AN EXAMINATION OF THE SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACT OF PLANNED OIL SANDS DEVELOPMENT IN NIGERIA

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ABSTRACT

Nigeria became a mono-product economy through its heavy reliance on crude oil for export and revenue. As a result of oil price volatility and the need to increase national revenue and public spending, the Nigerian government has adopted a policy of diversification to non-oil minerals. This study focuses on oil sands that are considered second only to oil in terms of economic potential. This policy also means that Nigeria is moving towards finite resource and a dirtier form of crude oil. A national analysis of non-oil mineral activity using a GIS indicates that exploration, mining and quarrying are widespread; a potentially positive outcome for national mineral development. The government however, is failing to take into account the impact of this activity on communities and ecosystems overlapping or lying proximal to mining licences. A case study indicates that oil sands exploitation can have a positive impact on the host communities through infrastructure development, which can trigger small businesses, job opportunities and increased income. Despite these benefits, there are fears of environmental degradation, displacements, loss of communal lands and means of livelihood. Already, the long delays in the development of oil sands are fuelling anger, deprivation, land grabs and pollution, and worst of all, ever-deeper underdevelopment of these 'conditional resource communities', which is aggravating the resource curse. For the oil sands projects to be feasible, beneficial and sustainable, Nigeria's quest for resource wealth must integrate economic growth, social equity and ecological integrity at this planning stage. The thesis makes original contributions to determining resource communities and to the cumulative body of knowledge on the potential impacts of resource development on host communities in a rent-seeking economy like Nigeria.

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ABBREVIATIONS AND ACRONYMS

API	American Petroleum Institute
ASM	Artisanal and Small-scale Mining
BEECON	Bitumen Exploration and Exploitation Company of Nigeria
BP	British Petroleum
BPE	Bureau for Public Enterprises
BPIC	Bitumen Project Implementation Committee
BRIC	Brazil, Russia, India and China
EIA	Environmental Impact Assessment
EIR	Extractive Industries Review
EITI	Extractive Industries Transparency Initiatives
ERA	Environmental Rights Action
ERCB	Energy Resources Conservation Board, Canada
ESRI	Earth Systems Research Institute
CAPP	Canadian Association of Petroleum Producers
CBN	Central Bank of Nigeria
CDA	Community Development Agreement
CERA	Cambridge Energy Research Associates
CIBP	Committee on the Implementation of Bitumen Project
DERM	Department of Energy and Resource Management
DPI	Department of Primary Industries
DPR	Department of Petroleum Resources
DRC	Democratic Republic of the Congo
EEZ	Exclusive Economic Zone
EITI	Extractive Industries Transparency Initiative
EOIs	Expression of Interests
EUB	Energy Utilities Board
FEC	Federal Executive Council
FEPA	Federal Environmental Protection Agency
FG	Focus Groups
FGD	Focus Groups Discussion
GC	Global Compact
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GI	Geographic Information
GIS	Geographic Information Systems
GPS	Global Positioning Systems
HDI	Human Development Index
HDR	Human Development Report
HRH	His Royal Highness
IBB	Ibrahim Badamasi Babangida
IBRD	International Bank for Reconstruction and Development

ICMM	International Council on Mining and Metals
IIED	International Institute for Environment and Development
IMF	International Monetary Fund
IOCs	International Oil Companies
JV	Joint Venture
MCO	Mining Cadastre Office
MDAs	Ministries Departments and Agencies
MDGs	Millennium Development Goals
MMA	Minerals and Mining Act, 2007
MMSD	Minerals Mining and Sustainable Development Report
MP	Member of Parliament
MSMD	Ministry of Mines and Steel Development, Abuja
NAN	News Agency of Nigeria
NASRDA	Nigerian Airspace Research and Development Agency, Abuja
NBS	National Bureau of Statistics, Abuja
NCC	Nigerian Coal Corporation
NDDC	Niger Delta Development Commission
NEB	National Energy Board, Canada
NEITI	Nigerian Extractive Industries Transparency Initiative
NGOs	Non-Governmental Organisations
NGSA	Nigerian Geological Survey Agency
NIOMCO	Nigerian Iron Ore Mining Company
NMC	Nigerian Mining Corporation
NNPC	Nigerian National Petroleum Corporation
NPC	National Population Commission, Abuja
OECD	Organisation for Economic Co-operation and Development
OMPADEC	Oil Mineral Producing Area Development Commission
OPEC	Organization of the Petroleum Exporting Countries
PFC	Petroleum Finance Company
PNG	Papua New Guinea
PTDF	Petroleum Technology Development Fund, Abuja, Nigeria
RA	Research Assistant
SSM	Small-scale Mining
UNCTAD	United Nations Centre for Trade and Development
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNESCO	United Nations Education Scientific and Cultural Organisation
UNICEF	United Nations Children’s Fund
UNOCD	United Nations Office for Crime and Drugs
US	United States
USEIA	United States Energy Information Administration
USGS	United States Geological Survey
WEC	World Energy Council, London
WRI	World Resource Institute

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CHAPTER ONE

INTRODUCTION

The prices and revenues from fuel and non-fuel minerals tend to be volatile and often translate into macroeconomic instability (Budina and Wijnbergen, 2011). In an attempt to reduce the impact of the boom/bust cycles of the world oil market on the national economy and to attain sustainable economic development, Nigeria has seen a new economic opportunity and development prospect arising from the exploitation of its oil sands resources. This is a feasible and viable option given the extent of Nigeria’s oil sands wealth. However, the danger is that improper management of these ‘new resources’, as is the case with the petroleum sector, can frustrate rather than promote development. While conventional oil remains the mainstay of the national economy, its contribution to the local economy remains questionable. For instance, instability in the Nigerian oil-producing region, popularly known as the Niger Delta, has impacted on global oil supplies and on the Nigerian economy (Akpan, 2005:2; Watts, 2008).

The consequences of exploiting oil sands in countries like Nigeria that have weaker political and environmental governance frameworks, in comparison to resource-rich developed countries, are likely to be more disastrous. In Canada for example, oil sands production has resulted in irreparable damage to local communities and environment, including forest and wetlands and increased pollution and air emissions that have impacted on the health and livelihood of the First Nations Citizens, who live near or downstream from the projects (ICMM, 2010). As a geographer, the questions that are of interest are: as Nigeria seeks to exploit and expand its resource wealth, what are the processes and inter-relationships through which oil sands resources will be developed and what impact will these have on local development agendas and the environment at the local scale? The expansion of Nigeria's oil sands ideally guarantees a certain level of prosperity as is often the claim whose claim?; but such additional wealth can be a curse as much as a blessing. This assessment is set against the evidence that shows Nigeria lagging behind in human development and in generally translating oil wealth into economic prosperity – an emblem of the resource curse (see Chapter Two).

It is within this context that this thesis examines the socio-economic and environmental impacts of oil sands resource extraction in Nigeria at the initial stages of project development. While the resource curse measures impacts at the national scale and at the point when the resource is fully operational (e.g. Auty, 1997; Collier, 2007; Humphrey, 2007; Karl, 1997), it is appropriate to consider the local scale at which these impacts may occur. Hitherto, most of the research on resource impacts in Nigeria has tended to focus on the effects of oil extraction on Niger Delta communities. For example, the works of Ross (2003), Watts (2004, 2008), UNDP (2006), Amnesty International (2009) and UNEP (2011) are the most comprehensive examples of the analysis of oil extraction and the resulting impact on Niger Delta communities. Understanding community dynamics at the planning stage provides a valuable opportunity to influence public perception on oil sands, to provide a positive atmosphere for future relations, and to minimise the chances of conflict on the project (ICMM, 2007; DPI, 2008).

In order for the research to identify and understand the potential impacts of proposed mineral extraction on local communities in Nigeria, a two-stage approach was adopted. The first stage involves extensive national Geographic Information Systems (GIS) analysis of the geography of mining and its proximity to settlements. In this case, the study identifies the extent of the scale of the impact of mining and identifies communities that are currently or likely to be affected by mineral [mining] activities. While it is not possible to examine all kinds of minerals, the study centred on one resource sector, oil sands and the communities that are in close proximity to the oil sands licences in Ondo State, Nigeria (see Chapters Five and Six). Some of the communities identified by the GIS process form the case study for the second stage (Section 3.2).

It would not be too premature to briefly outline the reserve of oil sands in Nigeria; details can be found in Chapter Five. The oil sands belt lies on the coastline areas of south western Nigeria, east of the Benin basin covering Lagos, Ondo, Ogun and Edo states. The various field surveys carried out by Adegoke and Ibe (1982), Enu (1985) and Coker (1988) among others, estimated the entire oil sands belt to be approximately 120 kilometres by six kilometres, with an estimated 30-40 billion barrels in reserve. This projection was based on a 17 square kilometre area; probable reserve estimate of the entire could be more than double the one reported. For example, the Ministry of Mines reported that oil sands reserve by open cast mining across a 4.5 by 5.5 kilometre area is about 16 billion barrels, while in-situ mining on a 4.5 by 55 kilometre area is close to 42 billion barrels (MMSD, 2010). Furthermore, the Ministry of Mines recently demarcated oil sands exploration into three blocks to cover much wider areas: Block A is around 4,170 square kilometres, Block B is approximately 3,707 square kilometres, and Block C is undisclosed. It is within these blocks that companies bid for space of operation spanning up to a 1000-kilometre-square area. At the time of writing this report, a new bitumen committee was setup that will lead to the bidding for the blocks, identification of investors and the eventual development of Nigeria’s oil sands resources.

Considering the extent of the area covered by potential oil sands production; Bello (2003), Adebiyi et al. (2006, 2007, 2008) and Gbadebo (2010) anticipate oil sands exploitation to have very negative impacts on environmental resources. Nwankwo (1985) initially predicted the damage to the local environment to be 100 times greater than those caused by conventional oil exploitation. Consequently, communities located in the vicinity of proposed oil sands extraction are most likely to be affected by eventual production because of the extent and volume of the resources. Thus, in the second stage, a case study of the identified oil sands communities was undertaken to better understand the characters, perceptions, needs and expectations of the communities about the potential impacts of oil sands extraction on the environment and their means of livelihood. Communities' attitudes, perceptions and beliefs are not an end in themselves; rather they are a means to understanding community–resource relationships, as well as the communities' potential contribution to improving resource development decision-making processes and distribution of benefits.

The study of the specific impact of resource development is one of four areas of resource development inquiry for resource geographers. The area of inquiry relevant to this thesis is social and economic factors that condition resource development and impact (Mitchell, 1989:2). Other areas of resource analysis identified by Mitchell (1989) include studies of resource allocation; studies of the physical occurrence and measurement of resources and studies of alternative allocation of resources. In more recent times, the study of resources in geography is establishing: "an intellectually vibrant and politically significant arena for critical inquiry... into the complex socio-natural processes that defines a resource" (Bakker and Bridge, 2006:19). Furthermore, Olson (2010) states that 'Critical Resource Geography' scholars (such as Bakker and

Bridge, 2006; Hayter, et al., 2003; Himley, 2008 and Jonas and Bridge, 2003) have demonstrated that natural resources are not only a biophysical product, but also that political, social, and economic institutions and processes are involved in creating them.

One of the key questions that this research investigates is how communities can be involved in creating oil sands as a resource and also the factors that need to be in place for oil sands projects to contribute to sustainable development of local communities that bear the immediate impact of operation. The aim for resource creation/production should be the delivery of socially desirable goals to communities in particular, rather than wealth generation alone at the national level (Bridge, 2004a). The thesis, therefore adopts an original and distinctive approach to the topic of the potential impacts of resource development on host communities, an approach that is valuable in both theoretical and practical terms. Through a range of techniques (Chapter Three), this research identifies the national scale of mining impacts and uncovers the possible scale of impact of oil sands extraction on host communities in Nigeria in respect of the planning stage. This study came at a time when Nigeria is strengthening the development of oil sands resources and in a world where climate change and environmental issues, energy security, poverty alleviation and development are firmly on the global policy agenda.

This introductory chapter contains three main sections. Section 1.1 sets the wider context of this study. It examines the renewed interest in the activities of the extractive industries amongst stakeholders in the field (geographers, development agencies and others). It looks at the impact of these activities at various levels, and the resulting policy responses, aimed at reforming extractive sector for the benefit of countries and their peoples. Section 1.2 explains the effects of Nigeria's overdependence on oil revenue and the contribution of non-fuel minerals to the national economy. The chapter then outlines the aims and objectives of the thesis in Section 1.3. The last section (1.4) provides a brief description of how the thesis is structured and how the findings are organised. Throughout this chapter, reference is made to other chapters of the thesis where the issues introduced are discussed later.

1.1 The Extractive Industries

According to UNCTAD's World Investment Report 2007, the extractive industries are primary economic activities involved in the extraction of non-renewable resources. For the purpose of this research, extractive industries do not include forestry, fisheries and agriculture. Extractive industries have been viewed as key drivers of economic growth and the development process (Bradshaw, 2005) and as lead sectors that can create 'spread effects' that drive economic expansion, leading in turn to higher levels of social and economic well being (Bridge, 2008:391). However, these possibilities remain the subject of policy and intellectual debate. In recent times, before the current economic recession, the rising demand for primary commodities from fast-growing developing countries like China has added to the persistent high level of mineral demand in developed countries. Similarly, high mineral prices and demand have stimulated an investment surge in mineral deposit exploration and production. With the onset of the global recession in 2008, commodity demand declined and prices fell sharply from their peak. Three years on, prices have since rebounded; a barrel of crude oil rose from US$40 during the recession to about US$110 in March 2011. Similarly, the prices of non-fuel minerals have bounced back; spot price of gold rose from US$900 per ounce in 2008 to about US$1,532 in June 2011. In order to take advantage of increases in the price of commodities, as well as the push in the equities market and the growing popularity of oil sands, resource-rich countries like Nigeria have relaxed their trade barriers and provided incentives to encourage foreign and local investments in the extraction of both fuel and non-fuel minerals.

Concerns about extractive activities emerged in the last two and a half decades. However, it is only during the last decade that developmental, environmental and ethical issues associated with resource extraction at varying geographical scales (global, national and local) came into global attention. At the global scale, the concern is about energy security, climate change, biodiversity and critical ecosystems because extractive industries have a reputation for damaging ecosystems, depleting non-renewable resources and promoting the emission of greenhouse gases. These concerns at the global level are supported by research indicating that the environmental and social impacts of mining extend beyond the boundaries of production, ranging from limited site-specific contamination to wider surrounding areas. There is growing concern about increasing greenhouse gas (GHG) emissions and environmental degradation from global exploitation of unconventional fossil fuels (e.g. oil sands). For example, a recent report released by Ceres (2011) indicates that the risks involved in the production of oil sands may be greater than ultra-deep water oil production in the Gulf of Mexico (LÓpez et al., 2011). Ceres is a coalition of investors, environmental organisations and civil societies that study activities that pose challenges to sustainability. Similarly, the Mining and Critical Ecosystems Report commissioned by the World Resource Institute, (Miranda, et al., 2003:17) reported that about 75 per cent of mining and exploration activities are conducted in areas of 'high conservation value' and the remaining 25 per cent are within the radii of 'protected areas'.

Concerns at the national scale are about why many resource-rich countries have weak rates of economic growth, lack strong governance and legal frameworks to protect their people, and are amongst the poorest in the world. There is a large body of literature about the impact of resource development on national development. For example, '*Our Common Interest*', a report of the Commission for Africa (2005:161) noted:

> Countries with economies dependent on one or a few primary commodities, particularly high-value resources such as oil and other minerals, are often poor, have weak and less accountable governance systems, and are more vulnerable to violent conflict and economic shocks.

This outcome counters the assumption that mineral extraction is a "boon for development" (Bridge 2004a: 225). At the local level, there are issues relating to the management of impacts and the reduction of risks from the extractive industries to the host communities' livelihood and environment. Concerns at this scale are based on "environmental degradation, non-sustaining cycles of boom and bust and long-term environmental liabilities" (Bridge (2000:245). Evidently, these concerns have triggered closer scrutiny of the role of primary commodities in development. As a follow-up, major global initiatives and best practices have been introduced, aimed at ensuring that extractive industries promote economic development and reduce negative consequences for the people and the environment (Bridge, 2004b; Kitula, 2005). The initiatives also persuade governments to become more transparent and more accountable for extractive revenues. The World Bank Group (WBG) is supporting or leading a number of the major initiatives that address specific issues like the Extractive Industries Transparency Initiative (EITI) and the Extractive Industries Review (EIR). A host of other initiatives between individual states, financial institutions, mining conglomerates and multinational agencies have also been established. Box 1.1 contains examples of some of the ongoing major global initiatives that scrutinise and also help in ensuring sustainable extractive industries development.

Box 1.1 Some global initiatives aimed at scrutinising the mineral industry
The **United Nations Global Compact** (GC) (2000) is an alliance between businesses committed to sustainability and the international community to ensure that all forms of business benefit societies. This 'partnership' adopts 10 principles to maximise business opportunities and confront challenges of human rights, environment, corruption and transparency in host countries (United Nations Global Compact, 2009). The **Extractive Industries Review** (EIR) (2002) assessed the World Bank's lending in extractive activities to determine if this lending fosters poverty alleviation and sustainable development. The report, officially released in 2004, identified key areas for intervention: small-scale mining, climate change, good governance, sustainable development and poverty alleviation (International Finance Corporation (IFC), 2009). Similarly, the **Extractive Industries Transparency Initiative** (EITI) 2002 is a voluntary coalition of extractive industry, governments, NGOs, companies and investors aimed at improving governance in mineral economies through transparency and accountability of payments and revenues derived from the extractive industry. The EITI procedure requires firms to publish what they pay and government officials to record and report the revenues received so that citizens can monitor and hold government accountable for its spending. **Minerals Mining and Sustainable Development** (MMSD) (2002) is a regional and global initiative driven by key stakeholders' concerns about social issues connected with mining and how best it can contribute to the global transition to sustainable development. A decade after the Rio conference, MMSD also aimed at evaluating the performances of the minerals industry and proposing action plans for improvements, capacity building and networking with affected communities. Finally, the **Equator Principles** (2003) is a framework developed by banks and lenders for assessing and managing the complex environmental and social risks associated with project finance. By so doing, the negative impacts of mining projects to the ecosystem and the community would be avoided, minimised, mitigated or compensated where applicable (The Equator Principles, 2006:1-2).

In principle, global treaties and conventions are binding on mining corporations and national governments; implementation through national legislation is difficult in resource-rich developing countries due to poor governance and policy failure (see Chapter Two). For example, the EITI was based on the "belief that the prudent use of natural resource wealth has the potential to provide the basis for sustainable economic growth and development" (EITI, 2003:1). Nigeria was one of the first African countries to endorse the EITI; but oil transactions are still shrouded in secrecy (Ocheje, 2006). In contrast to the Nigerian case, Norway's extractive economy is characterised by high transparency, accountability and freedom of information (Haufler, 2010).

1.2 The Nigerian Extractive Economy

Nigeria is not only the most populous country in Africa, but also the major producer of oil in the continent. The political economy of Nigeria is based on extractive industries (Orogun, 2010). Major mineral resources found in Nigeria include petroleum, natural gas and solid minerals (Appendix One). Nigeria produces 21.2 per cent of Africa's crude oil ahead of Libya, Egypt, and Algeria. Oil from Nigeria accounts for 2.6 per cent of global production (BP, 2010:8), and the country is ranked the world's eleventh largest producer of crude oil (USEIA, 2010:2). The discovery of substantial crude oil reserves in the deep water offshore is expected to increase the reserve base from 37.2 to 40 billion barrels by the end of 2010. Projects that have been initialised to meet these targets have been hampered because of instability in the oil-producing areas.

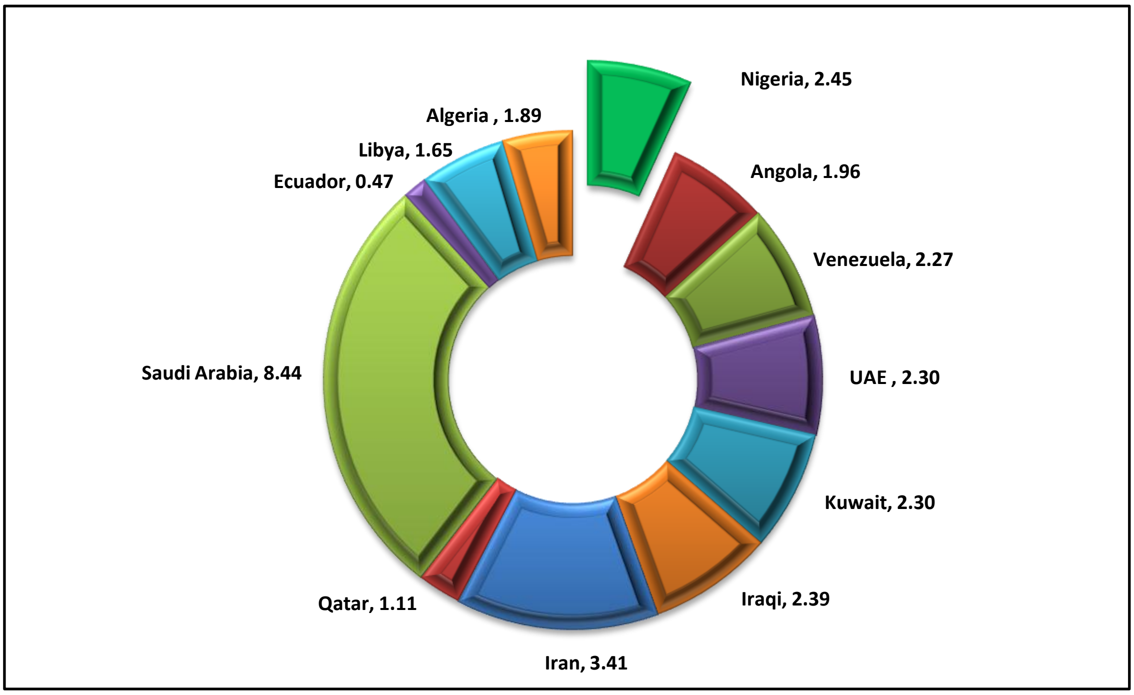


Figure 1.1 Average crude productions from OPEC countries. The figure shows Nigeria's relative amount for the period ending October 2010. Source: USEIA (2011)

As Figure 1.1 illustrates, Nigeria currently produces about 2.5 million barrels per day of OPEC production, compared to less than two million barrels due to conflict in the Niger

Delta crisis. With the resumption of shut-in onshore production and relative peace in the Niger Delta, crude oil production capacity is expected to reach an average 2.9 million barrels per day (IEA, 2010a; USEIA, 2010). Figure 1.2 shows that Nigerian onshore oil reserves are found in the South-southern (Niger Delta) region, a vast area of creeks and waterways, with a surface area of about 112,110 square kilometres. Offshore oil reserves are in the Bight of Benin, the Bight of Bonny and the Gulf of Guinea. Oil exploration activities in the Niger Delta are currently focused in the deep and ultra-deep water, with some interest in the Chad and Sokoto basins, to determine the prospect of oil discovery in Northern Nigeria.

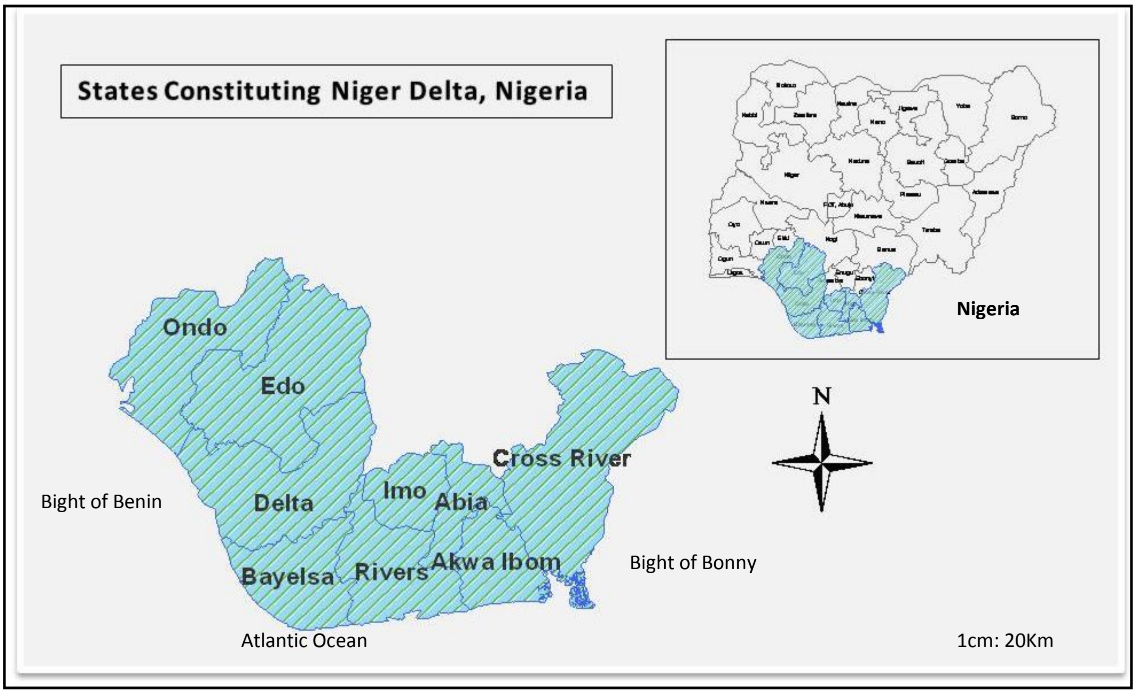


Figure 1.2 Nine states that make up the Niger Delta. It has a population of about 28 million, 40 ethnic groups and about 5,000 communities.

According to the Revenue Watch Institute (2010), the Nigerian economy has grown extraordinarily dependent on oil exports: in 2009, 99.7 per cent of its export and 89 per cent of government revenue came from oil, making it the most oil-dependent country in the world. From the early 1970s to date, total earnings from oil stood at over US$400 billion. Prior to the current economic downturn, the national income had risen significantly, with external reserves reaching an all time high of US$60.1 billion in 2008 (CBN, 2008; Revenue Watch Institute, 2010). Despite huge revenue earnings, the vast majority of the Nigerian people have not benefitted from this legacy of wealth.

In addition to oil wealth, an estimated 5.3 trillion cubic metres (TCM) of gas reserves make Nigeria the world's seventh largest holder of natural gas reserves and the largest in Africa (USEIA, 2010). However, about half of the natural gas associated with oil production is currently flared (12.5 per cent of the world's total) because of lack of infrastructure. The flaring of gas is wasteful, while at the same time a major issue for climate change and human health (Edino et al., 2010; Orogun, 2010). Pipeline development, expansion of liquefied natural gas (LNG) infrastructure and strengthening of gas-flaring policies are expected to reduce gas flaring in the immediate future and accelerate gas utilisation, both for export market and domestic use.

Apart from oil and gas, Nigeria is endowed with solid mineral wealth. Solid minerals in the Nigerian context include all minerals and metals, excluding oil and gas (Appendix Two). Solid minerals, unlike oil, are found across the country; while some of them are of commercial value, others are too small to exploit unprofitably (Chapter Four). In 2001, the President of Nigeria maintained that the non-oil mineral sector was worth over US$30 billion, with the capacity to generate five million jobs at optimal operations (Obasanjo, 2001). Ten years on, there has been no evidence to substantiate this claim regarding the economic value of Nigeria's mineral sector. Although no total income has been mentioned, Ishola (2008) who was a former Minister of Solid Minerals claimed that seven minerals alone can contribute 85 per cent of the income that the entire sector is required to contribute to national development (see Table 4.1). Davenport (2010) estimated that the expansion of mining has the potential to contribute 15 per cent to Nigeria's GDP by the year 2015. Davenport's estimate may seem overly optimistic considering the current poor performance of the sector within the economy (Figure 1.3).

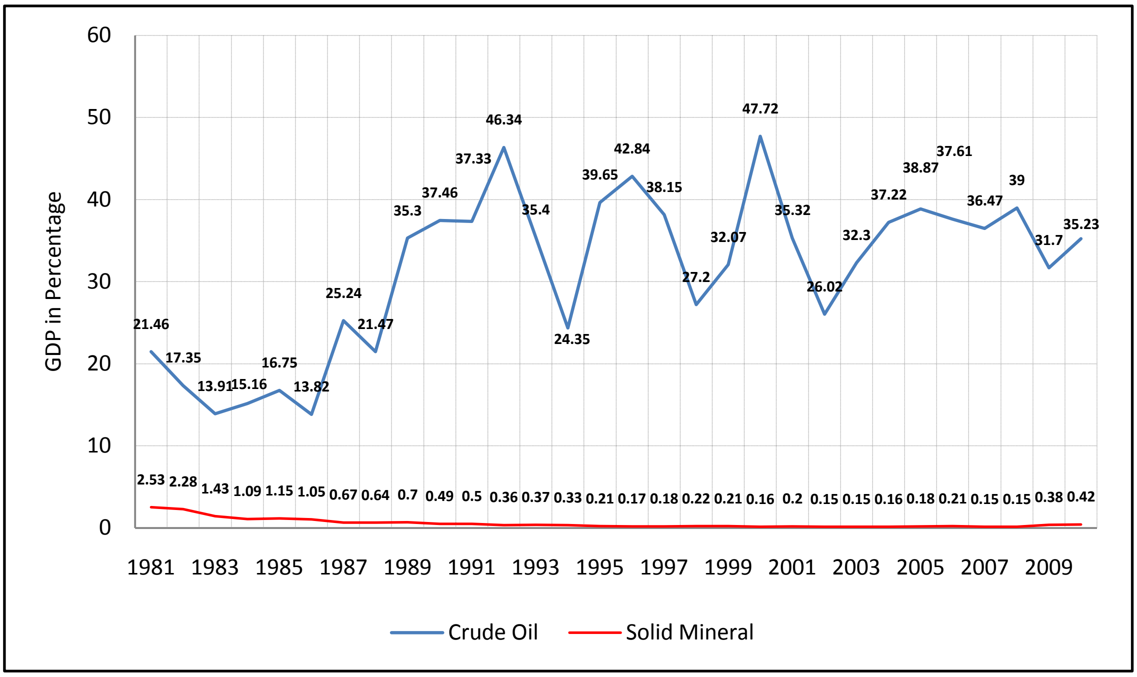


Figure 1.3 Contribution of crude oil and solid minerals to the GDP from 1981-2009. Source: NBS Annual Bulletin (2009 and 2010)

As Figure 1.3 illustrates, this sector, unlike oil, is undeveloped, non-productive, and currently contributes less than 0.5 per cent to Nigeria's GDP, as against 35 per cent from oil and gas in 2010 (CBN, 2010; NBS, 2010). Nigeria's effort at promoting the exploitation of non-oil minerals is aimed at mobilising additional revenue and reducing the impacts of heavy dependence on oil. Thus far, 34 mineral resources have been identified as worthy of investment (MSMD, 2008a; NAN, 2008), but a lack of institutional capacity to develop all these minerals has compelled policymakers to reduce the number to just seven. The seven minerals receiving priority attention for privatisation and development are gold, bitumen (oil sands), coal, iron ore, barite, lead/zinc and limestone. The rest of the minerals are considered viable for providing local raw materials and for import substitution. In normal circumstances, the combination of oil and gas revenues and solid minerals potential would be considered a 'blessing' to the nation. Unfortunately, the blessing seems to have instead become a curse because Nigeria's development indices have remained dismal.

A look at some measures of economic and social development supports the above conclusion. First of all, the poverty rate (measured against US$1 per day) continues to climb, accounting for over 60 per cent of Nigeria's 150 million people (NBS, 2008a). Furthermore, the most recent UNDP human development index ranked Nigeria below countries like Uganda, Cameroon, Ghana, Gabon, Togo and Congo. In addition, the UNDP human development report (2010:162-163) shows Nigeria as the 27th poorest nation in the world. Despite its vast mineral wealth and human resources, 64.4 per cent of Nigerians live on less than US$1.25 a day (UNDP, 2010:162). The poor in Nigeria comprise more than the combined ninety million populations of the other 10 West African countries excluding Ghana and Cote d'Ivoire. Income distribution has widened sharply - the majority of the population are pushed under the poverty line, while there are a few extremely rich individuals. The standard of living has deteriorated from the 1970s to date, making access to basic social services such as health care, clean water, roads and electricity even more difficult (Xavier and Subramanian, 2007).

Electricity supply is erratic and of poor quality (Odularu and Okonkwo, 2009). By the end of 2010, the total power generation capacity was less than 4,000 mega watts (MW) (Okafor, 2011). The consequence is an electricity deficit of 20,000 MW. In 2007, the per capita energy consumption was just 129 kilowatt hours (kWh) per person - less than half of the Ghanaian average, nine times less than the African average, and 22 times less than the world average (Research and Markets, 2011; Sambo, 2009). The huge deficit has meant that the majority of the population live far below the 4,000 kWh levels required for achieving a decent standard of human existence (UNDP, 2010). The Bureau for Public Enterprises (BPE) estimated that about 100 million Nigerians are without access to electricity, while the remaining 40-50 million receive low quality or an irregular supply (Oyetade, 2011). Thus, it will be difficult and expensive for Nigeria to sustain its economic growth and drive diversification policy, energise human development process and attain the MDGs and encourage investors in especially energy intensive operations like oil sands, without making reliable and affordable energy available to all.

Rather than bringing prosperity to communities where oil is extracted, oil has turned into a curse (Karl, 2007). The oil communities in Nigeria have suffered over time from lower economic growth and greater social unrest than the rest of the country. The combination of poverty, deprivation of means of livelihood, economic and political marginalisation, poor governance, corruption and environmental degradation has spawned violent militia insurgencies with sabotage, looting, hostage-taking and ethnic separatism (Hassan et al., 2002; Lujala, 2003; Onyeukwu, 2007; Orogun, 2010; Watts, 2004:278, 2008; Zalik, 2004). These challenges have affected the internal stability of Nigeria and the delivery of crude oil to the international market. Between late 2005 and mid-2009, during the conflict and as a result of economic sabotage, Nigeria lost billions of dollars in oil revenue (Idemudia, 2009:2). With the peace-making initiative of granting amnesty to ethnic militias, coupled with long-term infrastructural development programmes, normal crude production has resumed since 2009.

Figure 1.4 below charts some of the internal factors that have had an impact on oil production over the past four decades. The description above of the dependence of Nigeria on oil, with deteriorating economic performance, weak political structure, conflict and adverse negative effects on the producing host communities, can be regarded in totality as the effect of the 'resource curse' or the 'paradox of plenty' (Auty, 1993; Ross, 2003; Sachs and Warner, 1999).

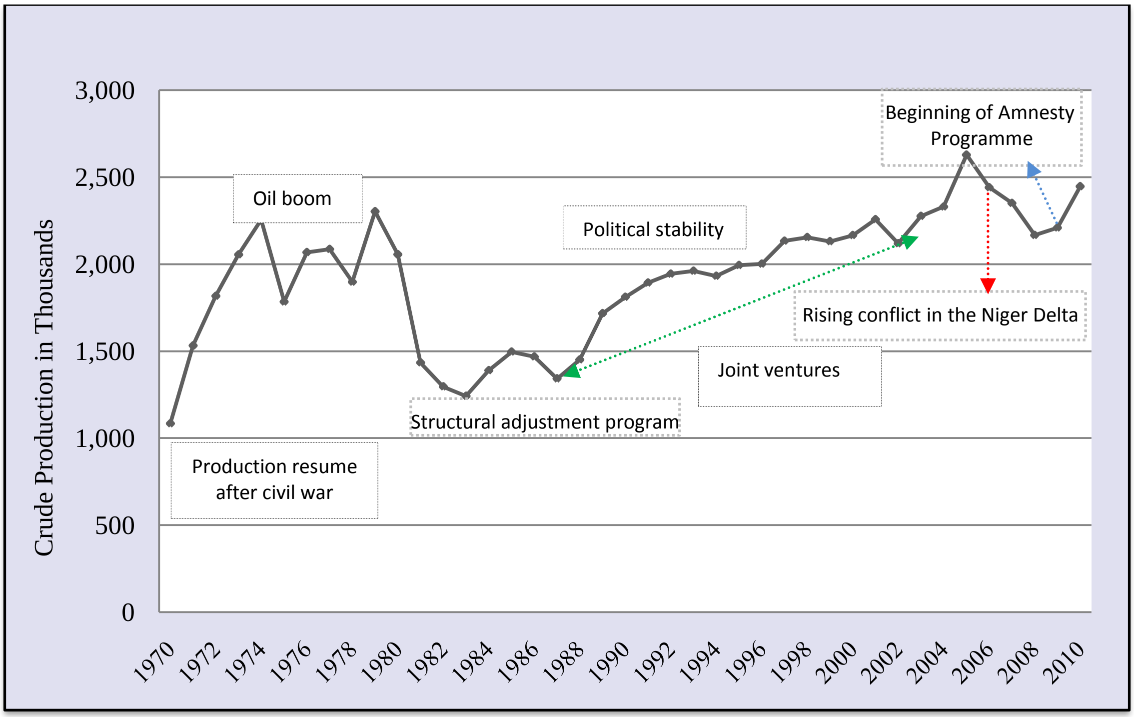


Figure 1.4 Nigeria's average annual crude oil production from 1970–2010. Source: Data from USEIA (2011)

In terms of investment climate, Nigeria ranks 12th amongst the 192 countries rated 'high risk' for investment, and 137th out of the 183 countries with favourable business environments (IBRD and World Bank, 2011:4; Maplecroft, 2011). Weak governance and lack of standards, internal conflicts and insecurity, corruption and human rights abuse are among the factors that give the country a low score. In addition, the 'Failed States Index' ranked Nigeria 14th most failed nation in the world in 2010, because of weak internal security and the government's failure to perform basic development functions (The Fund for Peace, 2010). These rankings show a worrying combination of high levels of poverty and high levels of risks. The risk might even be higher in mining because it requires large amounts of capital with long payback periods, and projects can operate for decades. Mining investments are made taking into account potential rewards against possible risks. Apart from operational risks (exploration, mining, production and reclamation), business-related risks, carbon emissions and social and legal factors such as government effectiveness and communities' affects investment decisions.

The over-reliance of Nigeria on oil revenue and the absence of a stabilisation fund mean that any oil price decrease is likely to have an immediate negative impact on the national budget. In 2009, Nigeria recorded a budget deficit of about five per cent of the GDP, which is well above the three per cent allowable limit in the country's Fiscal Responsibility Act (Federal Ministry of Finance, 2009; Vanguard, 2009). The deficit was caused by a shortfall in revenue as a result of a fall in crude oil prices, a cut in OPEC production quotas and a decline in crude production. Nonetheless, the oil price is currently in the range of US$90 to US$110 above the crude oil price benchmark of US$70 per barrel set for the 2011 national budget. In addition to the above uncertainties, the world now faces an energy dilemma in meeting the future challenges of energy security and climate change. With countries working at achieving their carbon emission targets and discussing alternative and renewable sources of energy (see Bradshaw, 2010), the predictions for the future of oil cannot be all positive, and this is alarming for Nigeria.

Oil-rich countries like Saudi Arabia and the UAE are tackling the reality of oil volatility through economic diversification (Aldagheiri, 2008). Nigeria should pay greater attention to diversifying its economy, while strengthening the tax system in a similar manner to other non-oil producing countries. The question is: will oil sands as a form of resource diversification contribute to the growth of the Nigerian economy and the development of its people, particularly those communities that host the resource extraction? Within this wider context, the study first identifies communities affected by mining generally and in particular, those that may be impacted by oil sands activities - communities that are surrounding the geographic location of a mining licence. Second, a detailed analysis of the potential impact of oil sands development is undertaken to better understand the character, concerns and expectations of the communities. This research contends that for oil sands resources to be created and for the creation to benefit local communities, identifying neighbouring communities should start during the initial phase of a project and engagement must continue throughout development, operations and closure. The following aims and objectives together examine the relationship between resource extraction and potential development impacts on the host communities.

1.3 Aims and Objectives

This study has three principal aims:

1. To contribute to the development of a more critical approach to resource geography.
2. To conduct a survey of mining in Nigeria to determine its spatial pattern and to identify mining communities - those that are involved in or potentially affected by mining activity.
3. To assess the potential socio-economic and environmental impacts of opening oil sands extraction near communities, to enable identification of strategies to

avoid replicating the environmental degradation and deprivation of means of livelihood which characterised oil-producing communities of the Niger Delta.

In order to achieve the aims identified, the research is structured around four specific objectives:

1. A survey of the academic and policy-making literature and the international experience of the impact of mining.

2. The construction of a GIS, based on mineral titles, to show their spatial distribution and identify communities that are in proximity to the various types of mining in Nigeria.

3. Identify the communities located within a particular oil sands licenced block to determine the case study communities.

4. Detailed case study research in potential oil sands host communities.

1.4 Structure of the Thesis

The thesis is divided into nine chapters along conventional lines, which reflects the transition from introduction to conceptual background, followed by methodological issues to more substantive/empirical findings and then the conclusion. A summary of the contents of each chapter is presented below and the layout of the chapters is illustrated in Figure 1.5.

Chapter One presents a brief introduction to the thesis providing a background to the extractive industries and the 'risks' associated with the dependence of the Nigerian economy on oil. It also highlights the efforts made by the Nigerian government to diversify the economy through the development of solid minerals as an alternative to oil. The aims and objectives and structure of the thesis are also presented.

Chapter Two provides a review of the literature on the relationship between resource extraction and national development. Attention is paid to the related discourse on the 'resource curse'. Additionally, the chapter examines the theoretical and empirical debates concerning the concept of local mining communities and mining impacts, and indicates how the research builds on and extends existing work. In short, the literature review highlighted in Chapter Two forms the backdrop against which the analyses in subsequent chapters are undertaken.

Chapter Three presents the research design to examine the impacts of mining at the national and local levels in Nigeria. A detailed justification of the methods used by the researcher in the study, such as the GIS, focus group discussions, interviews, documentation and observation, is provided. The chapter elucidates how the researcher addressed the problems of validity and objectivity, given that the methods of sourcing data in the communities were primarily qualitative. In the GIS section, data preparation and processing are highlighted. The last section evaluates the various methods used for data collection and analysis.

