. This is expected to be sustained against the current policy environment defined by a more prudent and sustainable public sector spending behaviour underscored by a more robust macroeconomic management. The positive developments in public finances derive mainly from a more disciplined fiscal stance especially at the federal level and some of the states, high world oil and natural gas prices and revenues, and the privatization of public enterprises which used to scale up public sector borrowing and fiscal deficits.

Debt sustainability has become a key issue in recent years.

iv. External indebtedness at about US$6 billion contrasts sharply with US$35 billion less than a decade ago. Significant restraint on domestic borrowing has replaced the previous poorly managed public sector borrowing pattern.

v. The robust performance of information and communication technology (ICT) anchored on a privatized telecommunication sector is widely recognized. Greater access of more Nigerians to ICT, and its impact on efficiency and productivity, as well as the investment and employment generated over the years has been of much benefit to the economy and society.

vi. A more stable and robust banking and financial sector driven by improved Central Bank's oversight functions. The financial sector reforms of the past decade have changed the face of the capital market in Nigeria. This is highlighted by the fact that Nigerian banks can now syndicate mega loans far beyond the levels known before the financial sector reform.

vii. Increasing international confidence in the economy as evident in Nigeria's rating by international rating agencies and rising foreign investment.

Emerging Economic and Social Development Challenges

However, as impressive as the narrative of macroeconomic and sectoral trends may seem, the broader economic and social context of the narrative continues to generate much concern and debate among a variety of stakeholders. These concerns stem broadly from five major factors.

High Unemployment Despite Robust Economic Growth.

The robust and sustained economic growth has failed to translate into any net gain in productive employment for the majority of the labour force, especially for the millions of youth joining the labour market each year. Nigeria, with an estimated population of over 160 million people, is the most populous African country and among the top six most populous countries globally. With annual population growth rate of 2.8 per cent, it is yet to experience the demographic transition (illustrated by significant decline in fertility rate and high dependency ratio). However, the population size and growth have had significant socio-economic impact including poverty level, human development indicators, overall social well-being, the demand for public services, supply of reliable and adequate economic and social infrastructure and urban and rural development. Raising the standards of living of the population and, especially the poor, is more challenging where there is no demographic transition. Of significance in the past five years, is that an average of two million people is estimated to enter the job market annually despite the declining rate of job creation in the economy. This has exacerbated the massive joblessness in the economy. Another observation is that unskilled and semi-skilled workers dominate the structure of the labour market. Furthermore, one in four Nigerians were unemployed in 2012 compared to one in seven in 2008, according to the National Bureau of Statistics. In marked contrast to rising labour supply, labour demand is shrinking substantially due to the state of the economy and reduction in public labour demand associated with macroeconomic and fiscal discipline. Also notable, is that unemployment is becoming more of a rural than an urban phenomenon.

The unemployment rate by educational group throws further light on the nature of the potential social crisis associated with the unemployment problem. All categories of educational levels below postgraduate had double digit unemployment rates above 20 per cent, (20.2 per cent for bachelors' degrees to 33.4 per cent for Junior Secondary School Certificates). There is a growing phenomenon that is generating serious social concerns in the unemployed educated and young people. Besides, unemployment based on age group classification shows that those aged between 15 and 24 have the highest unemployment rate of 37.7 per cent, followed by the 25-44 age group with unemployment rate of 22.4 per cent. However, while unemployment rose sharply for all age groups, the rate of unemployment among the young who are joining the labour market in the millions is

Table 1: Trend and Pattern of the Labour Force in Nigeria (2003 - 2011)

Year	Labour Force (million)	Employment	Unemployment	Unemployment Rate (%)
2003				
2008	61.192	52.074	9.118	14.1
2009	63.150	50.709	12.441	19.7
2010	65.171	51.224	13.947	21.4
2011	67.256	51.181	16.074	23.9

Source: NPC (2012) The Performance of the Nigerian Economy 2011

Table 2: Unemployment Rate by Age Group in Nigeria (2011)

Age Group	Urban	Rural	National
15-24	33.5	38.2	37.7
25-44	16.3	24.1	22.4
45-59	12.5	19.6	18.0
60-64	17.8	22.1	21.4

Source: NPC

more alarming. Most striking is the rising unemployment rate among the educated youth who are graduates of the over 120 universities each year with skills and training that scarcely match what the labour market requires. The millions of youth made up of a mix of educated and poorly educated young people willing but unable to find decent work is the paradox of high but jobless economic growth in Nigeria.

Joblessness exacerbates poverty and income inequality. For inclusive growth and development, youth and women, especially, should be empowered with decent jobs and income generation. Inclusive growth and prosperity must address the paradox of majority of Nigerians living below the poverty line despite the immense natural and human resource endowment of being the 26th largest economy in the world. Therefore, providing an environment that will allow economic agents to create more job opportunities and boost the income earning capabilities of the population will be a veritable dividend of democracy.

The Youth Enterprise with Innovation in Nigeria Programme launched by the Federal Government in October 2011 has emerged as the most innovative policy for not only creating gainful employment especially for young people but, more importantly, for serving as an incubator for growing entrepreneurship among the educated youth in recent decades. The extension of such a programme to the minerals and metals sector would be a catalyst to a robust development of the sector with youth and women being the major beneficiaries. However, there would be a new orientation which will focus on teams of university and polytechnic graduates as entrepreneurs in mining driven by science and technology in marked contrast to the current traditional artisanal and small-scale mining, which is destructive to the environment. Encouraging youths to find suitable partners with complementary skills so that they can collectively face the challenges of operating in the Nigerian business environment is essential to growing the sector. Jointly pooling of skills and risks may be the key to sustaining such enterprises beyond the short term given the well-known fact that the life span of new enterprises (SMEs) is relatively short in Nigeria. Furthermore, the same amount of money will be given but with many more youths gainfully engaged in both job creation and income generation.

High Poverty Level, Declining Well-being and Rising Economic Inequality

Impressive and sustained economic growth has failed to translate into poverty reduction, inclusive growth and development. This observation is substantiated by the significant deterioration in economic prosperity for much of the population based on poverty level and other human development indicators. Using global benchmark in poverty level as a measure of

Table 3: Measures of Poverty Incidence (in % of Total Population)

Year	Food	Absolute	Relative	% of population living on US $1 per day	Population in Poverty (million)
1996	n.a		65.6		67.1
2004	33.6	54.7	54.4	62.8	68.7
2010	41.0	60.2	65.1	61.2	112.47

Source: National Bureau of Statistics

Table 4: Measures of Relative Poverty (in % of Total Population)

Year	Extremely Poor	Moderately Poor	Non-poor
1996	29.3	36.3	34.4
2004	22.0	32.4	45.3
2010	38.7	30.3	31.0

Source: National Bureau of Statistics

Table 5: Human Development Index Trend for Nigeria (2008-2010)

Index	2008	2009	2010
GNI	US$1,977	US$2,057	US$2,156
Life Expectancy (Health)	47.93	48.17	48.4
Education Mean	4.96	4.96	5
Expected	8.9	8.9	8.9
HDI Value	0.416	0.419	0.423

Source: National Planning Commission (2011) Performance Report on the Nigerian Economy

change in well-being, World Bank data shows that two out of every four Nigerians lived on less than US$1 a day in the past decade. Moreover, not less than three out of every four Nigerians live below US$2 per day[4]. Poverty incidence declined in oil rich African countries, such as Angola, Algeria and Gabon, but increased in Nigeria. Declining social welfare and increasing poverty for majority of the population in an oil rich country exporting over two million barrels of crude oil a day is a major and embarrassing paradox. In addition, economic inequality has increased.

Tables 3 through 5, which show several dimensions of economic and social welfare, summarize the salient features of the declining well-being of the average Nigerian despite being a citizen of a natural resource rich country. The incidence of poverty has risen significantly in both absolute and relative terms. A large number of people are poor in Nigeria with the number almost doubled between 2004 and 2010. A notable but adverse development is the recent trend in the distribution of the benefits of economic growth. The Gini coefficient, an indicator for measuring income inequality, show that income inequality widened from 0.429 in 2004 to 0.447 in 2010. Inequality widened by 4 per cent between 2004 and 2010. Table 5 provides another perspective on well-being based on human development indicators. The unimpressive performance, based on these key human development indicators, is evident from the data.

Overall, the available data suggests that the robust economic growth in the past decade has not generated perceptible gains in employment and wages or resulted in inclusive growth and significant poverty alleviation. How to reverse the current trend is a major policy challenge.

Growing the economy through robust mineral sector value chain development that focuses on youth and women would contribute significantly to sharply reducing poverty and income inequality in Nigeria in the coming decades.

Weak Productive Structure with Low Productivity

The inter-sectoral linkages in the economy are weak. In addition, the major sectors are characterized by low productivity. Obviously, agriculture and the service sector, which jointly dominate the structure of national output, are known to be characterized by low productivity[5]. The manufacturing sector that should serve as a catalyst for high growth productivity growth has not recovered appreciably from the de-industrialization process that started with the implementation of structural adjustment programme (SAP) of the 1980s and 1990s. The industrial crisis was subsequently aided by poor macro-economic, trade and industrial policies, high cost of finance and severe infrastructure constraints, especially transport and electric power.

The virtual collapse of organized mining except for quarrying in the past four decades, has given rise to a sharp decline in its contribution to the national economy from 5 per cent to less than 1 per cent currently. The low value addition in the sector is a factor in the weak linkage of the sector to the rest of the economy. The enclave nature of mining remains a central feature of the history of minerals development in Nigeria. Reversing this legacy will be a challenge to policy makers and other stakeholders.

High Cost of Finance

The high cost of finance in the economy is a feature that poses barrier to potential investors, especially small-scale and artisanal miners. For several years now, interest rates at double digit make access to finance for productive investment almost prohibitive for small- and medium-scale enterprises where the future of rapidly rising job creation and income for low- and medium-income households lie. It is one of the major hindrances to growing the economy robustly to achieve greater economic diversification and value addition in production.

High Inflationary Pressures

Though inflation has been restrained in recent times, its relatively high level undermines household well-being by reducing its purchasing power and the profitability of business enterprises. The main policy challenge is how to align both monetary and fiscal policies to support non-inflationary and inclusive growth and development.

Summing up, the combination of jobless growth, rising incidence of poverty and income inequality, declining economic prosperity, and inflationary pressures have jointly contributed significantly to the emergence of a more difficult economic, social and political space with significant adverse social and economic consequences. They also reveal unfulfilled societal expectations about economic and social development potentials associated with exploitation of the economy's natural resource wealth in the past four decades.

Mineral Sector Development

The following discussion focuses more specifically on what is known locally and globally concerning the minerals sector. In addition, some general observations on current conditions in the mining sector are revisited as necessary background for a discussion on how to make development of solid mineral resources in the context of sustainable socio-economic development in Nigeria achievable.

Broadly speaking, the global mineral story of the last century has been oil and gas, which Nigeria benefitted immensely from. It is also a fact that the country also suffered much from the resource curse and Dutch Disease syndrome. Although, Nigeria is better known for its petroleum resources (oil and gas), it is also well endowed with a variety of strategic solid mineral resources which are widely distributed across the 36 states of the country. According to official information, over 34 minerals have been identified but the most important are coal, iron ore, tin ore (cassiterite), columbite, manganese, lead-zinc, uranium, gold, barite, bitumen, marble, limestone and gypsum. Figure 1 (and Table A1 in the Appendix) shows the geographical distribution of solid mineral resources in Nigeria. In its effort to develop the sector, the government has identified nine of these minerals, namely, coal, iron ore, tin ore

Figure 1: Solid Mineral Deposits in Nigeria

(cassiterite), columbite, manganese, lead-zinc, gold, bitumen and barite as key focal points.

Though, Nigeria has significant potentials to be a major player in the world mining commodity market, in the aftermath of the decline in the sector for upward of four decades, it is currently, not a major player in the global production of major solid minerals. The potential for domestic utilization in various sectors of the economy is also substantial. Table 6 shows the sectors where the minerals can be utilized to add value to these commodities in raw form.

The history of mining of solid minerals predates oil and gas, the dominant extractive industry, in the extractive sector in Nigeria. Small-scale and artisanal mining dates back centuries, while organized and capital intensive mining activities began with the establishment of the Mineral Surveys of the Northern and Southern Protectorates in 1903 and 1904 respectively. Though the sector, in its modern form, is more than a century old, it has been characterized by discontinuity in its development. Nigeria was an important world ranking exporter of tin, columbite and coal in the 1940s. The sector collapsed with the advent of oil and gas from the 1960s onward. Three additional factors also contributed to the dramatic decline in the sector, namely: the indigenization decree of 1972 which contributed to the exit of most foreign owned mining firms; poor performance of public-owned mining enterprises, the Nigerian Mining Corporation, and its subsidiaries, the Nigerian Coal Corporation, the Nigerian Iron Ore Mining Company, National Steel Raw Materials Exploration Agency and the Nigerian Uranium Mining Company; and the less favourable conditions in the international market for minerals.

However, the more determined drive by the government to reverse the collapsed fortune of this important sector in its effort to diversify the economy and achieve economic transformation through the minerals and metals sector development are evident in the Minerals and Mining Act of 2007, the

Table 6: Locally Available Mineral Requirements by Industry

Industry	Locally Available Mineral Requirement
Oil	Barite, Bentonite, Mica, Gypsum, Soda Ash, Calcium Carbonate
Construction	Limestone, Gypsum, Clay, Granite, Marble, Dolomite
Agriculture	Phosphate, Limestone, Lime, Kaolin, Magnetite, Gypsum and Dolomite
Steel	Iron ore, Limestone, Coal, Dolomite, Clay, Bauxite, Bentonite, Manganese, Molybdenum, Magnetite, Kyanite, Selenium, Tungsten and Nickel
Manufacturing	Kaolin, Talc, Limestone Feldspar, Quartz, Dolomite, Soda Ash, Barite, Diatomite, Tin, Titanium Dioxide, Lead and Zinc
Cement	Gypsum, Limestone and Marble

Source: Report of the Vision 2020 National Technical Working Group on Minerals and Metals Development, July 2009, Abuja, p.42.