Chapter Four presents an analysis of the solid minerals industry in Nigeria. This chapter divides the industry into three important periods of political and economic reforms. The first is the structure of mining prior to the discovery of oil in 1956. The second period is when the country gained political independence to the end of military rule (1960-1998). The third period covers the 10 years after the return of the country to democratic rule (1999-2009). The changing regulatory and legislative framework and how it affects investments and host communities is assessed together with the capacity of the system to maximise benefits to the local people.

Chapter Five is divided into two parts. Part one presents a global perspective on the growing importance of oil sands as an unconventional means of attaining global energy security. The methods of extraction, processing and upgrade of oil sands are examined; including economic considerations and environmental concerns. Part two then examines the historical development of oil sands in Nigeria and how conventional oil has affected the development drive of this huge resource. Nigeria's heavy dependence on bitumen import for local consumption is also taken into account.

Chapter Six presents a comprehensive GIS analysis of the geography of mineral production in Nigeria. It begins with a description based on the location of the various mining licences that are at different stages of development. Additionally, the chapter identifies the communities hosting mining to show the expansion of potential impacts. The chapter narrows down the scale of analysis to one of the local government areas hosting oil sands-demarcated blocks. The communities in this local government area were identified based on their distance from or proximity to the blocks. Some of these communities were then selected to form the case study for further in-depth research.

Chapter Seven presents the findings of the case study analysis. The chapter highlights the positive and negative socio-economic aspects of oil sands mining relating to the livelihood and local economy of the case study area. The chapter starts by piecing together geographic, historical and socio-economic information on the potential oil sands communities, in order to provide baseline information on the communities. The aim is to profile the communities and relate this to the conceptual/theoretical issues of ‘mining communities’ highlighted in Chapter Two. This chapter describes how community characteristics can affect resource development.

Chapter Eight explores the various environmental issues identified in the study area and their effects on the local community. It presents the thematic issues that emerged from the communities’ impressions about the adverse impacts of oil sands operations, thus helping to make sense of grassroots opposition to oil sands development. The chapter also undertakes an investigation of the changes that have occurred as a result of oil sands activities in the past. Communities’ needs and partnerships are also documented in the last section of the chapter.

Chapter Nine links the aims and objectives, literature review and the major themes that emerge from the research to present the conclusions to this research project. This last section of the thesis also considers the policy options based on the findings of the study and suggest possible areas of further/future research.

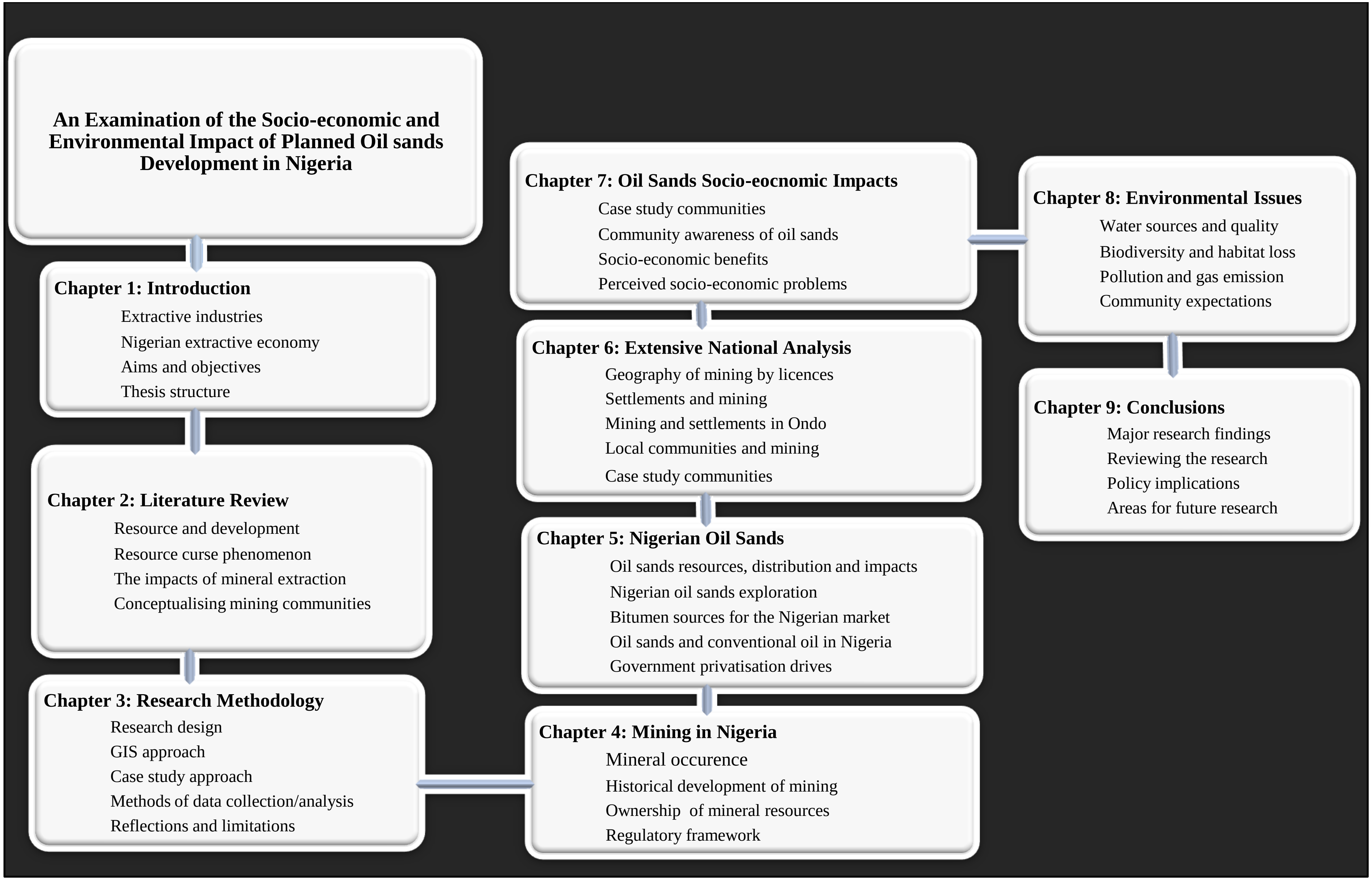


Figure 1.5 Layout of the thesis

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature on the concepts, theories, propositions and practices relating to the key aims of the research introduced in Chapter One. The major aim of the review is to pull together the relationship between 'resources' and 'development' in the literature and locate it within the Nigerian context. The first section of the chapter discusses the relationship between resource wealth and development. Part of this section includes the debate on resource depletion, followed by an examination of 'mineral economies' and how their mineral wealth affects their national economy. Section 2.3 elucidates the resource curse phenomenon, particularly within developing countries, with particular emphasis on Nigeria as a resource-cursed economy. The fourth section examines the local and national impacts of mineral development. The fifth section then introduces the concept of communities that host mineral extraction and their changing role as mining stakeholders. In identifying significant research gaps within the field, this last section further demonstrates the value and originality of the research presented in the thesis.

The sequence of the literature review proceeds from a broader perspective to a narrower focus that matches the aims of the thesis. This chapter contains varied sources of theoretical and contextual discussions; further references are contained in subsequent chapters as applicable, and the wider findings of the chapters are integrated in Chapter Nine. The first section of this chapter addresses the importance of mineral resources to development.

2.2 Mineral Resources and Development

Mineral resources are by nature the most common form of non-renewable resources that are extracted as primary products, e.g. metallic minerals (lead, zinc, iron ore, diamond, gold) hydrocarbons in solid, liquid and gas states of matter (bitumen, oil, gas) and aggregates/industrial minerals (gypsum, limestone, granite, phosphate). Adequate, affordable and secure access to mineral resources is regarded by Bradshaw (2010:2) as the lifeblood of a modern society. This means minerals should be a blessing provided by nature to be used to better the lot of a nation and its citizens. Highley et al. (2004:5) note that manufacturing of industrial and consumer products, military and energy equipment, and other services too numerous to mention, is made possible; but remains highly dependent upon the availability and reliable supply of mineral resources.

Mineral resources play an important role in human existence. A survey by the British Geological Survey (2005) estimated that each person in the United Kingdom, for example, would need a lifetime supply of over 560 tons of salt, sand, stone, gravel, coal, and iron ore. While some basic and essential minerals required for human existence may be abundant, others are in short supply, and the amount available for exploitation is even smaller. Strategic minerals are primary products (e.g. bauxite, chromium, uranium, platinum, diamond and cobalt, etc) that are needed in meeting technological, industrial, military, and energy requirements. Strategic minerals are crucial for the technological innovations and advancement of the EU, without which

> The EU will not master the shift towards sustainable production and environmental-friendly products without such high tech metals. These metals play a critical role in the development of innovative environmental technologies for boosting energy efficiency and reducing greenhouse gas emissions. Hydrogen-fuel based cars require platinum-based catalysts. Electric-hybrid cars need lithium batteries and rhenium super alloys are an indispensible input for modern aircraft production (Commission of the European Communities, 2008:3)

The key drivers for resource demand are population and economic growth, with associated urbanisation, rising standards of living, construction activity and infrastructure, metals and energy-intensive manufacturing and industrialisation. By 2015, emerging countries will need more commodities to fuel their development and infrastructure growth. The so-called BRIC (Brazil, Russia, India and China) alone are expected to consume about 121 per cent of oil, 140 per cent of aluminium and 105 per cent of copper by 2015 (Friedland, 2008). Similarly, advances in technology are related to the increase in demand for platinum. Diesel/hydrogen cars are being considered for the future to reduce carbon emission and reduce the rate of fuel consumption. To realise this goal, the demand for platinum as a raw material is on the rise, resulting in increasing prices. Another important key driver for resource demand is the global agenda for development. The eight Millennium Development Goals (MDGs) adopted in 2000 to eradicate poverty by 2015 require huge supplies of mineral resources for the provision of clean water, sanitation and healthcare, transport and telecommunications services, and power for heating, cooking and industrialisation (OECD/IEA, 2010). To meet these goals in an era of declining conventional oil reserves, new frontiers like ultra-deep water and the Arctic, or unconventional and dirtier forms of fossil fuels such as the oil sands are being developed. The result is growing demand that is fuelling the dramatic increase in greenhouse gas emissions that cause climate change.

Unlike earlier periods of mineral boom, growth in mineral demand has shifted geographically. The demand for minerals is mainly from the developing countries. Mineral supply to non-OECDs has increased tremendously as economic growth in these countries is more heavily reliant on mineral resources than is the case in OECD countries. China, India and the Middle East are identified as the main locus of demand, because their economies are currently in a "resource-intensive growth phase" (UNCTAD, 2007:88). During the cyclical era of mineral boom, exporting countries benefit immensely from high mineral prices, and market capitalisation of mining companies has followed the same trend – i.e. looking for opportunities to expand production and intensify exploration. Those countries whose economies depend on their mineral wealth see the prospect of having greater revenue to finance their societies. Australia benefitted from mineral export, earning up to AUD59.2 billion in 2006 alone (ICMM et al., 2007). Meanwhile the cumulative net profit of Rio Tinto, BHP Billiton and Anglo American rose by about 15 per cent (from US$4.3 to US$26.9 billion) in 2006. Mining companies from China, Russia and Brazil are also in the race to the margins in exploring for and investing in basic metals and fuel minerals from resource-rich countries (Varcoe, 2011).

According to the Financial Times of London (Mahtani, 2008:1), there is currently a "new scramble for Africa's resources" ranging from conventional to unconventional oils by small start-up companies to multinational extractive industries. New frontiers for oil are Ghana and Uganda and the discovery of oil sands in Madagascar, Congo and Nigeria corroborate this assertion. In 2007, China offered a loan of US$5 billion to DRC for the development of its infrastructure in return for cobalt and copper. In reaction to this rush for finite resources and the accompanying unfolding energy crisis, in 2007 the G8 summit put global energy security and climate change at the top of the international political agenda. The selection of oil sands for the study reflects its growing importance in meeting global energy challenges and Nigeria's quest to develop its huge oil sands resource (see Adelman and Lynch, 1997; Bradshaw, 2010; Campbell and Heapes, 2008; CERA, 2009; Deffeyes, 2005; Huber and Mills, 2005 and Odell, 2004 for debate on the energy dilemma, resource depletion and global energy security). This is based on the evidence suggesting that Nigeria's oil economy has not performed well over the last five decades. If the development of oil sands might not benefit the immediate surrounding communities, the country is better off leaving oil sands in the ground. The next section considers the criteria for identifying countries that rely on mineral resources for economic growth. This is to provide a theoretical background for situating Nigeria within the category of mineral economies.

2.2.1 Mineral-Dependent Economies

The definition of a mineral economy is not merely dependent on the amount of resources available to a country, but also on the contribution of such resources in macro-economic terms. Ahrend (2005:4) defined resource-based economies as countries whose mineral revenues account for more than 10 per cent of GDP and 40 per cent of exports, although his definition fails to take into account diversity and heterogeneity of countries. Some countries largely depend on mineral exports, but they contribute less significantly to the GDP. The World Bank (2004) classified resource-rich countries as those in which extractive industries account for, or are expected to account for, more than 50 per cent of government revenues. This chapter relies on the IMF definition. More specifically, it defines mineral economies on the basis of: 1) the average share of hydrocarbon, and/or mineral revenues in total fiscal revenue of at least 25 per cent during the previous three years; and 2) on an average share of hydrocarbon and/or mineral export proceeds in total export proceeds of at least 25 per cent during the previous three years (EITI, 2005:4). This definition suggests that almost all African countries are either mineral economies, emerging mineral economies or economies with significant mineral potential. Nigeria, together with Botswana, Angola, South Africa and Liberia, falls into the category of mineral economies: each of these countries has an extractive economy that relies on mineral revenue. Nigerian oil accounted for 96 per cent export revenues, 90 per cent foreign exchange earnings, over 85 per cent government revenues and about 50 per cent of GDP (USEIA, 2009; Watts, 2008).

Similar to Nigeria, the Saudi Arabian petroleum sector accounts for 45 per cent of GDP and 90 per cent of export (USEIA, 2009). The hydrocarbon sector in Libya accounts for 70 per cent of the GDP, 93 per cent of government revenues and 95 per cent of export earnings (Edwik, 2007). Emerging mineral economies including Tanzania, Ghana, Mali and Democratic Republic of the Congo have high-value gold, copper and diamond reserves, but are yet to realise the full potential of their resources. Mozambique and Namibia have resource potential; however, they are not yet at the stage where they can be considered mineral economies (Solomon, 2000). Botswana and South Africa are diversifying their economies from the extractive sector as the overriding contributor to the national economy. Australia, Chile, the United States and Canada are mineral economies but they do not fit into the definitions of the IMF and the World Bank (2004) because they have diversified economies.

The development literature suggests that resource-rich and mineral economies should, under normal situations, have some obvious advantages over resource-poor countries (Twerefou, 2009). First, revenues earned through mineral exports can generate wealth, thus allowing the purchase of essential goods and provision of services to the people. Second, processing of these minerals into finished or semi-finished goods can promote industrialisation with import substitution and competitive exports. Third, revenues from mineral resources can be used to finance human and physical development. On the negative side, mineral economies development experience slow economic growth mainly because of volatility of terms of trade (Ahrend, 2005; Auty, 1994); they have a low level of human development and include some of the poorest countries in the world. The contribution of resources to development in these countries has become subject to intense enquiry, which is a reflection of the complex issues surrounding mineral extraction, the challenge of maximising benefits, and the sustainable development of particularly local communities. This phenomenon, commonly known as the ‘resource curse’ or ‘paradox of plenty’, is captured in a large body of theoretical and empirical studies. The next part of this chapter examines more closely the transition from resource wealth to resource curse on the one hand, and economic performance on the other.

2.2.2 The Resource Curse Phenomenon

Resource endowment can bring huge wealth to countries and can be a valuable development asset. Considering the rising mineral prices and increasing revenue to resource-rich countries after the Second World War, this view was challenged, as it was observed that resource-rich countries grew more slowly than resource-poor countries (Auty and Warhusrst, 1993; Sachs and Warner, 1995). This gave rise to alternative views that resources are a ‘curse’ that hinder rather than promote economic sustainability in mineral economies (e.g. Auty, 1993; Davis, 1998). The conventional view argues that revenue from mineral wealth should generate substantial wealth for the economy, which would then translate into economic prosperity, just like the path taken by the developed nations. Proponents of this view, known as the “big push theorists” (e.g. Rosenstein-Rodan 1943; 1961), suggested that mineral endowment would industrialise the developing countries based on revenue windfalls from extractive activities. Likewise, Rostow’s (1960) third stage of the five-stage development model argued that the presence of abundant natural resources would allow developing countries to "take off" (a transitional stage) similar to Britain's course to development. No doubt, resources have historically played a vital role in the economic success of resource-rich countries, such as in Canada, Australia and the United States. However, the global economy has changed significantly since the nineteenth century, and assumptions based on historical analogy that all resource-rich countries will take the same path to development are misleading (Power, 2002).

Furthermore, the ICMM, UNCTAD and The World Bank (2006) and the ODI (2006) established that mineral extraction provides economic growth and poverty eradication opportunities to countries that are at their early stages of development. This was based on case studies where the mineral industry is bringing about economic prosperity. Surely the above are examples of countries that have managed to avoid the curse. For example, Ross (2001:62) admitted that "some states with large extractive industries - like Botswana, Chile and Malaysia - have overcome many of the obstacles …and implemented sound pro-poor strategies". Other similar instances include Indonesia (Temple, 2001) and Norway (Wright and Czelusta, 2002). Likewise, emerging oil economies such as Uganda, Peru, Tanzania and Ghana are likely to benefit from their resources if lessons are learnt from the above countries.

The alternative view is negative about the ability of mineral revenues to promote economic prosperity. While Auty was the first to use the term resource curse in economic literature to show why resource wealth hinders economic growth and development, Sachs and Warner (1995) are among the first authors to use cross-country evidence for the resource curse phenomenon. An earlier study by Auty (1991) found that per capita income of non-mineral producing nations is two to three times higher than that of the mineral economies. The publication of their evidence heralded the emergence of an extensive body of literature that sought to explain their findings (e.g. Atkinson and Hamilton, 2003; Auty, 2001; Gylfason, 2001; Ross, 1999) in different perspectives (e.g. Brunnschewiler, 2008; Stevens, 2003). Stijns (2001) and Stevens (2003) have questioned the robustness of the findings of Auty (2001), Gylfason (2001) and Ross (1999) on the basis of the definition of resource-intensity, and the time period chosen for their analysis. The resource curse thesis, however, offers a diverse set of explanations covering, amongst others, terms of trade effects, Dutch disease, internal conflict, human rights violation, debt overhang, institutional quality, corruption and rent-seeking behaviour, and other political economy arguments.

Currently, more complicated explanations are offered for the resource curse. Many analysts such as Collier and Hoeffler (2000), Ross (2003), Watts (2008) and Orogun (2010) consider the advent of oil wealth as a leading factor in poor economic performance and conflicts in 'Petrostates'. Nigeria, Venezuela, Sierra Leone, Angola, and Niger are common examples of mineral economies associated with poor economic growth, conflict and under-development. Friedman's, 'First Law of Petropolitics' deals with the political consequences of oil price increase (Friedman, 2006:29). As countries run out of oil rents they are becoming increasingly democratised with superior prospects for economic growth (Auty, 2004:13). Bahrain is the first Gulf State to overhaul its labour laws in accordance with international labour standards. The current unrest, however, may be linked to the Kingdom's relatively small oil and gas production revenue that is insufficient for public spending without raising taxes, and the ruling class was seen amassing the dwindling wealth at the expense of the majority of the country's 1.3 million inhabitants.

The transition to resource curse can be broken into behavioural, state-centred and social capital perspectives (Rosser, 2006) - Nigeria incorporates each of these. The behaviouralist perspective places blame on the attitude of rent-seeking political actors in the context of natural resource wealth (Jensen and Wantchekon, 2004; Lam and Wantchekon, 2003; 1987; Ross, 1999; UNDP, 2006). The concentration of capital ownership among political elites reproduces social inequalities between those inside the elite (mostly politicians) and those outside it. This explains why the already existing income inequalities tend to expand (Auty, 1994), as in the Nigerian situation described in Section 1.2. Omeje (2004) referred to an 'alliance of dominant social class forces' as contributing to the Nigerian resource curse, and which have continued to dictate and share power - neglecting their responsibilities to the people (Omeje, 2006:2).

Based on a mixture of cognitive, societal, and institutional arguments, state-centred explanations elucidate how over-reliance on resource rents can inhibit the development of sound economic policies, increase public spending through ill co-ordinated decisions, and result in less accountability and transparency (Auty, 2001; Ross, 1999). The state-centred explanation contends that oil extraction, for example, generates large streams of foreign exchange, and these large flows become the basis for patronage that supports dictatorship and autocracy, and less accountability to the societies they govern (Bray, 2003). The failures of governance and complete lack of public accountability can be one of the main reasons for the failure of resource wealth to translate into development. Part of the revenue surplus is used in suppressing opposition through tax policies (Ross, 1999). Mehlum (2002) considers reduction or elimination of taxes by governments in mineral economies as the commonest way of making people less likely to hold the government accountable.

There exist evidences to show that commodity price volatility has a negative effect on economic growth of mineral economies (e.g. Ploeg and Poelhekke, 2009; Santos, 2010). Instead of saving the excess revenue during the boom period for the future, the boom cycle encourages governments to initiate immediate, often short-term, unrealistic expenditures. This leads to a spending spree including embarking on high-cost infrastructure projects that may be financed by external debts. More importantly in this context, Palley (2006:5) argued, making unproductive investments and unplanned spending is the "vehicle for corruption and influence peddling. The net result is loss of fiscal discipline that contributes to inflation, the build-up of external indebtedness, and the development of cultures of corruption". This way, the Dutch disease sets in, because the additional wealth generated induces exchange rate volatility which, if uncontrolled, can harm domestic production in the long-run.

The social capital perspective argues that access to and the struggle for ownership of natural resources creates conflicts (Humphreys, 2005; Jensen and Watchenko, 2004; Lujala, 2003). Jensen and Watchenko (2004) make a further suggestion that the concentration of power among the few makes it rational for the opposition to pursue power through extra-constitutional means. Second, it gives rise to agitation over the acquisition of a fair share of the natural resources revenue. Third, separatist tendencies may arise with the feeling that resources revenue has been siphoned from the producing region to the capital or abroad. Ross (2006) suggests that conflict in resource-rich regions can emanate through insurgency or trade shocks. These views have in part led to conflict and instability in the Niger Delta (Obi, 2008; Orogun, 2010; Watts, 2004a, b, 2008; Xavier and Subramanian, 2003). The case study in the oil sands communities discloses the trepidation surrounding the possibility of heightening the Niger Delta crises because of the centralisation of the initial stage of oil sands activities, and the lack of consultation with the communities.

In addition to the social capital perspective, Amnesty International (2009) links decades of oil extraction in the Niger Delta to human rights violations/conflicts on account of environmental damage and pollution. First, the petroleum regulatory system in Nigeria is weak and deeply flawed. Second, there is a near absence of studies on the impacts of the oil extraction on the communities in relation to their health and livelihoods. Third, there is a lack of adequate measures to protect any human rights violation of the poor and deprived communities in the Niger Delta. In recent times, community grievances and environmental degradation have degenerated into violence (Müller, 2010). The region suffers "administrative neglect, crumbling social infrastructure and services, high unemployment, social deprivation, abject poverty, filth and squalor, and endemic conflict" (UNDP, 2006:9).

A number of solutions for transforming the resource curse into a blessing have being proffered. Several scholars have focused on sound economic policy changes (Auty, 1995; Collier and Hoeffler 2000), diversification (Adeloye and Ekwere, 2010; Solomon, 2000; Veit et al., 2011), the creation of stabilisation funds (Santos, 2010; Skancke, 2003), introduction of neo-liberal economic policies (Ross, 2003:200 and UNDP, 2006) and the reform of governance and social structures (Iimi, 2006; McPhail, 2008;

Woolcock et al., 2001:90). Other scholars have called for international intervention to reduce the curse (Bannon and Collier, 2003:10) and Auty (2004: 46) has supported the use of international certification processes, such as the Kimberley Process Certification Scheme. According to Müller (2010), the institutionalisation of best practices such as the EITI is a means to overcome lack of transparency and corruption in the management of resource wealth. Lastly, Gylfason (2001:850) suggested investment in human resources through education. Detailed explanations of these solutions to the resource curse are outside the scope of this study.

While the various suggestions outlined above can foster development in resource-rich countries of the developing world, they tend to centre at the national level, neglecting the communities where the resource economy hits the ground, and who are the ones that bear the brunt of the curse. A number of case studies highlight distribution of benefits at the local scale (e.g. Kapelus, 2002; Manteaw, 2007; Reed, 2002), but research about conditional communities - those that are awaiting the exploitation of new resources especially oil sands - is rare. Studies of this nature are contained in company reports or as part of EIAs or SIAs. One such example is the report on oil sands investment in the Congo Basin (Friends of the Earth Europe, 2009). This is a reflection that communities awaiting large-scale mining remain profoundly under-researched by development geographers. This study, however, concentrates on the local impacts of resource development, which attempts to provide a basis for the discussions on the potential impacts of mining development on local communities. The focus of the study on the communities extends the resource curse thesis by considering local issues that can hinder or help a national economy's ability to manage resources for development.

2.3 The Impacts of Mineral Extraction

It is true that minerals are used to satisfy some basic (or otherwise) needs of humanity which include transfer of technology, increasing productivity, the generation of employment and skills, generation of income and industrialisation (Bradshaw, 2005; Bridge 2004b; UNCTAD, 2007; World Bank, 2008). It is also true that mining is destroying the livelihoods and environments of those citizens of humanity at the receiving end (Fonseca, 2004) – all of which can be associated with oil sands production. These impacts depend upon the nature of mining operation, the size of the project, type of mineral being extracted, type of exploitation method and the life span, the nature and sensitivity of the surrounding physical and social environment and the effectiveness of planning, pollution prevention, mitigation and control techniques. According to Noronha (2001), and the World Bank and the IFC (2002), the impacts are inherently detrimental to the communities that are in close proximity to newly established mines or those that are closing down. Taking advantage of mining opportunities at the same time as coping with negative impacts can be daunting to communities that have no history mining, such as those covered by this study.

The impact, whether positive or negative, can vary significantly, depending on the management of the mines and the implementation of the legal and regulatory frameworks put in place. Kemp (2009) added that the communities become more vulnerable when governments fail to adequately protect them. The stage of the life cycle of the mining project is another important determinant of its impact. Researchers have shown that the most useful approach in assessing the impact of mining is to consider the various stages of development - from conceptualisation to remediation (Eggert, 2010; Elliot, 2003; Fonseca, 2004). Before mineral resources are harnessed they have to pass through certain phases (Adekoya, 2003), but each stage gives rise to particular impacts in terms of scale and intensity.

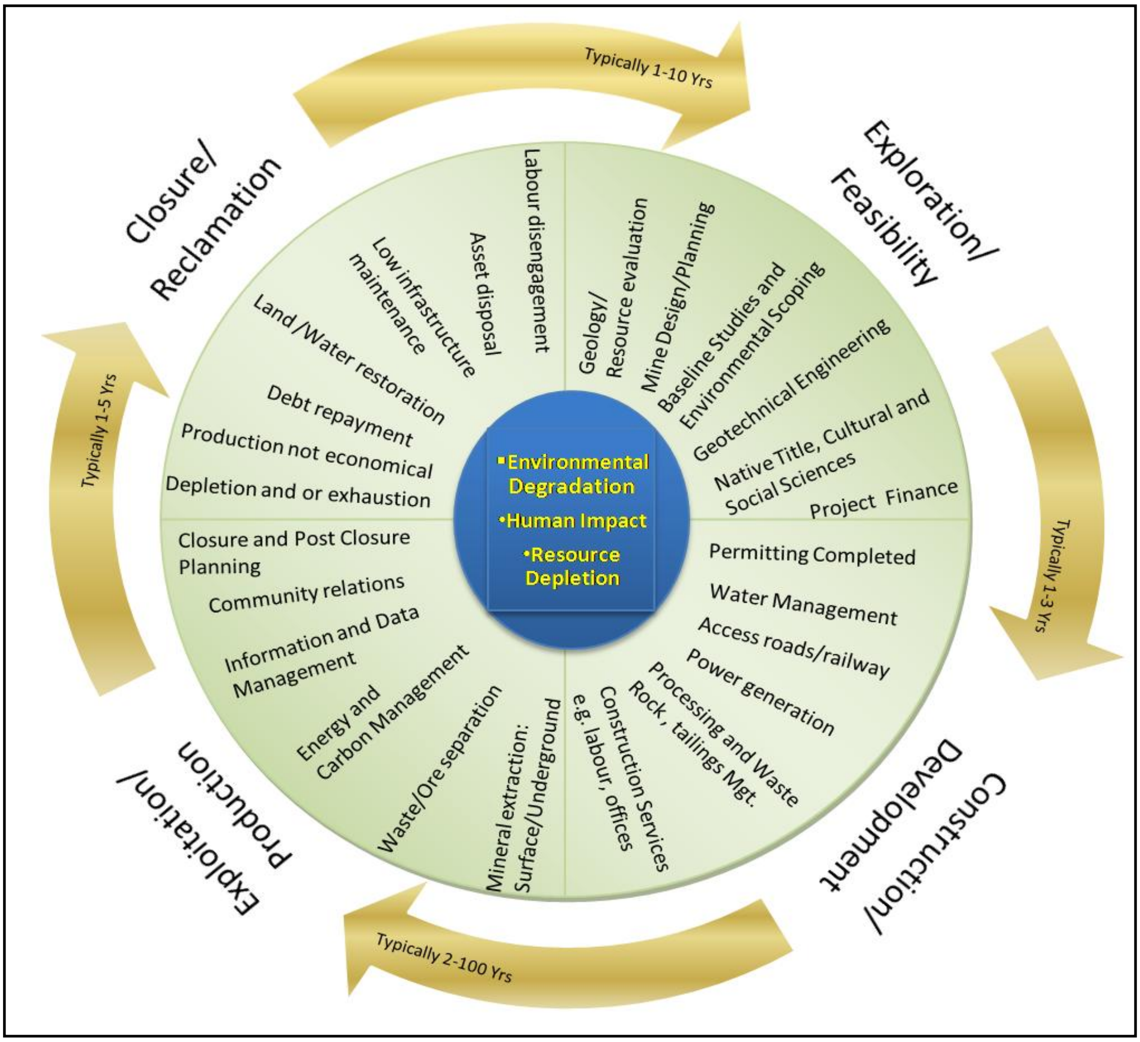


Figure 2.1 The stages of the mining cycle.

The phases of the mining cycle can broadly be classified into prospecting and exploration, mine construction and development, exploitation and production, and closure and reclamation (Figure 2.1). In the exploration phase investigative studies are conducted to identify large areas that may have a certain type of ore deposit and determine if it could be developed as a resource. The benefits and risks at this stage are not as significant as in later phases of the mining cycle, but are critical in identifying communities in the vicinity of the exploration title. This stage is often the first contact between the communities and the company. Luning (2010) argues that responsible relations with communities have to be created and negotiated from the outset of exploration. Thus relationships should be established with the communities so that they can learn about the basic impact of mining operation in their area even though enormous uncertainty exists during this stage (DPI, 2008; Gibson, 2001). The lack of community relations at this stage can have longer-term effect on the mine and may disrupt later stages of mine development.

The construction/development stage is characterised by opening remote areas, heavy movements, construction of infrastructures and stimulating migration to the locality. This stage, although short, has long-term impacts by causing social and physical upheaval (MMSD, 2002). This is the most expensive phase of the mining cycle; at this stage issues relating to access, water, land, mineral rights and rents, finance, labour force, equipment and environmental studies should have being concluded. Actual mining begins at this stage and the choice of mining methods depends on the characteristics of the ore body, environmental restrictions, safety and geotechnical challenges and economics. After excavation, ore bodies undergo processing to separate them from gangue (waste) materials. The real impact of mining begins to emerge at this phase with often short-term benefits on the communities and the surrounding environment. Mine closure and reclamation is the process of reforming the land surface and related surroundings to a condition similar to its original state before commencement of mining. It is the final stage in the operation of most mines (Hatmen and Mutmansky, 2002) principally due to depletion and or exhaustion of the ore, or when production is no longer economic in the present economic circumstances, the latter being the most common. The impact of this stage is largely dependent on the initial plan drawn up in the first stage and the resources available to sustain it.

Recent debates about mining sustainability have centred on the long-term sustenance of the local economy after mine closure (Evans, 2006). According to Veiga et al. (2002), a sustainable mining community is one that benefits from mining operations; from the planning stage to the start of operations, through the life of mine operations and at the point of mine closure. In addition to factors already mentioned, the actual or perceived impact on local communities also depends on the process of community relations, the role of governments at all levels and other stakeholders (MMSD, 2002). The next section focuses mainly on the impact of mining at the local scale in order to appreciate the potential impacts and the perceptions of communities of mining. With increasing interest in the development of Nigerian oil sands which is now at the exploration stage, it is vital to study the likely socio-economic impacts (displacement, destruction of livelihood resources, employment opportunities) and environmental impacts (pollution, loss of water and biodiversity) in the communities where oil sands is to be exploited, then plan on how to manage risks throughout the life of the mine.

2.3.1 Social, Economic and Environmental Impacts of Mining

The purpose of this section is to review briefly the literature with regard to social, economic and environmental impacts from mining, at both the national and local community levels. These impacts make it almost impossible for communities to experience positive gains from the sector. The following discussion summarises those social, economic and environmental issues that formed the basis for the study of communities in planned oil sands extraction in Nigeria.

Social Impacts

Simply, social impacts are any mining-related change in the way that people live, work, relate and arrange to a common goal in a community. The impact can also cause changes in values, norms and beliefs systems, and social organisation. The impacts at the community level are both positive and negative, which will be felt in the short-term or long-term depending on the cycle of development. Some of the costs that come with mining are summed up by Fonseca (2004:23) as: "appropriation of the land belonging to the local communities, impacts on health, alteration of social relationships, destruction of forms of community subsistence and life, social disintegration, radical and abrupt changes in regional cultures, displacement of other present and/or future local economic activities". In addition, social impacts result in social ills (alcoholism, promiscuity, drug abuse, women and child abuse and the spread of HIV/AIDS among others), an increase in violent crimes and idleness. Worse still, local communities bear uncompensated loss of farmlands and other means of livelihood due to weak environmental management and mismanagement of mining revenues.

The fear of the social risks associated with mining has become a major global concern of late. The industry is obliged to adopt recognised standards to minimise social risks and to adopt a proactive approach to social issues throughout all phases of operations. Perhaps the IIED (2002) was the first major industry-wide attempt at understanding the challenges faced by the industry (e.g. use, control, impacts and management), and setting an agenda for change (e.g. partnerships, best practices, management of impacts). While mining companies have adopted some of the agendas for change, the report has also drawn some disapproval (see Whitmore, 2006).

Case studies of the failure to incorporate social impacts into mines' plan and operational processes have been well documented and an ample body of literature exists on this topic. For example, the Bougainville open cast copper mine in Papua New Guinea closed in 1999 as a result of land conflict with the host community. Conflict with indigenous people can lead to abandonment and even a change in national legislation, as in the case of the Marcopper tailings spill in Philippines. Muradian et al. (2003) reported a conflict between a Canadian mining company and the local people. As social awareness increases, debates are focused on the decision about 'by whom', 'when' and 'under what conditions' mining should be allowed. The Ok Tedi mine in Papua New Guinea (PNG) is a case where a viable answer has not been found in balancing the country's drive for economic prosperity and the long-term policy to protect the environment of local communities. Bastida (2001) reported that the World Bank recommended the shutdown of the Ok Tedi mine because of tailings and waste rock disposal into river systems, but the PNG government decided to allow the running of the mine in order to mitigate the devastating economic consequences of closure.

In recent times, the management of social issues in the mining industry has culminated in the form of community engagement practices. One strategy for success is to obtain a 'social licence to operate'. A social licence to operate includes, among other criteria, acquiring free, prior and informed consent from potential host communities (Salim, 2003). This process is now a global mandatory requirement of the permitting process to give communities the leverage to negotiate conditions of resource extraction in the short- to long-term. Some of these conditions are covered later on in the thesis. A body of literature (e.g. Esteves, 2008; Porter and Kramer, 2006) has focused on evolving guidelines to drive companies towards engaging with the communities as part of their social responsibilities. Doing so can potentially reduce conflict tendency and facilitate permitting and exploration, project development and production. Social concerns are not treated in isolation, but are integrated into economic and environmental issues.

Economic Impacts

The level of economic benefits that communities derive differs considerably from case to case. Rather than provide a catalogue of case studies, this section presents the economic gains of mining to the local economy and how it has changed overtime. Mining has the potential to create significant direct economic benefits in the generation of employment and skills, increasing income to the host country/region and the enhancement of domestic firms (Bradshaw, 2005; Bridge 2004b; UNCTAD, 2007). Mining can also contribute indirectly through linkages with the rest of the economy. Ritter (2000) considers employment creation and income generation as having the most important direct economic impact at the local level. The local community's ability to capture some or more of these benefits is dependent on: 1) the scale of the mine and the maturity of the mineral project, and 2) the pre-existing community, its size, and the range of economic activities already undertaken there (Ritter, 2000:5). These factors form the basis for undertaking a baseline study of the case study communities to understand the dynamics of the communities that are potential hosts to oil sands extraction in Nigeria.

The connection between mining and the rest of the economy is referred to as linkages (Auty, n.d.; Eggert, 2002). Specifically, economic impacts emerged from the 'enclave model' or 'export base model' of Hirschman (1977) through backward, forward, final-demand and fiscal linkages. Backward linkages occur when a mine purchases goods and services or production inputs (such as retail shops, recreational services, automotive repairs and sales, personal services, financial services and local processing of food and drink) from local suppliers within the territory of its activities. Forward linkages represent the downstream sector of mining, including refining, smelting and polishing of the manufactured product prior to export or transport to local market. Backward or forward linkages inject competition, reduce production costs and create innovation and change in technology that leads to greater economic benefits. Final-demand linkages are the activities that respond to the spending of the income and wages earned from mine labour and other services. Restaurants, groceries, clothing and retail shops are examples of goods and services that are set up to cater for the mine community. Fiscal linkage represents spending of revenues in the development of infrastructure and the purchase of other goods by the government.

The common case for poor linkages with local productive structures is partly caused by the non-availability of sourcing expertise or materials. For example, a mining project requires specialised inputs; as such mining services in Ghana are dominated by foreign firms because of local industries' inability to provide complex project services such as steel work, electrical services, plumbing, ventilation repair and servicing of heavy-duty machines (Appiah-Adu, 1999). In an attempt to maximise the business linkages of resource extraction, the Nigerian government initiated a 'Local Content Act', this is a systematic means of adding value to the economy by utilising Nigerian human and material resources, with the goal of stimulating local production of goods and services in the petroleum industry (Nwaokoro, 2011). Infrastructure that benefits local communities in Nigeria, as elsewhere, is planned and executed in the life cycle of the mine; once it closes local authorities are finding it difficult to take on the responsibility of maintenance. Infrastructure can also be left under-utilised or allowed to fallow when a mine is closed (Dung-Gwom, 2007). In this instance, Jackson (2002) recommends that infrastructural benefits should be negotiated prior to mining operations, so that the responsibility of maintenance after mine closure is defined and documented.

The concerns about mining enclaves have raised questions about how to provide appropriate compensation; how to invest mineral wealth in other forms of capital that can sustain the community after the mine; and how to create resources consistent with environmental and social values (Eggert, 2002: 35). All these issues are contained in the sustainable-development model, which considers the finite nature of mineral resources and the long-term survival of communities. For example, some communities in Jos have disappeared or declined as tin mines have closed (Dung-Gwom, 2007). Such a phenomenon of allowing resource communities to become 'ghost towns' is heavily contested (e.g. Azapaic, 2004; Hilson and Murck, 2000; Kitula, 2005; Soderbaum, 2007:207). The point here is that mining can disrupt the economic activity it has created, causing damage to the local environment, dislocating traditional lifestyles and affecting the ecosystem.

Environmental Impacts

Mining can directly impact the environment through the value chain activities - exploration and feasibility; construction and development; ore extraction, separation and dressing; refining; transportation; closure and reclamation (Twerefou, 2009). Until recently, the most commonly shared opinion of research on the environmental impact of mining has been that environmental impacts are localised as mines occupy a small area of land when compared to the scale of other land uses, such as forestry and agriculture

(Hodge, 1995). However, a growing number of research studies on the environmental impacts of mining challenge this view of mining as a localised activity with isolated environmental impacts (Bridge, 2004a; McAllister et al., 2001; Miranda et al., 2003).

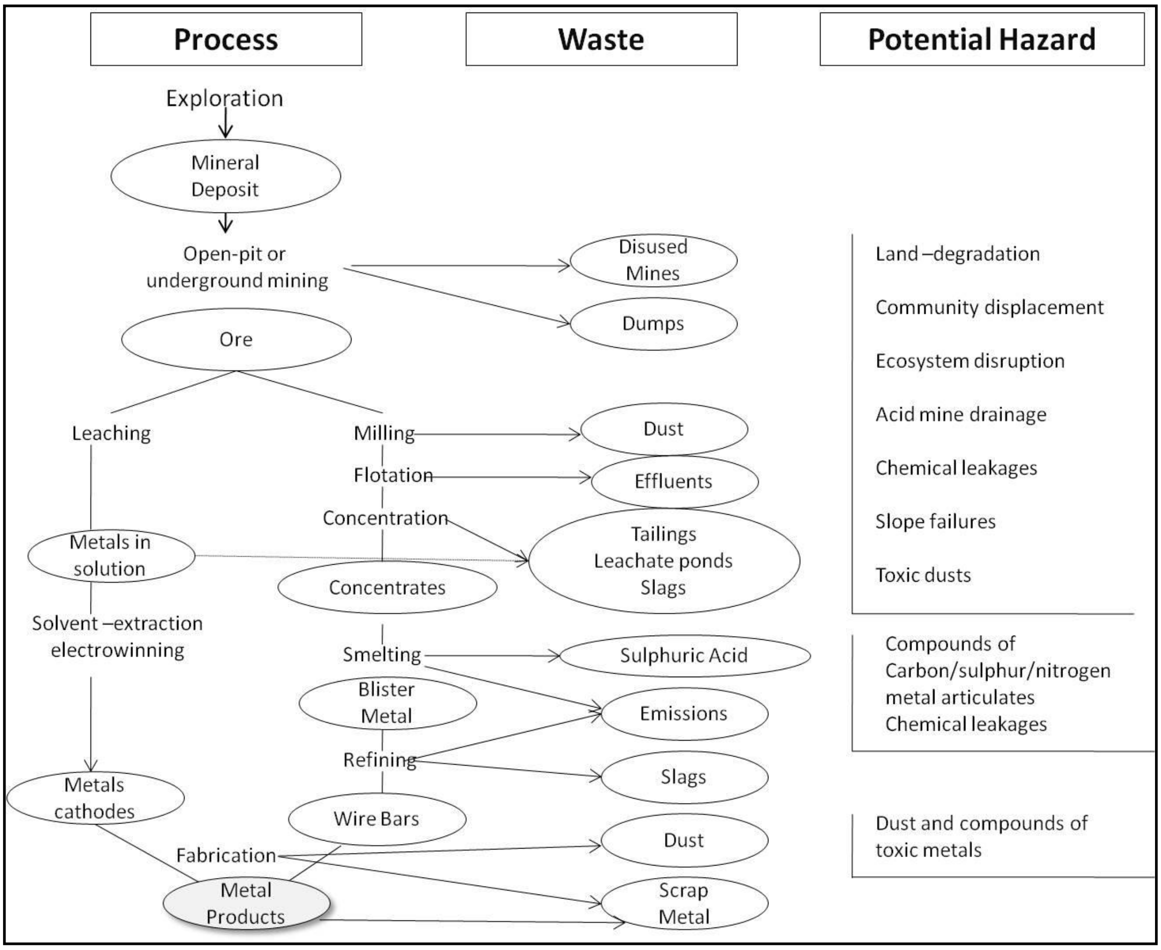


Figure 2.2 Waste and potential hazards of metals mining. Source: Modified from Bridge (2004a: 211, adapted from Warhurst 1994)

The geology and chemical characteristics of the mineral extraction techniques and the size of the mine are critical to the level of environmental impact, the larger the mine the greater and more widespread the impacts. Proximity of the mine to habitation and economic activities such as agriculture, fisheries and sources of water also determines the extent of the impact (Miranda et al., 2003; MMSD, 2002; UNCTAD, 2007). As Figure 2.2 above indicates, environmental consequences are not static - they change in terms of scale and intensity from exploration to mine closure, often with long-term effects (Fonseca, 2004). To Ritter (2000:5), the "remoteness" or the location of the mine relative to communities is of paramount importance to the scale of its environmental impact. A study by Bridge (2004a) found that increasing investments in Peru, Chile and Indonesia have spurred mining-related impacts. The fear of negative environmental consequences often triggers rejection and political opposition by locals who see themselves as the first to bear the negative impacts (Bridge, 2008).

Global geographical shifts in the expansion of mineral projects to meet global demand, and industry best practice have further intensified scrutiny about the impacts of mining (from local→ regional→ global) on biodiversity and ecosystem viability. The interplay between demand, supply and price significantly affects the closure phase of a mineral project. A prolonged slump in commodity price in the worst case can result in the termination of production before the reclamation stage is reached. The sudden closure of a mine, as in the case of some settlements in Jos, Nigeria leads to the sudden end of the economic opportunities it has created and significantly increased poverty levels. Mineral economies with weak institutions and environmental laws are even more vulnerable to the negative environmental impacts caused by any sudden mine closure. Because of weak environmental regulations about sudden closure and poor monitoring, in the late 1990s, the Namibian government and the host communities suffered sudden closure and withdrawal of foreign mining investors without notice (Weber-Fahr, 2001).

Mining is a generator of waste, in many cases contributing significantly to the total waste output of a particular nation. For example, gold and silver generate more waste because the waste-to-ore ratio is higher than in iron ore mining. The impact of waste is often more evident and visible with open-pit mines than with underground mines

(Matthews et al., 2000:107; Sampat, 2003). Air pollution in the form of dust from transportation, and dust from rock blast and waste disposal can easily be inhaled. The removal of vegetation alters the availability of food and shelter for wildlife. In turn this impacts on biodiversity by changing species' composition and structure. For example, acid drainage and high metal concentrations in rivers generally results in an impoverished aquatic environment for fish. Destruction of habitats that host traditional medicines can weaken a community's health and identity (MMSD, 2002:207). Hazardous chemicals such as cyanide, concentrated acids and alkaline compounds used in processing metal, no matter how well controlled, usually end up one way or another in the hydrological system. These chemicals destroy fish stocks, thus depriving the locals of a major source of livelihood, and can render the soil unproductive. Road construction, buildings, tailings dams, deforestation and other human activities all modify the nature of the local environment (see Ashton et al. 2001; Bridge, 2008; IIED,2002; Marcus, 1997 for more comprehensive reviews on environmental impacts of mining) There are countless case studies on the environmental impact of mining on communities which cannot be addressed in this thesis because of space limitations (e.g. IIED 2002; Fonseca, 2004; Jenkens and Yakovleva, 2006; Kitula, 2006)

When mines close down either due to minerals depletion or the fact that falling prices have made it uneconomical to continue the resultant impacts can persist for centuries or even millennia (Miningwatch, 2001). The importance of the industry to modern society underscores the need to promote improved environmental management in operations and to minimise the negative social and economic impacts. These factors therefore compel mining stakeholders to genuinely evaluate environmental issues at the community level in advance of mine development.

2.4 The Role of Stakeholders in Mineral Extraction

Identifying mining stakeholders is a prerequisite for enhancing mining's contribution to sustainable development (Azapagic, 2004), but working out the boundaries of rights and responsibilities is a challenge (MMSD, 2002). The roles of each stakeholder will depend on local conditions and the stage of the mining cycle. Indeed, the identification of communities as stakeholders is a 'best practice' that should be considered during the early stages of the mining cycle (ESMAP et al., 2005). This provides the case for the regulator, operator and host, as core stakeholders, to ensure a balance between the needs of the society, economic growth and environmental protection (Clark and Clark, 1999; UNCTAD, 2007). As indicated in Figure 2.3, major stakeholders include government, industry, communities, civil societies/NGOs, and financiers; others sub-sets include contractors, shareholders, customers and insurers. This section concentrates on government, industry, and civil societies. Section 2.5.1 concentrates on mining communities.

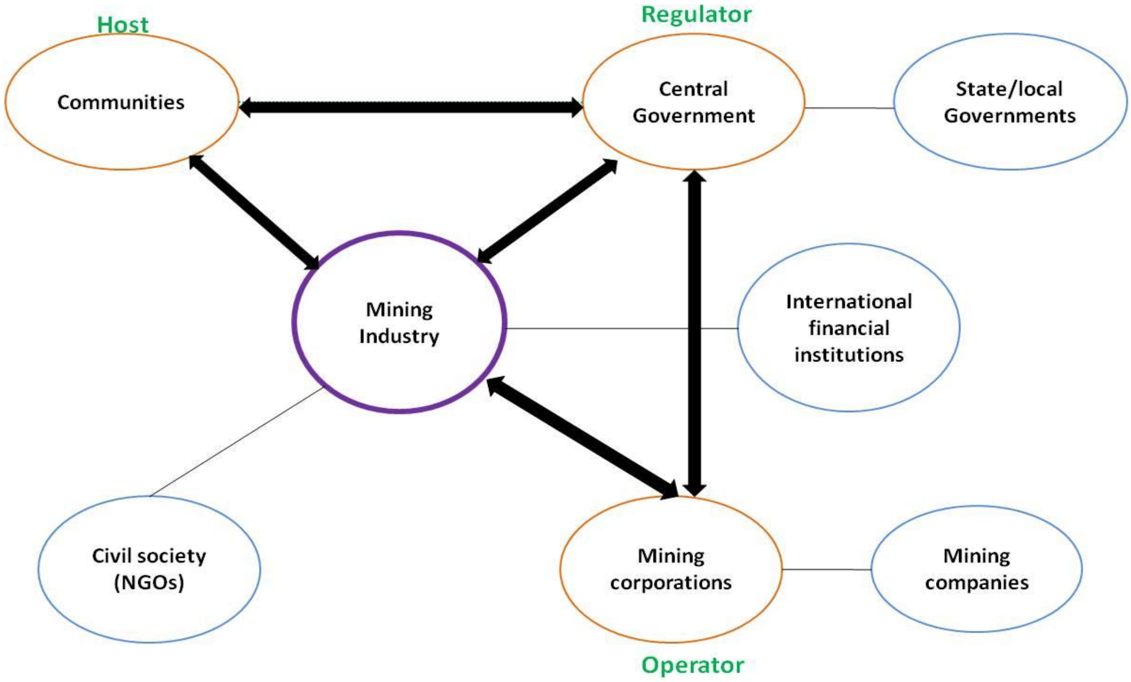


Figure 2.3 The association of mining stakeholders.

Governments at all levels have key responsibility for ensuring that the rights of all citizens are respected and the environment is protected (MMSD, 2001). The role of government in mining is not different to that of its broader responsibilities to the people (ECA, 2002; Eggert, 2001); the only difference is the need to ensure the sustainability of communities dependent on mining as a source of livelihood. More specifically, these responsibilities as contained in the World Bank's (1997: Part Three) five fundamental roles of government for economic and sustainable development are: 1) a foundation of law and property rights; 2) a non-distortionary policy environment, including macroeconomic stability; 3) investment in basic social services and infrastructure; 4) protection of the vulnerable, and 5) protecting the environment.

In this light, governments should set policy and standards for monitoring and evaluation of mineral projects and protecting communities from negative outcomes. For instance, mineral economies, such as Nigeria, have reshaped their policies in order to attract investments, with priority given to private ownership with government adopting the role of regulator. On social services and infrastructure investment, government at all levels - local, regional and national - need to be capable of providing social and physical infrastructure or at least subsidising them. As mining often occurs in locations that are home to poor and vulnerable people (Kemp, 2009), those affected need government protection of their right to livelihoods. Governments have a key role in setting environmental standards through best practice environmental management and ensuring that mining projects meet these. In the case of failure, weak regulation or non-enforcement and monitoring of rules, the government is directly or indirectly responsible for meeting the costs of environmental mismanagement. As such, assessment of environmental and social impact prior to implementing any project becomes an obligation.

According to Eggert (2001), mining industries are only able to create mineral wealth when government establishes a framework to develop them. For mining companies to maximise profit, the creation of the resources must be in a manner consistent with local conditions and global best practice. However, it is not a best practice for mining projects to simply conform to government regulations without measuring whether those regulations either adequately protect the environment or meet international standards. Where there is weak government capacity, the MMSD (2002) advised mining companies to coordinate with NGOs rather than do everything independently. Interacting with communities is regarded as a potential source of company profitability in what way exactly? (Eggert, 2001).

Over the last two to three decades, the ground rules for mineral projects have shifted significantly: the government's role in mining is changing from an owner to a regulator, and civil societies expect environmental responsibility and relationship with local communities (The World Bank and ICMM, 2005). Such policy shifts now pressure and compel mineral projects to obtain a 'social licence' to operate - a means for local communities to be informed, to participate and to monitor and measure project performance throughout the mining life cycle (see Azapagic, 2004; Jenkins and Yakovleve, 2006; Salim, 2003 Veiga, 2001). While it is possible for a company to assume a leadership role in establishing community responsibilities, they should not have to take on the role of government at the local level. For instance, a study by Aroca (2001) revealed that the community projects initiated by companies operating in the

Chilean II region made the host government less responsive to providing infrastructure to these communities.

Mining communities are becoming an integral part of the mining cycle, and ideally [not in every case] continue to enjoy the services provided by the companies in the form of access to wealth through employment, and the provision of education, health, water and sanitation. Community relations are an integral part of the permitting process in Nigeria, Ghana and South Africa. Elsewhere, policies on community as a whole and community relations are included in national mining regulations. In Indonesia, for example, the licence holder must plan for the community beyond the lifespan of the mine. Peru, Argentina, Columbia, the Philippines and Chile are all intermittently refining legislation or regulation to address social impacts. Section 2.4.1 has provided detailed review of the literature on communities.

Since the 1990s, NGOs/civil societies have often located themselves between the state, the community and the company concerned to serve as a pressure group for cleaner production, improved environmental performance, community relations, and transparency in relation to revenue (refer to Box 1.1 for examples of international NGOs that provide guidance for best practice). Whether local or international, NGOs that focus their attention on mineral extraction often exert influence on the host community and the providers of project finance. Bridge (2008) noted that NGOs have been successful in the formation of institutional initiatives that assess the financial risks of social and environmental impacts of mining for lenders. Some of these initiatives have led to the formation of the EITI, the UNESCO Conventions and the Equator Principles – most of which now serve as best practice templates for the mining industry.

Furthermore, the rapid increase in social considerations and environmental liabilities now represent significant risk factors in project finance. Financial and multilateral institutions and the underwriting agencies such as the OPIC, the MIGA and the IFC are now attaching loan approval to environmental and social performances. The focus of NGOs at the community level should, according to Strongman, 1998 in Eggert (2001:60) are to "develop mechanisms to resolve internal conflict; develop good leaders; avoid a culture of dependence (or a handout mentality); build up infrastructural assets, and start early to plan for mine closure". These issues clearly extend the case for relating with communities in the distribution of the wealth derived from a mineral project located on their doorstep.

2.4.1 Conceptualising Mining Communities

As already indicated in Section 2.3, mining is a localised activity and is typically situated within rural and remote areas, where people live and make use of land for agriculture and other means of livelihood, where the forest is not interfered with and biodiversity is not disturbed. Mining can also be associated with the history and development of local communities around the world. There are a number of examples where communities have grown from mining; prominent among them are Antofagasta in northern Chile, Victoria in Western Australia, Rocky Mountains in the USA, Johannesburg in South Africa, Kiruna in Sweden, Jos and Enugu in Nigeria and the city of Noril'sk above the Artic Circle in Russia. Mining in any such community can have significant socio-economic and environmental impacts on the local population, including those neighbouring the mine sites and those that provide accommodation to migrant workers. The whole notion of community in the social sciences is complex and highly contested (Helen et al., 2002; Jenkins, 2004; Kapelus, 2002); as such this literature review does not focus on the debate. The terms 'neighbour', 'community', 'public', 'camp', 'village', 'host' and 'resource town' are variously used to refer to people who are affected by mining or have an interest in mining (Cheney et al., 2002:5). For example, Veiga et al (2001) define mining communities by association and impact: a mining community is any area where the population is affected by a nearby mining operation. This definition was based on an existing operation, while excluding those communities that are at the planning and construction stages of mining operation.

Furthermore, the classification of mining communities was developed by the International Institute for Environment and Development (IIED) in its 2002 report titled '*Breaking New Grounds'*. The Best Practices statement of the IIED divided mining communities into occupational, residential and indigenous communities. Occupational communities comprise households that depend on their earnings from the mine. As a consequence this group has to seek alternative survival strategies once the mine closes. Residential communities either emerge with the operation of the mine or are in existence well before the mine's development. This group, either in close proximity or farther away, is affected by the activities of the mine. These communities can host mine workers and mine facilities. Environmental mismanagement can directly and easily affect these communities, such as through water pollution and dust; thus information about potential impacts may influence the decision-making process. Indigenous communities are local people who have special attachments to their ancient lands and cultural affinity endemic to their territories prior to and after the discovery of resources in their locality (MMSD, 2002:200). Presumably these 3 groups are not mutually exclusive, but can overlap.

Geographic location of host communities relative to the mining area is significant in determining the scale of impacts (Department of Energy and Resource Management, 2011). Thus the mining industry typically defines communities in geographic and homogenous terms (AccountAbility and BSR, 2004). The definitions can vary according to the size of the company but are usually based on those communities that are within the impact zone of operation. Depending on the situation, a community can also include landowners at the periphery, potential for linkages in the downstream and the company's objective of a community development programme. For example, the IFC (2000) sets out how a mining company in Namibia chose to define the whole country as its 'community' to fulfil its obligations to the whole country rather than just a few neighbouring communities. In a different manner, a mining company in South Africa defines communities within a 50-kilometre radius of its operations. This delineation based on geographic terms enabled the company to work with communities within the vicinity of their operational licence. Luning (2010) argued that those communities facing the damage from mining operations are often located further away. To illustrate this point, Luning quoted Townsen and Townsend's (2004) case studies about communities that suffer from mine operations but are not classified as a mining community by a company. The vast majority of communities that suffer from tin mining in Nigeria are located downstream. Again the litigation case against BHP's Ok Tedi mine was brought by those communities outside the impact zone, whose land has being affected.

The above definitions and categorisations are not mutually exclusive and change over time depending on the nature, characteristics and stage of mining operations. The IIED classification has not taking into account communities that are potential hosts to extractive activities, and whose lives have been affected by the mere presence of economic resources awaiting exploitation – i.e. the impact of the possibility of mining operations. Nonetheless the IIED's recommendations open enquiries into classifying and understanding the nature of the communities that are being affected by the development of mineral resources. To date no studies of this nature have been conducted in Nigeria, a country that is largely dependent on the extractive industries, mainly oil, and which is now diversifying to other non-fuel minerals.

In response, one of the objectives of this study is to first identify mining communities in the areas where mining is situated or planned in geographic terms. In this context, mining communities mean those groups of people living in and around a proposed site of mineral activity that has been licenced. From the above definitions of 'mining communities', the research identifies communities based on their proximity to mineral licence. This can be seen in later part of the thesis (Chapter Three). Subsequently, only those communities that are in proximity to a proposed oil sands mining licence were selected to serve as the case study. The second objective is to understand the more detailed character of the communities and establish their concerns and expectations about the development of large-scale mining operations. For any scale of mining development, there is the potential for communities in close proximity to be displaced and for local environments and other resources to be destroyed. However, "mining communities in different geographic locations may differ widely in terms of culture, environmental characteristics, and collective attitudes towards mineral resource development" (Schafrik and Kadakidis, 2011:87).

The actual impacts and the perceptions of the community will also depend on the role played by the government, the extent of their engagement with the community, the social changes brought about by mining and even the pre-existing social conditions in the local community. As mining communities become more dependent on the extractive company, they concurrently become unable to diversify (O'Hagan and Cecil, 2007). Diversification according to O'Hagan and Cecil (2007: 20) is the ability “to distribute employment among different industries to reduce risk in the event of the demise of a particular economy”. Further, Bray (2003) and Giordano et al. (2005) suggests that a fair distribution of revenues earned from mineral rents not only provides opportunities for host communities to have infrastructure that would power development, but also reduces the possibility of conflict, whether upstream or downstream.

2.4.2 Communities’ Risks Perceptions

This section is aimed at presenting how and why communities perceive those risks associated with mining already presented in Section 2.3. It also includes some examples of lived experiences of communities who have been impacted by mining. This section provides a background for the findings in chapters seven and eight. One of the earliest studies of risk perception was conducted by Slovic et al. (1979, 1980). Using what they termed the ‘psychometric paradigm’, they conducted a survey of the social, cultural, and psychological factors that can subjectively influence an individual’s understanding of risk. Slovic et al.’s (1980) methodology led to wider applications and has contributed to the knowledge of people’s understanding of the risks of potential projects. Sjoberg (1999) has argued that risk perceivers can be incorporated in the psychometric paradigm to understand their mitigation strategy. Since the psychometric paradigm there has been increasing interest in the study of the environmental risk perception and factors influencing people's perception such as their locality (e.g. Brody et al., 2004, 2005 and El- Zein et al., 2006). Scholars have suggested for the inclusion of socio-economic factors in describing perceptions about environmental risks. For example, Brody et al. (2004) advocated for the integration of risk perception perspectives in the decision-making processes of risk reduction. Hanley et al. (2006) and Syme et al. (2008) have focused on the relationships between environmental degradation and economic development levels of the perceivers.

A risk perception study is regarded by Rayner and Cantor (1987) as an expansion of the fundamental concept of risk, i.e., the probability that a planned event may have adverse effects and the magnitude of its consequences. For example, earlier work on the socio-economic impacts of large-scale electric generating facilities on communities by Webb et al. (1980: 86) indicated that "perceptual measures of impact may represent a key approach to assessing the consequences of development projects". Sokolowska and Tyszka (1995) believe that the acceptance of risks may be associated with or influenced by the perceived benefit associated with any event or activity. Perceptions of socio-economic benefits and environmental risks are particularly sensitive in communities that are remote, isolated and highly limited in economic opportunities. However, community perceptions of issues associated with resource extraction can differ significantly from those of other stakeholders (Hadden, 1991). This research extends this line of investigation, by examining communities' economic dependence and perception of risk in the differing context of planned mineral project in Nigeria.

There is also a gender perception to the risk-analysis and decision making processes. Women have traditionally had limited access to job opportunities in large mines. Many studies have found that women are passive recipients of mining benefits and tend to bear more of the risks than men (Bianco et al., 2008; Earthworks and Oxfam, 2004; Lahiri-Dutt, 2006; Nesar and Lahiri-Dutt, 2006). On the contrary, some authors believe that both women and men suffer the same consequences at the community-impact scale and their views about socio-economic and environmental risks do not differ (El-Zein et al., 2006; Howel et al., 2003). Scheyvens and Lagisa (1998) documented that women are the first to express their dissatisfaction of any aspect of mining development especially compensation, often triggering conflict with the support of men. For example, a study by Hassan et al. (2002) on the impact of resource exploitation on women found that they are becoming increasingly vulnerable to poverty and their livelihoods is declining mainly from deprivation of the environmental resources that they depended on before oil production. The presence of oil installations has encouraged prostitution and other social vices thereby eroding social values. However, Brody et al. (2005) showed that perceptions should focus not only on gender, but on age, literacy level, income and economic activity, and duration of residency in the community. Referring to Brody et al. (2005), this study used some of these factors in determining how they shape community members' perceptions about the impact of planned oil sands development.

There are a number of other factors that can affect people's perception of risks. The location of communities and their proximity to social services are relevant in shaping their perception towards environmental issues (see Wakefield et al., 2001). Employment status may also contribute substantially to people's perceptions of certain environmental issues (Freudenburg, 1991). Communities' dependence on natural resources for their livelihood strategies shapes their attitudes to environmental and social risks. Experiences of mining induced impact from other places also influence their perception. For example, the dumping of tailings to river sources by the Grasberg mine in Indonesia, the oil spillage in the Niger Delta and lead poisoning in Northern Nigeria, have been sources of conflict and environmental damage to communities. Even though the local communities in Fort Chipweyan, Canada benefit from oil sands, they are fighting against further upstream development and disregard by the government.

The study of impacts of mining development on the surrounding communities would necessarily rely on an understanding of the characteristics of the location (Nzeadibe and Ajaero, 2010). An assessment of the communities' perceived risks and benefits is timely, particularly in order to unravel the key social, environmental and socio-economic concerns associated with large-scale oil sands mining. A study that relies on community voices has a greater chance of reflecting local realities (Gibson, 2001:8). Most significantly, the likely environmental and socio-economic impacts of oil sands projects and expectations of potential host communities appears to have been given relatively little consideration in academic research (Abutudu et al., 2007). Given Nigeria's association with the oil curse, integrating communities' perceptions of risks, benefits and expectations into the planning stage of project development would seem to make sense - outcomes both socially and environmentally are also likely to be better. A recent study by Thaddeus and Chukwuedozie (2010) indicates that communities in new oil projects expect sincerity and frankness in project development to prevent conflict and uplift their current poor economic status.

Bickerstaff and Walker (2001) and Sjoberg (2001) have contested the role of perception studies in decision-making processes due to uncertainties inherent in intuitive judgements, as compared to those based on measurements. Nonetheless, perception analyses based on communities' subjective interpretation of impacts and expectations prove beneficial to the communities themselves, the government, and potential investors, in their decision-making processes and in supporting policy formulation (see example from European Commission Aarhus Convention 1998). Throughout this study local communities clearly talk about the risks and benefits associated with the exploitation of oil sands in Nigeria.

2.5 Conclusion

Huge spending on infrastructure and improvements in terms of trade resulting from the recent commodity price boom represent development opportunities for mineral-exporting countries. Yet evidence suggests that many countries now face the challenges of harnessing mineral revenues to boost development, and that some of those countries suffer from the resource curse. While the literature has dealt extensively with resource-development phenomena, three limitations can be identified: 1) generalisations are squarely based on national issues while the impacts are experienced at the local level; 2) little attention has been paid to the initial processes of resource development; and 3) the literature excludes empirical evidence of communities potentially at risk from new extractive activities. This thesis responds to these limitations through a local-scale study of the potential impacts of resource development on communities in Nigeria. Nigeria is currently in the process of developing its huge oil sands resources, which will have an adverse impact on existing communities and the environment. The vast area containing the oil sands deposits and the fact that it is being evaluated for future development serve as an ideal case study to address the three aforementioned limitations. Potential environmental and socio-economic impacts can be mitigated and avoided at the planning phase, which at the local level minimises or eliminates resource curse.

There appears a natural convergence between mining stakeholders to balance corporate goals, community needs and government responsibilities. Although inference can be made from key mining stakeholders, it is still very difficult to argue which one of these comes first in the relationship. Many authors (such as Humphreys, 2000 and Ostenson, 2007) who try to resolve this tension simply outline what they think should be the responsibilities of each stakeholder to the others; however, regardless of the depth and breadth of the relationships or changing roles, the host communities bear the brunt of mining costs. As presented in the later part of this thesis (Chapter Seven), Nigerian communities as stakeholders have been relegated to the background in practice. Furthermore the conflict of interests between communities and the government is far deeper and much more complex than appreciated in the academic literature.

Communities' perceptions determine their responses and attitudes towards mining. Thus, community involvement in the decision-making process of mineral extraction has become a prominent theme in recent debates on the extractive industries, and is a key component of mining impacts discourse. As already emphasised, environmental and community impacts are systemic features of mineral industry operators and regulators and, as such, should be approached systematically. Attention to environmental and community issues needs to be integrated into the strategic decisions of operators and regulators, at each stage of the mining cycle, from permitting through to exploration, production and closure.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methods used in the research by highlighting the data collection process, interpretation of results and reporting of the findings. The findings of the thesis rely on the combination of both quantitative and qualitative frameworks to understand the spatiality and impacts of mining in Nigeria. The GIS exercise identified key communities for a case study. The methods employed and the stages involved in the research process are indicated in Figure 3.1. The figure also shows the tasks undertaken, locations where the fieldwork for both the GIS and the case study was conducted and where analysis was made.

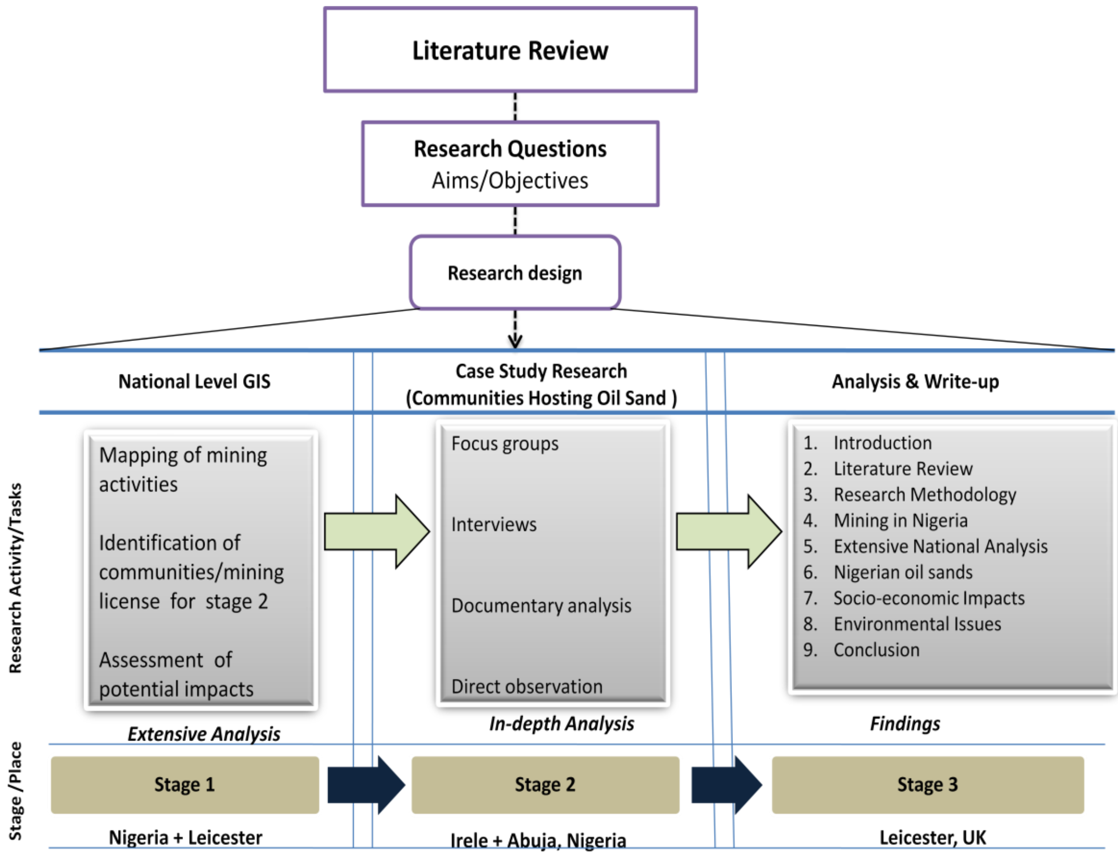


Figure 3.1 The research processes for evaluating oil sands impact.

As Figure 3.1 illustrates, the research journey begins with a literature review and the aims and objectives of the study were developed based on the identified gaps in the literature. At the national level, GIS was used to map the geography of mining in Nigeria and to identify communities that are hosting mining activities in general and oil sands in particular (Chapter Six). Some of the host communities identified by the GIS were used for in-depth research (Chapter Seven). Finally, tools for representing the result of spatial analysis in the form of maps and tables and - in the case of in-depth study - issues raised in the discussions are presented as the findings in Chapter Six, Seven and Eight. .

The first section of the methodology chapter explains the strategy used in the execution of this research from the methods used in gathering data to analysis and discussion. Sections 3.3, 3.4 and 3.5 cover the two stages and approaches of the methodology: stage 1 is the national-level GIS and stage 2 is the case study. The data collection methods used were archival database, focus group discussions (FGD), follow-up interviews, documentary analysis and direct observation. The justification for why and how these techniques and methods were used and their limitations are also discussed in detail. Section 3.7 evaluates the credibility, process and validity of the methodology, noting the issues considered during the course of the fieldwork, problems encountered and the measures that were taken to solve them. Before the conclusion of this chapter, Section 3.8 elucidates limitations of data sources.

3.2 Research Design

A research design can be viewed as "...the logical sequence that connects the empirical data to a study's initial research questions and ultimately, to its conclusion" (Yin, 2003:21). A research design in essence structures the collection of evidence that answers research objectives as unambiguously as possible (Kitchin and Tate, 2000). Figure 3.2 indicates how all elements of the research collaboratively achieve its objectives.

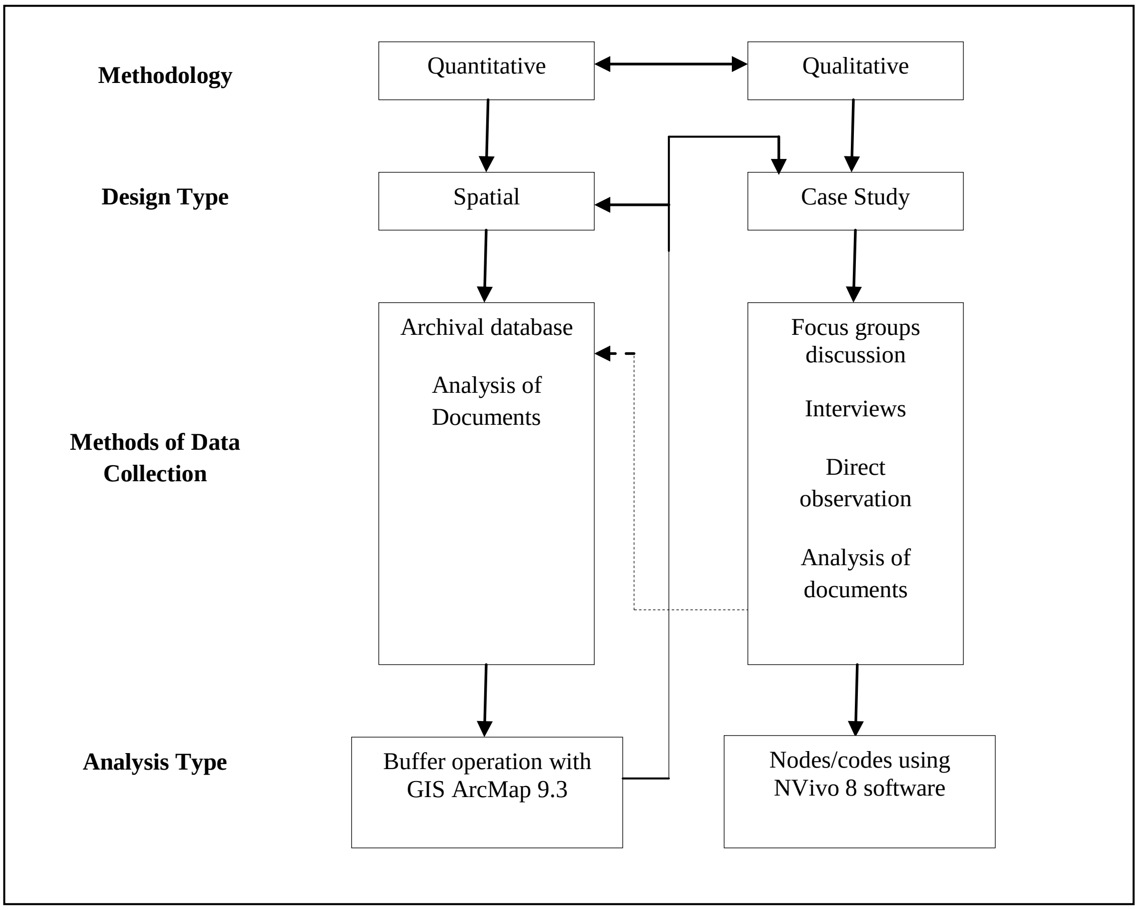


Figure 3.2 Data collection methods and tools for analysis.

Each research objective has been addressed using a selection of one or a combination of methods discussed in the sections that follow. Table 3.1 summarises the aims and objectives, and methods used in addressing each objective, although there is considerable overlap in the data gathering process and people interviewed. As outlined in the introduction, GIS was chosen for the first-stage analysis and a case study for the second-stage analysis (refer to Figures 3.1 and 3.2).

Table 3.1 Linking aims, objectives and methods to scale and participants.

Aims	Objectives	Methods	Location/Scale	Participants
To contribute to the development of a more critical approach to resource geography	1. Survey of the academic and policy-making literature and the international experience of the impact of mining	Documentary analysis Literature survey	Local, national and international: particular reference to resource-dependent states	Various; including government and non-profit institutions
To conduct a survey of mining to determine its spatial pattern and to identify mining communities	2. The construction of a GIS based on mineral titles to show their spatial distribution and identify communities that are in proximity to the various types of mining in Nigeria	Secondary data: mining database obtained from private and public institutions	National Regional Local/Community	Ministry, department and agencies and Private consultants
	3. Identify the communities located within a particular oil sands licenced block to determine case study communities			
To undertake an assessment of the social and environmental impacts of oil sands extraction near communities	4. Detailed case study research in potential oil sands host communities	Focus groups Interview Observation	Local: Oil sands host communities in Irele, Ondo state, Nigeria	Community leaders Youth groups Women’s groups Government officials

3.3 The GIS Approach

With the strategic drive towards reforming the Nigerian mining sector to become the largest contributor to the national economy after oil, the issuance of mining licences has increased so rapidly that it has boosted extractive activities. The licences are issued with little or no emphasis on the significance of the impacts associated with mineral extraction, such as those highlighted in Chapter One and Two. The management of the social consequences for the communities, as advocated by Bridge (2004b), can better be achieved by understanding which communities are most likely to be affected by the extent and intensity of mining activities. To determine this extent at the national level requires information about the quantity and types of mineral activities, the geographical location where the activity occurs and a description of its relationship with the surrounding environment. For example, the geographical locations of the different mining rights can be documented at a variety of spatial scales, from an exploration licence that may cover a wider area (often 100s to 1000s of square kilometres), to a small-scale licence that may be less than a hectare of land. One of the benefits of a GIS approach in this instance is to combine this variety of scales to determine the spatial pattern of mining activities. It is also possible to use GIS to measure the distributions of surrounding communities and environment according to their proximity to mining.

A GIS is simply a collection of "hardware, software, and data for capturing, managing, analysing and displaying all forms of geographically referenced information" (ESRI, 2010:1). The GIS in the context of this research combined mining licences based on a coordinate system and location of settlements to effectively quantify the spread of activities, and identify potential areas of impact. Unlike any other information system, a GIS analytical tool distinguishes between locations by defining the spatial relationships among all the map components. The GIS handles spatial and descriptive data from a wide variety of sources such as satellite imagery, GPS, and digitised and scanned images - which in this case include the mining cadastral register, settlement data and the population census. These abilities to capture a variety of data and establish links between descriptive and spatial data make the GIS valuable for explaining events, predicting outcomes, and planning strategies (Longley et al., 2005).

To achieve objectives 2 and 3 (Table 3.1), the GIS research was divided into two steps. Step I was an extensive mapping of mining activities across the country to show the types of mineral activities, their location and their possible effects on settlements. Step II maps and categorises mining communities based on their proximity to a mining area, because communities' layout may influence mine location (Knapp, 1998:4). The communities identified at a regional scale are narrowed down to those specifically surrounding oil sands resources. Figure 3.3 indicates the broad-narrow scale of the GIS process. In particular, the communities situated in oil sands-licenced areas at the state/local scale were mapped for the case study.

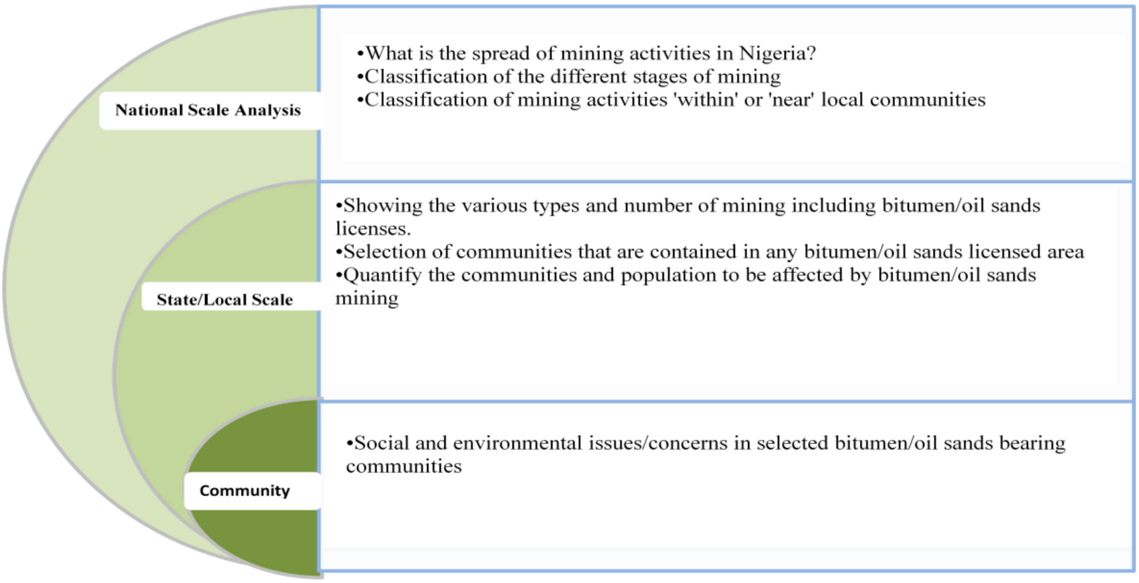


Figure 3.3 The objectives of a GIS approach at different spatial scales.

Ideally, any GIS process or task consists of input, manipulation, management, query and analysis and visualisation (ESRI, 2010). These tasks have been summarised into three major components; database construction, analysis and results. Each of the components has a subset of functions carried out as indicated in Figure 3.4. Also, the procedures for the execution of the functions employ standard ArcMap 9.3 commands and routines. The following sections achieved the tasks for steps I and II.