Minerals and Mining Regulations of 2011, the Solid Mineral Roadmap and the Presidential Retreat on Minerals of 2013. Until recently, and largely because of the deep-rooted adverse impact of oil on the economy, policy and governance, Nigeria failed to leverage on the significant opportunities that exist in the exploitation of non-energy mineral resources for sustainable development. Undoubtedly, the new policy drive should help entrepreneurs to make the sector as catalyst for sustainable development and consequently bring about a dramatic and positive change in the sector.

Of much concern in the sector in recent years and a challenge in the quest to modernize the sector is the absence of medium- and large-scale mining enterprises. In terms of organization, the mining sector is dominated by artisanal and small-scale miners who feature mostly in low skilled mining activities that produce precious metals such as gold and gemstones. It is estimated that 500,000 operators belong to the industry. Artisanal and small-scale mining (ASM) is highly labour intensive and employs many unskilled and child labour as workers. ASM employs more people per naira invested compared to the more organized but more capital intensive mining activities. It is also estimated that it supports about 2.5 million dependents. Most of them are poorly educated and trained, lack technical capacity and access to appropriate technology, lack access to finance and face challenging market conditions for their output. Integration of ASM into the mainstream mining remains a major policy challenge.

Mining activities have had severe impact on the environment, agriculture and sustainable livelihoods of people living in these areas through land and water pollution in abandoned mines that litter the countryside. The environmental and health hazards from mining, especially informal mining, came to light in the lead poisoning of children in Zamfara State a few years ago[6]. This is part of the adverse legacy of the industry. Though environmental dimension of mining activity has been addressed in the new legislative framework for the industry, the real issue is enforcement of the rules on environmental impact. So far, the regulatory and enforcement history has not been impressive in the country.

The virtual collapse of organized mining except for quarrying in the past four decades, has led to a sharp decline in its contribution to the national economy from 5 per cent to less than 1 per cent currently. The low value addition in the sector is a factor in the weak linkage of the sector to the rest of the economy. The enclave nature of mining remains a central feature of the history of minerals development in Nigeria. Reversing this legacy will be a challenge to policy makers and other stakeholders.

Mineral Resource Development: Emerging Regional and Global Trends

This section provides an overview of emerging global trends in the solid mineral industry, especially the state of the market, exploration, production, supply, demand and prices and the key players as well as the prospects for the future of the industry. The emerging trends can be summarized in terms of four stylized facts.

1. There has been a major shift in global investment in exploration and production of solid minerals from

Table 7: Nominal Price Change for Metals (in per cent)

	1Q80-4Q99	1Q00-1Q13	1Q12-1Q13	4Q12-1Q13
Aluminium	-27	27	-8	0
Copper	-32	344	-5	0
Lead	-46	285	7	3
Tin	-61	339	5	12
Zinc	47	99	1	4
Gold	-53	519	-4	-5

Source: McKinsey Global Institute (2013) Resource Revolution: Tracking global commodity markets. Exhibit A2.

Table 8: Volatility in the Nominal Price of Metals (in per cent)

	1Q80-4Q99	1Q00-1Q13	1Q12-1Q13
Aluminium	25.9	24.8	1.8
Copper	25.9	56.2	1.1
Lead	24.0	54.5	5.6
Tin	40.5	58.4	9.2
Zinc	26.2	49.6	3.1
Gold	18.8	63.8	2.8
Silver	59.9	74.1	4.6

Source: McKinsey Global Institute (2013) Resource Revolution: Tracking global commodity markets. Exhibit A2.

the developed to developing countries since the middle of the 20th Century. In addition, the largest mines are located in developing countries. Africa, Asia and Latin America are three major destinations of investors in solid minerals. The shift in the locus of exploration and production of solid minerals is due to four key factors.

- The decline in easily accessible and profitable mineral deposits in North America and Europe after more than four centuries of exploitation.
- The discovery of new low cost mineral deposits in developing countries. In addition, technological progress has made previously difficult to access rich mineral deposits in developing countries more profitable for extraction.
- Globalization of the industry driven by faster and cheaper transportation of minerals from the supply source to the demand centres through the world's sea lanes provides another reason for the shift in investment and production location.
- Mining sector reforms in mineral-rich countries in Africa, Asia and Latin America that resulted in very attractive fiscal regime backed by globally competitive legal and regulatory frameworks have also facilitated the relocation from more matured mining regions of Europe and North America to these developing countries.

2. The world demand for raw materials, including solid minerals, has experienced robust growth since 2000. The rapid and sustained economic growth of the emerging economies of China, India and Brazil has been the main driver on the demand side that fuelled the boom in the world market for solid minerals.
3. The world market prices for minerals have trended up substantially in the last decade compared to previous decades of the 1980s and 1990s, as can be observed in Table 7. Two factors explain the upward trend in market prices for minerals. One is the increase in demand for

them from the emerging economies of Asia and Latin America. The other is rising marginal cost of supply (exploration and production) linked to geological factors, such as mine productivity decline, and escalation in factor input cost, especially skilled labour and equipment. The input cost inflation factor is likely to continue to exert upward pressure on market prices in the medium term. The upward trend in prices is expected to continue into the medium term as supply increasingly fails to adjust to demand.

4. The mining sector, like other commodities market, has been characterized by price volatility. In fact, the data in Table 8 shows that price volatility for mineral commodities intensified since 2000. However, in the past year, price volatility has subsided considerably. Mineral price volatility has important implications for managing mineral-dependent economies and fiscal behaviour in prospective mining countries such as Nigeria. The curse of oil has accompanied the extraction and export of crude oil and gas in Nigeria.

Finally, the corporate landscape of the global mining sector is dominated by the majors consisting of about 150 companies[7]. These giant multi-national conglomerates dominate the industry. Their asset base ranges between US$3 and US$10 billion. The next major players in the sector are the intermediates numbering about 350 with asset base of between US$1 and US$3 billion. At the bottom of the industry structure are the 'juniors', approximately 1500 of them, with asset base of between US$500 million and US$1 billion. The juniors dominate exploration in the sector globally.

3

Policy, Legislative, Regulatory and Institutional Frameworks

This chapter focuses on the policy, legislative, regulatory and institutional frameworks on the mining industry. These four factors under examination here are the minimum necessary conditions to guarantee success in any endeavour. The mining industry in Nigeria is in no wise different.

The Four Fundamental Frameworks

The Minerals and Mining Act of 2007 and the Minerals and Mining Regulations of 2011 embody the sector's policy, regulatory and institutional frameworks. The Act empowers the Minister for Solid Minerals Development, on behalf of the Federal Government, to issue mining licenses. There are six types of licenses that can be issued. These are:

i. Reconnaissance Permit;
ii. Exploration License;
iii. Small-Scale Mining License;
iv. Mining License;
v. Quarrying License; and
vi. Water Use Permit.

Artisanal and small-scale miners are not qualified to apply for mining license. They are entitled to reconnaissance permit, exploration and small-scale mining license. However, there are operators who do not have mining licenses and are illegally involved in mining especially of precious metals and gemstones. Two major requirements for a license, namely, 'proof of sufficient working capital' and 'technical competence to carry on the purpose' have pushed numerous small-scale miners into operating without mining license. The scale of illegal mining in Nigeria is widely known in the sector and across the country.

The fiscal incentives to guide mining entrepreneurs and investors are a prominent aspect of the 2007 Act. They are incorporated in the fiscal regime for mining enterprises that have approved licenses to operate. The fiscal incentives which are quite attractive terms by global standards include the following:

- Exemptions from Custom and Import Duties in Respect of Plant, Machinery, Equipment, and Accessories Imported Exclusively for Mining Operations;
- Expatriate Quota and Resident Permits In Respect of Approved Expatriate Personnel;
- Permission Granted to Exporters of Mineral Products to Retain part of Their Foreign Exchange Earning in a Domiciliary Account for the Purpose of Acquiring Spare Parts and Other Mining Inputs;
- Free Transferability of Funds;
- Tax Relief for Three Years which may be Extended;
- Tax Deductible Reserves for Environmental Protection, Mine Rehabilitation, Reclamation and Mine Closure Costs;
- Accelerated Depreciation on Capital Investment;
- Deduction of Exploration/Other Costs;
- 100 Per Cent Remittance of Profit and Dividends.
- Corporate Tax At 20-30 Per Cent Of Net Profit (Global Standard Is 15-35 Per Cent);
- Capital Gains Tax of 10 per cent.

Artisanal and small-scale mining currently dominate the structure of mining in Nigeria. Clearly, given that artisanal and small-scale mining are largely not qualified to have a mining license because of financial and technical capability reasons, it is obvious that they cannot benefit from this fiscal terms. In essence they will not be able to compete with the bigger players in the sector that are increasingly made up of foreign firms and medium and large domes-

tic enterprises. Undoubtedly, considerable reduction in the barriers to entry that face ASM in profitable mining is central to inclusive growth and development in Nigeria. Effective implementation of policy to formalize the informal mining sector will help to reduce the significant barriers to inclusive growth and sustainable development in the sector.

The institutional framework and governance structure for the sector consists of the Federal Ministry of Mines and Steel Development, Mining Cadastre Office[8], the Mines Inspectorate Department[9], the Environmental Compliance Department[10], Artisanal and small-scale Mining Department[11], the Metallurgical Inspectorate and Raw Materials Department, and the Steel and Non-Ferrous Metals Department.

Arguably, the Act embodies the best international practices concerning the policy, legislative and institutional frameworks for harnessing extractive industries for inclusive growth and sustainable development.

The Act also provides for compensation of host mining communities. In fact, no license can be issued without a Community Development Agreement between the host community and the prospective mineral title holder, a form of corporate social responsibility. Environmental and socio-economic development issues associated with harnessing extractive resources are embodied in the agreement. However in the past, mining activities have had severe impact on the environment, agriculture and sustainable livelihoods of people living in these areas through land and water pollution in abandoned mines that litter the country side. Though environmental dimension of mining activity has been addressed in the new legislative framework for the industry, the real issue is enforcement of the rules on environmental impact. So far the regulatory and enforcement history has not been impressive in the country. The environmental and health hazards from mining, especially informal mining, came to light in the lead poisoning of children in Zamfara State a few years ago. [12]This is part of the adverse legacy of the industry.

Under the 1999 Constitution of the Federal Republic of Nigeria, as amended, mining and all sub-soil resources belong to the exclusive federal legislative list. The implication is that state and local governments that are the custodians of the lands with the mineral deposits are precluded from legislating on mineral resources. However, as a compromise, though jurisdiction over mining belongs to the federal government, in order to make the states and local governments which are closer to the mining enterprises to be joint stakeholders in the sector, the Minerals and Mining Act of 2007 provided for a forum for the three tiers of government to interact. This came through the establishment of a Minerals Resources and Environmental Management Committee. The responsibilities of the committee are to:

i. Consider and advice the Minister on issues affecting returns of necessary reports and grants of mining titles;
ii. Consider issues affecting compensation and take necessary recommendations to the Minister;
iii. Discuss, consider and advice the Minister on matters affecting the population and degradation of any land on which any mineral is being extracted;
iv. Consider such other matters relating to mineral resources development within the states as the Minister may from time to time refer to the Committee;
v. Advise the Departments established in accordance with the provision of this Act for the supervision of the mineral exploitation and the implementation of social and environmental protection measures;
vi. Advise the Local Government Areas and communities on the implementation of programmes for environmental protection and sustainable management of mineral resources;
vii. Advise and offer the necessary assistance required by holders of mineral titles in their interaction with state government, local government councils, communities, civil institutions, and other stakeholders;
viii. Help the Minister to resolve conflicts between stakeholders; and
ix. Advise the Minister on matters connected with the implementation of this Act.

From the above responsibilities, the Minerals Resources and Environmental Management Committee is an important institution designed to support sustainable exploitation of solid minerals. However, its mode of operation has been below expectation.

Finally, the Act provides for a Solid Minerals Development Fund which was expected to finance the development of human and physical capacity in the sector; geo-scientific data gathering, storage and retrieval to meet the need of the private-sector-led mining industry; equip mining institutions to enable them perform statutory functions as well as essential services to small-scale and artisanal mining operations; and provide infrastructure in mine lands. However, since the establishment of this fund, it has not functioned effectively due to lack of funds.

Other institutions involved in the sector are the Nigerian Geological Survey Agency (NGSA), Council of Mining Engineers and Geoscientists (COMEG), National Metallurgical Development Centre (NMDC), and Nigerian Extractive Industry Transparency Initiative (NEITI).

The Minerals and Mining Act of 2007 and the Minerals and Mining Regulations of 2011, which have redefined the rules of the game in the Nigerian minerals sector, have provided new opportunities for domestic and foreign investors to enter the industry. Notably, and until recently, major global mining companies were not enthusiastic about acquiring mining assets in Nigeria mainly because of the business environment and government policy in the sector. Government policies have driven development in the sector since the colonial times till date. The collapse in the industry was triggered by poor public sector control and ownership of the industry similar to what happened in other sectors of the economy.

In the new policy regime, mining is to be private sector driven with the government playing the role of administrator and regulator. Recent extensive reforms of legal and regulatory framework in the sector have resulted in a transition to a more liberal space for foreign and domestic investment. The major players, both the majors and juniors, are expected to be important players in Nigerian mining following the aggressive push of the current government to leverage on the solid minerals industry to diversify the economy. This is a dramatic change from state control of the sector in the previous four decades.

An important concern and policy challenge is artisanal and small-scale mining, which is largely informal and often falls outside regulatory control. How to scale up informal sector operations and modernize the sector has been the concern of the government and development partners in recent years[13]. Since the exit of the medium- and large-scale mining enterprises more than 30 years ago, the sector has been dominated by artisanal and small-scale miners who feature mostly in low skilled mining activities that produce precious metals such as gold and gemstones. Artisanal and small-scale mining is highly labour intensive and employs many unskilled and child labour as workers. Most of them are poorly educated and trained, lack technical capacity and access to appropriate technology. They also lack access to finance and face challenging market conditions for their output. Sustainable integration of ASM into the mainstream mining remains a major policy challenge.

In conclusion, the law, policy, regulatory and institutional frameworks in the sector fall within global best practices. However, their implementation has been far less than optimal. Environmental degradation and health and safety issues are major challenges that have been magnified by the dominance of the sector by artisanal and small-scale and often illegal mining. Environmental Impact Assessment (EIA) is hardly complied with in the sector and compliance with mining laws and regulations are weakly enforced even if enforced at all. The financial and administrative skills as well as technical capacity to fully implement the Act are grossly inadequate.