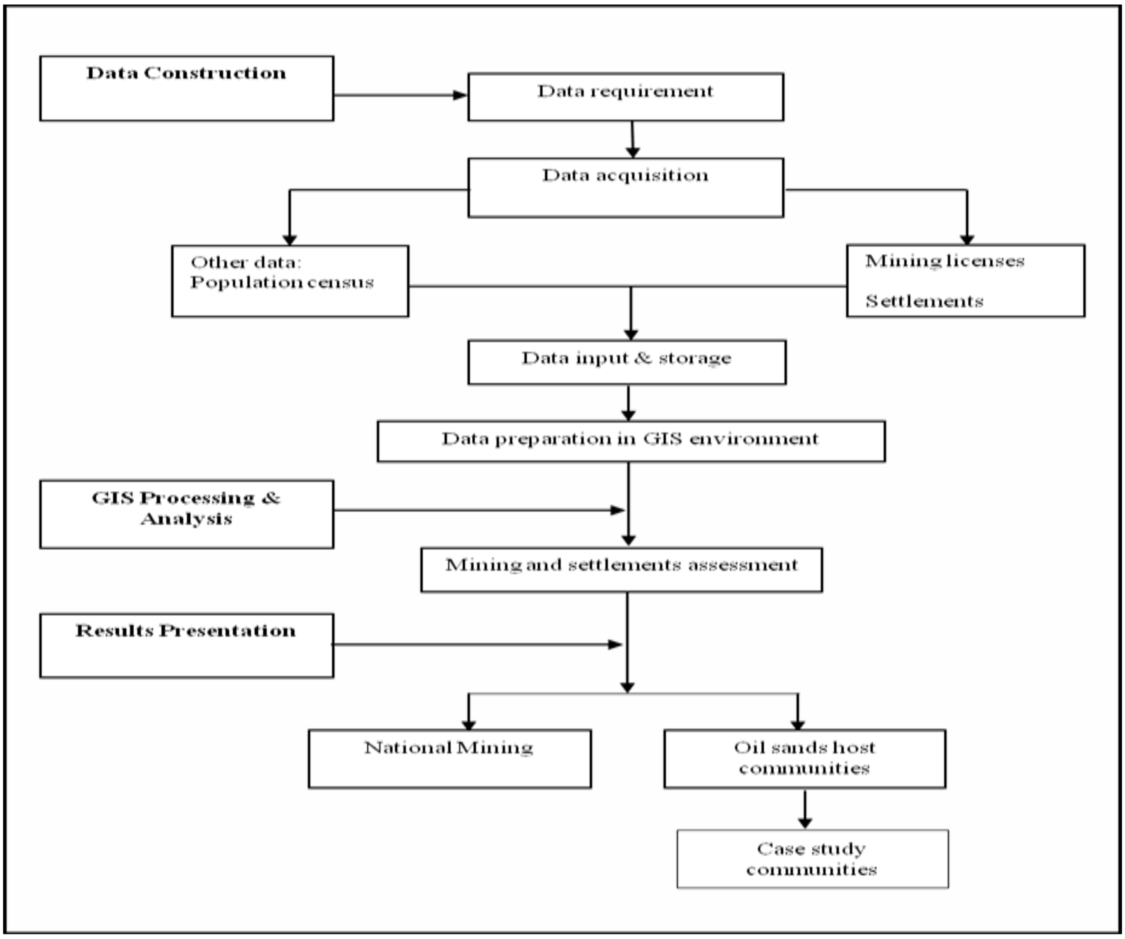


Figure 3.4 Tasks and steps taken to create the GIS of mining in Nigeria.

3.3.1 Database Construction

Database construction is the design and implementation of the various data sources (Kitchin and Tate, 2000:184; Longley et al., 2005:128). Data requirements for this part of the research are to simply identify the geographic and attribute data relevant for the analysis. Two major issues were considered during the sourcing and compilation of the dataset. The first was data availability and accessibility, as finding the correct data at the right level was difficult. Secondly, the issue of data quality was taken into account. Mining cadastral data, both spatial and attribute are the data required for the first stage. The Nigerian mining cadastre is an official register containing the ownership, the areal extent, the value of mineral rights and the validity of mining rights in a given geographical location. A shapefile containing the geometry of titles based on a pre-defined grid system, a defined spatial limit and extent and a numeric application (numbers as identifiers) are the data required for analysis. The Nigerian mining licences are granted as polygons representing geometry (spatial coverage). Each polygon contains maximal and minimal coordinate values, making the data suitable to perform spatial queries. The cadastre dataset obtained in the month of May 2009 contains information on exploration licence, small-scale licence, mining lease, reconnaissance and water use permits. The research covers the first three types of licences – reconnaissance and water permits data are not covered by the study. A set of files containing descriptive and administrative data regarding the licences, with numbers used as identifiers, was obtained.

Settlement data is the second major data group required for the study. Settlement data in the context of this research simply refers to a community of rural and urban people living in a particular location (see Section 2.8). Census data for the country are considered an essential requirement of the database. The 2006 population census data were obtained. Unfortunately, there were no existing processed data on population based on communities/settlements. The data available to the research are at local and state government level. National, state and local political boundary data in shapefiles were also used to define areas of analysis. As indicated in Table 3.3, the thesis used disparate sources of data. In the GIS, there is no limit to the attributes that can be associated with each feature within the coverage, but only the data that are absolutely necessary for the research were sourced. For instance, even as data on elevation, groundwater and relief features were obtained, it is beyond the scope of this research to undertake a detailed analysis of those data. Section 3.4.2 explains the sources of spatial and attributes data used for the GIS exercise.

During the pre-cadastral phase (before 2006), the issuance of mining licences by the MSMD was characterised by a paper and analogue method. In such instances, the researcher would be left with the laborious task of digitising paper maps and analogue licences into a computer-readable format. This task is however simplified by the availability of data in a digital format. The spatial data obtained already exist in a GIS-compatible format (shapefile) that is easily imported straight away without conversion. Mining licences, settlements and political boundaries were imported into the GIS environment. While some attribute data have a spatial element that relates to their location, census data for example were loaded and linked to their spatial components (Figure 3.5).

Vector and raster are the two methods used in storing and organising geographical phenomena into layers in a GIS. Vector stores objects such as water, roads, vegetation and settlement as points, lines and polygons with a high degree of accuracy (Kitchin and Tate, 2000:166). The Nigerian mining licences and boundaries are represented in the GIS as polygons. Settlement data are formatted as ‘points’ because of scale and resolution. The raster format stores objects as a regular matrix of cells called pixels.

Attribute data in the vector format are managed in a table, and integrated alongside the geometry or cell format used. The preference for vector rather than raster in this research was largely because of data requirements, sources of data, area of application and to achieve the aimed-for results.

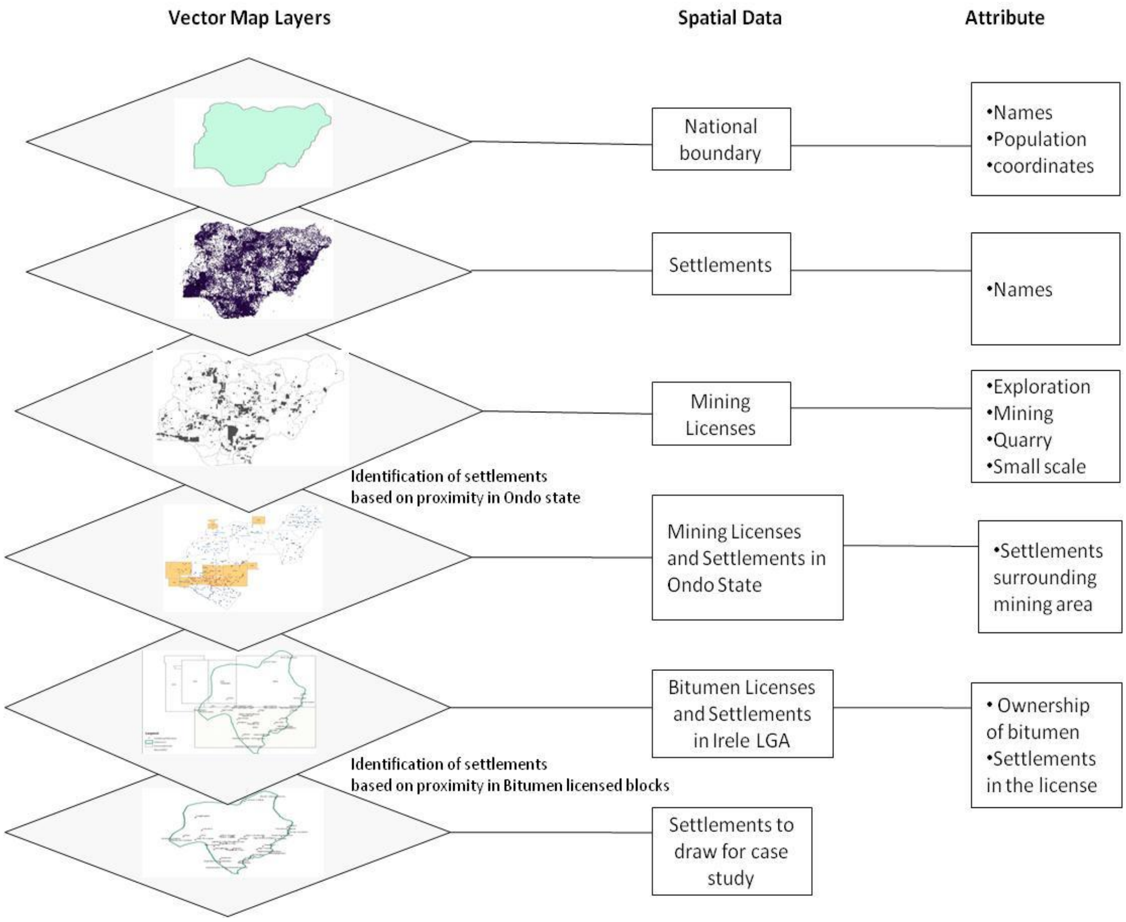


Figure 3.5 Vector map layers (polygons and points) showing the different spatial scale of analysis and result.

3.3.2 Methods of Analysis

Before proceeding with the analysis, the data were prepared and pre-processed into a uniform and compatible format. This is consistent with Longley et al.'s (2005:117) suggestion that GIS data need transformation to make them compatible with the system of analysis. The transformation is likely for scale, projection or file format which could be temporary or permanent. Following Longley's suggestion, this research ensures that all databases in the GIS are in a common projection and on the same scale so that they can overlay accurately. The database was initially obtained with the ‘geographic coordinates system’, but was constructed (geo-referenced) to the standard map projection for southern Nigerian (WGS_UTM_Zone_31N). Even though no map projection is without distortion (ESRI, 1996:6; Longley et al., 2005), the transformation in this research allows for conformity of the database and enables the calculation of distances and areas.

The links between spatial and descriptive data in a GIS database provide a flexible way of manipulating the data to answer questions. The **Buffering** operation is generally used in answering proximity queries. A buffer refers to a zone of specified distance around points, lines and polygons based on each feature’s spatial and attribute values. Buffers can provide a way of querying or asking specific questions to determine which entities occur either ‘within’ or ‘outside’ a defined zone (ESRI, 2010; Robert and Robert, 1993). A common type of proximity analysis is the creation of buffers around features. Buffer operation is particularly useful in the study to determine the licences issued within a specified distance to existing settlements (communities). The researcher used query functions by textual attributes to display the various types of mineral licences existing in Nigeria. The same procedure was used to narrow the boundary from the national to the local scale. Spatial query was used in locating licences and settlements within a particular distance. In summary, the buffer operation achieved objectives 2 and 3 of the research as contained in Table 3.1 and Figure 3.4, using general and analytical questions like:

1. Where are mining licences located?
2. What is the dominant mining activity?

3. What are the settlements surrounding mining licences?
4. How many settlements lie within and outside mining licences?
5. If mining takes place how many settlements might be affected?
6. How many people might be impacted by mining in those settlements?
7. How many settlements lie within a demarcated oil sands licence that can be used for the case study?

The proximity between mining licence and communities is the range of distance covered from a few hundred metres to less than one kilometre radius. However, this is not a ‘text book’ rule or ‘right answer’ regarding proximity yardstick between mining area and communities, as there are examples of communities that co-exist with mines inside the community (Hodge, 2009). For instance, mining in Australia is not permitted within 100 metres around and below residential areas. In Scotland and Wales, coal mines are not permitted within 500 metres of housing. Based on this criterion, it was at the researcher’s discretion to select buffer zones and overlay the results for further analysis, as depicted in Figure 3.5. However, the accuracy of buffer operations depends entirely on the quality of the database.

The production of maps traditionally involves the unification of different types of features such as licences, settlements and boundaries. The combination of the different features used in this analysis is arranged in layers to form a map. **Context operations** therefore imply the creation of new layers based on existing features and the context within which each feature in the layer is found (Kitchin and Tate, 2000). For this research, the database can be divided into as many layers as required, where each layer contains one characteristic or a combination of features. For example, mining licences, settlements, boundaries, and population are all features that are present in separate layers (see first 3 layers in Figure 3.5). These individual layers can be combined with each other to create a new layer based on the themes that would capture the objectives of the study (last three layers in Figure 3.5). Licences were divided into exploration, mining, quarry and small-scale layers. In particular, exploration licences were queried to obtain oil sands (bitumen) licences. Once the layers are created, they are organised according to the study's objectives. It is not a rule of thumb that a layer at the top draws from those below it; it can be altered to suit individual needs. The order of layers in Figure 35 is an example of this. The bottom map is drawn from the maps at the top. For further analysis, layers based on themes can be integrated through overlay.

Overlay analysis requires the physical combination of one or more data layers to create new output features. According to ESRI (2010), this method is useful in integrating different layers to locate areas that are suitable for a particular purpose. The overlay operation was used in the study to determine the local government in Ondo State with the highest number of oil sands blocks. Similarly, the layers of oil sands licences, settlements and the Irele local council boundary were integrated to determine the communities that are lying in oil sands blocks. However, there was the problem of settlements falling exactly on a boundary. For example, Ode-Irele, Omi, Ago Lawrence, Kekemeke Oke and others, fall on the oil sands polygon boundary. In this case, the GIS used a predesigned decision rule to determine whether these settlements are classified as being in a polygon (oil sands licence) or not, even if this is not the case in reality.

For many types of geographic operation the end result is best visualised as a map, graph/chart or table. Maps are very efficient at storing and communicating geographic information. The content of the map, as well as the scale, was driven by the objectives of the research. The end result of the GIS processes is to show in graphic form the distribution of mining activities in Nigeria (refer to Chapter Five for detailed discussion) and how this can be used in identifying and assessing potential impacts on communities. The result in GIS is also a 'means to an end'. Stage I is the 'means' that show the communities likely to be affected by mining based on proximity, and the 'end' is in stage II - a case study strategy in some of the identified communities. The following section explains the criteria for selecting the study communities.

3.4 Choice Criteria for Case Study Communities

This section provides a brief overview about the specific criteria used in selecting case study communities. Extensive information about the communities can be found in Chapter Five and findings from the case study are discussed in Chapters Seven and Eight. Random sampling was the option provided by the GIS in selecting communities for case study. The inadequacy of this technique is the unification and recognition of all the communities as having an equal chance of being selected. In reality, however, the sample would not be a representation of the population from which it was drawn because the communities are located on different types of sites. Similarly, communities' size, function and status involve spatial patterns, as do variations between communities in their overall physiognomies and internal compositions.

Figure 3.6 illustrates the communities in Irele that form the study cases. As demonstrated in the figure, and as can be seen later in Section 6.6, Irele communities affected by oil sands extraction are based on less than one kilometre distance to oil sands blocks. The figure has shown that these communities are not a great distance away because the blocks were licenced or demarcated to cover the land area they occupy. Irele, the local government area where the communities were selected contains the highest number and the largest proportion of oil sands blocks planned for investment and are at the bidding stage. The communities are as varied as their settings. Some are riverine areas located along river channels, while others are linear communities located along major roads and highways.

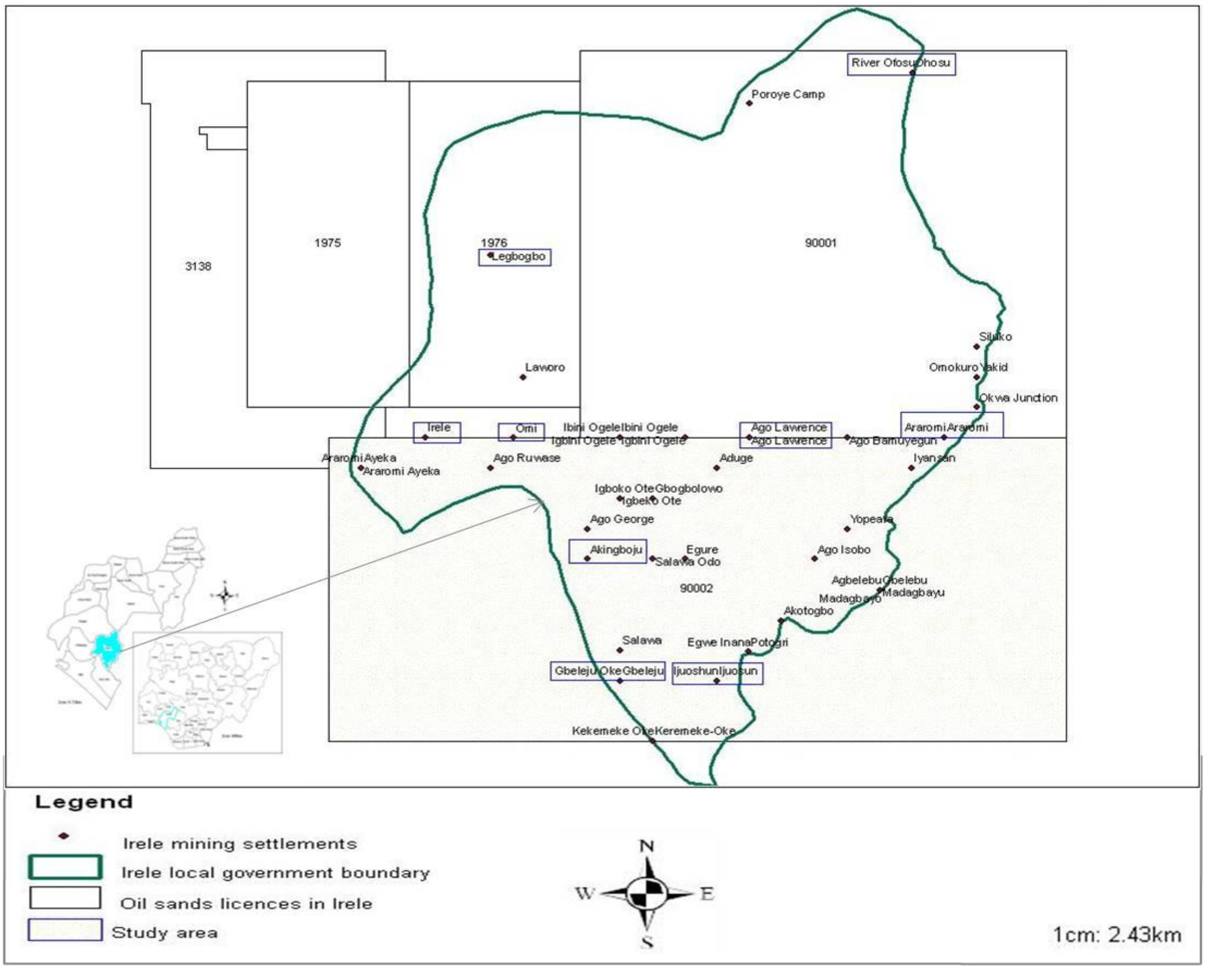


Figure 3.6 Communities in Irele used for data collection. An indication of the categories of the selected communities is contained in Table 3.2.

There are remote communities that are geographically isolated resulting in access problems, they depend directly on their natural resources for survival, and appear to be the poorest and most marginalised among the case study sites – a characteristics similar to what MMSD (2002:200) classify as indigenous communities. The rest are towns that are relatively small except the local government council headquarters – Ode-Irele. For representation and wider geographical coverage, an in-depth study of at least one of the four categories was conducted. The need for this was to select study sites that cover these key types of sites/axes of variation: three remote communities, three towns, three linear communities and one riverine community. In addition to geographical contexts, time, budget and logistical constraints are considered in the selection of the case study.

Table 3.2 Methods and participants in the case study areas

Communities		Methods			Participants			
		FG	Obs.	Docs.	Women	CL	*Children	Youth
Town	Ode-Irele							
	Omi							
	Ajagba							
Linear	Legbogbo							
	Gbeleju-Oke							
	Araromi							
Remote	Akingboju							
	Ijuba-Ijuoshun							
	Gboge							
Riverine	River Ofosuohu							

Key: FG = Focus groups, CL = Community leaders, Docs. = Documentation, Obs. = Observation ***Children were interviewed as part of the community

Table 3.2 shows the communities in Irele. In this table, 10 communities were selected based on their size and their location and type according to the 4 types identified above. Coincidentally, these are either at the boundary of a demarcated block or are contained within it. At this time, the type of mining proposed is surface mining on a large-scale. Surface mining of oil sands is invasive and much more obviously destructive in terms of excavation, further raising the likelihood of depopulating these communities. There are no official data on the population of these communities; as such the research relies on unsubstantiated population figures pending the release of the official data. Given that case study research is flexible in the course of fieldwork (Robson, 2002) Ajagba and

Gboge-Gbeleju communities whose names are missing from the GIS results. A trip was also made to Agbabu, where the first bitumen exploration well MBC-7 was drilled to observe how natural bitumen leaking on to the earth surface is affecting the surrounding environment.

Women, community leaders and elders, youth groups and children were involved in the research. Interviews with government officials were conducted as a follow-up to issues identified by the research participants in the case study (Section 3.6.3). The different sets of methods used in different communities depended on the consent of the participants and the community leaders. In Ijuba-Ijuoshun, for example, the women themselves took the stage, while in Omi women were not keen on participating. Table 3.2 itemised the different methods used in the different communities. Prior to meeting the groups, consultations were held with some communities in order to solicit their cooperation to actively participate in the research. Certainly, a study of this nature in the oil sands belt of Nigeria has benefited from an examination of the concerns and living conditions of the people hosting such huge resources, which would put Nigeria on the map of the top global oil sands producers.

Women occupy disadvantaged positions in mining related impacts (Lahiri-Dutt and Mahy, n.d.): they tend to bear a disproportionate share of the costs and an inadequate share of the benefits. The study included women in the discussions so as to reduce their lack of decision-making power at the community level (Naser and Lahiri-Dutt, 2006). No doubt, the discussion has empowered women to consider the potential problems associated with oil sands extraction and the resulting impact on their livelihood – they often appear defensive, and critical about the extraction process The youths are the dominant age groups in the communities (NPC, 2006). The younger members of the communities see new opportunities for prosperity as the oil sands project progresses, but this attitude depends on their knowledge and whether the families have benefited or not from past oil sands activity. Many of the young people in riverine and remote communities lack an economic opportunity, which locks them into extreme poverty. Thus, on the one hand youths value protecting their traditional heritage, while on the other, they favour access to employment and improvement in living standards, which according to Lahiri-Dutt and Mahy (n.d.) results in a serious value conflict within the community. The following section explains the rationale for adopting a case study approach in these communities, followed by the various methods used in gathering information in a case study research.

3.5 Case Study Approach

The case study of communities surrounding oil sands licence areas forms the focus of this stage of the methodology. For this thesis, the researcher simply refers to 'case study' as a detailed and multi-source investigation of a geographical phenomenon over a period of time. The 'phenomenon' in this research is the oil sands (bitumen) project that is studied within the context of the surrounding communities. The aim of the case study is to undertake a detailed study of the potential oil sands host communities. The decision to conduct the work as a case study resulted from the desire to investigate resource communities and to elucidate the finer details of the processes of community consultation and participation in resource development. Examining the range of actors and issues involved in oil sands projects in different ways calls for a 'triangulated' study – where a number of methods can be used to address these processes, but a case study approach was considered the most appropriate and the logical outcome of these requirements as outlined by Benbasat (1987:371), Denscombe (1998), Yin (2001:13) and others too numerous to mention.

According to Kitchin and Tate (2000:225), a case study “allows a particular issue to be studied in depth and from a variety of perspectives”. However, the suitability of the approach depends on the investigator’s desire to: “a) define topics broadly and not narrowly, b) cover contextual conditions and not just the phenomenon of the study and rely on multiple and not singular sources of evidence” (Yin, 1993: xi). The intentions of this research met the three criteria mentioned by Yin in stressing the inseparability of mining oil sands from its social, environmental and institutional context; and adopting a flexible approach to gathering data from multiple sources. The multiple methods are introduced to increase the quality of data and analysis, which makes it a ‘triangulated study’ (Yin, 1994:66).

As a number of methods can be used as sources of evidence in case study research, focus groups, interviews, documentary analysis and direct observations are case study protocols that were used in this research. Madsen and Adriansen (2004) have supported the use of multiple methods in geographic research as it offers unique perspectives in relating society and environment, in this case, from a resource geography perspective. The methods are considered the most suitable approach that could enrich the research and aid generalisation in the study of communities potentially hosting mineral resources extraction. Again, in accordance with the rationale, processes and selection of either a single or a multiple case study; the researcher opted for a multiple cases of oil sands projects as a representation of future large-scale mining in Nigeria (see exploration licences in Chapter Five). Investigations carried out into communities’ understanding, perceptions and anxiety regarding the extraction of oil sands, are in line with Yin, Skate and Hartley's case study procedure. More recently, Aldagheiri (2008) used case design to examine how transportation infrastructure can boost the Saudi Arabian minerals industry. An oil sands project was selected because it is a potential nucleus of mining activities as the country progresses towards economic diversification. The communities hosting oil sands are considered by Nnimmo (2003) to play a major role in the production process, based on the country's negative experiences of oil conflict between host communities and producers in the last five years.

At the outset of the research design phase, the researcher determined that the GIS was the first stage towards selection of case study sites. The study further sets the boundaries to include some of the communities represented within the local government area with a higher number of licences, because in reality, the communities differ in terms of their geographic space, social organisation and economic activities. The criteria for the choice of oil sands host communities have enriched the research and aided interpretation, thereby minimising the issue of generalisation inherent in case study research. The following methods provide sources of data for stages I and II respectively.

3.6 Methods of Data Collection

The following techniques were used to answer research aim 1 and 3: focus groups (FG), interviews, documentary analysis and observation. Each method presents different opportunities for obtaining as much information as possible on the potential impacts of oil sands extraction on the host communities. Focus groups allow for an in-depth examination at the community level through group interaction. The interview is a follow-up response to the issues raised by the communities during the FG. Field observation gives an insight into the areas with oil sands-induced environmental problems and verifies claims of past activities in the oil sands belt. Documentary analysis provides new information or corroborates evidence from other sources. Relying on a typical case study, these methods are complementary and matched to reveal as much as possible, thereby providing a complete picture of the study area. The choice of methods however, depends on the peculiarity of the study area, the work plan of the study and logistics consideration. The sections below explain the methods used.

3.6.1 Documentation

Documentary analysis for this study was used for contextual understanding of the complex institutional state policies and how they intersect with the international donor agenda and players in the industry to affect mining activities in Nigeria from the national to the community level. In order to achieve this, scholarly publications and materials on current views about human and environmental geography, extractive industries reports and the impacts of mining on host communities were acquired In addition, consulting numerous public and private organisation documents and records backed up primary data collection. Obviously, MSMD, MCO, NASRDA and NPC top the list, but other departments and private consultants supplied a large amount of information for many aspects of this research. The most important of these data sources are mining licences and settlements and population data. Table 3.3 summarises the major sources of documents from Nigeria used in stages I and II.

Public domain documents obtained included the Mining Act and related policies, technical reports, newspaper extracts, government pronouncements and reports. Internal documents that are less visible such as plans and proposals were also obtained. These documents, either archived or recent, were obtained from MDAs, mining companies and development organisations. In each instance, access to documents was consented to by the organisation; however confidential material not made available to the researcher may conceal some critical findings. Nevertheless, a public document "reflects the aims and attitudes of the people and organisations that collected the data" (Clark, 1997:65). The lack of access to documents such as population by communities is regarded as a fundamental constraint of this method. The documents at the disposal of the researcher serve as primary sources of data and corroborate the facts derived from other data sources. For instance, MSMD, NASRDA and NPC were heavily relied upon to supply mining licences, settlement data and population figures as the information cannot be found in detail anywhere else. The 'question' of what convention was used in the data was 'answered' by the researcher by converting the data into a unified standard format for analysis (as previously described in the GIS section).

Table 3.3 Key document sources from Nigeria.

Key Documentation	Sources
Mining licences Tarsands and Bitumen-Exploration opportunities in Nigeria Sectoral Environmental and Social Assessment (SESA) Report 2005. Nigerian Minerals and Mining Act National Minerals and Metals Policy Solid minerals sector: Our34 minerals	Ministry of Mines and Steel Development (MSMD), Abuja
Niger Delta Human Development Report, 2006	United Nations Development Programme, Abuja
Settlement data	National Air Space Research and Development Agency (NASRDA), Abuja Urban Aesthetics Concepts, Abuja
Road networks in Nigeria	Urban Aesthetics Concepts, Abuja
Population data	National Population Commission, Abuja
Mineral resources of Nigeria	Nigerian Geological Survey Agency (NGSA), Abuja
Statistical yearbook	National Bureau of Statistics, Abuja

Access to secondary data for GIS analysis was fairly smooth as approval by the MCO (government agency that issues and documents mining licences) for the release of the data and relevant document was granted instantly. The researcher was granted the same courtesy in the National Bureau of Statistics and National Population Commission.

3.6.2 Focus Groups

The focus group is one of the most widely used research tools in a case study research. Put simply, it is "a research technique that collects data through group interaction on a topic predetermined by the researcher" (Morgan, 1996:130). The focus group arguably originated from the field of sociology in the early 1950s; 20 years later it disappeared but re-emerges in the 1980s, owing to the successes of the method in marketing studies (Lunt and Livingstone 1996; Stewart et al., 2007). It is not out of context to conclude that the focus group is regarded as an appropriate and efficient data-gathering tool in a "more critical and politicised" (Lunt and Livingstone, 1996:80) research context. Table 3.4 summarises the key differences and similarities between focus groups and interviews conducted in the study communities.

With the shift to more nuanced explorations of people/place relationships in geography, Cameron (2005) asserts that focus groups are becoming an increasingly valuable qualitative research tool in human geography subfields. The focus group method in geography explores the complex relationship between the social and the physical environment. For example, Zeigler et al. (1996), Breen (2006) and Skop (2006) have used focus groups in geographic research. For resource geographers who are committed to understanding the spatial and temporal dynamics of resource development, focus groups have the potential to expand and transform knowledge between regulators, extractive industries and communities.

Table 3.4 Contrasts between interviews and focus groups in the study

	One-to-one interview	Focus groups
Purpose	Probe experience: Individual attitudes, beliefs and feelings	Generate ideas: Community views and processes
Researcher role	Interviewer: Guided conversation to maintain subject at hand; response bias and inaccuracies arising from poor recall.	Moderator: Imposes some structure on the discussion; but deviates towards issues that are pertinent to the subject, but are not outlined.
Sample	Individuals	Homogeneous/heterogeneous groups: Hypothetically 6-12 participants in each; but more participated in each of the case study communities
Equipment	Tape recorder, lapel microphone, quiet room	Tape recorder, props (flash cards, leaflets), video camera, community hall/traditional ruler's palace

Source: Flick (2002) and compilation of the author's study.

This study identified communities hosting oil sands and also explores their perceptions and concerns and how to build and sustain relations with oil sands investors. The setting provided a level ground for questions, answers and suggestions to be posed by the participants in respect of the planned oil sands projects and their associated activities, relative to their positions, level of knowledge or experience. As part of a baseline socio-economic investigation, pertinent issues were raised that included socio-cultural elements (history, ways of life and social system), economy (means of livelihood such as occupations and any other sources of income), availability of physical infrastructures and social amenities, community awareness and contacts with government or its agencies and people's perceptions and expectations of the oil sands projects. Environmental concerns such as loss of land and pollution were linked to socio-economic factors mentioned above. In general, the oil sands host communities seems committed to the oil projects. The focus groups therefore provided an exceptional opportunity for the communities to clarify issues and misconceptions, develop questions, react to particular policy, identify problems, and offer suggestions on how to overcome perceived challenges.

Thus, the choice of a focus group is more appropriate to source data from a group of people in a community than any other method (Stewart et al., 2007). In agreement with Richardson and Rabiee (2001), participants for the focus groups were selected individuals representing the sample of a specific population that can contribute to a specific research topic. These participants included traditional/community rulers (Olofas, Oloyes), or community elders, women, men, youth representatives and children. The details of the research and its expectations were introduced to the participants before the commencement of discussion. Where consent was given, names of group participants and their positions were documented.

On two occasions, the decision by at least two community leaders to allow for the participation of all interested members of the community was complied with, but in a manner suggesting that only key participants were engaged – this allowed a more representative focus group. Even in such instances, community leaders reached a consensus with the community members as to the individuals they thought would be appropriate for the discussion, while the rest remained as observers or spectators, but were free to interject when necessary. The decision of the community leader in Ijuba-Ijuoshun was to demonstrate their transparency in the affairs that affect their community. Selection of participants by random sampling was therefore not an option in order to eliminate ‘friendship pairs’ (Babbie and Mouton, 2001:292), or ‘homogeneity in attitudes’ (Morgan, 1997:36), that would lead to difficulties in the selection of participants, or result in individuals being resistant to participation in the research. In order to achieve objective 4, the researcher adopted Fern’s (2001) focus group framework to illustrate the issues (mainly group composition, setting, cohesion, discussion process, and moderator) in the use of this method and how these affected the outcome of the study (Figure 3.7). In some cases, observation was made to verify allegations made by participants on available infrastructure and the oil sands issues, such as drilling sites, was undertaken in some of the communities.

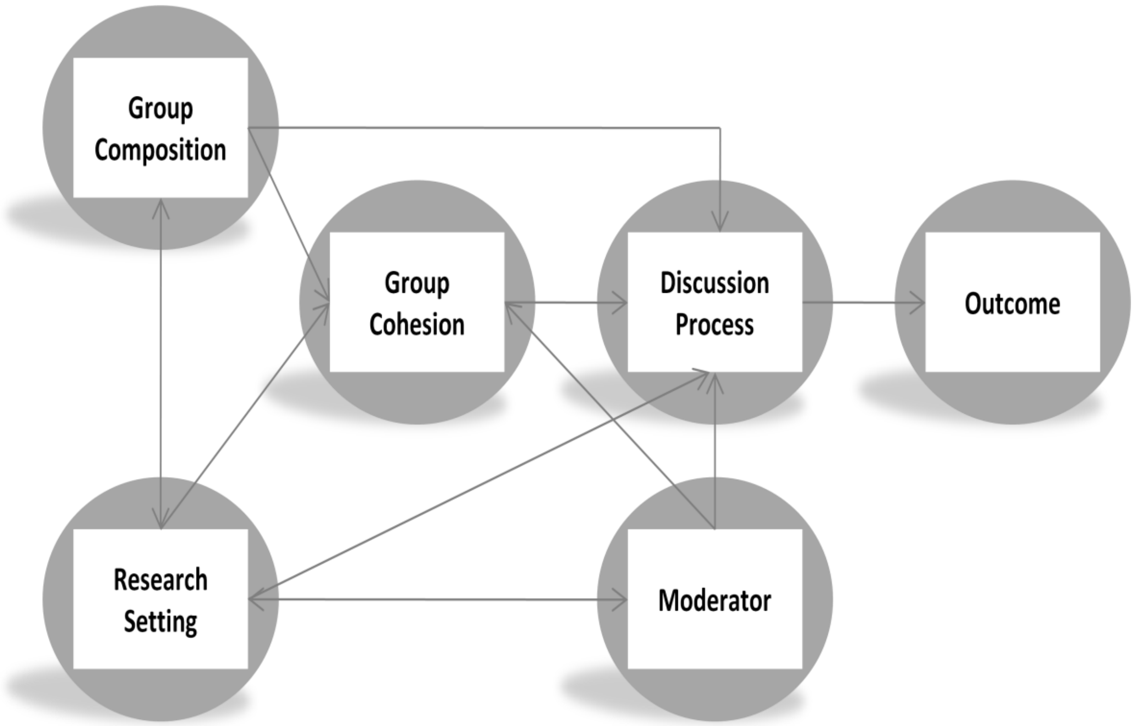


Figure 3.7 Focus groups framework outlining the conduct of the focus groups, from group composition to the role of the moderator. Source: Modified from Fern (2001)

Group composition

Pertinent characteristics of participants include culture, age, ethnicity, gender and personality. The study used a range of focus groups - youths, women, children, community leaders and elders (Plates 3.1 and 3.2). It was the intention of the researcher to have at least one focus group for each of this age/gender categories– but didn’t quite work out on the ground. Therefore, careful consideration was given to the composition of the groups and the resulting effect on group cohesion. In reality, though, the theoretical classification of these groups based on gender or age group alone was not possible in some of the communities. Based on the request of the chiefs, every individual in the community is an 'inclusive' member of the discussion and is free to express his/her opinions without ridicule.

Plate 3.1 A group photograph of youths who form a group for discussion in Gbeleju community. In the picture are two elders, two women and children. Source: Fieldwork (2010)

In Ijuba-Ijuoshun and Gboge communities, for example, it was the desire of the researcher to hold discussion with youths up to the age of 40, community leaders and women, but this became a town-hall meeting, with many, diverse members of the community in attendance. All the same, involvement of Gboge community members in the discussion process has particularly enlightened them on the aspects of oil sands extraction that can affect their future existence as a community. The time available and large number of participants limited the extent of participation and contributions from the group. The researcher observed that women were rather passive, submissive or even emotional as discussion unfolded; therefore organising a group solely for women became an option. In the resultant women-only group, there were disclosures, disagreements and expressed resentments, with plausible suggestions for the extraction of oil sands in their communities.

Plate 3.2 A cross section of the community - leader in the orange shirt accompanied by his elders in a group discussion in Ijuba-Ijuoshun. Source: Fieldwork (2010)

Group setting

The focus group setting encourages participants to provide their own understanding of a phenomenon. Pursuant to Krueger and Casey's (2000:87) recommendation, the following consideration was taken into account when selecting the discussion settings: where will participants be most comfortable? At what time of the day do they normally gather and talk? Does the locality present any barriers to communication such as room size? Based on these concerns discussions were conducted in participants' own communities because the setting provides a geographic space within which the people live. The choice of meeting them in their locality made it easy for them to consciously talk about matters raised in the group. In all the remote communities visited, the community leader's hall or palace was the preferred choice of venue. But, as more and more people were added to the Gboge community leader's compound, there was an incremental decrease in the space available for each person. Discomfort from a lack of sufficient space might have affected participants' willingness to respond. Meetings were mostly held in the evenings (slack times), to avoid conflict with participants' day-to-day routines.

Group cohesion

Fern (2001:14) describes group cohesion as the "heart" of focus groups which has a direct effect on the discussion process. The researcher observed that the groups maintained closeness with common purpose among members. Participants were motivated by the need to address their views at least for the first time on oil sands issues - a discourse that directly impacts their community. As such, it created tensions and the belief that they stand to gain from the outcomes of the interaction. The participants were able to share experiences and feelings with resolve to work together, to enable the research purpose to be met.

Group discussion process

When compared to the interview or survey method, the group setting provides the opportunity for participation in, but not necessarily contributing to, the discussion.

Where English language was not understood, the local dialect was adopted in the discussion to stimulate a robust response and sense of belonging. As the discussion process progressed, participants nodded in affirmation of ideas and anxieties shared by someone, or indicated to the contrary. At one instance, women participants in Ijuba-Ijuoshun took the place of the moderator, disagreeing and reaching consensus among them. At the end of each discussion, participants showed satisfaction with their interaction, and issues raised were shared and agreed with. The group interaction produced group consensus, multiple opinions and divergent views about the subject. Time spent on each stage depended on the sensitivity and understanding of the questions by the participants. Considerable effort was made to limit the amount of time spent in each thematic area and on member contributions so that "member dynamic does not overwhelmingly control group dynamic" (Fern, 2001:11).

Group moderator

A body of literature considers the roles and responsibilities of a moderator (e.g. Krueger and Casey, 2000; Morgan, 1996, 1998; Stewart et al., 2007). In academic research, the moderator is often the researcher who is acquainted with the research. In this case, the moderator (researcher) engaged the services of a native, less experienced, research/field assistant (RA) in order to gain access to the participants and to break down the language barrier where possible. The RA took a compelling leading role and that of an interpreter. Even in such instances, the researcher initiated the discussion by introducing the research to the group. Aspects of the research were structured (Appendix Three) that directed the discussion and managed group dynamics to give the discussions more sense - broader questions about the topic were first asked followed by focal questions

Group outcome

If the success of focus groups was to depend on the researcher's qualitative judgement - so far, the outcome of the FG has been a success in gathering data for the study. Needless to say, the quality of data derived from this method is more desirable than the quantity. Moreover, the number and composition of participants, settings and time, critical role of the researcher and the data analysis strategy employed have an effect on the quality of FG data (Krueger and Casey, 2000; Morgan, 1996). As it is impossible to recall everything that was discussed, an audio recorder was used to record discussions when permitted. Moderator notes and audio recordings are the tools used in producing the FG output and combined with the other methods, the aim of using a case study approach was achieved.

3.6.3 Interviews

In qualitative studies, the interview provides the researcher with an in-depth understanding of the experiences of the interviewee and the meanings within their account of a particular action, process or event (Wainwright, 1997: 999). There are a number of interview styles that could be used in any case study. The distinction between interview styles is blurred in reality (especially between structured and unstructured interviews); thus it is important to take into account the suitability of types of interviews available. Interviews in this case adopted an open and unstructured style in a conversational manner focused on major areas of inquiry. The major aim of the interview is to corroborate the facts that have been established and to seek answers for the questions that recur during the FGDs. In conducting the interview, specific questions regarding the emerging issues were carefully selected and worded to draw a response with a commentary rather than simply proving or refuting a claim. For instance, the question about current status of oil sands extraction was recurrent in all the communities visited.

In order to find answers, specific respondents were identified in MSMD because of their capability to provide facts about aspects of the problems identified by the FG process and they are crucial to understanding the interface between the government and the community. If problems identified in the group discussions remained unanswered in the follow-up interviews, this would significantly reduce the generalisability of the report. Interviews were conducted with a local government official in whose jurisdiction oil sands appear. The aim of the interview with the local authority is to understand the extent of their involvement in oil sands activities. Top officials of the MSMD were interviewed because a number of grey areas outlined in the FG are policy-related and these officers are directly in charge of oil sands issues. It was a privilege to meet the Permanent Secretary of the MSMD (incidentally former Secretary of the BPIC) who subsequently directed the researcher to the Secretary of the Bitumen Committee for detailed conversations. The questions sought to elicit information about the status of oil sands extraction; foreign investment in the sub-sector; government policy on oil sands; community relations, and challenges to oil sands development, as well as any other issue that the respondents considered relevant. An attempt was made to conduct individual interviews with community members in a neutral environment (Ondo Town) after meeting officials of the MSMD, but was abandoned for security reasons. Appendix Four provides examples of some key questions used in the interview.

The time and venue for the interview was based on the respondent's suitability and availability, taking into consideration internal and external factors affecting research participants' responses. The interviews were carried out in the respondents' offices within their organisations, in order to gain a feel for the individual's environment and to gain access to additional information. The responses given by government officials in particular are contingent on the specifics of their positions, organisation and time, as meanings and understandings of interviews change across people, time and circumstances. Some questions were not answered to the satisfaction of the researcher and occasionally information requested was refused, apparently for reasons of confidentiality. Also important is that answers from respondents can change over time as situations in the oil sands projects unfold; for example, from the current exploration bidding process to identifying core-investors, to construction stage and eventual full production. However, despite these limitations, the responses provided were helpful to the researcher.

3.6.4 Direct Observations

Observation has a long tradition in social science research (Yin, 2003) as a method of collecting data associated with either a positivistic or phenomenological methodology (Hussey and Hussey, 1997:159). Observation in research implies some purposeful gathering of primary information on nature, events or behaviour. The field visit is one of the techniques that provided the researcher with the opportunity to undertake direct observation (Yin, 2003:92) of the nature and problems of oil sands activities in the study communities. However, various factors including the nature of the research, time, available resources and ethical issues affected the extent to which the researcher was able to observe the phenomenon of interest. Direct observation could not have provided a holistic perspective on the project; it has allowed the researcher to learn about phenomena that the participants are not aware of; may have been untruthful about, or which are simply withheld from the researcher in the group discussions and interviews. The field role of the researcher was limited to a 'spectator or passive observer' rather than a 'participant'; informants are used for further information and to minimise bias.

Part of the second fieldwork phase was to visit key places within the oil sands belt to gather information about the physical occurrences of oil sands deposits. The visit to these sites was made during the three months of fieldwork from mid-January to mid-April 2010. The most important visit was made to Agbabu subsurface bitumen field. Agbabu is a native settlement where bitumen was believed to have been first spotted in 1905 and is host to the first drilled bitumen well. Information was gathered about the natural discharge of bitumen to the surface and how it affects the ecosystem and neighbouring communities. The site that hosted the ground-breaking ceremony to signify the official commencement of oil sands exploration and exploitation by the former President of Nigeria in 2003 was also visited. These visits are in accordance with Yin's (1994) notion that sites visits are often useful in providing first hand information about the research. The observations of these valuable interactions and site conditions were recorded on an ongoing basis in field notes, supplemented occasionally by still and motion photographs. Field notes were taken of the subject under observation, transcribed and integrated with the findings of focus groups, interviews and documentation. The rich qualitative data from both the field notes, images and the other methods have provided a site-specific knowledge about the oil sands project in Nigeria.

Data gathered through discussions, interviews and observations were processed and analysed in NVivo 8, a software package designed for qualitative data analysis. The process, just like coding, involves collating the different textual databases together as a project, identifying emerging issues and generating different issues contained in the dataset. Coding is a process of: 1) "noticing relevant phenomena; 2) collecting instances of relevant phenomena; and 3) analysing the relevant phenomena in order to find commonalities, differences, patterns and structures" (Seidel and Kelle, 1995:55-56). However, one must note that codes are stored as nodes in NVivo logic. While nodes contain categories and ideas that are of interest to the research, coding is the process of gathering those segments at a node (Richard, 2006:24).

Similar to open, axial and selective coding, NVivo recognises three categories of nodes used to code data: free nodes (more general categories are identified and labelled, but are not related to any other code), tree node (just like selective coding - identify a specific category and systematically relate it to other categories of nodes) and a case node (codes that gather materials about the individual cases of analysis, e.g. focus groups and interviews are cases). In addition to coding, choice quotes served to elucidate common positions or divergence or for the most part to articulate individual or idiosyncratic takes upon the object of interest to the researcher. The process of identifying the themes or nodes includes a part of what Ryan and Bernard (2003) suggested as the different ways in which data are coded: by word repetition, by comparing and contrasting statements, key words selection and metaphor and analogy. This theoretical concept was applied in NVivo to develop themes that are most relevant to the research aims, with the emerging facts serving as the views of host communities about oil sands.

3.7 Reflections on Research Methodology

Before proceeding to Chapter Four, certain issues relating to the general conduct of the research methodology; in particular, the researcher's experiences in the field are presented. These include ethical issues, positionality and reflections on subjectivity and credibility. Lastly, Section 3.8 looks at the limitations of the data sources.

Ethical issues played an important role and were considered throughout the process of the research from planning (proposal), data collection (secondary and primary), through analysis, to dissemination of the findings. Ethical issues in focus groups are the same as other methods in qualitative research (Homan, 1991). As noted by Healy and Rawlinson (1993:340) ethics simply involves: "explaining adequately the purpose of the investigation, the confidentiality of the responses and the rights of the respondents to comment what is written about them". Alongside advocates of ethical consideration in geographic research (e.g. Frankfort-Nachmias and Nachmias, 1992; Madge, 1993, 1997b and Sultana, 2007), ethical issues explored in the research specifically involve, but are not limited to what Wiles et al. (2005) describe as factors to consider in managing informed consent:

a) informed consent of research participants on whether or not to divulge information or participate in the discussion/interview (Appendix Five);
b) maintaining individual or corporate anonymity during the fieldwork and in the report;
c) privacy and confidentiality for documents and settings for group discussions and interview and
d) exchange of information between the research participants and the researcher during the discussion sessions and a brief feedback for consensus at the close of session.

Schmidt (1997:4) recognised that: “the informed consent can be presented to the user, requiring them to take action signifying their acknowledgement of the consent form”. For example, when selecting individuals, full information about the purpose and use of the research was disclosed. The issue of language and literacy level was a primary consideration in communicating with research participants. Consent forms were read out loud in case participants experienced difficulty in reading and the Field Assistant assisted with translation where English was not understood. Community leaders often consented to the form on behalf of the community after indicating an interest in participating (see Appendix Five). When dealing with data obtained from the participants, their confidentiality was respected. The researcher however encountered issues surrounding the disclosure of information by the participants. While some participants consented to having their voices heard in quotes, others declined, hence the use of pseudonyms or codes.

The researcher remained honest and kept participants informed about the researcher himself, the topic and the outcome of the research. On the difficult issue of whether the extent of damage to the communities by oil sands was disclosed; the researcher, aimed at understanding oil sands issues as perceived and experienced by the communities and was not bound to reveal the scale of the damage of oil sands. As a rough guide, some pictures of oil sands operations from Alberta were presented to the communities visited. Accountability to the research community forms an integral part of the ethics of this research. Based on this need to ‘give-back’ to the research community (see Eshun, 2011; Raghuram and Madge, 2005), findings of the research are to be disseminated through the medium presented in Section 9.3.2.

In addition to ethical issues such as consent, the researcher accepts the argument of Madge et al. (1997a) that any piece of research is far from being a neutral and objective exercise. Decisions and actions taken, in this case, were influenced by sponsorship, data sources and community peculiarities, and by the more immediate value judgements of the researcher. Subjective decisions are manifested in this research, ranging from the dictates of a sponsor, the choice of methodology, realities in the fieldwork and interpretation of the results, to the very decision on choice of location, issues examined and analytical techniques. The research has been funded by the PTDF and so far, administrative procedures and logistics have affected the progress of the research, especially the untimely release of funds for the first and second fieldwork stages (with a delay of almost six months). Part of the condition of the sponsorship for this research is to use GIS to show mining in Nigeria. Hence, the application of GIS was to satisfy the sponsor's requirement and the use of the content analysis was to make the research academically viable and useful for policymakers on issues concerning the impact of oil sands extraction on host communities in Nigeria.

In the case of researcher-participant relations, the position of the researcher as a Nigerian prompted a more realistic response from targeted participants. However, progress was restricted by time wastages and the need for negotiations to secure permission and consent from gate keepers to organise the groups. In order to create access and build relationships, local contacts were made with government officials, local elites and other actors with power as, more often than not, they facilitated access to and co-operation from the community. In choosing these personalities for access careful consideration was paid to hierarchical structures of the society based on the traditional system of leadership. On many occasions, the researcher attempted to dissociate himself from his position as a government official, or as a member of an NGO, in order to ensure confidence and avoid local expectations of tangible benefits from participating in the research. In the course of the fieldwork, knowing that the researcher came from a 'foreign' university had prompted eagerness and more realistic responses and expectation from participants. Comments like the following are common:

a) 'Tell the whole world about our situation. We appreciate your coming';

b) 'We are convinced about the research, if not we would not have responded';

c) 'Please do not follow people who came here, took photos, sometimes dig holes and go. Let the government know about us'.

Table 3.5 Questions for evaluating a qualitative research and chapters to consult in the thesis for answers.

Question	Elaboration Examples	Thesis Chapters
1. What was the natural history of the research?	Purpose, rationale and evolution of research	Chapters 1-3
2. What data were collected and by what methods?	E.g. note-keeping and tape-recording	Chapter 3
3. How was the sampling carried out?	Sampling frame and rationale for choice of method	Chapter 3
4. How was the data analysis performed?	Procedures for summarising and presenting data	Chapter 3
5. What results are presented?	Description of results presentation (e.g. description)	Chapters 2,4-8
6. How credible and dependable are the data-construct links?	Details of the relationship(s) between data and constructs derived from data	Chapters 2,4-8
7. How credible is the hypothesis?	Specification of the relationship between construct and theory/research questions	Chapters 2,4-9
8. How transferable are the findings?	Recognition of the limits imposed by the sampling strategy	Chapter 9

Source: adapted from Baxter and Eyles (1997:518), originally based on Rose (1982) and Lincoln and Guba (1985)

Based on these examples, the researcher also holds with the argument by Madge (1993:296) that researcher position influences the process of data collection and eventually the outcome (knowledge). Some elements of the researcher's efforts to meet the expectations of the communities are outlined under Section 9.3.2. Throughout any research, acknowledgment of subjectivity issues connected to methodology can improve the honesty and credibility of the research, and Bailey et al. (1999) came to the agreement that subjectivity does not in any way negate the ability to rigorously conduct the research. The research process conforms to the check list constructed by Baxter and Eyles (1999) for evaluating qualitative research (Table 3.5 above). Steps were taken to ensure the credibility of the research through rigour and openness of reporting the procedures for the research.

3.8 Limitations of Data Sources

Before concluding the chapter, some issues the researcher has had with the data are raised. Generally, the two periods of fieldwork progressed smoothly, given the sensitivity of the subject. However, many obstacles were encountered during the field investigations that limited the amount of data available for the study. Both government officials and local gate keepers were cooperative at the outset, but the task of organising participants and interviews was time consuming. Many difficulties were faced; for example, in securing appointments and permits for the focus groups and the follow-up interviews. To run the focus groups, the researcher had to obtain the necessary permits from a higher local authority - all of which took a substantial part of the time allocated for the fieldwork. To this end, group discussions were conducted at night and in the evenings at the convenience of the participants. The physical presence of the researcher within various organisations has influenced the release of data based on the needs of the research, but it took a long time to meet government officials, e.g. the Permanent Secretary of the MSMD. Furthermore, some of the communities had no road access for vehicles. In two instances, the researcher and his field assistant had to park their vehicle and follow a footpath to the communities avoiding sacred places.

The first stage of the study primarily relied upon official documents and records, which were initially prepared for administrative purposes only without reference to the point of view of other disciplines such as geographers. Mining licences may not be sourced from anywhere but the government agency that issues them. Mining licence data were obtained from the MCO, and the GIS representation of these licences is as accurate as the original source. A case in point: the major problem encountered during the data preparation of mining licences was a confusing discrepancy between two data types obtained from the same organisation (i.e. between licence data in shape files and excel records), to the extent that some parts of the data were rendered unusable owing to inconsistencies in systematic arrangement and compilation errors of values and names - all capable of endangering the reliability of the data. Another major problem was that some key information, such as the duration of the title, name of holder and types of mineral, was missing in the attribute table.

These problems were overcome by merging the data for easy manipulation. Since the 2006 population census data have been based on state and local government populations; they do not give the whole count for all people and households at the community or ward level. The non-availability of this socio-economic data has limited exhaustive investigation of the research into the number of households and the local economy affected by mining activities. Therefore, any estimation was based on a local government area, as against community (ward) level. The researcher's aim to report the locals' understanding of oil sands in their locality was also constrained by a language barrier. This is not surprising as it is a national problem: the illiteracy rate in Nigeria is over 60 per cent of the population, and is much higher in rural areas (NPC, 2010:173-174). Because of low levels of literacy and understanding of the English language in communities such as Gboge and Ijuba-Ijuoshun, the researcher relied on the ability of the field guide to moderate the discussions using a local dialect.

3.9 Conclusion

This chapter has presented the research methodology deployed to study the issues and concerns of communities that would host the planned oil sands projects in Nigeria. The researcher began by laying the trail of the methodology that focuses on the relationship between two strategies (GIS and a Case Study). The first stage is a quantitative analysis that provides information and constructs the platform for the qualitative study in stage II

Settlement data, mining licences, political boundary data and population censuses were the major data requirements. Buffering operation, context operation and overlay formed the basis for the primary analysis that presents an overview of Nigerian mining as well as the communities host to oil sands mining. Rather than hand-picking case study communities, the GIS method has provided an alternative way to identify specific locations where the impact of mining on nearby communities can be expected. Following the results of the first phase of the methodology, fieldwork in Irele was undertaken based on a case study strategy, by the fact that: (a) Irele contains the largest number of oil sands licence in Ondo State, (b) a study of this nature has not yet been performed in these communities, and (c) it allowed the researcher to study communities that are potential hosts to billion-dollar oil sands projects. Empirical data for the qualitative study were primarily collected from focus group discussions and interviews and supported by observation and secondary sources. Focus groups facilitate an in-depth investigation at the community level; interviews centred on issues raised by the communities; field observation provided the opportunity to obtain information about the communities; the physical appearance of oil sands, and documentary and archival records provided related documentation and data for both the national GIS and the case study.

The use of multiple methods had provided as detailed information as possible about the oil sands project. It has also strengthened the credibility of the findings. Finally, ethical issues in the conduct of empirical research in geography were examined. Reflections were also provided on the methodology and the conduct of research, identifying the obstacles that the researcher faced and the measures taken to solve the problems. The thesis now turns to the results of the research, starting with a discussion on the Nigerian mineral industry, followed by an extensive analysis of mining.

CHAPTER FOUR

THE NIGERIAN MINERALS SECTOR

4.1 Introduction

Solid mineral deposits occur throughout the Nigerian geological environment. Indeed, all 36 states of the Federation have a share of the mineral inventory of the nation (Obaje, 2009), unlike oil that is predominantly found in the Niger Delta. Geological studies of the country have established the spread of mineral resources across geological belts in over 450 locations (MSMD, 2008a). According to Ogezi (2002) and later Obaje (2009), the geological setting undoubtedly favours the extensive occurrence and widespread variety of mineral resources that can be extracted as essential materials for industrialisation, as a source of foreign exchange, and for the establishment of ancillary industries. As indicated in Section 1.1.2, some 34 minerals were found in large enough quantities to be considered economical under the prevailing mineral market conditions (see Table 4.1 for examples). The rest of the minerals range from occurrences of limited economic potential, to those large-enough to sustain long-term profitable extraction.

Chapter one has shown that the Nigerian economy is largely dependent on oil, but currently potential is all that the non-oil minerals offer. The non oil minerals sector's contribution to the national economy is abysmally low (Figure 1.3), under-developed and only employs a few thousand workers (possibly only hundreds). As such Nigeria relies on the export market for the minerals that it has in abundance such as oil sands, iron ore, barite and coal among others. Compare this situation with South Africa where mining is responsible for nine per cent of GDP, and close to a million people are directly or indirectly employed in the sector. Australian mineral commodities represent nine per cent of GDP and directly employ around 300,000 people. Mining in Peru generates 5.5 per cent of the GDP and 50 per cent of total export. In 2010, diamond mining alone in Botswana accounted for around 30 per cent of GDP and 80 per cent of export earnings, and in Namibia it was eight per cent GDP and 40 per cent of export (DeBeers, 2011). The economic and monetary value of some of the minerals listed in Table 4.1 is unknown as they are still undergoing technical and economic evaluation.

Table 4.1: Nigeria's seven minerals reserve estimate and value

Mineral	Reserve Estimate	Mining option	Value ($)
Coal	1, 487 million tonnes	Surface highwall and Underground longwall operation	6 billion per annum
Iron ore	1, 478, 000, 000 tonnes	Surface	-
Lead/zinc	20,000 tonnes	Surface; small-scale	-
Bitumen	42 billion barrels	Open –cast and In-situ	Up to 10 billion per annum
Gold	50,000 ounce	Artisanal and small-scale	-
Limestone	1,355,980,000 tonnes	Surface; small scale	-
Barite	21, 123, 913 metric tonnes	Surface; small-scale	-

Sources: Malomo (2007); MMSD (2007); Gynag et al. (2010)

The aim of the chapter is to provide background information on the Nigerian minerals industry, and a base for the analysis of mining licences in Chapter Six. The first section of the chapter presents an overview of historical developments of mining from the colonial period to the current democratic government. The second section assesses Nigerian mineral ownership structure, while the third section specifically focuses on certain portions of the current Mining Act that are relevant to the research topic. The last section contains an appraisal of the issues relevant to developing and maximising benefits to the local community.

4.2 Historical Development of Mining in Nigeria

This section presents a historical account of mining from the colonial period, highlighting the nature of local and foreign investment in mineral resources, and the changing role of the state as an operator and a regulator of the industry. The analysis is divided into three distinct periods: the first period spans colonial rule (1860-1960); the second period is after the country gained political independence (1960-1998), and the third period is when the country returned to democratic rule after more than two decades of military rule (1999-present).

4.2.1 Colonial Mining, 1860-1960

The amalgamation of the northern and southern protectorates that eventually become Nigeria in 1914 guaranteed colonial control and domination of resource extraction. Resource extraction was undertaken at specific sites in small- and large-scale operations. Prior to colonial rule, early European and Arab explorers, mainly Germans, Spanish and Lebanese discovered, mined and traded tin, galena and gold with their home countries (Hodder, 1959). Historical evidence suggests that tin was mined and smelted in the early eighteenth century (Fell, 1939; Hodder, 1959; NBS, 2008b). Organised mining began in Nigeria between 1902 and 1923, following the commissioning of the minerals survey of the southern and northern protectorates (Marcellus, 2010). The 1886 charter of the Royal Niger Company (a nineteenth century company that combined and conducted all British government commercial interests in Nigeria) was revoked in 1899 and acceded all its land and mining rights to the colonial state. The revocation made it possible to exercise complete legal control over the industry from the outset. This power was used to invite investors and entrepreneurs (from Britain and other industrialised European countries) to undertake large-scale operations. Bower (1948) maintained that this action in the long run benefited more foreigners than the Nigerian economy, because they owned, operated and sold their products freely, and determined what to pay as royalty to the government. The colonial government's first major investment into the sector was the establishment of the mineral survey.

In 1902, the Niger Company surveyed and found large tin deposits after it was reported that tin was being produced by the Hausa natives of Plateau and Bauchi. In 1906, coal exploration commenced in Enugu and actual production began in 1916. The first mineral ordinance of Nigeria was consolidated in 1916; later on the geological survey of Nigeria was established as a department of government to take over the work of the survey teams. The principal mineral occurrences discovered by the survey teams included Lignite deposits at Asaba, Lead-Zinc ores at several locations, and Tin and Columbite in the South-east; and Monzonite and Limestone were also found at several locations. Others are Coal at Enugu; Brine springs at Arufu and Awe; Galena in Jos area; Iron Ore deposits in Niger and Kwara districts and Marble deposits in Jakura (NBS, 2008b). Bower (1948) reported that by 1936, Nigeria exported minerals valued at £2.1 million, ranking it fourth among mineral-producing British Colonies. This value is worth 14 per cent of total mineral exports. Table 4.2 presents the output and export value of some Nigerian minerals recorded in 1936. Between 1924 and 1939, Nigeria produced tin ores valued at over £37 million. The revenue was used to invest in railway and cocoa plantations.

Hodder (1959) documented that mining companies paid annual rent fixed by the government every seven years. One fascinating aspect of colonial mining was the recognition and protection of Africans as occupiers of mineral-bearing land. The law also compelled mineral title holders to compensate landowners for disturbances and damage to buildings and crops. However, the payment of compensation was carried out without the participation of the landowner, meaning – they had no say in the amount of compensation . Community leaders at that time were the recognised land owners and recipients of any compensation; as such those individuals who owned that land where minerals were found hardly benefited. Mining employees (referred to as pagan labour), the majority unskilled and a few semi-skilled, had limited rights of negotiation, but were protected by the Mining Regulation of 1927-1929. Mine workers (natives) are also protected against injuries and can claim for compensation in case of accident (Bowler, 1948).

Table 4.2 Mineral production, export and value in Nigeria in 1936

Mineral Type	Production	Exports	Export Value (£)
Tin concentrate (tons)	13,432	13,108	1,835,120
Gold (oz)	33,364	34,793	243,842
Wolfram (tons)	646	0	986
Columbite (tons)	511	511	(49,531)
Silver (tons)	1275	1216	(24,320)
Coal (tons)	(297,053)	46,975	42,678
Total value of exports (£)			2,196,477

Source: Bowler (1948)

Before the enactment of the first Mining Law in 1946, there was no documented regulation and environmental management strategy for mineral extraction, processing and reclamation (Usman, 2001). Therefore, the 1946 Act included environmental protection in its first attempt at regulating mining activities. Yet this Act failed in giving the required protection to the environment from the harmful effects of mining. In short, the industry did not consider environmental issues as an integral part of the mining business. The cost of a lack of environmental protection in the Act is evident in the

Plateau tin mining fields. Many writers (such as Alexander, 1990; Hodder, 1959, and Godfrey, 1939) observed that over 100 years of mining in the Plateau had left a legacy of a damaged landscape and a wasted land, in addition to the imminent danger of exposure to radioactive wastes.

A recent government survey (Vanguard, 2010) has shown that there are about 1500 dangerous mining ponds that have degraded the physical landscape of the Plateau. While colonial mining contributed to government revenues in the form of rents and royalties used for infrastructural development at the national level, it relegated host communities to sources of labour. An estimated £500,000 was disbursed annually as income to native labourers working in tin production (Fell, 1939). As Bowler (1948:42) envisaged, “unless there is some important new discovery, the relative importance of minerals among the exports of Nigeria may be expected to decline after 1945”. Ten years later, Bowler’s forecast became a reality when oil was discovered in 1956. In 1960, Nigeria became an independent country; revenues derived from mineral and agricultural commodities were diverted for the early development of the oil industry. With the end of colonialism, the government, even at independence, took the path of the colonialist; it continued to wholly own, operate and control the minerals industry. For example, the Nigerian Coal Corporation (NCC) became actively engaged in coal exploration and mining long after the demise of the Royal Niger Company.

4.2.2 Mining, Post-Political Independence (1960-1999)

The mineral sector suffered a significant setback after more than three decades of independence, as a direct result of neglect (Madueke, 2009). The civil war Nigeria experienced in the late 1960s cannot be ruled out as another cause of the decline of mining. During this three-year period of civil war, foreign companies left the country, and only a handful returned after the war. In the early 1970s came pressures by the Nigerian elite for the nationalisation of business and industrial enterprises - such as shipping, airport control, and tin and cement production. The agitation led to the 'Indigenisation Decree of 1972 and 1977' which gave Nigerians opportunities to participate in the development of solid mineral, oil and gas, and the manufacturing industries (Ogbuagbu, 1983). While the policy shifted partial control to Nigerians, it discouraged the inflow of foreign investments and incited large-scale withdrawal of foreign mining companies. An external factor that played a key role in the collapse of mining was the commodity crash of the 1980s. The fall of mineral production and closure of mines increased rural poverty, resulting in job losses especially where mining was the major source of livelihood (MSMD, 2008a; NBS, 2007). The overall outcome was degeneration of mining and related productions from large-scale operations to the dominance of small-scale, illegal and artisanal mining (Ishola, 2008).

Prior to the establishment of the government-owned Nigerian Mining Corporation (NMC) in 1972, the government encouraged mining through the provision of infrastructure in mine fields. At that time, the majority of the functional mining companies were government owned, such as the NMC established to mine kaolin, barites, feldspar, gold, marble and tin. The Nigerian Bitumen Development Agency was for oil sands extraction, and the Nigerian Uranium Mining Company was created to develop uranium (BPE, 2008; MSMD, 2008b; NBS, 2008b). Royalties, rents and other related income from mining operations were collected by the government. The government's policy to directly participate in mining was driven by the need to fill the vacuum caused by the civil war and other issues highlighted above.

The introduction of the World Bank's neo-liberal economic model of structural adjustment, inflation, shocks of oil volatility and increased public expenditure called for a review of the indigenisation policy and government's participation in mining. The result was a change in the concept of diversification of activities and the promotion of privatisation and commercialisation. By the end of 1994, the government canvassed a private sector-led economic revival programme in solid minerals, as a means of diversifying the Nigerian economy. The economic policy led to the establishment of a regulator, administrator and operator for the mineral sector - 'Ministry of Solid Minerals Development (MSMD)'. Notwithstanding the shift in policy, the government continued as a 'partial operator' and a 'full regulator'.

4.2.3 Mining in a Liberalised Political Economy, 1999 to Present

The years of military rule in Nigeria ended with the return to democracy in 1999. As the country gradually embraced a politically stable environment, the democratic government continued with the liberalisation policy for the national economy. In the minerals sector, this involves privatisation and the creation of incentives for the rapid production of minerals for export and import substitution. In spite of the privatisation drive and policy changes of the new government, this period witnessed the complete collapse of the already comatose mining industry (Figure 1.3). The sector was and is still dominated by illegal artisanal and small-scale mining, exploiting rich veins and alluvial deposits of gold, tantalite and gemstones for export (see Chapter Five). The resultant outcome is illegal mining and uncontrolled devastation of land and the environment. Illegal mining activities also led to gross loss of revenue: a mere 89 million Nigerian Naira (less than £400,000) was realised as revenue from mining in

2002 (Ezekwesili, 2006). Production value has increased from US$35 million in 2002 to US$135 million in 2009 due to the beginning of large-scale mining (MSMD, 2011).

Compliance with the mineral laws is, however, minimal and enforcement is non-existent, as is supervision. There was conflict between the states and the federal government over mining jurisdiction, as the other tiers of government have become involved in solid mineral affairs that are exclusive to the Federal Government (Section 4.6 explains mineral ownership). Mining licences application and issuance procedures became rather opaque, leading to speculative titles and thus discouraging genuine local and foreign investors. The available geological data were considered out-dated; the lack of current, reliable and modern geological information on minerals equally hindered investment. Over a decade into the abysmal performance of the MSMD, the vision for the Ministry was yet to be achieved on the grounds that gross inefficiency and poor structures made it barely able to cope with its statutory roles.

For all the above reasons, the last 10 years have witnessed various initiatives and radical reforms in policies, institutions and legal frameworks to revive the sector (Ezekwesili, 2006; Ishola, 2008; Madueke, 2009). The reformation policy has changed the role of the regulatory ministry from an ‘Owner-Operator’ to an ‘Administrator-Regulator’; the aim being to persuade private sector exploration and development investment that would foster wealth creation, poverty reduction, community transformation, employment generation and skills transfer. The policy of administrator-regulator suggests the separation of powers and duties between the public – in this case MSMD, and the private – mineral investors. While the former provides the enabling environment for investment and regulation to ensure security of tenure and compliance to the rules governing mineral extraction, the latter is expected to engage in actual extraction and production processes. About six years into the new policy, mineral resources abounding in the country remain unexploited; and the entire sector is stagnating, still contributing less than 0.5 per cent to the national economy (Figure 1.3). To make matters worse, reputable private investors with a pedigree of extracting coal, oil sands, and iron ore among other minerals, have retreated following an initial expression of interest as in the case of the past bitumen-bidding process.

4.3 Ownership of Mineral Resources

Generally, countries' mineral resources are treated as national heritage (Haysom and Kane, 2009). Nigeria, similar to South Africa, Indonesia and India, has created legislation that entrusts the ownership of these resources to the care of the government. The rationale is to protect and guarantee that the extraction and development of resources becomes beneficial to the land owners on whose lands the resources are found, and the rest of the citizenship. Countries like Canada and the United States are able to manage their resources differently without conflict; through individual, provincial and national ownerships. In the Nigerian case, however, national control of mineral rights breeds corruption and underdevelopment of the resources. The mineral ownership system was developed in response to the UN General Assembly Resolution 1803 of 1962 and the 1992 Rio Declaration on the Environment and Development. Both the resolution and declaration recognised national ownership of resources as a sovereign right. Unlike the United States that operates on three principles of resources ownership (absolute ownership, qualified interest and Oklahoma), Nigeria adopts the national ownership principle that places ownership of resources as the exclusive right of the Federal Government (Iwere, 2008). This principle is also used in Brazil, Australia, Chile, Venezuela, South Africa, India and China. In countries with a monarchist system, e.g. Kuwait and Saudi Arabia, the Emir owns all of the country's mineral resources, and the national oil companies manage the resources for the King/Emir.

In order to provide legal backing, a number of legislative acts have been promulgated to capture all the mineral resources in land and water, and vest them in the Federal Government. For example, Section 44(3) of the Nigerian Constitution provides that:

> Notwithstanding the foregoing provision of this section, the entire property in the control of all mineral oil and natural gas in, under or upon any land in Nigeria, under or upon the territorial waters and the exclusive economic zones of Nigeria shall be vested in the government of the federation and shall be managed in such manner as may be prescribed by the national assembly (Constitution of the Federal Republic of Nigeria, 1999:28).

Indeed applying literal interpretation to the above provisions, it is patently clear that all minerals are owned by the Federal Government alone, not the States, Local Governments, Communities or Individuals. Thus, the Federal Government is primarily responsible for the development of mineral resources in the country, including licencing, regulation, supervision and monitoring, providing a legislative framework and overseeing the collection of mineral rents and royalties. Mineral resource rents and royalties are payable to the federal government, which are then shared between the three tiers of government: Federal, State and Local.

Similarly, Section 2(1) a and b of the 1979 Land Use Act vested surface rights to the states and local governments, but any mineral found under the surface of the land belongs to the Federal Government. This then alienates people from their land with limited rights of ownership at the surface. Legislation has also been propagated on specific minerals including oil and gas and solid minerals. The Nigerian Petroleum Act of 1972 is similar to the UK Petroleum Act of 1934 that makes the federal government the owner of all petroleum resources as well as all revenue proceeds accruing from its development. In the same manner, the Nigerian Minerals and Mining Act of 2007 is comparable to the South African Mining Act of 1971, the New Zealand Crown Mineral Act 1991, and Canada's Mines and Mineral Act 2009 that vested mineral wealth to the federal government. Coincidentally, these countries are former British colonies, as the mining laws originated during the colonial period.

So long as the federal government controls and determines the regulatory framework of minerals in the country, the states and local governments have no direct control over any mineral within their domain. The states where the mineral resources are extracted may be allocated a certain proportion of the revenue realised from the mineral products. Revenues generated are shared between the producing states based on the 'Derivation Principle'. This principle dates back to the pre-independence era of the revenue allocation formula, where a certain percentage of mineral revenues is allocated to the states where minerals are extracted as compensation for resource extraction. In theory, the derivation is for developing the host communities and for environmental management, but in practice communities where the minerals are mined barely feel the impact of the wealth. That is why the derivation principle still remains contentious in the Nigerian oil sector, even though the federal government is in the process of divesting 10 per cent equity of all its investment in the oil sector to the producing states. In short, the derivation formula currently applies to the oil sector alone and is not covered in the solid mineral sector.

The non-oil mineral-producing communities are also covered by the provision of Section 44(3) of the constitution, but are not benefitting from the sharing formula.

While the derivation principle is implemented in oil and gas extraction, it is yet to be applied in the solid mineral sector. Again, a number of commissions cater for the overall development of the oil producing communities - from the scrapped OMPADEC to the NDDC and now the Ministry of the Niger Delta. The Mining Act 2007 failed to deal with this issue as apparently no similar institution has been established for the solid mineral-producing areas. The presence of numerous institutions, all with an abysmal performance in dealing with environmental pollution and degradation only confirm replication of the problems associated with the Niger Delta and Jos area.

4.3.1 States and Local Governments in Mineral Governance

Mining is under the exclusive list of the federal government; therefore, the states and local governments have no direct control of the resources. Under Section 19(1) of the 2007 Mining Act, state governments have no power to either enact or repeal any mining legislation nor establish their own mineral regulatory institutions. Their participation is relegated to membership of 'state mineral resources and environmental management committee' to ensure that the interest of the federal government is protected, and to advise the Minister of Mines on issues of compensation. The local governments play an important role in addressing conflict and safety issues. The village head/community leaders are saddled with the responsibility of ensuring peaceful co-existence between miners and indigenous communities. Any case of conflict, depending on its magnitude, can be resolved at the first instance by the community leader and the local government authority. Section 100 of the Mining Act requires that title applicants obtain the consent of land owners before gaining access. A 'Community Development Agreement' (CDA) with the host community is also required for their sustainable social and economic development, such as conflict management and the provision of social amenities and infrastructure. The Act limited the role of local authorities and community leaders to membership of ‘state mineral resources committee’, when matters discussed fall within their territories. The following section (4.7) outlines aspects of the Mining Act 2007 that are relevant to the objectives of this thesis.

4.4 The Minerals and Mining Act, 2007

From 1940 to 1999 Nigeria had about five to six mineral acts and decrees. Currently, mining activities are governed by the Minerals and Mining Acts, 2007. The new Act is the very foundation for dealing with issues of mining administration, host community development, environmental considerations, investor incentives and powers of mining officials. However, the Act gives overwhelming discretionary powers to the Minister of Mines in mineral resources management, which has in the past led to inconsistency, favouritism and flouting of the mining rule. The excesses of the minister in the discharge of his responsibilities are evident in the number of bogus mining licences granted with total disregard for the existing law. Even as the power of the minister is not reduced, the coming of the Mining Cadastre Office as an institution to issue licences has to a certain extent reduced undue influences. Mining right is granted on behalf of the federal government to an incorporated company for exploration, mining and marketing. Chapter Six presents mining titles in Nigeria, but before that Section (4.4.1) gives an overview of the mineral titles and the incentives in place for encouraging investment.

4.4.1 Mineral Titles and Incentives

For effective growth of the mineral sector, mineral licences are ambitiously issued to ensure that the sector becomes a revenue generator for the government. Under Section

46(1) of the Mineral Act 2007, the right to search for and exploit minerals in Nigeria can be granted under one or a combination of the following titles:

1. Exploration licences;
2. Mining lease;
3. Quarry lease;
4. Small-scale mining lease;
5. Reconnaissance permit;
6. Water use permit.

Nigeria has established a mining cadastre system, and is in the process of completing its full modernisation to make it better equipped for issuing mineral titles, and resolving mineral ownership related problems. Table 4.3 shows mineral titles, their allowable areal coverage, maximum approval time and the duration of grant. Chapter Six is based on national analysis of mining on the first four of the above titles. Water permits are issued in addition to any of the four permits that involve the use of water for dredging, extraction or processing. Reconnaissance permits are for preliminary surveys, usually in greenfields, to determine the mineral potential of a particular area for further detailed exploration and scientific studies.

Table 4.3 Mineral titles in Nigeria and their areal extent

Type of Licence/Permit	Duration (Year)	Maximum Area (Km^2)	Granting/Refusal Period (Days)
Reconnaissance Permit (PR)	1	Non-exclusive	30
Exploration Permit (EP)	3	1000	30
Mining Lease (ML)	25	50	45
Small-Scale Mining Lease (SSML)	5 or 10	3	45
Quarry lease (QL)	10	3	45
Water use Permit (WP)	-	-	-

Source: Ezekwesili (2006:5)

The Nigerian Mining Act provides incentives to attract investments in the minerals sector, in view of the growing demand for minerals and resurgence of mineral prices.

Investors' incentives in the formative years include a tax free period from zero to five years of the commencement of production. A capital gains tax of 10 per cent is charged as against the industry standard of 15 per cent. Royalty payments are considerably reduced or waived by the minister depending on the strategic size and nature of the investment. Up to 95 per cent capital allowance and expenditure may be granted on exploration and surveys, and on extension of infrastructure to mining sites. Furthermore, all operators in the mining industry are granted exemption from the payment of customs and import duties on machineries and chemicals. Expatriate quotas and resident permits for approved expatriate personnel with tax free remittances of expatriate funds outside Nigeria are granted. There is a free transfer of external funds by the Central Bank of Nigeria and free conversion and transfer of currency for payment of loans and remittances in the event of liquidation or termination of project.

Unlike mining where an investor has the choice of local partnership or to operate under 100 per cent foreign ownership, incentives in the oil and gas sectors are contained in joint ventures (JV) with the Nigerian National Petroleum Corporation (NNPC). The NNPC is a state-owned company that operates both as an industrial corporation engaged in downstream and upstream production and as a holding company for the purpose of gathering oil revenues through joint ventures, which accounts for 95 per cent of crude oil exploitation (Pearson and Rose, 2003). Some of the incentives in the JV include guaranteed minimum margin of US$2.50 billion; capital allowances of 20 per cent per annum in the first four years, falling to 19 per cent from the fifth year; tax rate of 30 per cent which provides that the capital allowances can be carried forward indefinitely; and graduated royalty rates of five to seven per cent offshore and onshore respectively. Oil sands operation will typically enjoy the same incentives as other solid minerals and some of those in the oil industry. Surface mining of oil sands will enjoy incentives of solid minerals while in-situ mining is covered by the policies in the oil industry. The harmonisation of oil sands regulations and policies based on international standards could create important benefits. Investors could benefit from not having to meet different national legal and regulatory requirements that are below international standards.

4.4.2 Environmental and Social Considerations

Ajayi and Ikporukpo (2005) noted that Jos tin and Enugu coal mines are instances of where several decades of poor mining practices and regulations have degraded the environment. As a result of increasing global competitiveness in mining and the need to entrench global best practices, the current mining law provides for very strong community relations and environmental restrictions. Mineral title holders are required to consider the potential effects of their operations and to take practical measures to prevent or mitigate environmental pollution and social disruption. Part of the requirements for obtaining mining lease under the mining law is the submission of an EIA report (Mining Act, Sections 118-120). To this effect, the Mines Compliance Unit ensures that mining is operated in an environmentally sensible manner. Other agencies of government (e.g. Federal Ministry of Environment) are also responsible for monitoring environments used for extractive activities. What is lacking, however, is the co-ordination and harmonisation of regulations by all the institutions responsible for managing and maintaining environmental standards. For example, maintaining a uniform standard by the Federal Ministry of Environment and MSMD would eliminate duplication of functions, and avoid conflicts between the institutions. The decentralisation of permissions and approvals from government creates risky, unnecessary and unfavourable expenditure for the investor through long and repeated journeys in pursuit of these statutory requirements.

As briefly noted in Section 4.4.1, consent is required from local authorities prior to the development of a mineral title. In this case both parties are to negotiate, agree and undertake actions on how to transfer sustainable benefits to the communities where the mine is to operate. This new approach encourages consultation and contract with communities from the onset of mining operations. Enumerated areas of development are agreed upon and are documented in the CDAfor implementation. However, these agreements are typically not implemented or monitored. One of the problems is identifying the communities with which an agreement is to be formed, based on their proximity to the mine area. These issues are examined in Chapter Six; and the question of whether the agreements take into account community interests through participation of community members is unravelled in Chapter Seven, looking at potential oil sands communities.

According to the New Minerals Act (2007) the CDA between a mineral title holder and a host community must include an appropriate and acceptable monitoring framework, and a means by which the community participates in the planning, implementation and management of activities. However, matters of community representation, the extent of participation and transparency on agreed ‘community needs’ are matters of detail not enumerated in the Act. Whatever the approach adopted, investors require clear and realistic environmental policies, with comprehensive outline of their environmental responsibilities and obligations. In theory, it appears that the Nigerian government has learned from its past mistakes by setting a law for engaging the communities in a bid to transform the mineral sector. Whether this translates into practical implementation can be seen in Chapters Seven and Eight of this thesis. Before the conclusion of this chapter, the following section summarises some of the issues related to the research topic.

4.5 Challenges in the Solid Minerals Sector

While the Nigerian government has embarked on a number of reforms, the mineral sector has continued to face some challenges that are hampering the flow of investment. The major challenge to the sector is the lack of stability which affects institutional capacity required not only to administer and support a modern, market-driven mineral sector, but also to regulate environmental issues and maximise benefits to the local community and the nation. The Nigerian mineral sector also lacks linkages with other sectors of the economy; contribution to the GDP is abysmal; development of large-scale mining is slow; environmental degradation and social issues are widespread, and there is a low level of value addition of minerals.

The MSMD was established in 1995 to drive rapid and beneficial development of solid minerals. To effectively perform its mandate, MSMD has been restructured into five departments, seven units and eight agencies (Madueke, 2009). Since 1994, instability in governance has affected proper policy formulation and coordination of mining activities in the country. The Ministry has implemented weak and ambiguous organisational structures over the years. It has changed name three times and its organisational structure has been tampered with more than four times. The instability and frequent change of ministers (13 ministers in 17 years) neither helps the organisation's credibility nor guarantees stability and continuity of policies. Thus, in the last 17 years of existence, the Ministry has been unable to articulate a concrete and stable framework that would ensure the maximisation of the various opportunities provided by the upswing of commodity prices in the last couple of years. The uncertainties about future governance and regulatory change have influenced the willingness to invest in the Nigerian mineral assets. One such instance is the revalidation of all mining licences by the MCO that took a long time to resolve due to leadership crisis that led to the appointment of three ministers within four years. Even though the exercise was for the good of the system, it has scared away prospective investors and operators. This is unprecedented in a situation where the Nigerian government is reviving the potentials of its mineral resources.