4

Mineral Wealth and Sustainable Development: Conceptual Framework

The discussion in this chapter is designed to provide the analytical context for understanding the linkage between mineral resource development and sustainable development.

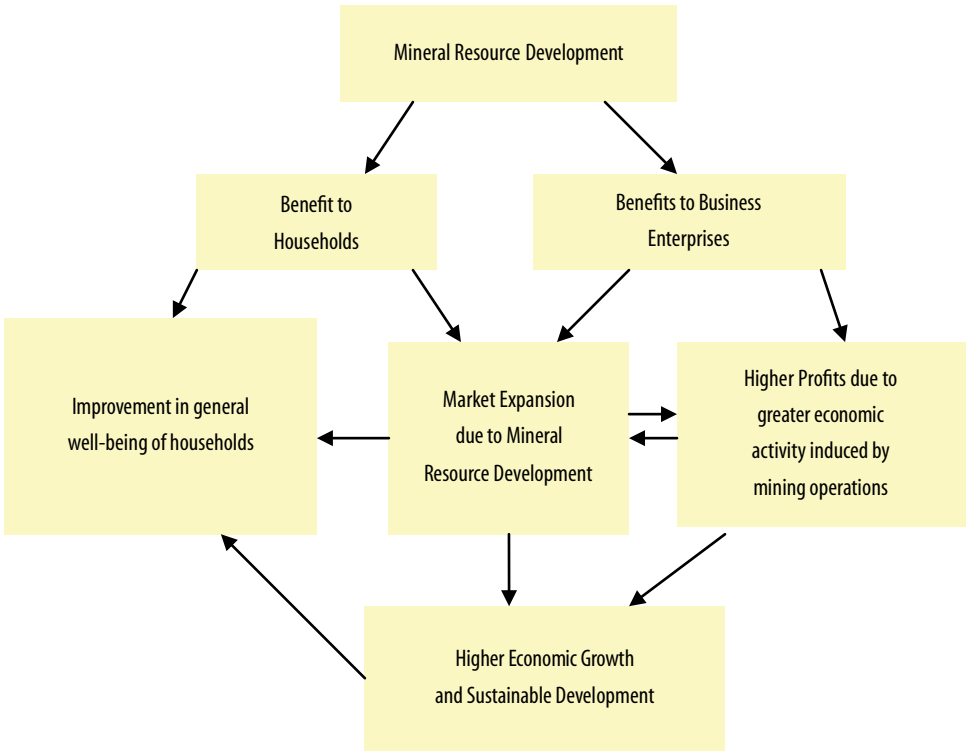
On Sustainable Development

What is sustainable development? And how do we measure it? These are difficult questions because of the multi-dimensional nature of the concept. In fact, the emergence of a universally acceptable and catch-all measure of development has remained elusive. The concept has evolved from being synonymous with rising level of per capita income, the dominant paradigm in the 1950s and 1960s, to the more embracing concept of sustainable human development of the 1980s and 1990s (WCED, 1987; UNDP's Human Development Reports since 1990).

The typologies of development definitions and indicators ranging from a single focal variable GDP and income per capita, popular with economists and policy makers, to a vector consisting of income, education and health indicators as popularized by the UNDP (Human Development Index) reflect the varying purposes and perspectives of analysts, policy makers and institutions. The evolving interpretation of development in the literature has been shaped by the experience of many developing countries which though had impressive economic growth in terms of Gross Domestic Product (GDP) and per capita income but marginal or no progress in terms of poverty reduction and significant improvement in social well-being. The wider concept of development in terms of sustainable human development and sustainable livelihoods began to gain wider currency with the Brundtland Commission Report in 1987 (World Commission on Environment and Development, 1987). As the Brundtland Report proposed, sustainable development means development that meets 'the needs of the present generation without compromising the ability of the future generations to meet their needs' (WCED, 1987: 8). Since 1990, UNDP has been in the forefront of redefining development to expand its socio-economic and environmental content through its annual *Human Development Reports*. However, the emerging consensus supports the notion that development must encompass broad-based and inclusive growth, employment-generation, and sustained improvement in literacy, as well as health status implicit in longevity and social stability.

In summing up, from the debate on development in more recent times, a number of observations emerge. First, development is about change that results in sustained improvement in the general well-being of people in the society. Second, development is about enlarging people's choices. Ultimately, the broadening of social and economic opportunities that takes cognizance of the natural environment must be at the core of development. Third, development involves achieving a set of social and environmental goals. Fourth, development is about economic as well as political freedom. Fifth, the well-being of the most disadvantaged groups (the poor in our midst) is of utmost importance and must be explicitly factored into the process. Overall, though what constitutes a better world is debatable, and cannot be based solely on objective facts, there seems to be an emerging consensus that rising income per capita, better education, better health, increase in life expectancy, full employment, and social stability are key constituents of a better world in terms of development.

Figure 1: A General Framework for Understanding how Mineral Resource Development Contributes to Development



Mineral Resource Exploitation and Sustainable Development: The Linkages

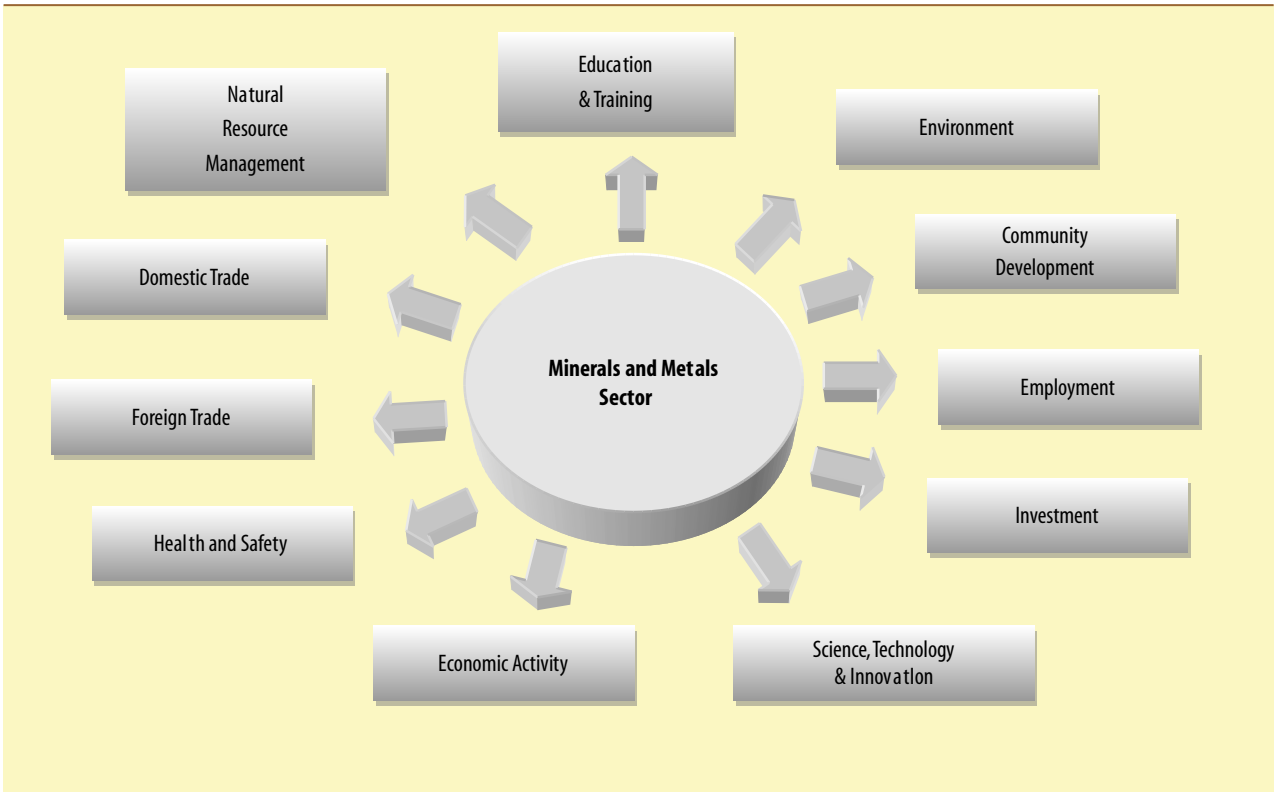
Mineral resources are an essential part of human development and play a key role in economic prosperity and overall well-being of people. However, the relationship between mineral resource development and economic development has been the subject of much debate. Figure 1 provides a simple framework for understanding important aspect of the relationship between mineral development and the development process. As shown in the diagram, mineral resource exploitation impacts development positively through many channels. First, it improves the well-being of households in both urban and rural areas, through higher income and employment opportunities, poverty reduction, higher household production and noticeable improvement in household livelihoods brought about by mining sector development. Second, mineral resource development impacts on the production side of the economy. Higher profits and enlarged market demand would combine to produce higher economic growth. Higher economic growth would imply higher living standards for the population. This would facilitate more economic exchanges and yield significant economic benefits. The causal linkages in Figure 1 provide a clear understanding of the nexus between mineral resource development and sustainable development.

Figure 2 provides another perspective to the multi-sectoral and multi-dimensional role of a robust development in the minerals and metals sector on the economy.

Getting this interconnectedness right, which will trigger sustained economic growth and inclusive development, is arguably the central challenge in sustainable mineral sector and overall development in Nigeria in the coming years.

Another important though more detailed perspective on the linkages between mining (large and small-scale) and inclusive economic growth and development can be observed in Tables 9 and 10. In both tables, eight impacts of sustainable harnessing of mineral wealth have been identified with both positive and negative dimensions.

Figure 2: Inter-linkages Of Mineral And Metal



These are macroeconomic, economic development, socio-economic, infrastructural, human capital, economic and political empowerment, food security, health, safety and environmental impacts. Due recognition of these transmission mechanisms in policy design and implementation will advance sustainable exploitation of Nigeria's large endowment of mineral resources.

Mineral Resources as an Exhaustible Resource: The Economic Analytical Framework

The economic analytical framework can provide a good starting point for analysing the complex problems that mineral resources pose for the economy, the society and the environment. Our first point of departure is microeconomic in nature, namely, mineral resources and markets. Several relevant questions are of interest in this regard. What determines how much of a mineral resource a producer is willing to supply and how much a downstream consumer is willing to buy? What is the role of incentive structure in the production and consumption of mineral resources?

The basic thrust of mineral economics is that a mineral resource is an economic commodity though with some special characteristics. As obtains for any commodity, consumers and producers, whether individuals or business enterprises, are faced with deciding how much to supply or how much to purchase to meet their needs and maximize their preferences, be it profit or utility. Just as individual economic agents are faced with hard choices in deciding what and how much to purchase or produce of a particular commodity because of limited means, the mining and metals sector must also do the same. At the core of understanding what happens in the market place, including minerals, are the following basic assumptions (Mankiw, 1998).

- Individuals and business enterprises are rational decision makers.
- Individuals and business enterprises face trade-offs when deciding on what to produce and consume. The meaning of this economic jargon is aptly captured by the adage: 'there is no such thing as a free lunch'. When an industrial enterprise commits an extra Naira on the purchase of iron ore, it has one less naira to spend on other goods

Table 9: Linkages between Large-scale Mining and Economic Growth and Development

Impacts	Positive Impacts	Negative Impacts
Macroeconomic.	Fiscal flows.	Potential for Dutch Disease.
	Foreign exchange generation.	Poor governance of key economic factors such as exchange rates and interest rates.
	Significant economic multipliers.	Cyclical commodity price impacts on an unbalanced economywhere there is heavy dependency on minerals.
Economic Development.	Associated economic and tertiary development.	Sudden end of economic opportunities and employments in thecontext of mine closure.
	Significant opportunities for SME development.	
	Upstream and downstream opportunities.	Competing for resources (land, water, infrastructure) can createbarriers in other economic sectors.
	Job creation.	Contractions of mining activity can create major unemployment in an undiversified economy.
	Mining infrastructure and related secondary and tertiary industries catalyse andcreate an enabling environment for cross sectoral development.	Income security of non-mining activities compr omised by increasesIn income resulting from high-income levels for miners.
Socio-economic Factors	Physical.	Dependency on mining related infrastructure leads to collapse ofinfrastructure with mine-closure.
	Social.	Rapid change in the economic and social fabric of society. Threats to indigenous land rights and usufruct on infringement by powerful mining companies. Social tensions and local price inflation due to large migration of job seekers. Conflicts between original residents and newcomers. Substance abuse, prostitution. HIV/AIDS and STDs.
	Industrial. Commercial. Administrative.	Government tendency to leave service delivery to mining companies exacerbates community dependency on mining Infrastructure and services.
Skills Development.	Life skills.	Work-related health risks, widespread HIV., alcoholism and related gender issues.
	Vocational skills.	Over-reliance on non-transferable mining skills.
Empowerment.	Economic empowerment.	Corruption: Benefit of mining diverted for personal /political gain.
	Political empowerment.	Risks to political stability -mineral revenues fund conflict; competition for mineral resources fuels political and civil conflict.
	Presence and development of local government Capacity.	High level of corruption can keep the poor further excluded from decision-making processes.
	Community capacity through consultativepartnerships with NGOs and mining companies building reduces vulnerability.	Development of culture of dependence on mining incomes and infrastructure.
		Local communities often excluded from planning and decision making processes on issues of fundamental importance to their interests.
Social Security.	Security of food supply.	Development of community dependence on mining incomes.
	Shelter.	Dependence on mining accommodation and infrastructure.
	Health care.	Increase In disease vectors sp. HIV/AIDS.
	Crime prevention and control.	Increase in local money flow in mine dependent communities encourages crime.
Environmental Impacts	Economic empowerment reduces the impact of poverty on the environment.	Inter-sectoral competition for critical natural resources and infrastructure.
	Deforestation for domestic fuel, charcoal making, land clearance for subsistencefarming, overgrazing, water pollution.	Environmental risks and impacts on health and environment (tailings, toxic waste, waste management, water, soiland air pollution, dust, land disturbance, deforestation).

Source: UNECA (2010: 8) Mainstreaming Mineral Wealth in Growth and Poverty Reduction Strategies.

Table 10: Linkages between Small-scale Mining and Economic Growth and Development

Economic Impacts	Positive Impacts	Negative Impacts
Micro-economic.		Large-scale smuggling of high value SSM product (gold, diamonds, tanzanite, coloured gem stones) escapes fiscal net and erodes foreign exchange earnings.
Economic Development.	SSM offers the lure of higher incomes than from alternative subsistence activities (farming. fishing).	Income tends to be highly seasonal..
	Important source of cash in rural areas. SSM is often a critical economic activity for women.	Competition for natural resources (land and water) by incoming groups of small-scale miners can compromise income generation opportunities for other subsistence economic activities.
	Employment generation.	Small-scale miners can lose property and Income where mining rights are not regulated or protected.
	Local cash economy catalyses rapid SME development and creates local economic multipliers.	Lack of financial resources by small-scale miners results in highly exploitative practices by commodity buyers, who advance money to miners on extortionate terms.
	The SSM "barons" typically re-invest their earnings in alternative activities such as shops, taxis, bars, and guesthouses etc. creating local economic diversification.	Domination of local economy by SSM "barons" can lead to highly exploitative practices negatively impacting on the poor.
	Artisanal miners are excellent prospectors and can identify deposits outside of expensive government or private sector exploration programmes.	
Socio-economic		
Infrastructural Development.		While artisan communities can rapidly develop and grow, there is seldom government support for these informal communities. Lack of infrastructure causes major health and social problems.
Skills Development.		Lack of formal mining skills leads to highly dangerous workplace practices and highly inefficient mining methods and resource utilization.
Empowerment.		Indigenous groups are compromised by exclusion from decision affecting their land and their property rights.
		Indigenous communities with traditional land rights are powerless to stop rushes of artisanal miners.
		Artisanal miners are generally excluded from public decision-making process because of the absence of local government structures.
		Artisanal mining is largely an unregulated environment, which is to the detriment of the greater community and economy.
Social Security.		Invasion of lands of indigenous or tribal people by miners.
		Risk of severe cultural conflicts between miners and local or indigenous population.
		If diamonds; risk of illegitimate diamond trading to contribute to finance regional conflicts.
		Lack of health care and education facilities in artisanal mining communities highly problematic.
		Widespread use of child labour has highly negative impacts on health and education.
		Work-related health risks as well as widespread HIV, alcoholism and related issues.
Environmental Impacts.		Massive physical damage.
		Mercury pollution.
		Extensive deforestation for mining support, fuel for artisanal mining communities and charcoal supply to these communities.
		Community health.
		Disease vectors.

Source: UNECA (2010: 8) Mainstreaming Mineral Wealth in Growth and Poverty Reduction Strategies.

because of its limited means.

- Decision about any course of action, for example, buying or selling, involves an opportunity cost. We must give up something to get something.
- Individuals make the best decision when they think at the margin. For example, what is the extra cost and benefit of consuming or producing an additional unit of coal? This principle suggests that a plan of action would be worthwhile when the incremental benefit derivable from such an action is at least as high as the incremental cost.
- Enterprises and individuals respond to incentives, which may be positive or negative. The major function of an incentive system in the economy is to provide decision makers with measures of the costs and benefits they face as they make their choices. When policy changes the incentive structure, it will alter the behaviour of the decision maker because of both the direct and indirect effects of such incentives.

One must also quickly add that a key assumption is that the institutions to support the efficient functioning of the market system exist. The non-existence or poor functioning of such institutions have been found to undermine efficient market conduct and performance. Institution building has become critical elements of second and third generation policy reforms of international financial institutions and development community. One must also not fail to state that there are situations when the market outcome may be flawed. Two important areas where the market model may be flawed in the minerals sector are: research and development, and mineral-related environmental degradation problems.

Mineral Resources and Exhaustible Resource Economics

An important question concerns the determinants of the optimal exploitation and use of depletable or extractive resources such as minerals in a developing economy. This is an important issue for the owner of a mine that produces a depletable mineral resource. This dynamic resource allocation problem differs from what was discussed previously about static resource allocation problem. Geologists tell us that it takes millions of years to form each ton of coal or iron ore in the ground. Consequently, extraction and sale of a mineral resource must take into consideration that these resources are essentially irreplaceable assets. This has important implications for their rate of depletion. The conventional wisdom, based on the famous Hoteling rule, is that the decision to extract now or later depends on the rate of interest (Hoteling, 1931). For example, postponing the extraction of a ton of coal or iron ore today for use in the future is economically justifiable if we expect the discounted price net of cost in the future to be higher than the current net price. On the other hand, if the discounted net price in the future will be less, it is desirable for the current generation to extract the coal or iron ore and invest it in fixed capital that will support the economy in the post-mineral era. When there is no difference in the net price, there will be no incentive to change the extraction plan. Obviously, inter-generational issues are involved in the timing of the depletion of mineral resources. The environmental consequences of extracting and using solid minerals should also be incorporated in the analysis.

Economics of Mineral Resource Development and Environmental Degradation

The exploitation of natural and environmental resource to support rapid economic growth often results in the degradation of the environment. This is clearly the case with the history of mining in Nigeria. What is the role of policy and the market in environmental degradation associated with an economic activity such as mining? Probing how decision makers extract and utilize environmental resources associated with their production activity provides some answers to this problem. The basic hypothesis in this section is that both policy and market failures largely explain the emerging phenomenon of severe environmental pollution associated with mining in many countries.

The analytic framework suggests that fundamental to understanding the general and specific issues associated with mineral resource-induced environmental degradation, we must know the following:

- How markets work, and why some don't work or work properly;
- The consequences of malfunctioning markets and correcting the market failures;
- How markets value resources, commodities, services, and assets; and
- How economic agents in their roles as consumers or producers behave and interact to determine what they do, and how they do them.

The market system filters human preferences to yield a set of prices that in many cases provide useful and fairly accurate information on the additional costs and benefits of producing and consuming the marginal unit of goods and services inclusive of environmental resources such as land, water and air. When markets function properly, they perform important functions in matching demand with supply. But getting and keeping them to function properly remains a major issue.

Why was the natural environment degraded by the mining sector in the past? The classic economic answer is that private valuation of these resources did not reflect their true social costs because of market and policy failures. The classic market failure argument is linked up to negative externalities. Unsustainable exploitation of mineral resources springs from the absence of markets to appropriately price these scarce resources, land, water and air, (Tietenberg and Lewis, 2012).

Currently, by and large, the price inputted to the natural environment is either very low or zero, as producers were not willing to internalize the environmental cost of mineral production in their economic and financial calculations. They neglected the social costs they imposed on the local community and the society at large. Un-priced/under-pricing of the environment combined with poor information and uncertainty partly arising from insecure property rights are additional causal factors related to the market failure aspect of the causes of unsustainable exploitation of mineral resources. Abandoned mines litter the country with no prospect of cleaning up such environment. From the policy perspective, poor enforcement of environmental regulations in a sector characterized by the large number of inefficient public mining enterprises, and poorly designed and inefficient incentive structure which drive a big wedge between the price and the opportunity costs of these resources, played prominent role in aggravating the degradation of land, forest, water, and air quality associated with mining. Policy failure and the high level of informal sector participation have undermined the adjustments needed to ensure a more rapid internalization of environmental externalities to ensure a smoother transition to a more environmentally friendly mineral development trajectory.

Internalizing the costs of environmental externalities to eliminate the causal factors in environmental degradation require that we have reasonably good estimates of the economic value of such degradation. Also, a proper evaluation of alternative government environmental programmes and actions to choose the option that is most socially desirable becomes imperative. This implies the need to compute costs and benefits of specific policies. Mineral resource development generates costs and benefits; economic valuation of the benefits and costs of environmental resources in mineral sector development should be incorporated into the analysis.

5

Key Issues in Unlocking Sustainable Wealth Creation through Mineral Resource Value Chains

The purpose of this chapter is to identify the way forward in the mining industry. The chapter identifies about a dozen key issues that can help unlock sustainable wealth creation through the mineral resource value chains.

Challenges and Policy Issues on Sustainable Mineral Resource Development in Nigeria

The robust long-term domestic economic growth fundamentals and prospects, the size of the domestic market, the upward trend and prospects in the global mining sector and the enabling mining environment highlighted by the Mining and Minerals Act of 2007, are necessary but not sufficient condition for achieving robust and sustainable mineral exploitation. Despite these positive initial conditions, the quest to achieve sustainable development of the solid minerals and the metals sector as an essential element in the strategy to achieve a more diversified and inclusive economy, faces several challenges as highlighted.

Political Commitment and Institutional Capacity

When the institutional capacity is high and strengthened, the public service official is well-trained, motivated and well-paid. With high institutional capacity, the likelihood of good governance is high. In contrast, when institutional capacity is low, the public service is poorly or inadequately trained and poorly motivated. Poor governance, rent seeking and corruption, are more likely to thrive. The socially most desirable option is the combination of high political commitment and high institutional capacity. Under this scenario, extensive mining sector policy reforms will be carried out and sustainable mineral wealth creation will obtain. Meeting this policy challenge involves creating the positive and negative incentives that will induce governments and public service under the prodding of civil society organizations and international development partners. Consequently, following best practises in the legal and regulatory frameworks must be backed up by robust political commitment and institutional strengthening.

The Business Environment

Maintaining the positive enabling business environment engendered by the current reform and institutional changes in the sector to guarantee that both the country (government and the people) and the mining companies get what they bargained for. The mining game should be a win-win one for all the stakeholders. As part of maintaining an enabling environment, maintaining current macroeconomic and financial stability will remain a challenge. In recent years, the business climate for mining has improved dramatically, however, the overall cost of doing business in Nigeria remains a major challenge for investors and entrepreneurs in the sector because the country remains a poor performer in business climate indicators in comparative global terms.

Inadequate Human Resource Development and Capacity Building

Making domestic mining and metals sector competitive globally faces the challenge of inadequate human resource development and capacity building in research and development institutions, charged with mining and metallurgy. Furthermore, the

complementary investment to facilitate sustainable mineral exploitation, which include infrastructure, institution building, community development, technological development, business advisory and support services, are grossly inadequate. Addressing these issues promptly will help accelerate the development of the sector. Adequate investment in the required skills required to support the expected robust growth in the sector is lacking. Currently, there is only one Nigerian university (Federal University of Technology, Akure) offering a programme in Mining Engineering out of more than 120 universities in the country. The Kaduna Polytechnic is the only polytechnic offering a programme in mining. There are several universities offering courses in geological and mining sciences. Notwithstanding the latter, the local skills gap is immense. How to maximize the use of domestic skills and supplement them with foreign skills will be a major challenge for stakeholders in the sector. The role of COMEG and NIMGS in this respect cannot be overemphasized. Both institutions need more support from stakeholders in order to achieve proactive development of the required skills in the sector.

Research and Information

The research data and information geo-data challenge may not seem as obvious as the other challenges. Yet they are crucial for the solid preparation required for sustainable mineral resource exploration and development policy. Poor data and inadequate or lack of research on the multi-faceted issues associated with sustainable extractive industry development policy has been the bane of good policy design in Nigeria. Operationalizing optimal mineral wealth management and sustainability into the annual budget requires the collection and in-depth analysis of information that must reflect medium- to long-term developments in the domestic and global economy and the mineral markets.

Political and Social Stability

Another challenge is on the issue of political and social stability. The current problem of insecurity of lives and property bedevilling the country pose a major challenge to large scale mining effort in some parts of the country. Overcoming this problem through economic and social empowerment of the mining communities and the country at large is an important policy challenge.

Integration of Mining and Metals Sector into Local Communities, Regional and the National Economy

This requires a comprehensive industrial policy that has the private sector as the operational driver while the government provides the policy support. National and regional planning for optimal benefit from mineral exploitation is imperative in the context of public private partnership backed by appropriate fiscal regime and incentive system. Diversifying the economy and public finance requires stronger backward and forward linkages between the sector and the rest of the economy. Strengthening rural-urban and inter-sectoral linkages by growing mineral value chains must be seen as an essential part of the new mining and metal sector development. Greater integration of the sector with the rest of the economy requires more coherence and coordination in national, state and local development plans.

Entrepreneurial and Technological Constraints

Artisanal and small-scale domestic firms dominate the sector and they are labour-intensive, but currently generate substantial income for low income people in the mining areas, thereby alleviating poverty. Growing them to be an important avenue for endogenizing the industry as well as providing substantial opportunities for mineral wealth and job creation (including poverty alleviation) faces significant challenge because of the current nature of their operations. There is need to provide more entrepreneurial and technological support for them to be more effective players in the sector. Overcoming the inadequate and high cost of finance for artisanal and small-scale potential miners is also a major issue that must be addressed.

Resource Curse Problem

The resource curse remains a potential problem. However, this is increasingly being overcome with the advent of sound macroeconomic policy stance. Improved

diversification of the economy and public revenues through a robust extractive industry development would help to eliminate or at least minimize this problem.

Resource Rent Distribution

Resource rent sharing among the tiers of government driven by good governance and accountability present another challenge from the public perspective. Current developments suggest significant challenges despite the corruption watchdog agencies like the Economic and Financial Crimes Commission (EFCC), Independent Corrupt Practices Commission (ICPC) and National Extractive Industry and Transparency Initiative (NEITI).

Infrastructural Challenges are Substantial and Pervasive

From the perspective of this study, the most serious infrastructural deficiencies are electricity, road and rail networks, as well as port facilities. Overcoming these challenges is critical to efficient and robust harnessing of Nigeria's diverse solid mineral resources for inclusive growth and development.

Low capacity utilization and productivity

The current mining sector is characterized by low capacity utilization and productivity, a reflection of the dominance of the sector by artisanal mining enterprises. These enterprises minimally use science and technology in their mining operations. Growing the sector based on more widespread use of science and technology is essential to higher capacity utilization and increased productivity on the one hand and, ultimately, sustainable development on the other.

Environmental Management and Sustainability

This sector is currently characterized by lack of environmental consideration in the process of mining as evident in the poor mining waste management both in solid and waste water. Post-mining transition issues are also not given proper attention, a legacy of the past mining history in Nigeria. For example, the mining landscape in Plateau State and other states with mining activities dominated by artisanal mining is often littered with abandoned mines with significant environmental degradation. Despite the existence of institutional infrastructure to monitor and enforce environmental regulations in the sector, especially at the federal level, inadequate capacity (number of personnel and equipment) has made monitoring and enforcement a great challenge, more so with the dominance of artisanal and small-scale miners in the sector.