Artisanal and small-scale mining in the Nigerian context is a short- to medium-term strategy for coping with income or subsistence loss owing to macro-economic factors - as more people become poorer they are pushed into the ASM to earn a living. Artisanal mining is a livelihood strategy with poor working conditions and health and safety risks that cause widespread environmental degradation. Gold mining comes with health risk to the miners and their communities, particularly if done by artisanal miners (Twerefou, 2009:17). In June 2010, a fatal lead poisoning event killing about 200 children and women was reported in two mining communities in Zamfara state, Nigeria (Ibrahim and Aliyu, 2010). The two communities were processing gold which had lead ore in it, and the lead was deposited in the villages because: “every household had a stone-grinding machine in front of it where the men crush the rocks and the women work inside the confines of their home sieving the crushed rock to extract the precious gold dust that promises a life of prosperity” (Ibrahim and Aliyu, 2010:1). Such incidents could expand the perception of the government’s weak institutional capacity to monitor and enforce mining regulations. Nigeria has one of the worst records of oil pollution of any oil-producing country. A 2011 report from UNEP depicts the devastating effects of long-term oil pollution on the local communities, mainly due to failure in monitoring oil activities.

As already indicated, a legal framework that would facilitate engaging the local communities in order to avoid an experience similar to the Niger Delta is in place. Considering the literacy level of local communities, Pedro (2004:11) proposed that:

> there is the need to empower local communities to effectively and meaningfully participate in the mineral resources development in their constituencies, there is need to empower them through training and improvement of their rights of access to information. Participation should also be extended to policy formulation and planning and monitoring of project implementation.

Such arguments are captured in the soon-to-be operational mines. However, the approaches to improve on the distribution of revenue at local level are deficient and based on the federal system that is operational in the oil industry (refer to Section 4.6). Apart from policy instability and failures and minimum institutional capacity, the shortcoming of the mineral sector may be related to poor understanding arising from absence of comprehensive data on the overall significance and impact of the mineral sector on: 1) vulnerability and sustainability of resource communities; 2) benefits in terms of cash flows to the mining communities and national government; 3) costs in environmental degradation and pollution including social impacts, and 4) the assessment of costs versus benefits in respect of the mine life cycle. The need for robust data on mining and its potential and attainable impacts at community, local and national levels cannot be overemphasised. Thus, this research deploys effort at collecting some information about perceived impacts of developing oil sands in Nigeria.

4.6 Conclusion

Nigeria contains abundant minerals and metals dispersed throughout the country, as well as hydrocarbons that are found in localised areas of southern Nigeria. The development of minerals and metals in Nigeria can contribute to a degree of resource diversification and enhancement of Nigeria's revenue profile. Although Nigeria has had several mining codes in the past, the respective roles of governments at all levels, the private sector, including host communities, are currently determined by the 2007 Mining Act and Policy. These Act and policy documents confirmed federal government's continued ownership of all mineral resources. Overall, the policy is pro-foreign investment, with weak roles for the communities and no role defined for the civil societies despite apparent commitments to greater inclusion of social and environmental issues.

The lack of a strong strategic framework and a genuine commitment from the federal government, coupled with the instability of the Ministry itself and its programmes and policies, is hampering the development of the sector. The lack of a well developed and functional infrastructure in addition to tight and bureaucratic bottlenecks, and the duplication of functions by several agencies on environmental matters discourage the inflow of foreign investment that would develop the sector. Worse still, the sector has not being integrated with the national economy and the communities are left to bear the brunt of illegal mining. At present there is poor understanding of the impacts of large-scale mining operation on communities. If the Mining Act is strictly and transparently enforced, with some of the above issues tackled, the mining sector may witness a plethora of investments from reputable mining companies. When this happens more and more positive impacts should be expected. The next chapter of the thesis concentrates on oil sands to show its importance as a commodity, and to provide the necessary context within which to situate Nigeria's oil sands project. Oil sands reserves are amongst the most abundant mineral resources in Nigeria planned for extraction, in relation to which numerous communities and environment will be affected. The oil sands occur in the ecologically sensitive mangrove environment of the Niger Delta, but are concentrated along the upper fringes in an equally sensitive agricultural environment.

CHAPTER FIVE

OIL SANDS FUNDAMENTALS AND THE NIGERIAN CONTEXT

5.1 Introduction

Chapter Four teases out the development of mining in Nigeria, ranging from the history of growth and evolution of regulatory frameworks to socio-environmental issues. This chapter concentrates on oil sands as one of Nigeria's minerals planned for large-scale exploitation. Millington and Mei (2011:3) stressed that: "decades of research from the government of Canada and the industry have converted the oil sands from a worthless mixture of sand and oil (only good for paving roads), into one of the most sought after commodities on the planet". Thus, Alberta, Canada, is currently the only logical reference point for the situation surrounding oil sands. On a number of occasions, this research has drawn on literature relating to Canada's oil sands industry, accepting the fact that/remaining aware that the industry in Canada is highly regulated, while the most basic environmental governance in Nigeria is difficult to manage. Similarly, lessons can be learned from best practices and about the potential risks of investment in Nigerian oil sands. There are two perspectives to this discussion. The first is a general introduction to oil sands including methods of extraction and upgrading, economic determinants of production and impacts. The second section focuses on the Nigerian oil sands resources (Section 5.7), where a lack of clear policy and negligence is hindering the development of Nigerian oil sands in spite of the commitment government has shown in the past.

5.2 Global Oil Sands Resources and Distribution

Oil sands are non-conventional crude oil found in conventional oil reservoirs. While Box 5.1 simplifies the misconceptions behind the interchangeable use of the terms 'oil sands', 'tar sands' and 'bituminous sands', oil sands is used throughout the thesis, except where it becomes necessary to use the term 'bitumen'. Figure 5.1 shows their physical appearance from one of the oil sands belts in Nigeria.

Box 5.1 'Oil sands' and 'Bitumen'

'Tar sand' or 'oil sands' are composed of the aggregate mixture of heavy oil, mineral-rich clay, sand and water excluding any related natural gas. The heavy oil in tar sand is called bitumen. In its raw state, bitumen is simply a thick, black, sticky form of crude oil "which is so heavy and viscous, that it requires heating or dilution with lighter hydrocarbons to make it liquid enough to transport by pipeline (Schlumberger, 2010:1). The term tar sands was applied to bituminous sands since the late nineteenth century; however from the mid twentieth century; experts argue that the use of 'tar' to describe bitumen deposits is incorrect - after all tar is produced by the destructive distillation of coal, and is chemically distinct from bitumen. While bitumen looks like tar, it can be naturally occurring or as a refined crude oil residue or can be rinsed and refined to produce fuel. The name 'oil sands' instead of 'tar sand' is now commonly used in Canada and other producing countries. Oil sands rather than tar sand is commonly used in the thesis and 'bitumen' is used in specific conditions.

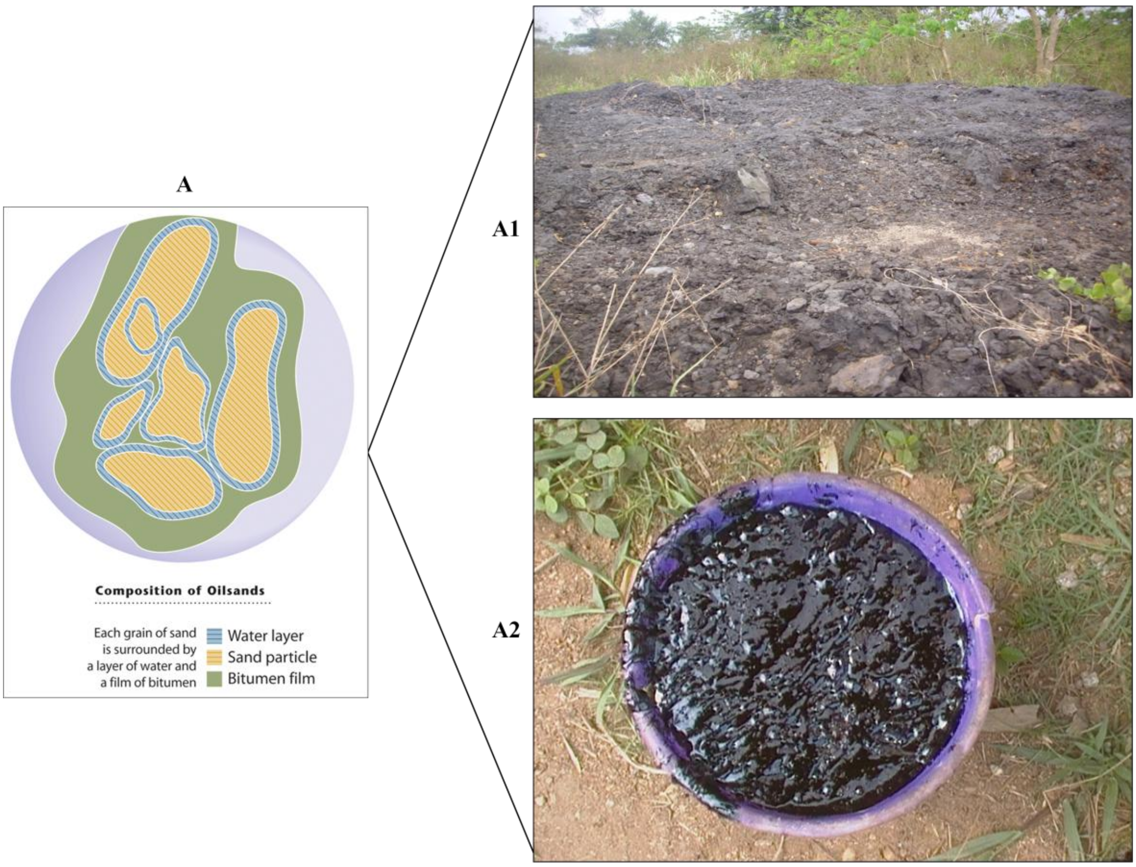


Figure 5.1 The physical appearance of oil sands and bitumen in the study area. Sources: Fieldwork, 2010 (A1, A2); Canadian Centre for Energy Information, 2010 (A)

Natural bitumen differs from light conventional oils by viscosity at reservoir temperatures, heavy metal content and amounts of nitrogen, sulphur compounds and API gravity. In Figure 5.2, light crude oil has an API gravity greater than 31.1^0, medium has an API gravity between 31.1^0 and 22.3^0, heavy oil has an API gravity between 22.3^0 and 15^0, and the extra heavy oil, bitumen has an API gravity from 5^0 to 15^0 (Centre for Energy, 2009). The greater the API, the lighter the oil will be, and the lower the viscosity, the lighter the oil.

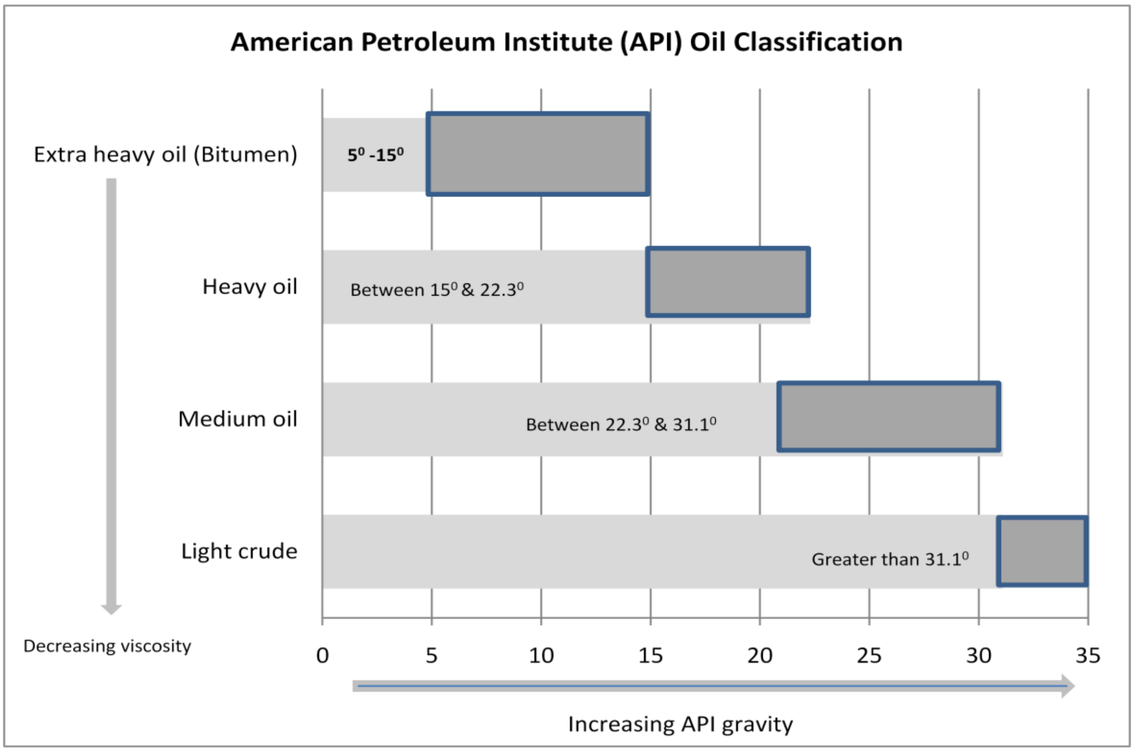


Figure 5.2 The fragmentation of oil based on API oil classification.

The bitumen extracted from Alberta's oil sands is generally less than 12^0 API, but varies by deposit. An API density of between 5.3^0 and 14.6^0 is found in the Nigerian bitumen; extra heavy oil is less than 10^0 and heavy oil is up to 20^0 API (Kazeem and Ademola, 2010). The high viscosity and high API gravity of the Nigerian oil sands is attributed to the degradation of the conventional oil near the surface of the earth. Generally, any crude that is below 15^0 is considered bitumen. In a number of cases natural bitumen contains heavy oil by virtue of variations in the chemistry, depth and temperature of the reservoir. Regardless of these differences, high viscosity makes bitumen immobile under reservoir conditions. In Figure 5.2 above, the API gravity of light crude is greater than 30^0; at this measurement it is lighter, it floats, and can easily be extracted from the reservoir to the surface by gravity. When bitumen API gravity falls below 10.0^o, it becomes highly viscous such that it cannot be transported by pipeline to the surface without being heated. Bitumen can be derived as a by-product of petroleum or can be upgraded to an API gravity of 31.1^0 (light crude).

Large deposits of oil sands are found in limited parts of the world; however, two major countries in the Western Hemisphere contain approximately close to the world's total reserve: Canada and Venezuela account for more than 50 per cent of oil sands and 85 per cent of heavy oil (Meyer et al., 2007). Figure 5.3 presents global occurrences and distribution of total and discovered natural bitumen. As shown in Figure 5.3, most conventional oil-producing countries also have deposits of oil sands. Based on this coincidence, the World Energy Council (2007:120-121) suggested that bitumen resources could in the future economically benefit these countries. However, some of the reserves are too small to be exploited economically and the precise quantities of bitumen reserve in some of these countries are unknown.

Globally, natural bitumen is found in 586 deposits in 22 countries with major deposits in Canada, Russia, Kazakhstan, Venezuela and the United States. Canada alone has about 227 natural bitumen deposits. Romania, Trinidad, Nigeria, Albania and Madagascar have significant resources. Nigeria has more than 40 billion barrels of oil sands (MSMD, 2010). In Ondo State, South-western Nigeria, probable reserves of a

4.5km x 55km area are estimated at 42 billion barrels (MSMD, 2010:7). About 95 per cent of the world's discovered oil sands are located in Northern Alberta, Canada. Alberta's oil sands, for instance, underlie a region of 140,000 square kilometres, just around 1.5 per cent of Canada's total area. The area appears small in proportion to the country's size, but the reserve of oil sands it contains is massive. According to the EUB (2010), oil sands deposits that are found in Northern Alberta are distributed over three main provinces: Athabasca, Cold Lake and Peace River. The Athabasca deposit is the largest of the three and the world's largest reservoir of crude bitumen and heavy oil.

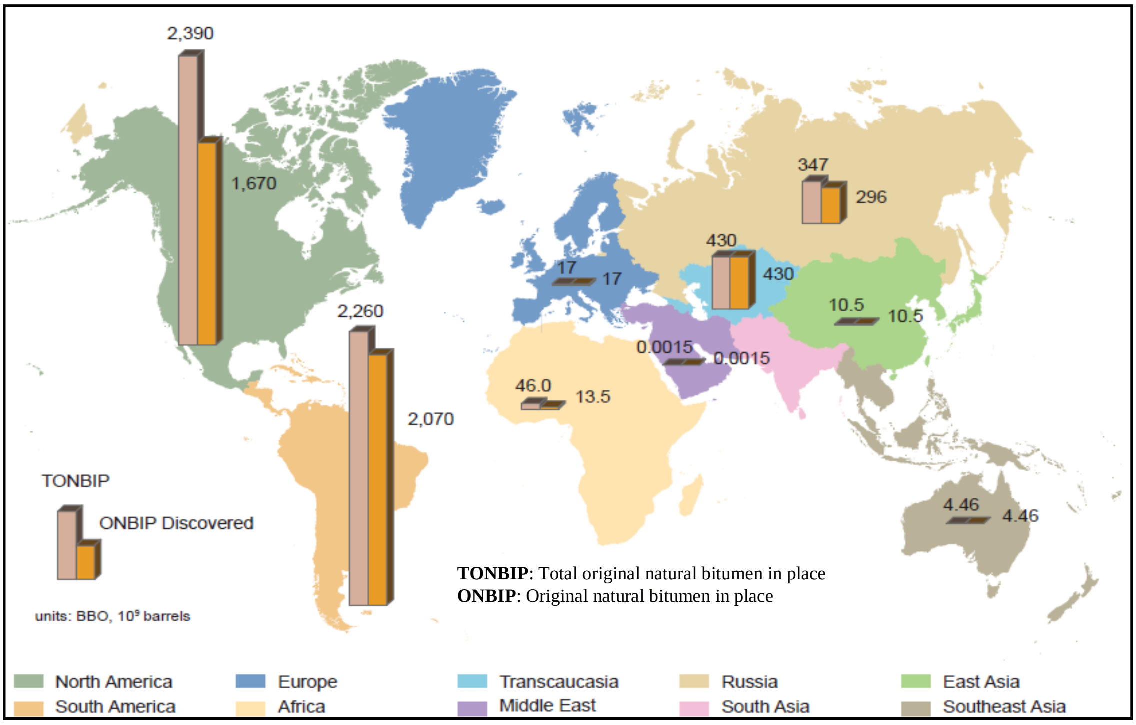


Figure 5.3 Geographical distribution of natural bitumen. Source: Meyer et al. (2007)

Global oil sands are approximately 20 trillion barrels of oil or even more, far exceeding conventional oil resources. Estimates of economically recoverable bitumen in the three regions are put at 179 billion barrels at the current rate of technology and market conditions. In Table 6.1, the recoverable reserves of heavy oil and natural bitumen appear close to nine trillion barrels compared to 1.3 trillion barrels proven conventional oil reserve estimate, as at January 2009 (USEIA, 2009). While Statistics Canada values oil sands at US$342.1 billion, Timilsina et al. (2005) forecast the figures to reach around US$500 billion by 2020.

Table 5.1 Discovered natural bitumen and heavy oil

Region	Heavy Oil (Original Oil in Place)		Natural Bitumen Original Oil in Place)	
	Discovered	Total	Discovered	Total
North America	650	651	1671	2391
South America	1099	1127	2070	2260
Europe	75	75	17	17
Africa	83	83	13	46
Transcaucasia	52	52	430	430
Middle East	971	971	0	0
Russia	182	182	296	347
South Asia	18	18	0	0
East Asia	168	168	10	10
Southeast Asia/Oceania	68	68	4	4
Total	3366	3396	4512	5505

Source: Meyer et al. (2007)

5.3 Oil Sands Extraction Techniques and Upgrading

The technology deployed to extract bitumen from oil sands is determined by the location, geology and saturation level of the oil sands. Two common techniques are widely employed (CERI, 2011): (1) surface mining for subsequent extraction and upgrading of bitumen values, and (2) in-situ method of reducing viscosity of oil sands so that it can flow to a producing well. For geotechnical reasons, the conventional method is most efficient on large-scale oil sands deposits of no more than 75 metres of overburden (Atannasi, 2008). If the bituminous oil sand is buried too deep (from 75-400 metres below sea level) for surface mining to be practicable or economical, extraction using in-situ becomes an option. Of the established reserves, 35 billion barrels of bitumen can be mined at the surface and 98 billion can be recovered in-situ in Canada (Government of Alberta, 2011; Millington and Mei, 2011). Oil sands in Nigeria share some characteristics of Canada oil sands, which makes it amenable to both surface and in-situ methods (Adedimila, 2000:24; MSMD, 2010). This is worth noting, given the likelihood that extraction methods in Nigeria would be dominated by surface mining, but for geotechnical reasons and as the market advances, in-situ operation is being considered in the long term.

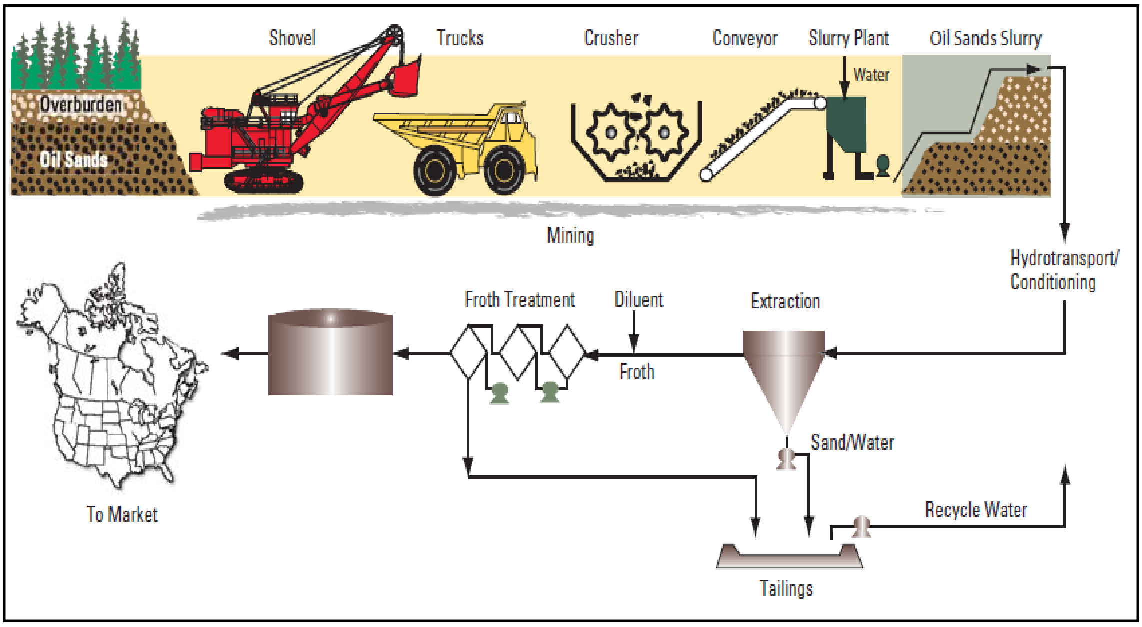


Figure 5.4 Schema of surface extraction process. Source: Imperial Oil and Kearl Mine (2006)

As Figure 5.4 conceptualises, surface mining techniques are used on oil sands reserves that are close enough to the surface by stripping the oil sands-rich overburden to gain access to the ore formation. The shovel digs out the oil sands ore after stripping large amounts of land, and loads it into the trucks that transport the ore to the crusher. The crushers handle the large piece of rock and reduce the ore particles to finer grades. After crushing into smaller particles, the oil sand is mixed with hot water at 35°C - 50°C and piped to the processing plant in a process called hydro-transport. During this process, bitumen starts separation from the sand, water and other minerals. Imperial Oil is Canada's largest petroleum corporation and the world's largest producer of synthetic crude from surface mining for the past 125 years. Similarly, the Syncrude surface mining operation contributed an average of US$5 billion to the Canadian economy (Athabasca Oil Sands Annual Report, 2011).

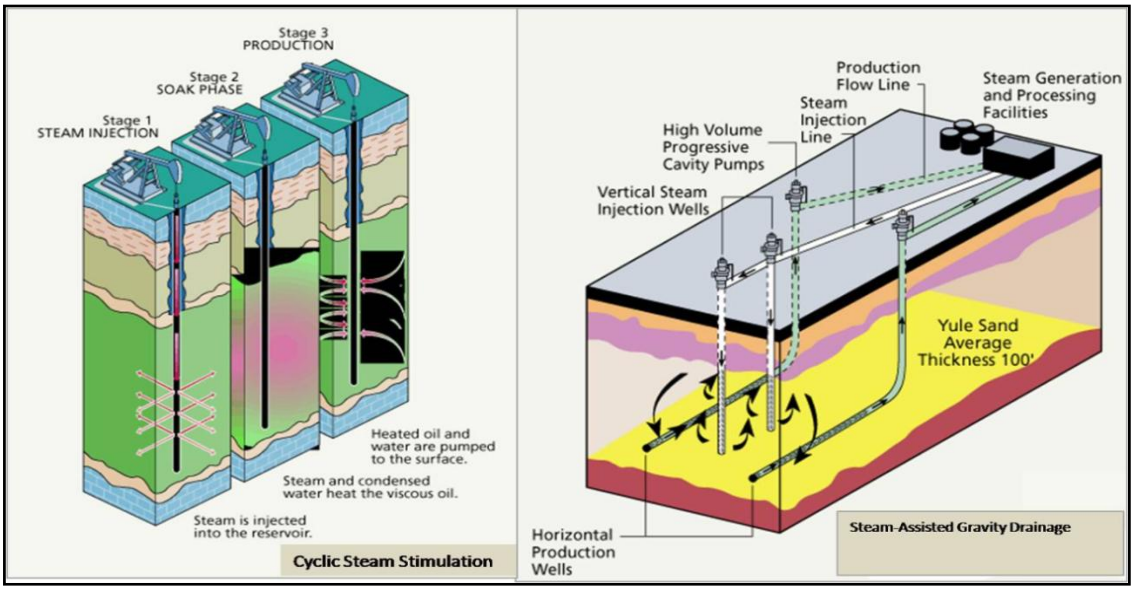


Figure 5.5 CSS and SAGD in-situ recovery methods. Source: Sefton Resources and Denver, Colorado (2009)

In cases of deposits with deep overburden that cannot be extracted while meeting regulatory requirements; in-situ mining becomes the method of choice (Batty, 1997). For example, about 80 per cent of Alberta's oil sands are recoverable by in-situ mining because they are buried too deep below the earth's surface to allow for surface mining (Canadian Centre for Energy Information, 2009). In-situ recovery makes use of thermal techniques similar to that of conventional oil production, where heat is injected to melt the semi-solid bitumen reservoir and gradually separates it from the gangue (waste) material. The heat causes bitumen to flow by gravity and collect in vertical and horizontal well pipes for pumping to the surface reservoir (Figure 5.5). Cold Lake is the world's largest oil sands in-situ operation, producing around 144,000 barrels per day in 2010. The most common in-situ steam recovery shown in Figure 5.5 includes Cyclic Steam Stimulation (CSS) and Steam-Assisted Gravity Drainage (SAGD). Cold Lake in-situ recovery project uses a CSS process also called "huff-and-puff". Suncor Energy, Long Lake and Fire Bag are among the top Canadian companies that are utilising SAGD. The SAGD has found acceptance with BP's new oil sands plant in Canada because it is less energy-intensity and gas mixtures are used rather than steam in a number of reservoirs.

Once the bitumen has been extracted, it can be converted into either petroleum derivatives or synthetic crude or 'syncrude' using various methods for upgrading (Woynillowicz, 2005). The primary products and by-products produced from bitumen are captured in Figure 5.6. Regardless of the method used, upgrading is the most energy-intensive part of the operation and also the big emitter of carbon (e.g. 20-200 kilograms of CO_2 per barrel of bitumen upgraded (Canadian Energy Advantage, 2009; Moorehouse and Peachey, 2007). About 60 per cent of the bitumen produced in Canada in 2006 was refined to meet local demand and the remaining product is exported to the United States for refining to oils and lubricants (Attanasi, 2007).

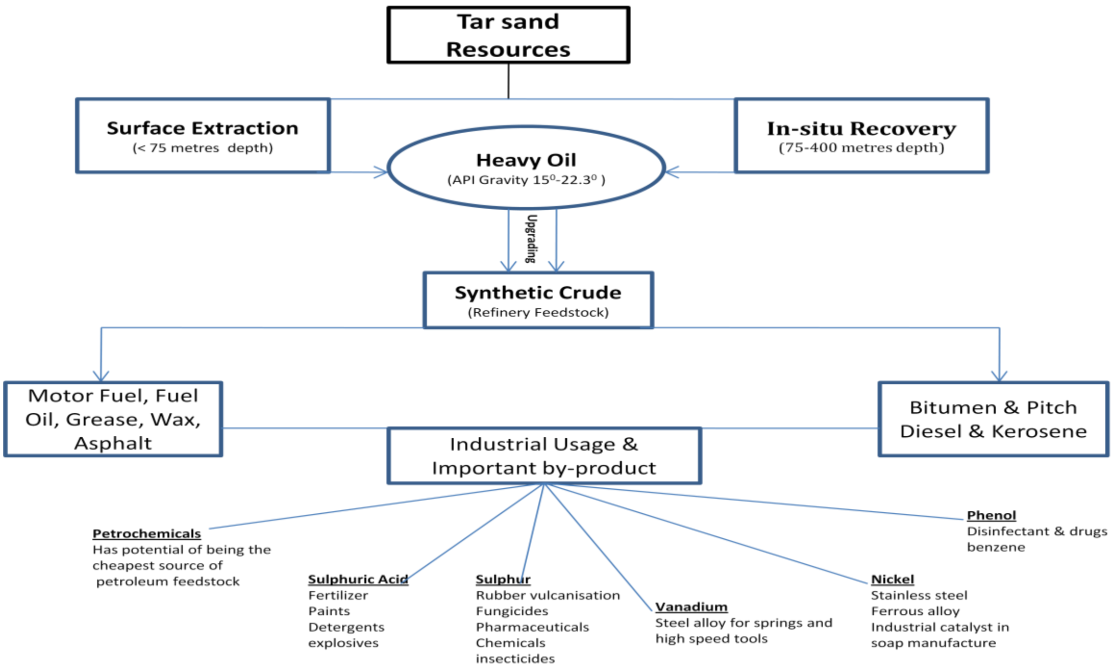


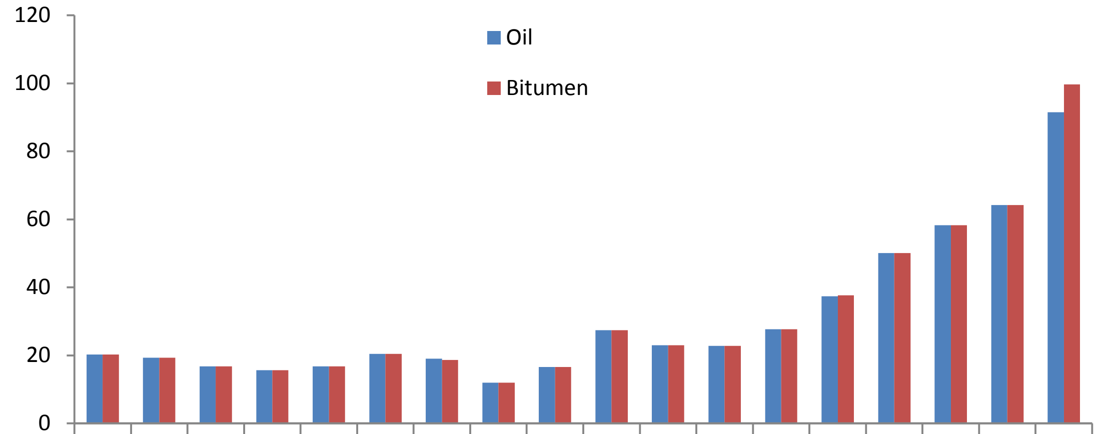
Figure 5.6 Extraction, processing and application of products from oil sands. Source: Adapted from Adegoke et al. (1989)

The cost for upgrading bitumen to oil is still high when compared to operation costs for conventional oil that start from as low as US$1 in the Middle East to about US$6 in the United States and Canada, up to US$10 in Nigeria. The US$15 cost of processing conventional oil in the North Sea is about the same as oil sands. The cost of production notwithstanding, prices for synthetic crude are based on the conventional crude oil benchmark price, such as West Texas Intermediate (WTI), North Sea Brent and Edmonton Par Price. The new refining technologies and processes invented are envisaged to cut the cost of upgrading bitumen to synthetic crude to about US$4.5 per barrel by 2012 (Gobert, 2009) from US$12 per barrel in 2006 (CAPP, 2006). The recovery efficiency rate is also likely to improve from 1.2 barrels of bitumen to one barrel of synthetic crude. The cost of oil sands production largely hinges on international oil prices and on country risk factors, as the next section attests to.

5.4 Oil Sands Production Economics

High oil prices in the short term have boosted oil sands revenues; at the same time capital and production costs have significantly increased with the increase in the prices of energy, steel and equipment. The sudden drop in oil prices below US$40 per barrel became too low to support extraction, leaving producers unable to recover their capital cost. However, the Energy Policy Research Foundation (2010:5) believes that the once uneconomical oil sands production has responded to the rising oil prices. As a result, oil sands producers operate profitably and are increasing their investment portfolio alongside significant advances in technology. Robust economics, low political risk and large-scale resources of oil sands are attracting investment in South America, Africa and Asia. The Calgary Herald (2011) reported that US$108 billion investment in oil sands is predicted in Canada in the next 10 years. Already US$20 billion is being invested by a

Chinese firm in Canadian oil sands (Varcoe, 2011). Currently, a contentious proposal for a US$7 billion 3,200 kilometre Kingston pipeline to transport oil sands crude to the United States is under review (Hamilton, 2011). Figure 5.7 shows that the prices of oil and bitumen have moved at par for nearly 20 years. Due to the 2008 economic recession, the Figure shows that the price of crude bitumen was higher than oil, but as at November 2010, the price of crude oil was US$77.93 a barrel, while crude bitumen sold at US$63.20.



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Oil	20.2	19.3	16.7	15.7	16.8	20.5	19	11.9	16.6	27.4	23	22.8	27.7	37.4	50	58.3	64.2	91.5
Bitumen	20.2	19.3	16.8	15.7	16.8	20.5	18.6	11.9	16.6	27.4	23	22.8	27.7	37.7	50	58.3	64.2	99.7

Figure 5.7 Crude oil and bitumen prices. Source: ERCB (Energy Resources Conservation Board, 2009a)

The Canadian Energy Board's Report (2006) is widely cited for estimating the operating cost of a bitumen mining operation. Table 6.2 below shows the operating and supply costs by extraction method even though it has not specified whether the cost applies to greenfield or a brownfield. The operating costs for upgrading bitumen to synthetic crude range from C$18-C$22 (US$14-US$25). Based on 2006 market prices, integrated mining and SAGD are considered economically viable at the price of US$30-US$35 per barrel of WTI. Therefore, if the price of US$50 per barrel is maintained from 2006-2015, about 16-27 per cent rates of return on investments will be achieved. If the price of oil increases to US$85, about 25 per cent rate of return can be gained. Oil sands projects are highly profitable, with oil above US$100 per barrel. Global unconventional oil reached 1.6 million barrels per day in 2007 (Attanasi and Meyer, 2007), but high refining, reduction in carbon emission and labour cost pose a risk to increased production, whereas improvements in extraction, processing and upgrading technologies lower production costs.

Table 5.2 Operation and supply costs of major oil sands recovery methods

Method of extraction	Oil sands price per barrel at project gate price CAN $ (2006)		
	Product	Operating cost	*Supply cost
Mining/extraction	Bitumen	9-12	18-20
Steam Assisted Gravity Drainage (SAGD)	Bitumen	10-14	18-22
Cyclic Steam Stimulation (CSS)	Bitumen	10-14	20-24
Integrated mining/ Upgrading	Synthetic crude	18-22	36-40

Supply cost is the addition of operating and capital costs, taxes, royalties and return on investment. Source: Canadian National Energy Board (2006)

Estimates by Masson and Remillard (1996) put the initial capital cost of a typical in-situ project at approximately US$200 million. About three years is required for feasibility studies, bankable studies and approvals, in addition to almost three years for engineering, procurement and construction, to first extraction. The projects could take 30 years or more, producing at an average rate of 35,000 barrels per day. Kearl open-pit mining is an example of a large-scale oil sands extraction project estimated to cost US$5-8 billion. This project started operations with an average 300,000 barrels of bitumen per day, and is expected to reach 345,000 barrels by 2018. Table 6.3 shows examples of the investment capital required in some oil sands projects in Canada.

Table 5.3 The minimum capital for establishing an oil sands project in Canada

Company (Project)	Extraction Method		Investment Capital (US$)	Average Daily Production
	Surface	In-situ		
Deer Creek Energy (Joslyn Creek)			270 million	2000 bbpd
Conoco Phillips Canada (Surmont Plant)			300 million	100,000 bbpd by 2013
Devon Canada Corp. (Jackfish)			550 million	30,000 bbpd
Encana Corporation (Christina Lake)			400 million	70,000 bbpd
SynEnCo Energy (Northern Lights)			3.5 billion	100,000 bpd
Imperial Oil Ltd. Exxon Mobil Canada Ltd. (*Kearl Mine)			5-$8 billion	100,000 bpd by 2010

Source: Compiled from Oil Sands Discovery Centre (2010). *The cost of the project has increased to US$10.9 billion due to changes in tailings dam and reconstruction plans (Tait, 2011).

An integrated oil sands mining and upgrading plant to produce 100,000 barrels a day of synthetic crude could cost US$1-5 billion. In the Nigerian case, the costs for an equivalent project would be considerably higher as investment costs and risks remain high in Nigeria (IBRD, 2010). The former Secretary of BPIC once disclosed that a minimum investment capital of about US$300 million is required to set up oil sands operation in Nigeria (Bello, 2004). With reference to Table 6.3, an investment capital of US$500 million is required for a large-size project that would produce 50,000bpd of synthetic crude in Nigeria. Nigeria’s risks profile can add to the above cost and delay oil sands investment and production. It is not surprising that none of the oil majors who are spending billions of dollars on oil exploration and exploitation have shown more than a perfunctory interest in bitumen development and utilisation. The reason is simply political risks and economics: there is plenty of oil, which at least in the medium term would be cheaper to extract, develop and export in a hostile environment. Other factors are market forces, change in technology, regulatory framework and social and environmental restrictions (Figure 5.8). Sinking capital-intensive investments in Nigeria is high risk, but the government can offset risk by compensating the company with more generous taxation terms. The next section outline impacts associated with oil sands.

5.5 Impacts of Oil Sands

Oil sands development, as any other human activity, is not without environmental impacts. In-situ deposits are developed underground with limited areal surface disturbance - similar to conventional oil development. Advances in multiple drilling of directional wells from one site have seen the reduction of areal coverage of disturbance, thus creating smaller environmental footprints on the surface. Surface mining requires clearing of the land, removal of waste rocks and transportation by trucks. The method also relies on large tailings reservoirs to deposit the residual clay, sand, water and bitumen produced during the separation process. The growing number of in-situ and surface mining operations are resulting in rapid degradation of the local, regional and global environment (Dan et al., 2005). Thus Rogner (2000), Levi (2009) and Carter (2010) strongly argue that this chain of processes can produce toxic heavy metals and large quantities of solid, acidic, liquid and gaseous wastes that contribute to global warming, water contamination, degradation of wildlife habitat and air quality. Table 6.4 compares environmental impacts relating to the methods of oil sands extraction. Canada’s prediction of producing five million barrels of oil per day from oil sands by the year 2030 and Nigeria’s efforts at extracting oil sands raises urgent questions on how to create a healthy balance between the associated impacts, mainly carbon emissions, environmental degradation and energy security. With weak regulation and poor implementation of environmental governance, Nigeria may yet face bigger challenges to deal with the oil sands impacts.

Table 5.4 Methods of oil sands extraction and the environment

Impacts	In-situ (SAGD)	Surface
Area coverage and intensity (hectares/ million barrels)	Smaller environmental footprint (1.4)	Much larger footprint in space and areal coverage (9.4)
Water use intensity (barrels/barrel)	Uses water from deep reservoirs, underground water, but could affect surface drainage (1.1/2)	Uses water from fresh water sources, e.g. surface water system (2.1)
Tailings	No tailings dam required	Requires tailings dams and waste dumps for water treatment
Grader operation	Does not require grader in operation	Requires upgrader for clearing before the product is pumped into the pipeline
Greenhouse gas intensity (Kilograms CO_2e/barrel)	Requires more energy -a very large amount of natural gas is burned to produce a barrel of bitumen, excluding upgrade (91)	Require less energy but large diesel burning truck are used in operation (36)

Source: Environment Canada (2009a and b); CERI (2011); Millington and Mei (2011); Tenenbaum (2009)

Tailings are a mixture of the remains from excavated overburden rock and rejected sands that can be stockpiled and used as backfill in the reclamation process (Stosurs et al., 1998), Northern Alberta create almost 20,000 square metres of fine tailings per day (Tenenbaum, 2009). A significant portion of air contaminants that affect human health and air quality are from oil sands operations (Environment Canada, 2009a). Typical examples of air contaminants include sulphur and nitrogen oxides and volatile organic compounds. In 2006, the oil sands industry recorded emissions of about 122,000 tonnes of sulphur oxides (SOx), over 37,000 tonnes of nitrogen oxides (NOx) and 61,500 tonnes of organic compounds (VOC) (Environment Canada, 2009b).

Upgrading oil sands to synthetic crude is the primary source of airborne emissions, producing 30-70 per cent more greenhouse gases than conventional oil processing (Tenenbaum, 2009). Oil sands operations are the fastest source of greenhouse emissions in Canada. Alberta oil sands alone release an estimated 29.5 mega tonnes of greenhouse gases, equivalent to five per cent of Canada's total emissions, and almost one per cent of global greenhouse gas emissions (National Energy Technology Laboratory, 2008). Greenhouse gases are generated and emitted when natural gas is burnt to create heat for extraction and upgrading to synthetic oil (CAPP, 2009; Peter, 2009). Forecasts suggest that Canada's emissions will increase from 756 million tonnes in 2006 to over 900 million tonnes in 2020. In 2007 Canadian oil sands produced around 40 million tons of greenhouse gases; by 2009, pollution from oil sands operation outweighs total carbon emissions from cars in Canada (Green Planet, 2011). Hence, the Canadian government was compelled to "reduce GHG emissions 33 per cent below 2007 levels by 2020, and at least 80 per cent below 2007 levels by 2050" (Environment Canada, 2008:1). Elsewhere, high sulphur content of Venezuelan heavy oil makes it difficult to meet environmental regulations (see 'Scrapping the bottom of the barrel' by The Co-operative Bank for detailed arguments about the investment risks, ethics and impacts of oil sands).