Youth and Women in Mining

Youth and women have been marginalized in the sector, though they are important in achieving the goal of significant and decent employment as well as income generation, inclusive economic growth and development. Mainstreaming these two key groups in the society would require support in terms of skill development, education, training, technology, finance and market access.

6

Key Issues in Unlocking Sustainable Wealth Creation through Mineral Resource Value Chains

The exploratory research design is adopted for this study. Mining companies were visited in locations across the 14 states of the federation, namely, Kwara, Kogi, Ebonyi, Ekiti, Gombe, Oyo, Enugu, Osun, Edo, Sokoto, Niger, Plateau, Zamfara and Bauchi. These locations were purposively selected based on information retrieved from inception and discussions with the President of the Nigerian Miners Association. Specifically, a list of the key minerals in each of the states was provided. Further to this, contact was made with key members of the Miners Association in the respective states. Their consent was sought and, in most of the cases, these key officials agreed to facilitate the execution of the field work by identifying mining companies and employees within those companies that will take up the task of filling out the questionnaires.

Survey Methodology

The population of this study comprised two categories of mining companies, namely, commercial and artisanal ones. However, larger proportions of companies on the field were small-scale/artisanal enterprises. These companies were characterized by primitive exploration technology, poor working conditions, and substantial uncertainty on returns from their exploration efforts among other features.

The data for the study was generated using a carefully constructed survey instrument. This primary data was collected through a detailed questionnaire administered to the mining companies. Although three mining companies were targeted per state, 40 questionnaires were retrieved. The remaining ones were either not properly filled or were not returned at all. Field officers were engaged and a training workshop was convened for them. The one-day workshop provided them details of the research which helped them to review the draft questionnaire in preparation for the state-level field work. Afterward, the entire team embarked on a pre-test field survey to mining sites in Komu, Oyo State. This was to elicit the kinds of responses and experiences that might occur during the main visits to each of the states. The questionnaire is included in the Appendix.

Method of Data Analysis

The data was analysed on the basis of the core objective of the study which is to explore options for harnessing the potential of the mining sector to contribute to national economic development. The emphasis was however on the operators in the sector. The core of the exercise was to gauge their opinions on issues such as the role of government within the sector, the effects of legislation/regulations, profitability of their business ventures, and mining company-host community interactions, to mention a few. The responses were coded and partitioned into clusters on a theme-by-theme basis. The major themes include, but are not restricted to, economic, financial, political, social, institutional constraints to Nigeria's optimal development of the extractive sector in general and the mining sub-sector in particular.

Statistical Package for the Social Sciences (SPSS) computer software was used in coding data generated from the field work. Related responses were categorized to ensure the feasibility of analysis and accompanying interpretation. The details of the results are presented in the next section, while the policy implications of these findings are discussed in the next chapter.

Table 11: Size of Organization/Enterprise

How would you describe the size of your organization/enterprise?		
Small	13	32.5
Medium	22	55.0
Large	5	12.5
Total	40	100.0

Source: Field Survey, 2014

Result Analysis

Assessment of Development in the Industry

Mining activities in the solid minerals sector in Nigeria are largely dominated by small- to medium-scale miners who largely depend on the traditional mining practices. The result of the survey in Table 11 shows that 87.5 per cent of the operators are small- to medium-scale miners, while 12.5 per cent are large enterprises.

About 90 per cent of the respondents reported that they have from adequate to very adequate staff strength. This is because, most skilled artisanal miners are easily mobilized to where there is a large occurrence of solid minerals and as soon as the deposit is depleted, they move to another site or find something else to do till huge deposits are discovered again. Owing to this on- and off- employment pattern, industry workers are not tenured at the small-scale miner level, particularly for miners in the precious and ornamental gem stones.

For instance, the survey results in Table 12 show that only 17.5 per cent of the mining site surveyed opened for 12 months in the last one year. Another 22.5 per cent opened between 7 and 9 months in the last one year. While, 12.5 per cent opened between 3 and 6 months, about 52.5 per cent did not respond.

For most mining businesses that were in operation for less than 12 months, 15.0 per cent indicated equipment breakdown as a major reason (see Table 13). Shortage of raw materials and financial constraints accounted for 12.5 per cent apiece, while shortage of electricity and skilled manpower accounted for 5.0 per cent respectively. About 50 per cent gave no reasons.

On capacity utilization, 77.5 per cent of the respondents rated their capacity utilization to be average and above, as the survey results show in Table 14. Also, 7.5 per cent rated their capacity utilization as excellent, while 15.0 per cent rated it as below average. In terms of sales performance over the last three years, 20.0 per cent of the respondents rated their sales performance as high. Another 52.5 per cent rated it average, and 17.5 per cent rated it low. About 10.0 per cent of the surveyed mining enterprises are not in operation, as shown in Table 15.

As for additional or new investment, in the last one to two years, only 40 per cent of the enterprises surveyed (as shown in Table 16) had undertaken a major investment; 60.0 per cent did not.

Key investments included the installation of new locally made plant and equipment (7.5 per cent) and transportation equipment (5 per cent). The other investments were installation of imported new plant and equipment, installation of imported refurbished plant and equipment, replacement of old plant and equipment, and purchase of generator with 2.5 per cent respectively.

About 32.5 per cent of the respondents considered labour relation in the industry as decent or good and 37.5 per cent considered it poor, as shown in the survey result in Table 17.

On the current revenue sharing arrangement between the government and the mining firms, some 10.0 per cent among the respondents consider it good, another 27.5 per cent think it is fair, and about 20.0 per cent think it is unfair. The other respondents do not know, as shown in Table 18.

The respondents were asked to rank from scale 1 to 10 (1 being the most important) the key success factors in the sector. The survey result, as presented in Table 19, shows that access to financial services is ranked as the most important critical success factor in the sector (scoring 35 per cent). This is followed by infrastructure at

Table 12: Number of Months in Operation

In the past 12 months, how many months have you been in operation?	Frequency	Percentage
3		
5	1	2.5
6	2	5.0
7	2	5.0
8	4	10.0
9	4	10.0
12	1	2.5
No response	7	17.5
Total	21	52.5
	40	100.0

Source: Field Survey, 2014

Table 13: Reasons in Operation for less than 12 Months

	Frequency	Percentage
If the business was in operation for less than 12 months, what accounted for this?		
Shortage of raw materials		
Equipment breakdown	5	12.5
Shortage of electricity	6	15.0
Shortage of skilled manpower	2	5.0
Financial constraints	2	5.0
No response	5	12.5
Total	20	50.0
	40	100.0

Table 14: Rating of CapacityUtilization in the last 12 months

How would you rate your capacity utilization in the past 12 months?	Frequency	Percentage
Excellent	3	7.5
Above average	15	37.5
Average	16	40.0
Below average	6	15.0
Total	40	100.0

Source: Field Survey, 2014

30 per cent. In the third place is host community relationship with 22.5 per cent, followed by legal and regulatory frameworks with 20 per cent. The fifth most important key success factor is shared between cost of capital and education and training with a score of 17.5 per cent, respectively. In the sixth place are cost of operation and supply-customer relationship, scoring 15 per cent, respectively. The seventh most important success factor is export infrastructure for minerals with a score of 12.5 per cent, and the eighth being business services supply, government business partnership, government policy and implementation, and corporate social responsibility with a score of 10.0 per cent, respectively.

Key Challenges and Proposed Solutions to Mineral Sector Development in Nigeria

The purpose of the overview of the sector is to identify the key legal, regulatory, institutional, policy, technical, and financial challenges facing Nigeria in its efforts to sustainably develop the extractive (solid minerals) resources as well as identifying solutions to these challenges as understood from the perspective of the operators in the sector.

Key Legal and Regulatory Challenges and Proposed Solutions. Based on the survey results in Table 20, about 32.5 per cent

Table 15: Rating of Sales Performance in the last 3 years

	Frequency	Percentage
In the last 3 years, how would you rate your sales performance?		
High	8	20.0
Average	21	52.5
Low	7	17.5
Not in operation	4	10.0
Total	40	100.0

Source: Field Survey, 2014

Table 16: Purpose of New Investment

	Frequency	Percentage
If yes, what is the purpose of the investment?		
Installation of new plant andequipment locally made	3	7.5
Installation of imported new plant and equipment imported	1	2.5
Installation of imported refurbished plant and equipment	1	2.5
Replacement of old plant and equipment	1	2.5
Purchase of generator	1	2.5
Transportation equipment	2	5.0
Reduce dependence on unskilled workers	7	17.5

Source: Field Survey 2014

Table 17: Labour Relation in the Sector

How would you describe labour relations in the sector?	Frequency	Percentage
Good	12	30.0
Decent	13	32.5
Poor	15	37.5
Total	40	100.0

Source: Field Survey 2014

artisanal miners considered bureaucratic bottleneck in government processes as a key challenge. Bureaucratic bottleneck manifests in cumbersome registration process, cumbersome site negotiation, difficult licensing handling process, community law against mining, such as excessive power of host community to issue letters of consent, cumbersome registration process, poor implementation of regulations, awarding of licenses to people without mining skills and expertise as well as poor policy communication to prospective miners.

This bureaucratic nature may not be unconnected with the inadequacy of the policy measures to modernize the operations in the mining sector. The reason for the inadequate policy measure and enforcement may be explained by the country's over-reliance on the oil sector of mineral resources that has attracted huge investment, compared to the solid minerals and agriculture. As part of the key legal and regulatory challenges, about 15.0 per cent of the respondents identified cost of procuring license. The other challenges include abandonment of the sector, implying that government investment in the sector is low with 10.0 per cent of the respondent identifying this challenge and another 7.5 per cent indicating poor policy implementation as a challenge.

A total of 55.0 per cent of respondents (from Table 20) suggested solutions that include government support in the form of reform of the legal and regulatory framework in the sector and also ensuring friendly community law, adequate implementation of regulations, making information available on the legal framework to all stakeholders, reduction in tax on mining company and strengthening of the mining Cadastre Office.

Another 27.5 per cent respondents proposed easy access to license by

Table 18: Revenue Sharing between Government and Mining Firms

What is your view about the current revenue sharing between the government and the mining firms?		
Good	4	10.0
Fair	11	27.5
Unfair	8	20.0

Source: Field Survey, 2014

Table 19: Ranking of Most Important Success Factor in the Sector

	1	2	3	4	5	6	7	8	9	10
Infrastructure		12(30.0)								
Skilled work force			9(22.5)							
Education and training institutions					7(17.5)					
Support networks									3(7.5)	
Business services supply								4(10.0)		
Access to financial services	14(35.0)									
Government-business partnership								4(10.0)		
Government policy and implementation								4(10.0)		
Legal and regulatory frameworks				8(20.0)						
Governance and accountability										
Supply-customer relationships						6(15.0)				
Host community relationship			9(22.5)							
Corporate social responsibility								4(10.0)		
Cost of operation						6(15.0)				
Cost of capital					7(17.5)					
Export infrastructure for minerals							5(12.5)			

simplifying licensing procedures through decentralization. About 12.5 per cent considered host community support as a key solution to developing the sector.

Institutional Challenges and Proposed Solutions. The survey result in Table 21 shows that 35.0 per cent of the miners identified failure of government to provide adequate infrastructure and finance. Another 15.0 per cent of the respondents identified host community relationship in the area of compensation to the communities as the key institutional challenge. Over the years the miner-host community relationship has for been a major issue in the development of the minerals sector in Nigeria. The poor management of community relationships by miners often leads to violence that constraint mining operations. Other institutional challenges identified include weak tax administration that often leads to multiple taxes, levies and rates (7.5 per cent); poor training institution for mining operators (15.0 per cent), mandatory formation of mining cooperative society without proper guidelines, and poor policy design for the sector (2.5 per cent).

From Table 21, about 40.0 per cent of the respondents proposed tax reduction, while another 22.5 per cent proposed provision of adequate security to check the host community hostilities and threat. Only about 10.0 per cent suggested funding. Some other suggested solutions were education of the host community by the Ministry of Mines and Power on the need for cooperation, establishment of a specialized bank for the mining sector, proper survey of all minerals in the country, government to establishment of a mechanism to secure mining site from communities, strengthening of the Nigerian Geographical Survey Agency Laboratory in Enugu, and establishment of a functional Nigerian Institute of Mining Geoscience.

Policy Challenges and Proposed Solutions. The survey results in Table 22 show 55.0 per cent of the respondents identifying poor policy as a key challenge to the sector. About 40 per cent of the artisanal mining company surveyed responded that they faced a key policy challenge, namely, poor policy design and execution. This implies that the poor performance of the sector can be attributed to government policy that does not support the growth of the solid minerals sector. This

Table 20: Legal and Regulatory Challenges and Proposed Solutions

	Frequency	Percentage
Legal and Regulatory Challenges		
Abandonment	4	10
Bureaucratic bottleneck	13	32.5
Cost of procuring license	6	15
Poor implementation	3	7.5
Technology constraints	2	5
Proposed solutions		
Government supports	22	55
Enforcement of use of appropriate technology	2	5
Host community support	5	12.5
Easy access to license	11	27.5
Task reduction	1	2.5
Training for miners or prospect	1	2.5

Note: Multiple responses are allowed and therefore percentages may not sum up to 100.

Table 21: Institutional Challenges and Proposed Solutions

Institutional challenges and proposed solutions		
	Frequency	Percentage
Institutional Challenges		
Cooperative ownership	1	2.5
Double taxation	3	7.5
Failure of government to provide adequate infrastructure and finance	14	35
Host community relationship	6	15
Inadequate training institutions	6	15
Proposed solutions		
Availability of funding	4	10
Cooperation from host community	1	2.5
Tax reduction	16	40
Skills development	2	5
Provision of adequate security	9	22.5
Provision of infrastructure	3	7.5

Note: Multiple responses are allowed and therefore percentage may not sum up to 100

manifests in delay in issuance of licenses, too many licensing rules and regulations, poor implementation, poor policy design, non-communication of changes to policy implementers in the sector, lack of policy consistency, and weak policy coordination.

About 37.5 per cent respondents proposed effective policy implementation as a solution, while 20.0 per cent suggested good policy design that meets international best practice in the industry, and adequate implementation.

Technical Challenges and Proposed Solutions. The result of the analysis in Table 23 shows that 52.5 per cent of the respondents, particularly the artisanal miners identified lack of mining equipment, such as compressor for drilling, engine to pump water, and safety wears as the basic technical equipment required.