Oil sands extraction activity can also result in the loss of wildlife habitat, destruction to migration routes and an increase in hunting activity. The 50 year old industry in Alberta has resulted in the disturbance of over 600 square kilometres to date (ERCB, 2009b). Health-related factors are vast, ranging from workplace accidents to pollution of freshwater, wildlife and fish. The negative health implications of oil sands production, though hard to establish, is impossible to rule out in nearby communities where it overwhelmingly affects their environment. However, 'The Guardian' reported that Fort Chipewyan, situated downstream from the heart of the Alberta oil sands mines, has recorded disproportionate levels of unusual cancers (Poitras, 2009). Oil sands production can have adverse impacts on existing communities; and can bring about displacement and loss in culture and tradition. Communal land can be lost and hunting becomes difficult (see details about land and displacement in Section 7.5.2). There are concerns centred around transparency on the ways data about oil sands impacts are gathered, monitored and communicated. This allegation was based on the Albertan policy that consultation with local communities is carried out after oil sands lands have been leased, similar to the situation in Nigeria. The local communities are now devising legal means to counter lack of consultation prior to full-scale exploration through to construction stages and production.

The development of a large-scale oil sands industry can, however, potentially bring significant economic and social benefits for local communities and the country at large (see Honarvar et al., 2011). Government and industry strongly hold the opinion that oil sands activities contribute to national economic security and global energy security. Combined royalties and taxes received by government from oil companies could support health care, education, roads, power generation and infrastructure development. Investments in oil sands activity have a positive multiplier effect through promoting related industries such as housing, manufacturing, marketing, finance and insurance. Moreover, it generates jobs for people to participate in the development of the oil sands. At the community level, however, there is some mixed feeling about the impacts of oil sands. While some of the First Nations Citizens in Canada have benefited from increased employment opportunities, others feel those benefits are overwhelmed by environmental losses.

According to Millington and Mei (2011:10), "environmental opposition to oil sands development continues, but environmental concerns are offset by concerns over energy security. This is not to say that environmental policies take a back seat". Similarly, Stéphane Dion, Canada's former Federal Minister of Environment trenchantly stressed that: "There is no environmental minister on earth who can stop the oil from coming out of the sand, because the money is too big. But we have to be very strict on environmental impact" (Clifford, 2005:1). These statements are evidence that an economic gain in oil matters precludes environmental concerns. Canada benefits from its oil sands wealth and also grapples with social and environmental costs of extraction.

The First Nations Citizens concerns over the impacts of oil sands could also have echoes in the Nigerian context. With reference to Section 1.2, Nigeria's development indicators have already suffered from its over-dependence on the petroleum sector that has benefited a tiny portion of the population (e.g. 'rentier elites'), which makes the prospect for real benefits of oil sands development to the majority of the population unlikely. Nigeria, unlike Canada, is striving to develop its oil sands reserve without proper institutional arrangements or a coordinated social and environmental monitoring framework that could reduce the impact. So far, there is non-disclosure to communities about revenues that may be generated from oil sands, how the contractual terms will protect people and the environment, and whether oil sands exploitation represents development to the Nigerian people. Section 5.6 describes the vast oil sands resources of Nigeria, looking at the importance of the resources to the economy, its relationship with conventional oil, and strategies for developing the deposit in the short to long term.

5.6 The Nigerian Oil Sands

This section presents Nigeria's oil sands reserve, the demand and supply of the commodity, and the various efforts made at securing investment in the sector. This section would be incomplete without examining the competitiveness of oil sands with Nigeria's conventional oil. The concerns and expectations of communities in the development process of oil sands are considered in Chapters Seven and Eight. While Canada derives economic benefit from its oil sands, Nigeria relies on the export market for local bitumen consumption.

Nigerian oil sands reserves are considered the largest in Africa and in the global top 10 countries with significant deposit potential (Meyer et al., 2007). The Nigerian oil sands belt has an estimated proven reserve of 42.7 billion barrels of oil sands underlying a belt extending through Ondo, Ogun, Edo and Lagos States (Adegoke et al., 1974; Ayoade, 2007; Fayose, nd). The bulk of the oil sands are located mainly in Ode-Irele community (the study area) and Agbabu. Nigerian oil sands appear in surface and sub-surface, bitumen-impregnated sand and bitumen seepages from wells (MSMD, 2010). Prospecting for oil deposit in the oil sands belt was first embarked upon by German companies, long before Nigeria became a political entity (Nwaochei, 1986). Detailed exploration dated back to 1905 when the Mineral Survey of southern Nigeria drilled 16 bore holes in the oil sands belt. The first important attempt at commercial extraction was by the Nigerian Bitumen Corporation and Shell D'Arcy between 1908 and 1914. The First World War halted exploration activities until 1936 when Shell-BP drilled six wells with three of the boreholes penetrating several horizons of oil sands and heavy oil, between 1937 and 1958. Prior to the discovery of oil, the Gulf Oil Corporation of Pittsburgh, USA examined 15 bituminous sands that were found suitable for road surfacing (Ayoade, 2007). Currently, the entire belt was delineated into six prospective blocks of an average 600 square kilometres of land.

Attention of individuals and organisations was drawn to oil sands, following the discovery of oil. Notable among them were Mobil Exploration between 1958 and 1968, Tennessee Nigeria Incorporated in 1966 and Tesco Hungary in 1976. Accordingly, the most extensive and detailed exploration in the Nigerian oil sands belt was conducted by the geological survey team from Obafemi Awolowo University, from 1974-1980. The team concluded that bitumen-impregnated sands appear continuous in the subsurface over the depth range of four to nine metres, with an overburden thickness generally less than seven metres (Adegoke et al., 1974). Later on, geological studies (e.g. Adedimila, 1987) and physicochemical properties (Oluwole et al., 1987; Ukwuoma, 1999) confirmed that Nigerian oil sands are an important source of energy, as well as an alternative source of hydrocarbon and raw material for the local petro-chemical industries. The above authors estimated that oil sands belt contains one billion barrels of recoverable heavy oil reserve covering an area of 550 square kilometres. Direct observation of oil sands belt during the fieldwork confirms bitumen seepages from the underlying sandstone reservoir, while the near surfaces are exposed along river banks and cliffs. The solid state oil sands can also be exposed with less than one metre drill.

Several studies by individuals, organisations and groups on the different aspects of the Nigerian oil sands appear in both published and unpublished documents (Adedimila, 2000; Adedimila and Olagoke 1990). However, the literature tends to focus on the physico-chemical properties and method of processing (notably Adedimila, 1987; Adegoke, 1974), with little emphasis on the politics and economics creating the resources, or the resultant impact on communities. The revenue contribution of oil sands to the Nigerian economy remains speculative. On one hand, Nnimmo (2003) claimed that when exploitation takes off, additional revenue of US$10 billion would accrue to national income. On the other, Akubueze (2003) projected that oil sands in Agbabu, Ode-Irele community in Ondo State would fetch about US$1 billion annually: US$870 million will come from exportation to the rest of African countries and the rest, US$130 million, is to be derived from the local market. Ayoade's (2007) speculation was that the Nigerian economy is losing over US$4 billion over lack of local production of bitumen. These estimates may not be substantiated because there is hardly any data that would refute or support their projections. However, it remains an indication of the possible revenue that would add to the income generated from conventional oil output.

On the issue of employment, Oladunjoye (2003) reported that BEECON and NISSAND have undertaken to employ 20,000 Nigerians on the commencement of operation before the revocation of their licence. This large number of employees can be engaged at the early stage of the mining cycle, but as the project reaches production stage more skilled and semi-skilled workers are required than unskilled labour. Oil sands activities will inevitably lead to the relocation of several settlements and farmlands. For example, the total area of land that is covered by the oil sands belt in Ode-Irele alone is about 1000 square kilometres. The implications of developing oil sands on the host community's environment and social wellbeing have also been neglected. In this manner, Chapters Seven and Eight examine potential impacts of oil sands on communities at this stage.

5.6.1 Bitumen Sources for the Nigerian Market

In spite of earlier government attempts to exploit bitumen, there is no known commercial exploitation of the resources for local use and for export. The country continues to depend on imports of bitumen from the producing countries of Venezuela, Cote d'Ivoire and the United States; thus draining foreign reserve. The bitumen imported is a by-product of the refining of heavy crude and is used as feedstock for local refining. Presently, over one-third of the bitumen requirement is imported (Ayoade, 2007). Unofficial sources estimate indicates up to 219, 000 barrels of bitumen was imported in 2009. Kaduna Refinery is one of four refineries in Nigeria designed to produce lube oil and bitumen from a relatively heavy crude steam. Commissioned in 1980, the refinery has a refining capacity of 110,000 bitumen barrels per day.

The initial concept of the refinery is to meet 25 per cent of local demand while the remaining 75 per cent would be met by developing the natural bitumen resources of Nigeria. For reasons to do with the operational state of the plant and the sources of the appropriate crude to generate the bitumen, the refinery has long ceased optimal production. Even at best, the total annual bitumen produced would be in the range of 160,000 kilograms (Ayoade, 2007). This meagre output from the refinery would not in any way meet the country's bitumen demand. According to Adegoke et al. (1991), the Nigerian oil sands belt has the potential resources to supply the right heavy crude for the Kaduna lube plant, which regrettably, has not been fully developed. The rapid expansion of infrastructure, such as roads in different parts of the country, has created scarcity of the product, thus raising the prices which affects government budget.

Bitumen is durable and the cheapest adhesive in road construction. Engineering specification, proposed utilisation of the road and local environmental considerations determine the ratio of bitumen to aggregate used in road construction (Fayose, n.d). Typically, as much as 50-100 kilograms of bitumen would be required to construct one kilometre of road, and four to eight per cent of bitumen is usually mixed with aggregate to produce asphalt. The total length and quality of roads constructed as well as the amount of maintenance required on existing ones determines the quantity of bitumen required for road construction. In 1914 the total road network in Nigeria was 3,200 kilometres, and this had grown in length to 66,000 kilometres by 1960. In 2008, the entire road length in the country was above 200,000 kilometres, of which about 25 per cent is paved, disallowing access to around 150,000 square kilometres land mass in Nigeria (Adewunmi, n.d.). By 2010, the total length of roads in Nigeria was about 200,000 kilometres (Fayose, n.d). As a rough estimate, about 5,000 metric tonnes of bitumen is required for the construction of about 100,000 kilometres of road (using the ratio of 50 kilograms of bitumen per one kilometre). This means more than 4,000 metric tonnes are required to meet the construction of over 100,000 kilometres of road. Abdulkareem and Adeoti (n.d.) reported that Nigerian roads, the longest in Africa, have a replacement value of US$25 billion, and about US$20 million is spent annually on the importation of asphalt (a bitumen derivative) for road maintenance alone.

Bitumen is increasingly used in building construction to stabilise earth building materials; as parapet roofing, and for protecting the roof membrane from storms and strong winds. The addition of bitumen increases resistance to pressure and improves water-proofing properties of earthen walls in buildings. In Olotuah's (2002) study on the use of local earth materials to build low-cost houses in Nigeria; about 15 per cent bitumen is required for earth material of high clay content while five per cent is required for that with high sand content. The amount of bitumen required in housing is limited when compared with other materials or its use in road constructions. The estimation is that the total volume of bitumen required by the building industry is in the range of 50,000 kilograms or 50 metric tonnes per annum. Apart from the use of bitumen in building and road construction, other derivable products (described in Figure 5.6) prove useful in a range of industrial applications. In summary, a total of over 50,000 metric tonnes of bitumen is required for roads and buildings alone in the short to medium term. In the long term, the demand may double in relation to roads expansion and building construction.

5.6.2 The Competitiveness of Oil Sands with Conventional Oil in Nigeria

The relative price of oil sands, the current and future level of energy demand, cost competitiveness when compared to crude oil and other non-conventional energy sources are the critical parameters in the determination of the economic viability of the oil sands development project. Taking other factors into account, Iwuyemi (1990) stressed that the critical determinant of oil sands development project in Nigeria is the availability of crude oil, which is cheaper to exploit and has a higher rate of return. Other pertinent issues include the rate of time preference (discount rate) and the fiscal arrangement under which the oil sands exploitation would take place. Equally important is the choice of a suitable technology, for such a venture must have knowledge of financial, physical and chemical characteristics, but also the primary environmental problems associated with the method.

The long-lag in commencing the development of oil sands since its discovery has generated controversy. Those promoting a more rapid development of this resource favour more aggressive private sector participation in its development; after all the attitude and direct involvement of government in the sector has been at best lacklustre, and indeed, several attempts in the past three decades have not yielded any investments. Part of the strategies for promoting a more rapid development involves transforming the oil sands to energy products and local raw materials (refer back to Figure 5.6). While the merits of this argument cannot be denied, the problem is the tendency to underplay economic variables, social concerns and environmental considerations, which are capable of: 1) undermining the drive of the government towards attracting foreign investment, and 2) affecting investment decisions in the Nigerian oil sands. For example, drilling for exploratory data has in the past been disturbed by some hostile local communities due to lack of consultation.

Whatever the non-economic motivations that makes the development of oil sands desirable, consideration must be given to return on investment and financial risks associated with oil sands vis-à-vis crude oil. This comparative analysis, which should reflect the opportunity cost of competing investment options, is vital in the investment decision-making process. The major economic factor that has impeded, and continues to impede the exploitation of oil sands reserve in Nigeria is the availability of domestic crude oil, which is cheaper to extract, and more profitable to refine. Historically, the development of non-conventional and alternative energy sources has been dominated by the economics and politics of oil. As discussed in Section 5.6, the advancement in technology is envisaged to reduce the cost of oil sands production on a par with conventional oil. Figure 5.8 summarises the major factors that have affected the development of Nigerian oil sands. Some of these hindrances are orchestrated by current global economic reality and the politics of climate change, while a lack of commitment from the government, corruption that is endemic in the Nigerian system, and community issues have also contributed. Akin (1990) is one of those who believe that production from oil sands in Nigeria during the period of high oil prices would be too expensive, and advocated that projects should not go beyond pilot stage. An increase in world energy prices and demand coupled with substantial cost reduction brought about by technological breakthrough in oil sands production stands to counter this pessimistic view. Also, the growing interests about the 'peaking' of oil, the threat of an oil supply crunch and carbon emission (discussed in Chapter Two) are likely to affect large-scale oil sands investment.

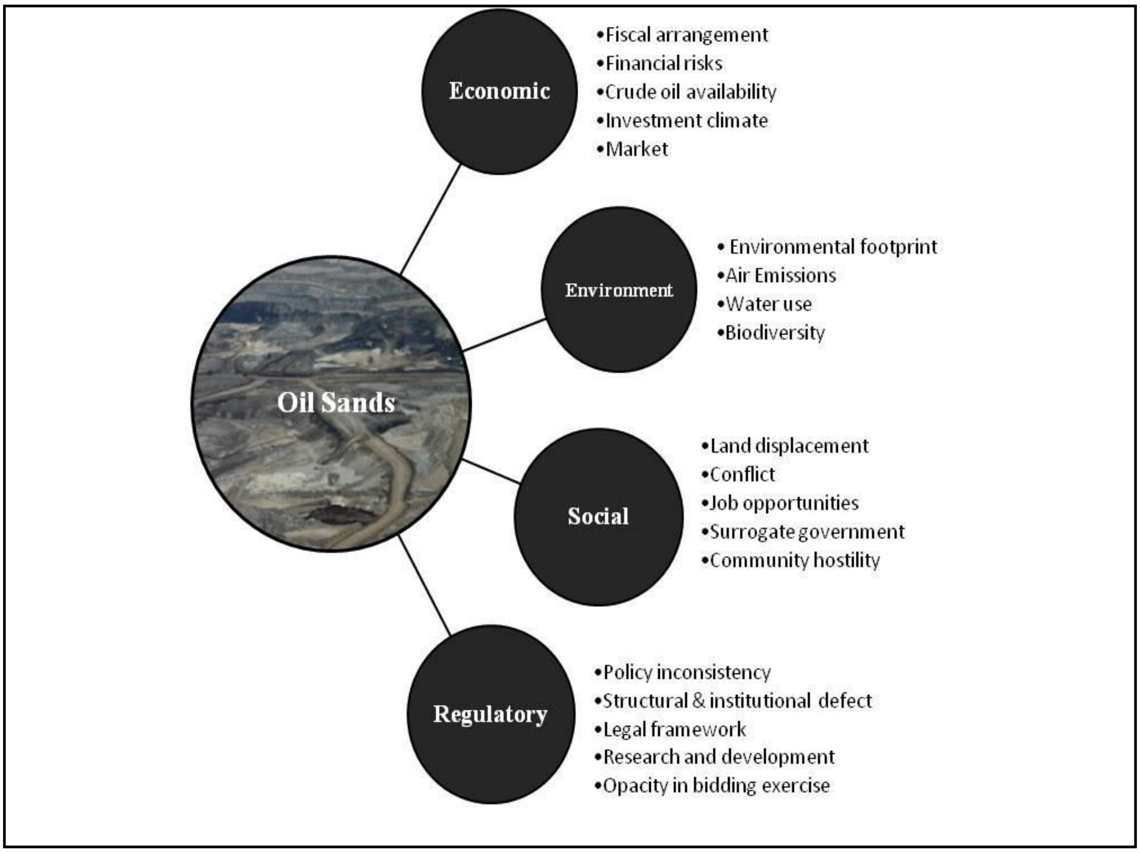


Figure 5.8 Challenges of oil sands development in Nigeria. Source: Author, with photograph from Suncor oil sands mine in Alberta

The initial fall in oil prices in the mid 1980s undermined investment in Nigerian oil sands. Most recently, high oil prices have rekindled optimism regarding the development of unconventional energy sources, such as oil sands (Bradshaw, 2010). With the gradual increase in the price of crude and the prospects of oil prices remaining high, oil sands appears an alternative and a competitive source of oil for the future. So long as crude oil prices remain above US$30 per barrel, oil sands projects are profitable with more than a 10 per cent return on investments in the major producing countries of

Canada and Venezuela. The cost of production in Nigeria may be considerable higher than the minimum US$300 million. Notwithstanding, Nigeria has made a series of unsuccessful efforts to develop oil sands.

5.6.3 Oil Sands Privatisation Drives

Oil sands affairs were handled through ad-hoc committees of the MSMD. A Committee on the Implementation of Bitumen Project (CIBP) was established (1989-2000) to prepare a programme of action for the commercial exploitation of bitumen within 18 months. Ten years later, the BPIC emerged following the demise of the CIBP for non-performance. According to their terms of reference, these committees are to initiate activities towards the utilisation of bitumen deposits for viable industrial and commercial projects, which did not go beyond the bidding process. Oil sands are now governed by the 2007 Minerals Act, even as the chemical composition and mode of extraction uniquely differ from other solid metals. Figure 5.9 charts the developments timeline in Nigerian oil sands since the period of first discovery to 2010. It was in the early 1990s that a number of investors attempted to operate in the oil sands belt which had been abandoned for over four decades. These investors came as either government representatives or as private bodies with foreign partners. Ogun and Ondo States operated a joint partnership with Aprofims Nigeria Ltd, while ROFEM worked in partnership with JEREZ Energy, Canada. Together these companies obtained permission to carry out exploration up till the drilling stage, and were on the verge of experimental production when the government stopped their activities (CIBP, 1991). At the time of revocation, JEREZ had sunk some boreholes under its licence, but quickly left a degraded environment that is now devastating one of the visited communities.

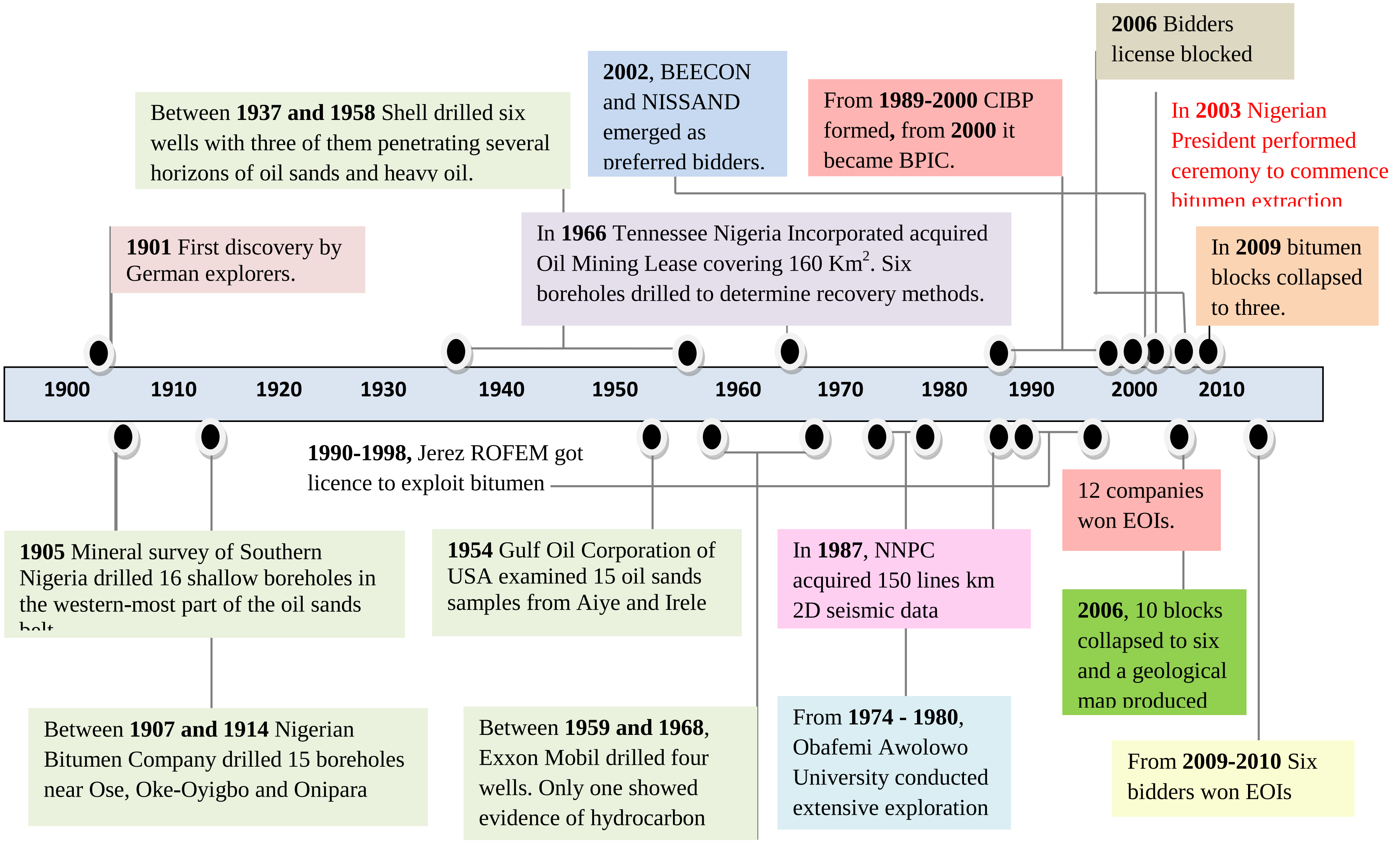


Figure 5.9 The timeline of major events in oil sands development in Nigeria (1901-2010)

The BPIC subsequently delineated the entire belt into 10 prospective blocks providing baseline information on the geology, stratigraphy and the resource potential. The belt was again put up for bidding in late 2002 where BEECON and NISSAND emerged preferred bidders out of 32 submissions - about US$20 million was realised from the bidding process. Canada's NISSAND (Nigeria) Ltd and BEECON (Nigeria) Ltd were adjudged technically and financially capable of exploiting bitumen within six months. Excited by this progress, the Nigerian President in 2003 performed the 'ground breaking ceremony' to commence bitumen extraction in Nigeria. Two years later, the two companies did not mobilise to site because of inability to secure the minimum capital and the technical ability to exploit oil sands. While NISSAND was able to raise US$200 out of the US$300 million minimum required capital, BEECON was looking for a financial partner; as a result their licences were revoked. Eight years on, the resources remain without meaningful investors to develop them.

By 2006, further progress had been made on exploration and baseline studies. The 10-block structure was collapsed into six and a geological map of the belt was produced. Twelve companies were pre-qualified for the blocks, out of which seven submitted technical bids and two were successful from the financial bidding. They are Gateway bitumen/Masefield - a local partnership with CGC of China. Both have paid the 10 per cent acceptance fees, but the remaining 90 per cent balance was not paid before their licences were revoked. It appears that government's undue interferences in the selection of bidders led to apathy and failure to exploit the resources. This is perhaps due to the fact that because of accomplices within the government, or bureaucrats, the companies (mostly local in collaboration with foreign) that have been issued licences in the past lack merit, technical expertise and financial ability or guarantee.

Shortly after the first fieldwork of this research in 2009, the six blocks were collapsed to three (Block A, B and C) and advertised for bidding. Block A covers approximately 4,170 square kilometres, Block C is about 3,707 square kilometres, and Block B has not been demarcated for bid because of litigations from past bidding process. As of August 2009, 16 companies had expressed interest in Blocks A and C (Patrick and Victoria, 2009). These bids seem different from earlier attempts that failed, as appropriate structures are now in place to coordinate activities in the sector. As a matter of thoroughness, bidders were compelled to provide verifiable evidence of technical ability; and more importantly they must meet the minimum financial requirements within a reasonable timeframe. While the role of the supervising ministry cannot in any way be undermined, undoubtedly a specialised bitumen regulatory body – not a committee - with expertise in the industry would be better suited to carry out these tasks, just like the EUB in Canada, and the DPR in the case of Nigeria's oil sector.

With government's apparent renewed vigour, and by involving the World Bank in the planned bidding process, reputable investors with pedigrees in oil sands exploitation can now be associated with the Nigerian oil sands. Nnimmo (2003:1) strongly argues that, overwhelmed by the economics, "government and its co-promoters are silent on the social and environmental costs of bitumen exploitation and how to mitigate those costs". Based on the concerns of host communities, transparency, objectivity, harmonisation of the institutional, fiscal and legislative matters, greater involvement of the communities and other stakeholders, security of tenure and policy consistency are factors that would boost investors' confidence and ensure peaceful exploitation. Above all, there is a need for the reinvigoration of the political will of the highest policymakers - beyond rhetoric - towards resuscitating and developing the potentials of the resource.

Government pronouncements on oil sands appear and have always been, far removed from what is being implemented on the ground.

5.8 Conclusion

This chapter has used a range of documentary evidence to highlight the importance of oil sands resources to global energy security and the current status of Nigerian oil sands. Additionally, it identified the demand and supply of oil sands in Nigeria, and how local conditions intertwine to affect past and present privatisation drives. The development of oil sands is largely driven by global demand and the price of crude oil. The diminishing access to oil and gas reserves that are relatively simple to extract has created opportunities for extracting the capital-intensive and environmentally damaging oil sands. The economic advantages provided to producing countries have rejuvenated their commitments to exploiting the resources. One such country is Nigeria, where oil sands resources estimated at over 40 billion barrels are feasible for production. However, high carbon emissions, land occupation and pollution are the noticeable uncertainties facing the future of the oil sands industry. Oil sands are extracted by surface or in-situ and can be upgraded to synthetic oil – but all these processes have their environmental footprints and socio-economic impacts especially the planned surface method of extraction.

One can note that the quest for the development of Nigerian oil sands came long before oil, but was 'lagging', as government and investors were initially reluctant to exploit the resources; primarily in view of the huge capital required and lack of investible environment, policy instability and institutional capacity. Currently, the Nigerian government is undergoing an adjustment plan to develop the oil sands sector. This will positively increase the balance sheet of the country as well as impact on existing communities. The commencement of extraction, however, depends on the prevailing local and global uncertainties of oil sands extraction. However, with the right mix of policies, technology, operational environment, and environmental sustainability in mind, Nigeria could harness the benefits that the oil sands offer and minimise the costs particularly to the local population. In short, the attitude of a business-as-usual approach is neither acceptable nor sustainable in the development of oil sands. As an investment incentive to offset the high risk of doing business in Nigeria and increasing the rate of return, the government, in theory, can set the taxation regime so that firms are indifferent as to whether they extract oil or oil sands. This situation means that the rent is less on oil sands than on conventional oil, but that is also true for LNG compared with oil.

Regarding the significance of the oil sands deposits, the study has shown that the sector has abundant potential to play a leading role as a source of raw material for both domestic and international markets, in addition to being a competitive source of oil for the indefinite future. The development of oil sands can be integrated into the country's medium- to long-term economic blueprint, as currently oil sands have no linkage with the national economic plan or local economic development. As the government is enthusiastic in reviving exploitation, there is growing concern amongst host communities about the consequences of extraction to their socio-economic life (Chapter Seven) and the local environment (Chapter Eight). Before that the next chapter shows how increasing expansion of mining may lead to corresponding increase in impact. The chapter uses a GIS technique to present the geographical distribution of mineral titles in Nigeria, and identify communities likely to be affected by mineral activities based on their proximity to a mineral-licenced area.

CHAPTER SIX

EXTENSIVE NATIONAL MINING ANALYSIS

6.1 Introduction

Chapter Four has provided an overview of mining in Nigeria. A discussion of Nigerian mining has shown the potential of the sector and the various policies formulated to regenerate the moribund sector for economic growth. One of the key components of the mining reform was establishing a modern cadastre system that grants mining permits and licences. As the mining permitting process steadily progresses, little or nothing is documented on the potential impact of the industry on the surrounding communities and the natural environment. Granted licences and permits commonly overlap other surface rights like private or public properties, forest reserves, conservation areas, farmlands and settlements. This chapter fulfils the second objective of the research by mapping the scale of mining activity and its potential impact.

The chapter begins with the presentation and description of the various mineral licences that are at different stages of development. It identifies the licences issued - as an indication of mineral activity - and how this activity would affect the natural and the built environment. In this manner, host communities are delineated by creating a buffer to show the settlements that are either ‘within’ or ‘in close proximity’ to the perimeter of the mining-licenced land. The GIS procedure used at the national level to delineate settlements is applied to Ondo State with a focus on oil sands licences. On a narrower scale, one of the local governments in Ondo State was selected for identification of settlements that are in close proximity to oil sands (bitumen) extraction. Some of these settlements form the basis for an in-depth study (Chapters Seven and Eight), but first an overview of the mining cadastre is presented followed by discussion on the distribution of mining activities by permits.

6.2 A Brief Background to the Nigerian Mining Cadastre

As noted in the introductory chapter, the Nigerian geo-physical terrain favours resource extraction across the length and breadth of the country. The development of mining in the economy, however, is not only dependent on the availability of resources, but has much more to do with the ways in which these commodities' systems are socially organised (Bridge, 2010:1). These socially organised systems include political, economic and cultural processes, an efficient legal and regulatory framework, security of tenure, transparency and efficient administration, and environment and community obligation – which all combine to create a favourable climate for investment.

In order to capture revenue from extractive activities, the Nigerian Constitution in the first instance states that mineral resources belong to the government (Section 4.6). The Federal Government as the owner of these resources grants permits, licences and leases for reconnaissance, prospecting and extraction to the interested party, which is simultaneously granted access to the land covered by their licence (Mining Act, 2007; Petroleum Act 1990). In the solid minerals sector, any individual or organisation wanting to explore for, extract or sell minerals, must lawfully obtain the appropriate licence from the Mining Cadastre Office (MCO) – an institution set up for that purpose under the supervision of the MSMD and the Minister.

Under the old regime, the MCO operated under the mines department and not as an autonomous body. The mines department at that time concurrently issued licences, supervised mining activities and regulated environmental issues. The multiplicity of functions in the mines department coupled with a lack of update of mineral titles rendered the entire cadastre system opaque, which led to the arbitrary issuance of mining rights without recourse to the Mining Act. The Nigerian mining cadastre was characterised by policy inconsistency, with undue regard for the law by the policy makers. For example, the discretionary powers bestowed on the minister and other mining officials by the 1999 Mining Act provided an avenue for the arbitrary revocation and allocation of mining titles over the years. This lack of transparency and accountability has created an unfavourable investment climate for Nigeria to harness fully its multi-billion-dollar-valued solid minerals sector. The sector became flooded with speculators which discouraged genuine mining companies. The extent of these problems was confirmed by the outcome of the reform exercise that led to the case-by-case revalidation of all the known mining titles/rights from 2006 to 2009.

The desire to open up the mining sector and avoid the bureaucratic and technical pitfalls of the past predicated the need for a mining cadastre system, with the responsibility to administer mineral titles and maintain a cadastre register on behalf of the Federal Government, such that it gains investors' confidence, and provides information on the state of mining activities to the investors and the general public. The mining cadastre was set up to guarantee a secure mineral rights system, by documenting the geographical location, ownership, validity period, type of mineral rights, payment of fees and compliance with regulations, such as environmental obligations and social agreements. The current state of modernising the cadastre system from a mining register to a mining cadastre allows for the acquisition of a variety of licencing scales that range from a few metres in the case of quarry or small-scale mining, to hundreds of square kilometres for exploration and eventual mining (Ozah et al., 2010). Whatever the scale, the new system captures all the transactions that take place during the life of the mine - from application through to granting, fees payable, tracking of annual reports, change in ownership, and finally, closure. However, the MCO must be completely free from ministerial and political interferences to be able to boost investors' confidence in the policy environment. The MCO as an independent entity must focus on governing the acquisition of titles according to the provisions of the Mining Act and fiscal regime - this proved not to be the case during the course of the research.

The digital nature of the mining cadastre made it possible for the information about mineral titles to be acquired and used for analysis in this chapter. The following section analyses the distribution of the revalidated mineral titles and permits obtained in April 2009. Since the approval of licences and updating of the modern cadastre is a daily exercise, the analysis and presentation is limited to the period the data were obtained; but will nonetheless provide an overview of the activities in the sector.

6.3 The Geography of Nigerian Mineral Activities by Permits

As a first step in implementing the cadastre system for mining in Nigeria, a computerised mining cadastre system was introduced, and in the process, mineral titles were revalidated. This modern approach can be a success if executed in a transparent manner, and with strict compliance with and recourse to the Mining Act. The spread of mining by titles is presented below. With reference to Section 4.4.1 (page 120), the search for and exploitation of Nigerian mineral resources is through an exploration licence, mining lease, quarry licence or small-scale mining lease (Figure 6.2) depending on the scale of operation, type of mineral mined and the geology of the deposit. These various licences - in addition to water and reconnaissance permits - are issued by the MCO under the provisions of the Mining Act. As noted earlier, the rate of Nigeria's solid mineral resources exploitation is low in relation to the extent of deposits found across the country (Appendix Two). The vast majority of mineral resources are either under-explored or not exploited at all. There is, however, concentration of mining on a small-scale in mostly brownfield areas, exploiting residual minerals. These areas have gold, iron ore, tin and columbite, tantalite and coal that have been mined in the past.

The Niger Delta region is the economic reservoir of Nigeria, which specialises in extensive onshore and offshore oil production. A significant proportion of land has been reserved for oil activities, not because of scarcity of solid minerals, but as a result of legislative restrictions. For example, the Mining Act prohibits dual licencing or overlapping of petroleum and solid mineral licences. Mining licences are, however, limited to small-scale mining and quarrying for construction and industrial materials such as granite blasting and sand dredging in the unlicenced areas, to provide raw materials for the construction works in the oil industries and related activities. Appendix One presents detailed onshore and offshore oil activities in the Niger Delta region.

A total of 2793 permits and licences that were recorded in the mining cadastre system as at April-May 2009 were analysed in this study, excluding water and reconnaissance permits. There are 1658 for exploration; Quarrying licence came second with 1003; mining at medium- to large-scale recorded 180 licences, and the least recorded is SSM with 116. As indicated in Figure 6.1, more than half of the activity in the solid mineral sector is on exploration and is spread across the country. The extraction of economic minerals by full mining operation at large- and small-scale is less than quarrying by about 20 per cent. Quarrying, which involves the extraction of construction materials (such as asbestos, granite, pipe clay, slate, sand, stone, laterite and gravel), is the major mining activity in the country followed by small-scale mining.

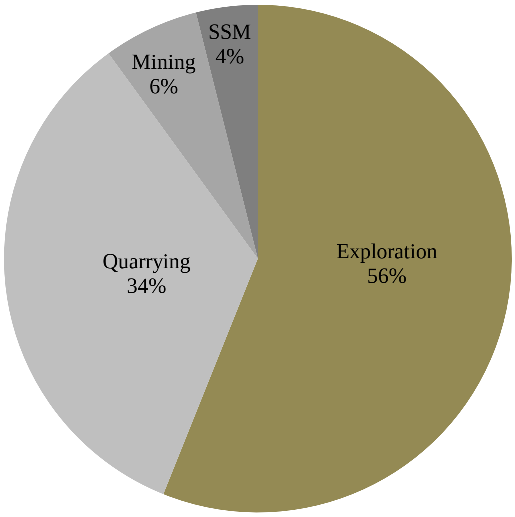


Figure 6.1 Portion of mineral activities by types of licencing in Nigeria in 2009. The country appears a virgin territory in mineral activities, which indicates an intensification of activities in the future. Source: Fieldwork (2009)

The illegal and artisanal miners who formalise their activity with the MCO are registered and grouped as ‘small-scale mining’. Although illegal mining is widespread and deeply rooted in the country, the government does not recognise it as a formal economic activity, and so it is not reflected in the enumeration of those participating in solid minerals extraction. Figure 6.2 shows the distribution of all these licences across the country. As noted in several sections of this thesis, solid minerals are distributed in all the 36 states of the federation; however, some parts of the country are notably more active in mineral extraction than others because of geological factors and the rate of demand from local industries. An extensive analysis of each of the licences was undertaken in the sections that follow Figure 6.2.

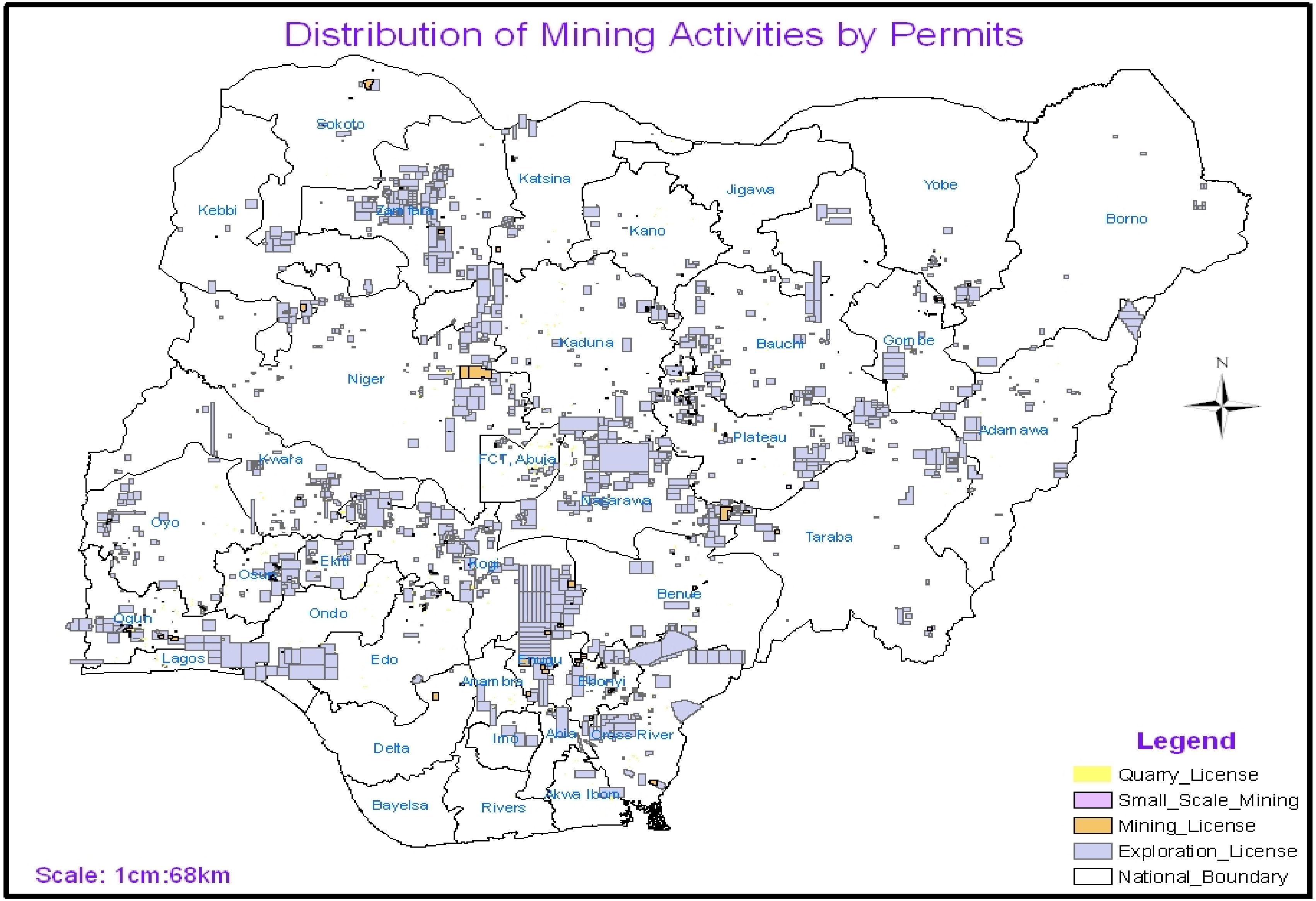


Figure 6.2 Geography of mining activities in Nigeria.