Table 22: Policy Challenges and Proposed Solution

	Frequency	Percentage
Policy Challenges		
Poor policy	22	55
Formulation and design	16	40
No major policy challenge	1	2.5
Proposed solutions		
Good policy design	8	20
Effective policy implementation	15	37.5
2007 & 2011 Act & regulation adequate	3	7.5

Note: Multiple responses are allowed therefore percentage may not sum up to 100

Table 23: Technical Challenges and Proposed Solutions

Technical challenges and proposed solution		
	Frequency	Percentage
Technical challenges		
Lack of training centres	2	5
Lack of mining equipment	21	52.5
Inadequate infrastructure	13	32.5
Proposed solutions		
Skill development	12	30
Availability and access to mining equipment	11	27.5
Provision of infrastructure	6	15

Inability to forecast weather or having access to weather report is also considered a key technical challenge. This is followed by another 5.0 per cent that identified lack of basic training centres for miners on how to improve production. Others identified lack of expertise on how to locate mineral deposits and some others identified lack of equipment and skill to test samples.

About 27.5 per cent of the respondents surveyed proposed availability and access to mining equipment as solution, while 30.0 per cent proposed skills development through training in the use of modern mining equipment, and establishment of mining department in all tertiary institutions for training, research and innovation.

Financial Challenges and Proposed Solutions. The key financial challenge as revealed by the survey in Table 24 is inadequate access to loan facilities to procure site and equipment, as 75.0 per cent of the respondents indicated. This may not be unconnected with the neglect of the sector by government in terms of providing adequate financial support to investors in the sector through a specialized bank as obtained in the agricultural sector or housing. This is followed by 15.0 per cent respondents who indicated lack of long-term loan as a key challenge. This is mostly because banks favour short-term loans as opposed to long- term financing required in the mining sector. Other financial challenges are poor financial management by miners, unwillingness of banks to fund the sector, and high cost of capital.

As part of the proposed solutions, from Table 24, about 42.5 per cent of the respondents identified government intervention funds and another 30.0 per cent proposed easy access to fund/credit facilities. Other proposed solutions include availability of long-term loans; tax reduction, establishment of mining bank to provide long-term loans at concessional rate, offering of financial management training to small-scale miners by the

Table 24: Financial Challenges and Proposed Solutions

	Frequency	Percentage
Financial Challenges		
Inadequate access to loan facilities	30	75
High cost capital	3	7.5
Poor financial management	3	7.5
Lack of long-term loan	6	15
Proposed solutions		
Access to funds/credit facilities	12	30
Low interest rate	3	7.5
Establishment of specialized mining bank	1	2.5
Government intervention funds	17	42.5
Proper forced management	3	7.5
Providing long-term loans	2	5

Note: Multiple responses are allowed therefore percentage may not sum up to 100

banking institutions, and government to subsidize procurement of mining equipment.

Policy Implication

The findings of this survey on harnessing the potential of the mining sector to contribute to national economic development show that the sector is largely characterized by low exploration technology, poor working conditions, substantial uncertainty on returns exploration efforts, and hostile community relations, among others.

A review of the minerals and mining Act of 2007 suggests that it is adequate and reflects international best practices in modernizing the sector. However, the enforcement of the rules of the game has been very poor, thus exacerbating the non-transformation of the sector. There is, therefore, a need for determined efforts and a change of attitude by the agencies charged with ensuring policy compliance and enforcement in the minerals sector to harness its potentials in contributing to national economic growth and job creation. Areas in the sector needing serious attention by the regulatory authorities are institutional reforms, funding mechanism, tax incentives, exploration and marketing, training and skills development, incentives for research and innovation to find more uses for the various minerals, labour and safety issues, environmental impact, and managing host community relations.

Illustrative Case: Artisanal Mining in Ijero-Ekiti

Ijero Ekiti is the headquarters of Ijero Local Government Area, located in about 120km North West of Ado-Ekiti, the capital of Ekiti- State. It lies between $7^0$48N to $7^0$51N and $5^0$00E to $5^0$09^1 on (1:100,000 Ekiti Sheet 244).

Mapping and sampling of industrial minerals from existing mining pits reveal gemstones like tourmaline (black, green, purple, red), which are heavily mined and are used for jewelleries and ornamentals. feldspar is being mined in abundance towards Ijero/Ikoro road and is mainly used in the glass industry and ceramic. Associated with feldspar mining are beryl and aquamarine, which are used for jewelleries and ornamentals; and kaolin which is used for coating tablets and functional filters. Other types of mineral resources that are found in this belt include: (i) Quartz, which is used in recommended glasses, clock and jewelleries; (ii) Mica (Muscovite) used in electrical industry and as drilling ingredients in boreholes; and (iii) Granite used for construction.

Most mining activities are still very low capital intensive and remain largely

artisanal. Most of the skilled work force migrated from other mining locations around the country and are not paid salaries or wages. There is a sharing formula between the owner of the mining site, the licensee and the miners. Most mining pits are not deeper than about 15 metres as the miner cannot dig deep to reach large deposits as they use manual equipment. The industry is largely unregulated, though the miners have some safety practices to prevent accident such as pit collapse.

The employment potential of the mining site in Ijero Ekiti is huge, nevertheless, due to its small-scale operations and its being labour intensive, it is not attractive to many young people. However, it was understood that once in a while, when miners get huge deposits of gem stone, it creates a rush, where many youths will come to the site and soon disappear afterwards, when they do not get 'lucky'. If the sector is modernized with appropriate technology, the gemstone and other solid minerals can trigger chains of business activities that could create many job opportunities.

Feldspar and associated solid minerals are limited in operation because the few glass industries are far from the mining site and the producers incur large transportation cost that heavily reduces their profit margin. Even if modern technology is introduced, the scale of operations is not likely to change except if glass industries are located near the mining site. During the interview, one of the producers said their cooperative society is making efforts to speak to the ceramic industries to patronize feldspar as a key raw material input.

7

Sustainable Mineral Development, Inclusive Growth and Development:

Linkages and Results from a General Equilibrium Model

Methodology

This section discusses the methodology and results obtained from the use of a Computable General Equilibrium (CGE) model to examine the macroeconomic impacts of mineral policy on the Nigerian economy. CGE models have several advantages such as the following:

i. They incorporate all economic interactions in an economy,
ii. They provide a laboratory for quantitative assessments of total effects (direct and indirect) of policy changes,
iii. They capture the interdependencies among economic sectors, economic agents and economic markets, and
iv. They capture feedbacks among production block, income block, expenditure block and trade blocks.

In addition, the underlying database is provided by the Social Accounting Matrix (SAM) which ensures data coherency and consistency and they help to isolate the economic effects of specific policy shocks. The CGE model utilized for this report is a variant of the PEP 1-1 Single Country Model developed by Decaluwe et al., (2010).

The Social Accounting Matrix (SAM) for Nigeria

The CGE model was based on the most recent Social Accounting Matrix (SAM) for Nigeria. The SAM was developed based on the 2011 Input-Output Table and National Accounts data. The SAM divides the economy into the following sectors: agriculture, crude petroleum and natural gas, coal mining, metal ores, other mining and quarrying, manufacturing, utilities, building and construction, transportation, telecommunication, distributive trade (wholesale & retail trade), services and non tradable services (public administration). There are three minerals related sectors in the model, coal, metal ores and other mining and quarrying. The structure of the model is described below.

Model Structure[14]

The model incorporates both the standard neoclassical economic assumptions: market clearing in all markets (goods and factor markets), zero excess profits, and a balanced budget for each agent. The model contains 12 sectors as listed above. It is divided into the following blocks: production, income and savings, demand, international trade, prices, and system constraints blocks. A full description of the model's equations can be found in Decaluwe et al (2010). On the production side, domestic firms are assumed to operate under perfect competition, with each firm seeking to maximize profits subject to its production technology. We assume a nested production function represented by a Leontief relationship at the upper level between intermediate inputs, value added and output. At the lower level, value added is a CES function of labour and capital.

The demand block specifies different equations for intermediate demand, household consumption demand, investment demand, and government demand. It is assumed that households have Stone-Geary utility functions (from which derives the Linear Expenditure System). Type h household demand for each good is determined by utility maximization subject to the budget constraint. We identified four types of households in the study: rural poor, rural non-poor, urban poor and urban non-poor.

Investment demand is made up of demand for gross fixed capital formation (GFCF). GFCF expenditure is distributed among commodities in fixed shares; implicitly, for a given amount of investment expenditures, the quantity demanded of each commodity for investment purposes is inversely related to its purchase price. Similarly, with government current expenditure budget, the quantity demanded of each commodity varies inversely with its price.

The next block is the income and savings block. Household incomes come from three sources: labour income, capital income and transfers received from other agents. Subtracting direct taxes yields type h household disposable income. Whatever disposable income is left after savings and transfers to other agents is entirely dedicated to consumption.

Firm income consists of its share of capital income. Deducting business income taxes from total income yields the disposable income of each type of business. Business savings are the residual that remains after subtracting transfers to other agents from disposable income.

Government income is derived essentially from multiple tax sources. The current government budget surplus or deficit (positive or negative savings) is the difference between revenue and its expenditures. The latter consists of transfers to agents and current expenditures on goods and services.

Finally, on the demand side, the rest of the world receives payments for the value of imports, part of the income capital, and transfers from domestic agents. Foreign spending in the domestic economy consists of the value exports, and transfers to domestic agents. The difference between foreign receipts and spending is the amount of rest-of-the-world savings, which are equal in absolute value to the current account balance, but of opposite sign.

The trade block is based on the standard Armington assumption of imperfect substitution between imports and domestically produced goods. Therefore, buyers assume that local products are imperfect substitutes for imports. The imperfect substitutability between the two is represented by a constant elasticity of substitution (CES) aggregator function. However, for goods with no competition for imports, the demand for the composite commodity is the demand for the domestically produced good. Commodities demanded on the domestic market are composite goods, combinations of locally produced goods and imports

The different prices and price indexes naturally depend on the hypotheses and functional forms already stated. In aggregations, the price of an aggregate is a weighted sum of the prices of its components. The weights are determined by equating the value of the aggregate to the sum of the values of its components, given the quantity of the aggregate (which is determined from the aggregator function).

The equilibrium conditions are critical to CGE models. Whether it is for the goods and services market or the factor market, supply and demand equilibrium must be verified. Thus, in the model, there is a separate set of equations that defines the equilibrium between the supply and demand for each commodity on the domestic market and another set of equations that ensures the equilibrium between total demand for each factor and available supply. Likewise, total investment expenditure must be equal to the sum of the agent's saving equation and the sum of the different forms of investment expenditure must be equal to total investment.

Simulations Performed

This study carried out three simulations. Simulation 1 assumes a 5 per cent increase in productivity in the three minerals sectors. This could come from the application of new technology that enhances the productivity of factors of production or/and from capacity development in the sector that leads to gains in productivity.

Simulation 2 assumes a 10 per cent increase in capital stock in the minerals sector. This could come from increase in foreign direct investment in the sector or through access to fund that enable operators to expand their capital stock.

Simulation 3 combines both the two effects above in order to evaluate the overall impacts of the minerals sector on the economy.

It is important to mention from the outset that the share or contributions of the minerals sector is currently small in Nigeria. This is due partly to the lack of government attention to the sector and the high level of informalization of the sector. The implication of this is that the current data on the minerals sector may actually understate its contributions to the economy.

The impacts of the above simulations are analysed on:

- Macroeconomic variables,
- Sectoral variables, and
- Household income.

Although, the results for the three simulations are presented, discussions will be primarily based on the third simulation.

Analysis of Results

Macroeconomic Impacts

Table 25 presents the results of the three simulations on key macroeconomic variables in the economy. Overall, the macroeconomic impacts are marginal. In Simulation 3, a combination of 5 per cent increase in productivity and 10 per cent increase in capital stock to the mineral sector will only boost overall real GDP by 0.02 per cent. It will also have positive impacts on investment which will rise by 0.11 per cent and government revenue which is expected to increase by 0.02 per cent. There is a mild impact on the general price level proxy by the GDP deflator and wage rate which will rise by 0.02 per cent as a result of increase in demand for labour.

Sectoral Impacts

The sectoral impacts are more dramatic. The minerals sector will witness significant growth from the above policy measures. In Simulation 3, exports of coal, metal ores and other mining will jump by 2.78 per cent, 11.45 per cent and 15.50 per cent, respectively. The increase in output in the three sectors by 2.87 per cent, 9.64 per cent and 9.24 per cent in coal, metal ores and other mining sectors will lead to a fall in imports from these three sectors, with other mining imports falling by as much as -22.80 per cent. Most sectors also benefit from the development in the minerals sector. Manufacturing exports increase by 0.15 per cent, and imports decline by -0.05 per cent, while manufacturing outputs increase by 0.12 per cent. These effects are due to the linkage effects between the minerals sector and the manufacturing sector. Outputs of most sectors also increase with the exception of oil and gas and the public service sector.

Table 27 also illustrates more sectoral effects. There is overall increase in the composite goods of all sectors in the domestic economy. This is due to the increase in goods supplied to the domestic market both from the local producers and importers. These effects, which are largely marginal, are positive for nearly all the sectors. This is due to the net effects of incomes and prices. Interestingly the productivity growth and increase in capital stocks in the minerals sector are labour saving. Hence, demand for labour in these sectors decline, while the rising outputs in other non-mineral producing sectors attract the labour that are moving away from the minerals sector, as shown in Table 27.

Table 28 also shows that the simulations would have impact on household incomes. In all the simulations, households

Table 25: Impact of Simulations on Macroeconomic variables [percentage change from the Benchmark]

Variable	Simulation 1	Simulation 2	Simulation 3
Real GDP	0.007	0.010	0.017
Investment	0.03	0.064	0.105
Government revenue	0.005	0.013	0.022
GDP deflator	-0.002	0.0002	0.001
Export	0.009	0.014	0.024
Import	0.014	0.021	0.036
Wage rate	0.008	0.010	0.018

Source: GAMS results

Table 26: Sectoral Impacts of the Three Simulations [percentage deviations from the benchmark]

Variable	Simulation 1	Simulation 2	Simulation 3 (1+2)
A. Volume of exports			
Agriculture	0.002	-0.009	-0.015
Crude petroleum & natural gas	-0.006	-0.007	-0.012
Coal	1.598	0.896	2.777
Metal	4.967	5.712	11.449
Other mining	3.726	8.907	15.495
Manufacturing	0.050	0.099	0.152
Utilities	0.014	0.011	0.018
Building & construction	0.007	-0.010	-0.017
Transportation	0.005	-0.014	-0.024
Telecommunication	0.001	-0.007	-0.013
B. Volume of Imports			
Agriculture	0.020	0.047	0.079
Crude petroleum & natural gas	0.034	0.054	0.091
Coal	0.281	0.186	0.520
Metal	-2.420	-2.299	-4.685
Other mining	-6.343	-14.211	-22.802
Manufacturing	-0.014	-0.033	-0.052
Utilities	0.001	0.004	0.007
Building & construction	0.022	0.088	0.153
Transportation	0.020	0.052	0.087
Telecommunication	0.018	0.050	0.086
Trade	0.013	0.048	0.081
Services	0.015	0.035	0.059
C. Output			
Agriculture	0.008	0.005	0.007
Crude petroleum & natural gas	-0.004	-0.004	-0.007
Coal	1.648	0.928	2.869
Metal	4.091	4.873	9.639
Other mining	2.213	5.294	9.236
Manufacturing	0.043	0.076	0.126
Utilities	0.002	0.006	0.008
Building & construction	0.026	0.039	0.067
Transportation	0.023	0.036	0.060
Telecommunication	0.016	0.015	0.026
Trade	0.011	0.010	0.016
Services	0.008	0.010	0.016
Public sector service	-0.003	-0.005	-0.009

Source: GAMS results

experience an increase in real income. Therefore developing the mineral producing sectors will have positive income effects and both the rural and urban poor will share the greater benefits from the rise in household incomes.

However, as Table 29 has shown, not all commodities will benefit from the increase in households purchasing power. The main beneficiaries are goods produced by the coal sector, the metal ores sector, the other mining sector as well as the manufacturing sector. The poor in the rural and urban sectors are also able to increase their demand for utilities.

Policy Implications

The minerals sector outside of crude oil and gas is very small relative to the size of the Nigerian economy. Based on the 2011 Input-Output Table, the sector accounts for about 0.14 per cent of value added, 0.01 per

Table 27: Sectoral Impacts of the Three Simulations [percentage deviations from the benchmark]

Variable	Simulation 1	Simulation 2	Simulation 3 (1+2)
D. Quantity Demanded of Composite Goods			
Agriculture	0.012	0.016	0.0260
Crude petroleum & natural gas	0.013	0.023	0.0380
Coal	0.442	0.274	0.7970
Metal	2.743	3.436	6.6864
Other mining	0.214	0.487	0.8390
Manufacturing	0.030	0.053	0.0874
Utilities	0.001	0.005	0.0079
Building & construction	0.025	0.047	0.0801
Transportation	0.023	0.039	0.0659
Telecommunication	0.017	0.031	0.0536
Trade	0.011	0.012	0.0193
Services	0.010	0.018	0.0297
Public administration	-0.003	-0.005	-0.0092
E. Purchaser Price of Composite Commodities			
Agriculture	0.004	0.016	0.0263
Crude petroleum & natural gas	0.011	0.016	0.0264
Coal	-0.080	0.044	-0.1376
Metal	-2.545	2.812	-5.4794
Other mining	-3.327	-7.602	-12.5040
Manufacturing	-0.022	-0.043	-0.0699
Utilities	0.000	-0.001	-0.0003
Building & construction	-0.001	0.021	0.0362
Transportation	-0.002	0.006	0.0108
Telecommunication	0.000	0.010	0.0161
Trade	0.001	0.018	0.0308
Services	0.002	0.008	0.0145
Public sector service	0.003	0.005	0.0092
F. Demand for Labour			
Agriculture	0.009	0.015	0.023
Crude petroleum & natural gas	0.009	-0.010	-0.020
Coal	4.210	-3.039	-7.212
Metal	-1.042	-3.364	-4.515
Other mining	-5.907	-11.419	-16.734
Manufacturing	0.183	0.261	0.430
Utilities	0.004	0.007	0.010
Building & construction	0.075	0.110	0.188
Transportation	0.053	0.078	0.129
Telecommunication	0.027	0.042	0.072
Trade	0.031	0.047	0.076
Services	0.011	0.019	0.030
Public sector service	-0.008	-0.09	-0.017

Source: GAMS results

Table 28: Impacts of Simulations on Household Incomes [percentage deviations from the benchmark]

Variable	Simulation 1	Simulation 2	Simulation 3
Rural poor	0.005	0.010	0.018
Rural non-poor	0.005	0.010	0.017
Urban Poor	0.005	0.010	0.018
Urban non-poor	0.004	0.011	0.016

Source: GAMS results

Table 29: Impacts of Simulation 3 on Households' Consumption by Type and Commodities: [percentage deviations from the benchmark]

Sector	% change in consumption by Household category			
	Rural poor	Rural non-poor	Urban poor	Urban non-poor
Agriculture	-0.018	-0.022	-0.018	-0.023
Crude petroleum & Natural Gas	-0.050	-0.063	-0.051	-0.066
Coal	0.320	0.303	0.314	0.290
Metal	13.070	12.910	12.909	12.544
Other mining	32.208	31.834	31.813	30.936
Manufacturing	0.167	0.151	0.163	0.143
Utilities	0.002	-0.001	0.002	-0.002
Building & construction	-0.014	-0.017	-0.015	-0.017
Transportation	-0.003	-0.006	-0.003	-0.006
Telecommunication	-0.005	-0.008	-0.006	-0.009
Trade	-0.012	-0.015	-0.012	-0.015
Services	-0.005	-0.007	-0.005	-0.008

Source: GAMS results

cent of domestic demand and 0.16 per cent of domestic output. As noted earlier, data is a major challenge in the sector and may have understated the relative size and contributions of the sector to the economy.

However, the analysis of the economy-wide impacts of a number of policy options have shown that the minerals sector backed with the right policies can make positive and useful contributions to important macro-economic variables, sectoral outcomes and even households' welfare. The effect of the policies on price level is also marginal and may not cause significant real exchange rate appreciation with its consequences on the economy.

8

Conclusion and Policy Recommendations

This study has attempted to provide a preliminary assessment of what is required to build a new, more diversified and environmentally sustainable economic future and inclusive development for Nigeria with robust mineral resource development strategy as the catalyst. In conclusion, as the country seeks to achieve sustainable wealth creation and economic prosperity through mineral resource development in the next two decades, the search for answers to achieve a robust and sustainable solid mineral development strategy and implementation will involve a variety of stakeholders, politicians, government officials, industrialists, bankers, geoscientists, legislators, lawyers and economists.

However, for the solid minerals sector to become a major player in the economy in the coming decades, with value addition along the value chain, the following key policy recommendations are proposed.

However, for the solid minerals sector to become a major player in the economy in the coming decades, with value addition along the value chain, the following key policy recommendations are proposed.

1. Provide support that will induce greater effectiveness and efficiency of entrepreneurs and investors in converting the numerous opportunities in harnessing mineral resources and related economic activities to achieve significant job creation, income generation, poverty alleviation and inclusive economic growth and development.
2. Explore ways for effective funding of exploration work critical to the development of the sector. Given the challenge posed by this problem to robust development of mining activities, government should take the lead, and in collaboration with industry stakeholders and supported by the development partners and financial institutions, jointly explore ways for effective funding of exploration activities.
3. Collaborate and share information between the government (federal, state and local) and other stakeholders in the industry, which would help to minimize the diverse and significant political, economic, financial, technological and environmental risks and uncertainties that exist in the sector.
4. Ensure that the policy is focused on mainstreaming inclusive growth and development in the strategic development of value addition in the minerals and metals sector.
5. Emphasize the process of developing the sector along its value chain to strengthen economic diversification through effective backward and forward linkages with the rest of the economy. Addressing energy and transport infrastructure deficiencies are key issues that must be addressed.
6. Encourage youth and women as important rather than marginalized stakeholders in the sector. Education, training, technical, financial and market access support for these two key groups in the society would make the goal of significant and decent employment, income generation, inclusive economic growth and development more realizable.
7. Bridge the sharp contrast and wide gap between modern mining production activities and practises and artisanal mining, which is characterized by crude and environmentally hazardous and small-scale low profit operations. Getting a public/private partnership to facilitate access to modern technology, skills and finance for artisanal and small-scale mining to scale up their operations is a major factor in eliminating the current huge gap in the sector and making its contribution to inclusive growth and development a reality.
8. Facilitate public-private partnership to scale up the technological capa-

city and skill development of domestic mining enterprises, which by global industry standards are largely small-scale.

9. Strengthen capacity building for human resource development in the sector. The skills gap in the sector partly explains the low capacity utilization in the sector and in artisanal mining. Notably, the Federal University of Technology, Akure (FUTA), is the only Nigerian university that offers a degree in Mining Engineering and only Kaduna Polytechnic offers diploma in Mineral Resource Engineering and Geological Mining and Mineral Processing Engineering.
10. Strengthen the capacity of the government and stakeholders to deal with challenges associated with the difficult environment for profitable businesses in the minerals and metals sector.
11. Ensure significant de-risking of the sector similar to what is currently emerging in the electricity sector.
12. Adhere to effective and efficient monitoring and evaluation of the 2007 Act. The rule of law and its enforcement in the sector must be to ensure a more conducive business environment which is a catalyst to the flow of the competitive capital in the global mining sector.
13. Operationalize the Solid Minerals Development Fund, which is urgently needed to bridge the huge financial resource gap in the sector, and especially to provide the long-term capital needed by artisanal and small-scale enterprises as the key drivers of inclusive growth and development, for sustained and higher productivity growth.
14. Strengthen regulatory and institutional frameworks to deal with the numerous economic, political, social and environmental challenges of significantly scaled up mining operations to global standards.

In conclusion, developing solid mineral resources to grow the economy anchored on adding more value locally through the development of downstream activities and ancillary industries, as well as their integration with the rest of the economy, will yield significant positive social and economic payoffs to the economy and the people of Nigeria. However, from our legacy of the recent past, natural resource exploitation and dependence has the capacity to bring significant positive economic and social benefits as well as result in significantly adverse economic, social and environmental consequences. Also, it should be noted that relationship between exploitation of these non-renewable mineral resource endowments and sustained economic growth and inclusive development is a complex one. It, therefore, requires innovative solutions.

Nigeria must not underrate the political, economic, social, and environmental challenges associated with mineral exploitation that are subject to the vagaries of world mineral market developments and unstable global financial and economic developments. The magnitude of the challenges associated with the feasible speed, sequencing and quality of public and private participation in harnessing mineral resources to achieve the much desired status of middle and high income economies must not be underestimated. Also, fully integrating the mineral sector in the economy through upstream and downstream value addition will optimize the sector's forward and backward linkages to the economy. The business-as-usual approach to policy design and implementation must give way to a more insightful policy and implementation stance.

End-Notes

[1]See Gelb (1988) and Elbadawi (2007).

[2]See the rebased GDP data recently published by National Bureau of Statistics.

[3]See National Bureau of Statistics.

[4]See the 2013 African Development Indicators published by the World Bank.

[5]According to the rebased GDP, the two sectors as consisting of 73 per cent (22 per cent and 51 per cent) of GDP respectively in 2012.

[6]Several hundreds of children died from mercury poisoning arising from artisanal mining of gold and other precious metals.

[7]The data is from McKinsey Global Institute (2013) Resource Revolution: Tracking global commodity markets.

[8]According to the Act, the Mining Cadastre Office is supposed to be an independent agency responsible for administering mineral titles and maintenance of cadastral registers. It is still subject to ministerial control.

[9]The Mines Inspectorate is responsible for the enforcement of mining laws and revenue collection.

[10]The Environment Compliance Department is responsible for the enforcement of environmental regulations.

[11]The ASM Department is responsible for formalizing the operations of ASM as well as providing them with extension services.

precious metals.

[12]Several hundreds of children died from mercury poisoning arising from artisanal mining of gold and other

[13]Part of the US$120 million World Bank loan on the Sustainable Management of Mineral Resources Project addressed part of the problem some years back.

[14]A typical form of the GAMS specification of the proposed CGE model is in the appendix. Of course this is tentative and would change based on discussions with the officials of the Ministry and the objectives of the study.

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Appendix

Table A1: Nigeria Rebased Gross Domestic Products at Current Basic Prices (N million), 2010 - 2013

Gross Domestic Product at Current Basic Prices (N Million)				
Activity Sector	2010	2011	2012	2013 (forecast)
Agriculture	12,988.809.19	14,421.928.95	15.918.631.70	17.625.142.90
I. Crop Production	11,650,645.93	12.884.849.19	14.191.235.47	15.662.324.87
2. Livestock	952.730.88	1.099.705.03	1.234.565.54	1,405.490.84
3. Forestry	135,720.90	153.045.31	170,159.66	190,533.96
4. Fishing	249,711.48	284,329.42	322,671.03	366,793.23
Mining And Quarrying	8,454.554.20	11.140.408.09	11.382,587.74	11,631.349.02
5. Crude Petroleum and Natural Gas	8.402.676.40	11.080,794.65	11,315.033.28	11.554,223.51
6. Coal Mining	3.218.23	3.927.62	4.678.59	5.641.51
7. Metal Ores	2.354.84	2,714.44	3.273.02	3.859.69
8. Quarrying and Other Minerals	46,304.72	52,971.37	59,602.85	67.624.31
Manufacturing	3,578.641.72	4.085.393.24	4,744,699.37	5,476.303.11
9. Oil Refining	255,160.05	294.748.21	332,090.85	378,889.70
10. Cement	221.087.82	254,653.27	300,680.54	350,678.37
11. Food, Beverage and Tobacco	2.298,522.91	2.667.543.92	3.158.989.33	3.703.565.04
12. Textile, Apparel and Footwear	352.543.82	359.428.71	371.114.42	380.771.02
13. Wood and Wood products	123.384.10	139.411.15	158.520.82	179.680.96
14. Pulp. Paper and Paper Products	24.355.21	28.529.11	33.098.64	38.585.51
15. Chemical and Pharmaceutical Products	25.167.16	29.373.94	34.143.46	39.769.04
16. Non-Metallic Products	59.548.40	65.293.55	71.657.11	78.605.67
17. Plastic and Rubber products	33.859.54	41.255.15	51.896.35	64.256.93
18. Electrical and Electronics	2.506.55	2.816.48	3.192.90	3.603.65
19. Basic metal. Iron and Steel	44.474.19	53.216.42	64.183.87	77.106.01
20. Motor vehicles & assembly	21.890.75	25.220.23	29.156.99	33.649.94
21. Other Manufacturing	116,141.22	123,903.10	135.974.10	147,141.27
22. Electricity, Gas, Steam and Air Conditioning Supply	315,302.59	486,162.80	654,380.92	944,802.53
23. Water Supply, Sewerage, Waste Management and Remediation	72,966.95	83,770.57	99,900.67	116,914.39
24. Construction	1,570,973.47	1,819,802.66	2,142,753.54	2,502,582.39
25. Trade	8,910,282.11	10,325,565.30	11,843,529.17	13,654,685.03

26. Accommodation and Food Services	245,760.58	282,439.47	327,404.73	377,898.66
Transportation and Storage	694,771.81	754,079.44	881,296.69	993,303.97
27. Road Transport	619,136.86	670,804.09	784,810.74	884.248.47
28. Rail Transport & Pipelines	107.77	116.90	135.01	151.20
29. Water Transport	4,225.75	4,705.73	5,418.30	6,136.25
30. Air Transport	32,673.90	36,668.85	42,732.74	48,878.49
31. Transport Services	22,646.26	24,775.87	29,000.43	32,836.45
32. Post and Courier Services	15,981.28	17,008.00	19,199.46	21,053.12
Information and Communication	5,960,944.87	6,754,904.07	7,692,089.42	8,780,137.74
33. Telecommunications and Information Services	4,931,991.14	5,530,155.05	6,213,794.01	6,974,681.34
34. Publishing,	14,661.08	16,720.63	19,072.87	21.754.10
34. Motion Pictures, Sound recording and Music production	479,194.45	639,245.40	853,937.18	1,139,942.91
36. Broadcasting	535,098.20	568,783.00	605,285.36	643,759.39
37. Arts, Entertainment and Recreation	30,934.93	39,358.21	50,075.79	63.711.40
Financial and Insurance	1,242,813.40	1,580,492.35	2,050,043.19	2,645.195.98
38. Financial Institutions	946,032.29	1,242,138.08	1,656,341.84	2,191,719.44
39. Insurance	296,781.11	338,354.26	393,701.35	453,476.53
40. Real Estate	4,127,988.21	4,633,587.99	5,544,996.12	6,429,913.45
41. Professional, Scientific and Technical Services	1,711,698.01	1,950,982.89	2,236,209.76	2,555,976.99
42. Administrative & Support Services	13.140.14	14.911.69	16.922.18	19.203.68
43. Public Administration	1.998.470.88	2.258.293.77	2.566.981.58	2.909.290.60
44. Education	826.671.62	965.125.17	1.133.391.18	1.327,104.42
45. Human Health and Social Services	560.047.59	639.370.18	722,346.00	820.373.01
46. Other Services	900,022.87	1,022,002.17	1,178,295.12	1,348,239.05
GDP at Basic prices	54,204,795.12	63,258,579.00	71,186,534.89	80,222,128.32
Net Indirect tax on Products	857.086.13	732,962.17	885.694.91	917.401.24
GDP at Current Market price	55,061,881.25	63,991,541.17	72,072,229.80	81,139,529.55

Table A2: Nigeria: Gross Domestic Product at 2010 Constant Basic Price (Nmillion)

Gross Domestic Product at 2010 Constant Basic Price (Nmillion)				
Activity Sector	2010	2011	2012	20l3f
Agriculture	12,988,809.19	13,437,367.04	13,808,846.72	14,032,549.19
1. Crop Production	11,650,645.93	11,914,060.84	12,107,582.48	12,112,011.50
2. Livestock	952,730.88	1,091,453.52	1,220,466.46	1,383,384.65
3. Forestry	135,720.90	152.016.09	168,349.55	187,685.33
4. Fishing	249,711.48	279,836.59	312,448.23	349,467.71
Mining and Quarrying	8,454,554.20	8,751,190.79	8,563,329.10	9.017,443.96
5. Crude Petroleum and Natural Gas	8,402,676.40	8,691,722.05	8,496,106.65	8,940,850.70
6. Coal Mining	3,218.23	3,918.09	4,655.59	5,602.58
7. Metal Ores	2,354.84	2,707.85	3,256.94	3,833.06
8. Quarrying and Other Minerals	46,304.72	52,842.80	59,309.92	67,157.63
MANUFACTURING	3,578,641.72	3,958,756.11	4,503,713.71	5,163,495.49
9. Oil Refining	255.160.05	286.627.11	316.217.59	358,333.18
10. Cement	221.087.82	247,636.89	286,308.63	331.652.44
11. Food, Beverage and Tobacco	2.298.522.91	2,577,660.22	2,989,090.85	3,480,692.27
12. Textile, Apparel and Footwear	352,543.82	349,524.81	353,375.23	360,111.72
13. Wood and Wood Products	123,384.10	135,568.35	150,942.01	169,930.36
14. Pulp, Paper and Paper Products	24,355.21	27,742.37	31,515.81	36,491.16
15. Chemical and Pharmaceutical Products	25,167.16	28,564.61	32,511.47	37,611.38
16. Non-Metallic Products	59,548.40	63,494.54	68,232.05	74,340.95
17. Plastic and Rubber products	33,859.54	41,045.80	51,418.54	63,485.43
18. Electrical and Electronics	2,506.55	2,738.87	3,040.27	3,408.13
19. Basic metal, Iron and Steel	44,474.19	53,138.42	63,823.60	76,456.56
20. Motor vehicles & assembly				

Gross Domestic Product at 2010 Constant Basic Price (Nmillion)				
ACTIVITY SECTOR	2010	2011	2012	2013f
	21,890.75	24,525.34	27,763.34	31,824.28
21. Other Manufacturing	116,141.22	120,488.78	129,474.33	139,157.65
22. Electricity, Gas, Steam And Air Conditioning Supply	315,302.59	441,280.95	499,644.22	563,740.49
23. Water Supply, Sewerage, Waste Management And Remediation	72,966.95	81,727.39	96,063.15	111,151.13
24. Construction	1,570,973.47	1,769,662.23	2,040,334.31	2,366,805.67
25. TRADE	8,910,282.11	8,723,126.89	10,328,358.92	11,133,543.17
26. ACCOMMODATION AND FOOD SERVICES	245,760.58	267,529.58	288,222.12	315,090.71
TRANSPORTATION AND STORAGE	694,771.81	678,644.02	699,857.95	735,495.06
27. Road Transport	619,136.86	602,567.85	621,341.05	652,290.57
28. Rail Transport & Pipelines	107.77	105.01	106.89	111.53
29. Water Transport	4,225.75	4,227.04	4,289.71	4,526.57
30. Air Transport	32,673.90	32,938.78	33,831.86	36,056.58
31. Transport Services	22,646.26	22,255.60	22,959.88	24,222.73
32. Post and Courier Services	15,981.28	16,549.74	17,328.56	18,287.08
Information And Communication	5,960,944.87	6,547,367.40	6,884,113.59	7,527,847.62
33. Telecommunications and Information Services	4,931,991.14	5,381,152.85	5,608,285.50	6,058,320.82
34. Publishing,	14,661.08	15,619.22	15,938.12	17,047.29

34. Motion Pictures, Sound recording and Music production	479,194.45	597,137.38	713,587.17	893,299.71
36. Broadcasting	535,098.20	553,457.95	546,302.80	559,179.80
37. ARTS, ENTERTAINMENT AND RECREATION	30,934.93	39,179.59	46,229.87	55,313.00
FINANCIAL AND INSURANCE	1,242,813.40	1,476,383.03	1,713,105.54	2,072,869.42
38. Financial Institutions	946,032.29	1,160,316.65	1,384,111.51	1,717,509.12
39. Insurance	296,781.11	316,066.38	328,994.02	355,360.30

Gross Domestic Product At 2010 Constant Basic Price (Nmillion)				
Activity Sector	2010	2011	2012	2013f
40. Real Estate	4,127,988.21	4,328,366.86	4,633,640.71	5,038,708.33
41. Professional, Scientific And Technical Services	1,711,698,01	1,822,468.83	1,868,674.45	2.002.954.26
42. Administrative & Support Services	13,140.14	13,929.43	14,140.91	15,048.69
43. Public Administration	1,998,470.88	2.109,536.69	2,145.081.82	2.279,823.34
44. Education	826,671.62	945,095.84	1,000.552.07	1.094.620.12
45. Human Health And Social Services	560.047.59	617,772.89	636,502.93	676.428.71
46. Other Services	900,022.87	954,681.41	984,634.82	1,056,527.95
GDP at 2010 constant price	54,204,795.12	56,964,066.98	60,755,046.91	65,259,456.29
Net Indirect tax on Products	857,086.13	660,029.15	755,907.50	746,291.67
GDP at 2010 constant Market price	55,061.881.25	57,624,096.13	61,510,954.41	66,005,747.96
Growth at 2010 constant basic prices		5.09	6.66	7.41
Growth at 2010 Market Prices		4.65	6.75	7.31

NB: 2013f -forecast

Table A1

SN.	Mineral	Occurrences	SN.	Mineral	Occurrences	SN.	Mineral	Occurrences
1	Tantalite	Cross River, Ekiti, Kogi, Kwara, Nasarawa	12	Feldspar	Bauchi, Borno, FCT, Kaduna, Kogi	23	Silica Sand	Delta, Jigawa, Kano, Lagos, Ondo, Rivers
2	Kaolin	Akwa Ibom, Anambra, Bauchi, Bayelsa, Ekiti, Imo, Katsina, Kebbi, Kogi, Ogun, Ondo, Plateau, Rivers.	13	Gold	FCT, Kaduna, Kano,Katsina, Kebbi, Kogi, Kwara, Niger, Osun, Zamfara	24	Fluorite	Bauchi, Ebonyi, Plateau, Taraba
3	Mica	Ekiti, Kogi, Kwara, Nasarawa, Oyo	14	Clay	In all the States of the Federation	25	Bitumen	Edo, Lagos, Ondo, Ogun
4	Baryte	Benue, Cross River, Nasarawa, Plateau, Taraba, Zamfara	15	Silver	Ebonyi, Kano	26	Lead	Cross -River, Ebonyi, FCT, Plateau, Zamfara
5	Coal & Lignite	Abia, Adamawa, Anambra, Bauchi, Benue, Cross-River, Delta, Ebonyi, Edo, Gombe, Imo, Kogi, Nasarawa, Plateau	16	Ilmenite	Benue, Cross River, Kaduna, Plateau	27	Zinc	Cross -River, Ebonyi, FCT, Plateau, Zamfara
6	Rutile	Bauchi, Cross River, Kaduna, Plateau	17	Limestone	Benue, Cross River, Ebonyi, Edo, Gombe, Kogi, Ogun, Sokoto	28	Bentonite	Borno, Edo, Kogi, Ogun, Ondo
7	Talc	Ekiti, Kaduna, Kogi, Niger	18	Columbite	Bauchi, Cross River, Kaduna, Kano, Kwara, Nasarawa, Plateau	29	Kyanite	Kaduna, Niger
8	Bismuth	Kaduna	19	Cassiterite	Bauchi, Cross River, Kaduna, Kano, Kwara, Nasarawa, Plateau	30	Iron - Ore	Enugu, FCT, Kaduna, Kogi, Nasarawa, Zamfara
9	Gypsum	Adamawa, Edo, Gombe, Ogun, Sokoto, Yobe	20	Diatomite	Borno, Yobe	31	Lithium	Kaduna, Nasarawa, Niger, Zamfara
10	Marble	Edo, FCT, Kogi, Kwara, Nasarawa, Oyo	21	Phosphate	Ogun, Sokoto	32	Wolframite	Bauchi, Kaduna, Kano, Kwara, Nasarawa, Niger, Zamfara
11	Gemstones	Bauchi, Kaduna, Kogi, Kwara, Nasarawa Niger, Ogun, Oyo, Plateau, Taraba	22	Manganese	Katsina, Kebbi, Zamfara	33	Molybdenite	Plateau
						34	Dolomite	Kogi, Oyo, Edo, Kwara and the Federal Capital Territory, Abuja

Simulation 1: 5 Per Cent Growth in Productivity: [percentage change in consumption by house-hold groups)

Sector	Household Category		Per Cent Change in Consumption by	
	Rural poor	Rural non-poor	Urban poor	Urban non-poor
Agriculture	0.001	- 0.001	0.000	- 0.002
Crude Petroleum & Natural Gas	- 0.014	- 0.018	- 0.014	- 0.019
Coal	0.191	0.184	0.188	0.177
Metal	5.894	5.824	5.821	5.658
Other mining	7.764	7.673	7.668	7.455
Manufacturing	0.061	0.055	0.059	0.052
Utilities	0.002	0.001	0.002	0.001
Building & Construction	0.003	0.002	0.002	0.001
Transportation	0.003	0.002	0.003	0.001
Telecommunication	0.002	0.001	0.002	0.001
Trade	0.002	0.001	0.001	0.000
Services	0.001	0.000	0.001	0.000

Simulation 2: 10% Growth in Capital Stock to the Minerals Sectors: [Percentage Change in Consumption of Commodity Types by Household Groups]

Sector	Percentage change in consumption by Household category			
	Rural Poor	Rural Non-Poor	Urban Poor	Urban Non-Poor
Agriculture	-0.011	-0.013	-0.011	-0.013
Crude Petroleum & Natural Gas	-0.032	-0.036	-0.031	-0.037
Coal	0.103	0.097	0.102	0.093
Metal	6.523	6.445	6.443	6.262
Other mining	18.541	18.328	18.313	17.813
Manufacturing	0.100	0.094	0.099	0.090
Utilities	0.001	0.000	0.001	0.000
Building & Construction	-0.009	-0.009	-0.009	-0.010
Transportation	-0.002	-0.003	-0.002	-0.003
Telecommunication	-0.004	-0.005	-0.004	-0.005
Trade	-0.008	-0.007	-0.009	-0.003
Services	-0.003	-0.004	-0.003	-0.004

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