6.3.1 Mineral Exploration

Mineral exploration is the second stage in the life cycle of a mine after reconnaissance, and the beginning of scientific and technical evaluation of the mineral that could be extracted on an economically viable basis (Hartmen and Mutmansky, 2002). Exploration determines as accurately as possible the size and value of the mineral deposit, by utilising techniques similar to but more refined than those used in prospecting. Exploration generally shifts from surface to subsurface locations, using a variety of measurements to obtain a more positive picture of the extent and grade of the ore body. Exploration for new minerals or existing reserves can be undertaken by the mining company itself or in partnership with an exploration company, otherwise called the 'Juniors', particularly in greenfield areas. Apart from the benefits derived from a successful exploration phase, however, exploration activity, which is more common in the Nigerian minerals industry, has a significant cumulative effect on the environment.

An exploration licence in the Nigerian context allows a licencee to explore for any type of mineral over an area not exceeding 200 square kilometres (Mining Act, 2007) for the duration of three years renewable. The Mining Act specifies that for a licence to be issued, the applicant should demonstrate a willingness and commitment to conduct exploration activities in an environmentally and socially responsible manner, but has not specifically entails exactly how. However, in reality, exploration licence applicants rarely follow the rules and the cadastre office is not keen to fully implement this provision of the Mining Act. Based on the researcher's observation, an exploration application is considered and granted based on the availability of a vacant land determined by the use of a global positioning system (GPS), evidence of availability of funds, and a certificate of incorporation, regardless of whether or not consent has been obtained from the community, and whether or not the area is appropriate for mining under the law.

Nevertheless, exploration is not confined to the 34 strategic minerals (Chapter One). Many more minerals are being explored including limestone, coal, phosphate, gold, lead and zinc, tantalite, manganese, barite and uranium that together cover more than 80 per cent of all mineral activities (Figure 6.2). Thus, Nigerian mining activity is currently dominated by exploration work that, if successful, may eventually progress to extraction on a large or small scale. This reality signifies that even though there are certain limitations with the permitting process, participation in the mineral sector is renewed in favour of exploration to determine the nature, quantity and profitability of the sector in the prevailing minerals market conditions.

Two main reasons for the intensity of mineral exploration can be deduced. First, the geological potential of the area was obtained from knowledge of earlier or historic mining activities, which include areas of abandoned mine or progressive exploration and mining sites, as well as non-mining-related activities such as land excavation and studies of hazards. There is also what Eggert (2010:6) refers to as a “bandwagon effect” - the exploration success of one company can lead to a flurry of other companies acquiring rights or an intensification of activities in the proximal areas. For example, exploration activities in Kogi were based on historic mining of coal, iron ore, precious metals and tantalite among others. Similarly, Enugu is being explored for coal, Jos for tin and gemstone, and Zamfara for gold, silver and copper. The current case is that mineral exploration is not entirely concentrated in past mining areas; greenfield areas are also explored with greater intensity from the north-west to north-central regions and from the south-west to the eastern part of the country.

Second, geosciences information made available by the geological agency has played a significant role in opening up greenfield exploration. Exploration companies have relied on the data gathered and disseminated by the government in place of gathering the information themselves. In the mining business, the availability of quality and reliable geologic data is a pre-condition for investment. As such, the government has provided the catalyst for greenfield exploration by making available basic information that gives some idea of geologic potential. A geologic map of the entire country was reviewed, updated and reproduced in a digital format. Appendix two is the map of mineral resources reproduced to disseminate data and stimulate investment. The availability of data promoted exploration investments in oil sands, barites, feldspar, quartz, marble, limestone, lead and zinc, and has led to the identification of minerals considered strategic for Nigeria's development. Nevertheless, the transformation of Nigeria's macro economy, political stability, legal and regulatory frameworks, fiscal policies and new mining regulations are the determinants for private, especially foreign, investment in mineral exploration. With a favourable investment climate, therefore, it is not out of context or over ambitious to conclude that with successful discovery in exploration, full and extensive mining can begin around 2015.

The Nigerian government (through its mining companies) is a major player in mineral exploration. The government has specific interest in gold, iron ore, coal, tin, copper, barites, talc and oil sands; as such it holds about five per cent of exploration. The remaining 95 per cent is owned by private individuals and corporate entities, out of which foreign companies make up less than five per cent. Some of the minerals sought after by both local and foreign companies include cassiterite, barite, gold, feldspar/quartz, galena, pyrite, lead/zinc, tantalite and coal, among others. Precious metals such as gold and silver, and gemstones including tourmaline, quartz, and barite dominate exploration by type of mineral.

In the past decade the major international exploration companies hardly showed more than a passing interest in Nigeria; however, some investors from China, South Africa and Canada are part of the five per cent that are beginning to show renewed interest in Nigerian mining. Part of the reform as it relates to licences is the revalidation of all mining licences prior to 2006, and the issuance of new ones. This measure became necessary because more than half of the mineral titles were speculative. Some of these titles are either non-existent in government records or cannot be traced. Therefore, building a historical record prior to 2007 was no longer possible for government because of poor record keeping, disorganised nature of procedures, and lost mining licences; this also made it impossible for the researcher to compile such a record.

The exploration stage is indeed the first point of contact between the proposed mine and communities: at this point cordial relations are expected to be established by the company. How that relationship is built and managed can determine the success or obstruct the take-off of further stages of mine development. Experiences in other countries have shown that engagement and accommodation of concerns from the local community at the earliest stage of exploration decreases the risks associated with opposition and social conflict (Lahiri-Dutt, 2006; DERI, 2011; DPI, 2008). Conflict may also occur with other uses of natural resources, such as tourism and recreation.

6.3.2 Mining Lease

Mining in Nigeria is expected to provide the next economic opportunity after oil. For instance, local host communities and the country are receiving infrastructural and economic benefits from Dangote Cement, an indigenous mining company exploiting limestone, gypsum, clay and laterite in North-central Nigeria for cement production. In a bid to gain economic opportunities like this, a number of mining licences were issued by the MCO. The Nigerian mining licence transfers ownership of a mineral from the federal government to the mining licence holder. Actual mining, whether surface or underground, begins at this stage, and the choice of method(s) depends on the characteristics of the ore body, economics, geotechnical challenges environmental restrictions, and safety. Two options are available for obtaining a mining lease: (1) by complete or part acquisition of an existing mining property and (2) by starting from the position of obtaining the appropriate licence from prospecting to exploration and mining lease. The first option is uncommon but began to emerge with the privatisation of government-owned mining properties like the NMC.

Evidence of mining on the ground was minimal even with the numerous changes adopted for improving the sector. Mining of different minerals accounts for six per cent of the mineral sector, and the intensity differs from one region to the other as the geology permits (Figure 6.3). In terms of these regional variations, the North-central region, which comprises Benue, Plateau and Kogi states, is dominated by mining in brownfield areas. Tin, columbite and iron ore extraction dominate mining activities, followed by limestone and granite. The NMC, although inactive, still has mineral holdings in Niger and Plateau states. The NMC's operations in the North-central were the centre of mining in Nigeria, until the early 1970s when poor management and a lack of understanding of the global commodity market led to the collapse of tin and columbite production. What remains are visible scatterings of small-scale mining that have been ongoing for years. The most important mining activities in the North-central are the Obajana and Benue Cement, both owned by Dangote Cement. Coal, iron ore, laterite, and limestone mining is still ongoing in the Enugu and Ebonyi states in the South-. In the South-west, there are important deposits of limestone at Sagamu, Ibese and Ewekoro and phosphate at Idogo and Oshoshun that are mined by cement companies. The NMC, NIOMCO and other state-owned mining companies have 12 per cent share of the 180 mining titles spread across the country. Given this scenario, the World Bank (1996:34) advocated for the independence of the MCO from issuing biased mining titles to state-owned mining entities.

In terms of scale, the Obajana cement covers about five square kilometres of land, displacing farm crops, economic trees, the ecosystem, water bodies and structures of neighbouring communities. Communities affected by the cement project are Obajana, Oyo, Iwaa and Oile, Iwa and Oshokoshoko (Busuyi et al., 2008; IFC, 2011). Hundreds of other communities along the 90 kilometre gas pipeline route from Ajaokuta to Obajana were either displaced or relocated. Obajana seem to be worse hit because of its proximity to the cement plant (Glen, 2005). The mining of oil sands by one project alone will more than double the size of a cement mine. For example, by 2010, 85,000 square kilometres of oil sands licences have been leased in Alberta out of the oil sands area cover of about 140,000 square kilometres (Government of Alberta Energy, 2010). This area is about 15 per cent Nigeria’s total land area and is 23 times the size of Lagos, which has a total area of 3,577 square kilometres (Lagos Megacity Project, 2011).

6.3.3 Quarrying Lease

Quarrying of granite, marble, sandstone and gravels is helping in meeting the demand for infrastructural expansion in Nigeria. Among these, granite is the most common, available and affordable building material. Quarrying as an extractive economy provides much of the raw materials used in building works and construction. As Nigeria is developing new structures and expanding existing infrastructure such as roads, hospitals and buildings, there is no corresponding increase in the number of quarries supplying construction materials. By estimate, constructing a one kilometre length by 10 metre wide stretch of road could utilise no less than 500 truckloads of crushed stone (ASPASA, 2011). Apart from being a construction material, quarrying contributes to economic development in a number of ways: it also contributes to government revenues through permitting, royalties, explosive permits and blasting certificates. Quarrying is a labour-intensive activity, and so creates employment opportunities and the development of mining infrastructure.

About 1800 quarries were recorded in 1996 (NBS, 2008b). Coincidentally, the number went down with the introduction of an import embargo on Nigeria by the Commonwealth in 1996. The sanctions succeeded in deterring the importation of quarry machines and spare parts that led to the eventual collapse of the sector. Beginning from 2005, with the reform of the sector, rising crude oil prices and the exclusion of duties on mining machineries, the quarry industries once again began to recover, while new ones are being registered. Currently, 1003 registered quarry sites are dispersed throughout Nigeria (Figure 6.3). Granite, marble, sand, laterite, clay and gravel dominate quarry activities by licences. By virtue of scale, any one quarry occupies an area of not more than five square kilometres, and the operation can be either on a small or large scale.

Quarry distribution follows geology, the pattern of infrastructural spending and the rate of growth of a particular region. The Nigerian capital city has the highest concentration of quarries to supply materials for building and construction work. Likewise, quarries are located in close proximity to the capital cities of the various states. In the south west region (Ondo, Oyo, Ogun, Lagos, Ekiti and Osun states) construction aggregates are extensively distributed, accounting for 40 per cent of quarrying. The concentration of quarries in Ogun and Oyo compared to other states is because of their proximity to Lagos State, where aggressive construction works are undertaken. This is coupled with the non-availability of granite rocks for aggregates in Lagos. The proportion of quarrying is 10 per cent relative to other mining in the south-east. North-eastern Nigeria has less than 10 per cent, while the least number of quarries are found in the north-western part of the country. The south-south region (Niger Delta) has solid minerals out of which sand, salt and clay are exploited. Sand is extracted by dredging the massive riverbeds which symbolise the marine nature of the region and are used for reclamation by the oil industry, brick making and as a raw material for the Ughelli glass industry located in Delta State. Kaolinite is quarried by the Akwa Ibom State ceramic industry.

Typical of extractive activities, the mining and production technique in quarrying is not without significant impacts on the environment that include loss of habitat and visual impacts (Lameed and Ayodele, 2010). Pits dug for sand and gravel excavation are benign because toxic materials are not used in processing, but an un-reclaimed pit can be potentially hazardous to people. Ground vibration from blasting, air pollution from explosives dust, land degradation and defacing the aesthetic nature of the local environment, and pollution of ground water are some of the measured physical impacts of quarrying.

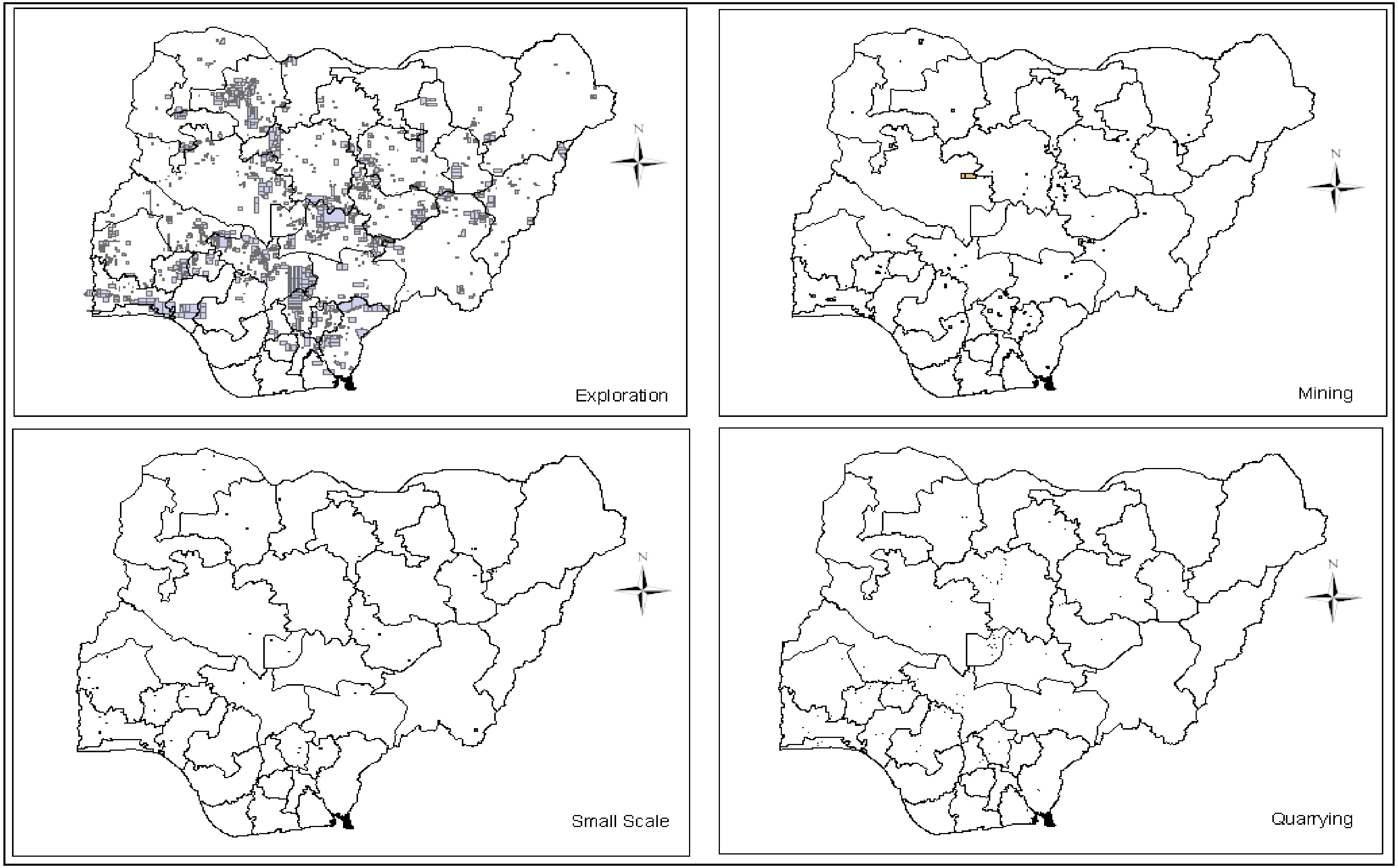


Figure 6.3 Mining permits and licences.

Small-scale mining (Section 6.2.4) has similar areal coverage to quarrying, but its activities differ, because it often specialises in industrial and precious minerals. The social impact of quarrying on the surrounding communities includes displacement and pollution. Therefore, quarries should strictly conduct EIA and CDA to determine the impacts of their activities before being licenced. There have been reported cases of gullies either initiated or accelerated by vibration from quarries in South-eastern Nigeria (Akpokodje et al., 2010:26). Apart from petroleum, quarrying of rock, sands and gravels is adding to environmental pollution and degradation in the Niger Delta region (Aigbedion and Iyayi, 2007). Similarly, Sagamu and Odeda communities in South-western Nigeria bear the environmental impact of quarry without being compensated (Adekoya, 2003; Omosanya and Ajibade, 2010). Other communities affected by limestone quarry are Ashaka and Gboko.

The estimated 16 million housing deficit in Nigeria (Ezekiel, 2010) and infrastructural development will continue to drive the demand for granite, marble, sand, gravels and other construction materials. In the Federal Capital (Abuja) alone, the supply shortfall of about 1.2 million tonnes of granite chippings is an indication that a ready market for quarry products has been established. With an estimated market value of about US$16 million in 2009, a quarry boom is just beginning in Nigeria.

6.3.4 Small-scale Mining Leases

A number of the mineral deposits in the country are too small to be economical for large-scale mining; hence, small-scale extraction becomes an option. Similarly, not all minerals can be economically mined at small-scale, as some minerals require large injections of capital to be exploited, and in such cases small-scale miners can explore minerals and negotiate with mining companies for large-scale extraction. Because of the extensiveness of superficial mineral deposits in small quantities, government interest in small-scale mining has grown in the last couple of years, and as the industrial infrastructure needs of the country grow, small-scale miners supply raw materials that would otherwise be imported. Small-scale mining activities are concentrated in the long-standing mineral-rich veins of the younger granite and sedimentary basin of north central and south western Nigeria. Tin in the Plateau, lead/zinc in Kogi, barytes in Benue, and tantalum and alluvial gold deposits in Zamfara, Oyo and Osun States are the dominant minerals and sites of SSM operations (Figure 6.3). Some minerals are mined superficially in shallow primitive underground mines; others are re-working the brownfield or tailings left by past mining. The reworking of tin and gold spoils left behind by historic miners is a common display of SSM.

The degree of participation varies by commodity and is, to an extent, determined by the availability of mineral deposits and access to markets; less so by quantity, ease of excavation, or availability of water for processing. The increasing number of SSM leases suggests that the activity remains widespread in the country, although the concentration of activity varies with the effects of cyclical changes in global and local demand for commodity, macro-economic conditions and technological skills. The use of tantalite in mobile phones has generated a flurry of SSMs searching for, and extracting tantalite in Zamfara, Kaduna, Nassarawa, Kogi and Niger States. The small amount of materials needed for digging and uncomplicated processing flow makes this subsector attractive as a poverty alleviation strategy in a country where about two-thirds of the population falls below the poverty level. Oil sands licences are not issued on a small-scale because: “It is not possible at all. It is a capital intensive project and requires companies with buoyant balance sheet, small scale mining has no place in bitumen" MSMD official Pers. Comm. (2010).

Small-scale mining activities have not been well documented in the past - about 95 per cent of them operate illegally. Tantalite, columbite, coal, gold, barite, tin, lead, zinc, tourmaline and barites are all extracted at small-scale. This study finds that in the last five years, the ASM department has made efforts to organise ASM into cooperatives. , This effort has yielded results as about four per cent of mining activities in Nigeria comes from ASM. This, however, does not reflect actual reality, because this sector is still characterised by informal status; as such it is difficult to capture an accurate or even reliable number of ASM sites operating across the country. For instance, Nassarawa and Kaduna States are the nucleus of ASM; so far, there is no registered small-scale miner in either state. Despite the difficulty in gathering data on the activities in this subsector, the number has increased exponentially in the past few months. The number of registered ASMs also increased from 116 in May to 234 in October 2009.

As noted in Section 4.5, the Nigerian government obtained a soft loan from the World Bank, part of which has been used to increase government's capacity to manage small-scale mining as a poverty reduction strategy. The Nigerian approach to SSM can be described as a liberalised marketing arrangement, with emphasis on the creation of ASM cooperatives and associations for speedy licencing. A closer scrutiny of the Nigerian approach, however, indicates that the SSMs apparently have no capacity to initiate environmental protection measures (e.g. the EIA) or even address social problems (e.g. CDA). Up to the present time, mining licences which do not follow the requirements of the Mining Act are been issued to these companies.. In such instances, the environmental and social costs of SSM production are borne by the host communities rather than the SSM cooperatives and associations. Furthermore, SSM, which accounts for about four per cent of mineral titles, requires extensive regulation, organisation and enlightenment on best practices, and integration into the mining value chain, not just credit grants disbursed by the ministry. Section 6.4 below looks at the overlapping of mineral titles on the built environment with emphasis on settlements (communities).

6.4 Nigerian Settlements and Mining Leases

From the presentation in Section 6.2, many mines are operating in both built and conservation areas. Mineral licences granted are overlapping the land area overseen by the State. Some minerals are now licenced and exploited within the boundaries of local communities. The MCO is unable to provide mining applicants with information concerning existing rights, because the data are simply not available. This section (6.4) shows how mining has led to the growth and disappearance of communities. Also, a buffer zone between mining licences and settlements was established to identify potential mining host communities based on their proximity to an issued mineral title.

Nigeria is predominantly an agrarian society (NPC, 2007); the beginning of mining could have influenced rural settlements and agriculture in several ways (Chapter Two). Mining could contribute directly or indirectly to the rapid expansion of existing communities and the creation of new settlements. This was the case when tin mining in Nigeria played a historic role in the evolution and development of Jos in the late nineteenth to early twentieth century, which became the largest settlement in the Plateau (Hodder, 1959). Jos is presently home to the administrative headquarters of Plateau and is growing in industrial activities. Initially, early settlements in Jos developed without systematic planning typical of rapidly growing pioneer mining towns. The architecture, layout and function of these towns are reflected in how they evolve and grow. Sabon Gida, a mining town, and Bukuru and Jos communities are also known as ‘stranger settlements’, hosting one third of mining migrant labourers. During the same time, Maijuju and Fusan Hausawa settlements evolved as markets for the miners and their mineral products (Hodder, 1959). The mining of gold, iron ore, coal, lead and zinc and limestone also led to the development of Abakaliki and Udi.

Since the beginning of the twentieth century mining has continued to be fundamental in the expansion of settlements in Jos and some other parts of the country. Gold and tin mining are important in the north-central region, as are industrial minerals in the south-west region. Coal extraction is important in the south-east, and in many parts of the country, settlements are mainly based on mining and agriculture. Regardless of the current low mining activity, there are new settlements emerging. The current mining sector as earlier described is dominated by exploration activity and a noticeable amount of ASM. Sarkin Pawa in Niger State and Azara in Nassarawa State have growing small-scale artisanal mining of tourmaline, tantalite and baryte. These settlements emerged with the ‘mineral rush’, but run the risk of becoming ‘ghost towns’ when the mineral deposits they are based on are depleted, because they are not built to live longer than the mines. A typical example of a settlement that more or less became a ghost town is Old Birnin Gwari, which was for a time famous for gold mining. Ajaokuta town serves several iron ore mines and steel workers. In summary, certain settlements were short-lived; and some disappeared, while others became ghost towns because of mineral depletion or changes in mineral price and demand. Jos town was able to survive because it became a manufacturing and service centre for the entire region. These changing trends make the communities associated with mining dynamic.

The definition of ‘mining settlements’ depends not only on distance and proximity to the mining area, but also on the social and economic characteristics of these communities. While this section identifies the communities that are ‘within’ or ‘near’ any given mining-licenced area based on proximity in current times (Figure 6.4), Chapters Seven and Eight investigate the development of mining in these communities. However, the data used in this chapter six are unable to differentiate between the settlements that emerged at the same time as the mine or the settlements that were built before the mine. As such, any categorisation of mining communities based on their impacts becomes difficult. For this reason, the term ‘proximity’ indicates those settlements that are closer to any mining licence or even contained within the licence because mining licences issued do not take into account the presence of built-up areas, protected areas and environmental peculiarities.

Some countries and regions are setting a buffer zone between mining and residential areas to provide protection to the local communities from noise, vibration, dust and other immediate environmental impacts of (especially) open cast mining (Owen, 2011). For example in Australia miners are not permitted to work within a nine metre radius or 100 metres below a residence (Rural Law Online, 2009). In Scotland and Wales, a 500 metre buffer zone is required between mining and built areas. Owen (2011) reported that recent efforts by some English Members of Parliament to define a mining buffer zone suffered a setback when the bill for a 500-metre buffer zone between new mines and residential areas was opposed by the government. Already a distance of 100-200 metres referred to as ‘stand-off’ is in place to minimise the impact of the mineral extraction process. Nigeria has neither ‘stand-off’ nor buffer zone; the attention is on intensifying mining without any consideration for a buffer definition to protect the environment and nearby communities. Nonetheless, there are examples of communities that co-exist with mines inside the community. Likewise, there are instances where coal burning smoke and vibration from coal blast have shattered nearby communities. Buffer zones are also created to address the impact of mining operations such as in the design of tailings dam and waste dumps, and the issue of staff safety.

Generally, there is no clear-cut spatial yardstick for demarcating a mining buffer area. Therefore, in this context, the study used the GIS buffer operation to select the settlements that fall within the perimeter of mining rights, and those that are not within, but are closer to, the mining right. Proximity of 100-150 metres distance from the mining licence was created for those settlements outside the mine area to understand the closeness of the activity. Figure 6.4 indicates the overlap of settlements and the number of mining licences across the country. Based on the above criteria, 10.1 per cent of all settlements in Nigeria either fall completely within or are contained by the perimeter of any given stage of mining licence. Exploration licences are offered on a short-term basis, lasting for a maximum period of six years on over 3600 settlements, representing about eight per cent of the total settlements in Nigeria (Figure 6.4). The exploration programme is extensive; however, it has a low impact on settlements, but compensation can be awarded for any disturbance. Because mining rights holders have the rights of entry to private land including their equipment, giving notification to the holders becomes an important part of community consent.

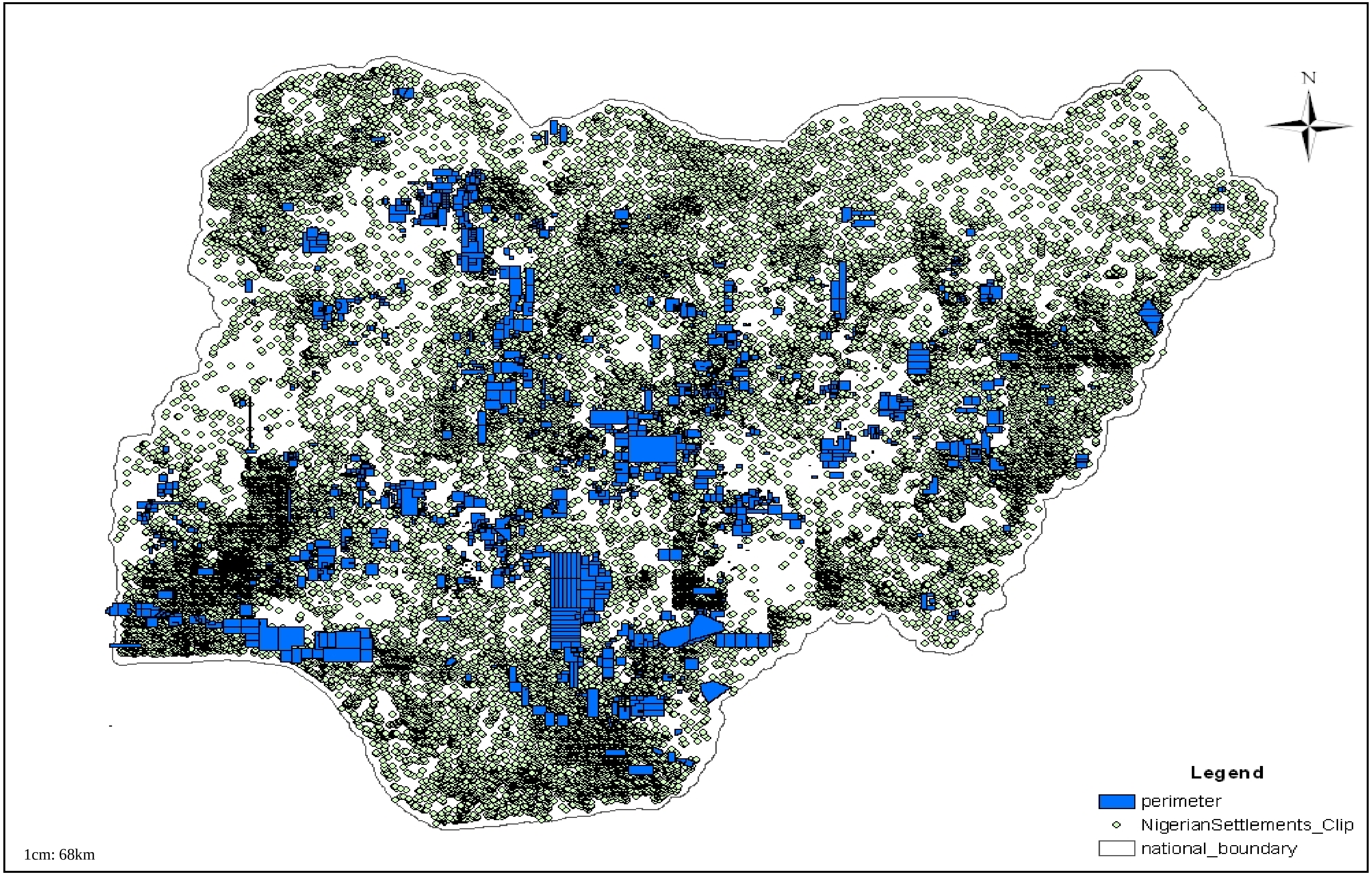


Figure 6.4 Mining licences and surrounding settlements. The mining rights are coloured blue (perimeter) and the settlements appear as points data.

Figure 6.5 below is a pyramid which shows that reconnaissance to detailed exploration covers a wide land area, consequently affecting settlements. The impacts begin to expand during construction to the development stage. The more remote the activity becomes, the more extensive the impact on the environment. For example, although quarries occupy a relatively small area of land, the impacts can be widespread.

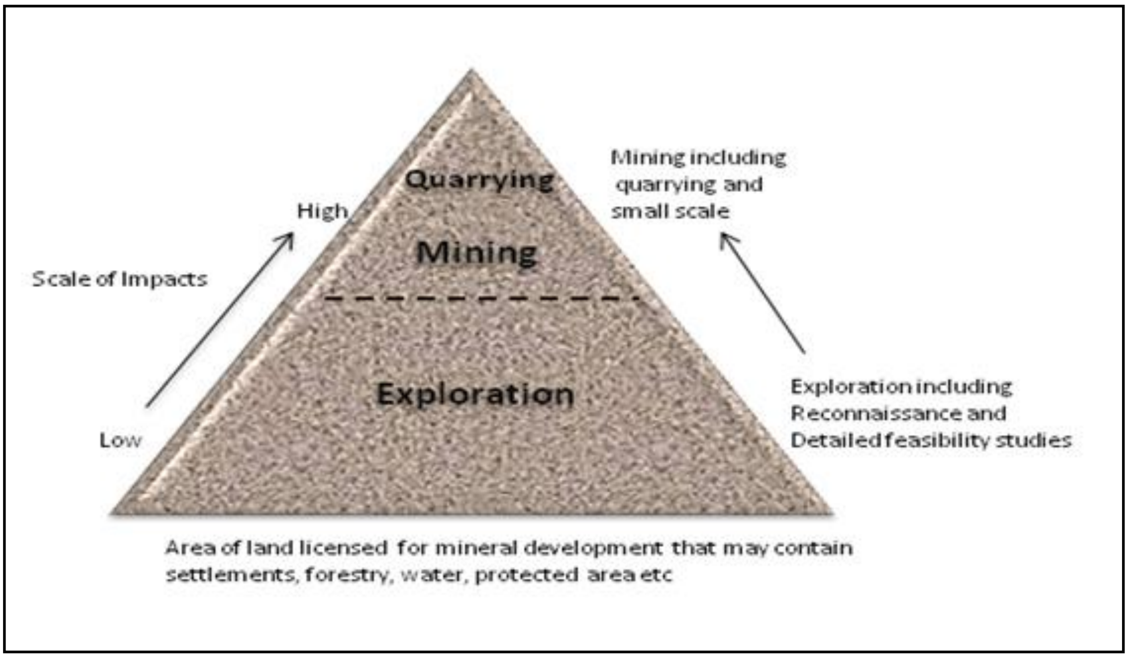


Figure 6.5 Mining activity and scale of impact on the surrounding environment.

From the analysis, 61 local government areas which have mining licences in their localities are home to a population of 12.1 million people, which is eight per cent of the Nigerian population. This figure is similar to the whole population of Burkina Faso (12.5 million) or Greece (11.2 million). Therefore, such scale of impact calls for consultation with the communities at the initial stage. In the interpretation of the above data, the locational attribute used as a selection criterion tends to underestimate the important role played by mining within the economies of these settlements. Narrowing the scale, the next section identifies mining communities in Ondo State, south-western Nigeria.

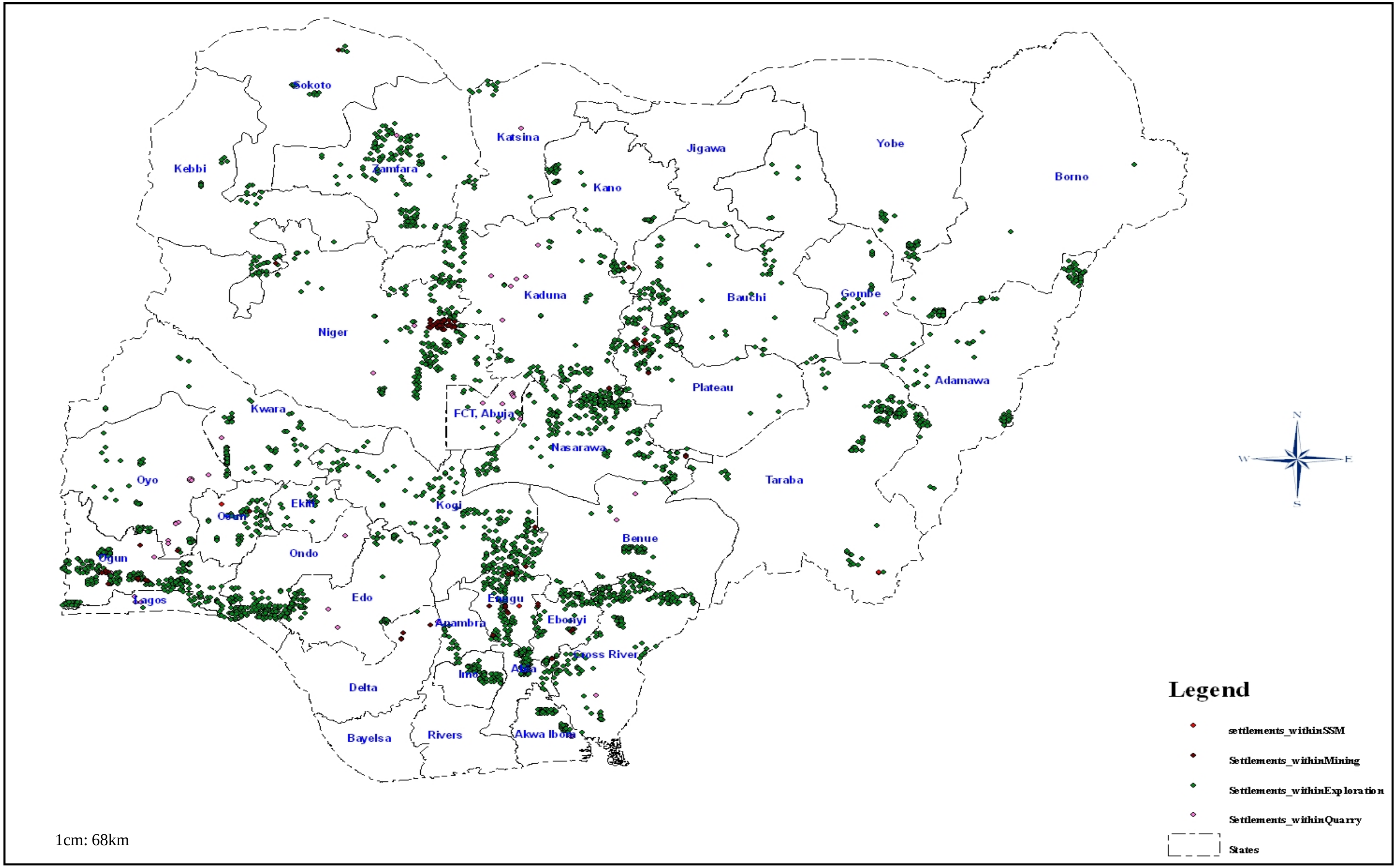


Figure 6.6 Nigerian settlements lying within the perimeter of licences in 2009.

6.5 Mining and Settlements in Ondo State

Oil sands deposits extend through five states (Chapter Six), of which over half are located in Agbabu and Ode-Irele in Ondo State, thus making it the choice of study. Ondo is situated in south-western Nigeria with Akure as its capital city. The 18 local government councils making up the state were carved out from the former western states in 1976. The State is bounded to the south by the Atlantic Ocean, to the north by Ekiti State, Edo State in the east, and Ogun State to the west (Figure 6.7).

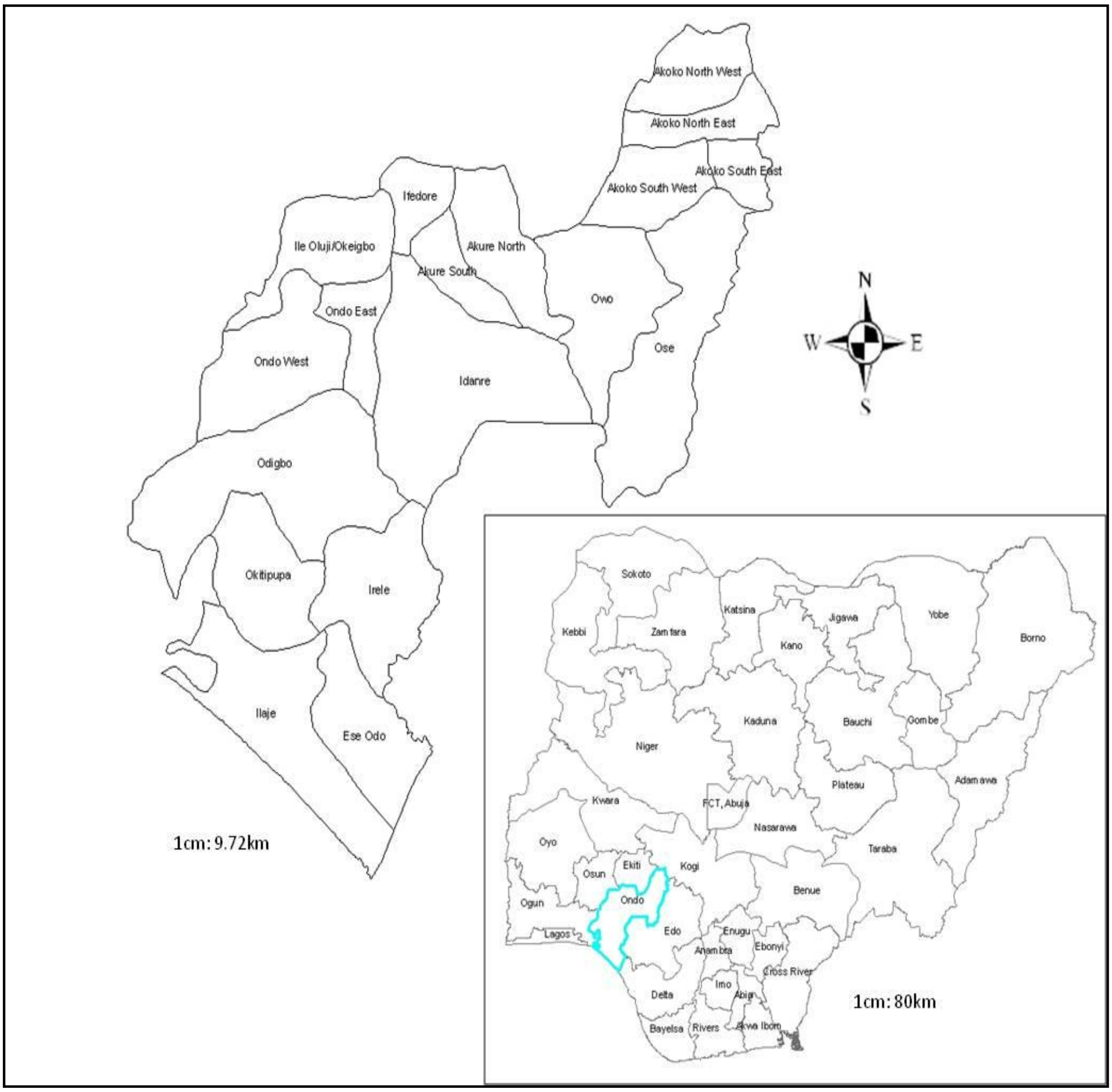


Figure 6.7 Ondo state, Nigeria.

For legislative purposes, the state is divided into three senatorial districts. Ondo is among the nine oil-producing states of Nigeria with an estimated daily production capacity of about 20,000 bpd (Ondo State Web-portal, 2009). According to the 2006 population census, the state has about three and a half million people living in an area of about 14,606 square kilometres, and it has been predicted that the population will reach 4.7 million by 2020 (UNDP, 2006). Ondo is an agrarian state with agriculture engaging over 70 per cent of the working population, unlike other Niger Delta states whose populations are predominantly fishermen. One-third of the land surface is dedicated to agricultural production. Cash crops include rubber and timber; cotton and tobacco are mainly produced from the northern part of the state, while palm kernels are cultivated throughout the state. Indeed, Ondo is the largest producer of cocoa in Nigeria. Other agricultural products include fruits and vegetables, coffee, cassava, and rice.

Non-metallic minerals such as clay, aggregate, marble and kaolin are extensively found throughout the state, whereas mineral fuels such as coal and oil sands are localised within the sedimentary belt. Oil sands deposits are situated across six local government areas: Ode-Irele, Odigbo, Idanre, Okitipupa, Ese-Odo and Ilaje. The two major crude oil-producing local government areas (Igbokoda and Egbekebo) border the local communities hosting oil sands deposit. The mineral resources in Ondo, including the economically viable ones, are unexplored and untapped - a situation similar to that at the national level. In comparative terms, all mineral activity permits - i.e. exploration, quarrying, small-scale mining and mining rights - in Ondo State account for just 1.5 per cent of the national total. At present there is no large-scale mining activity taking place in Ondo State. Figure 6.8 below shows that of all the licences offered by the Federal Government for mining not one was issued to the state.

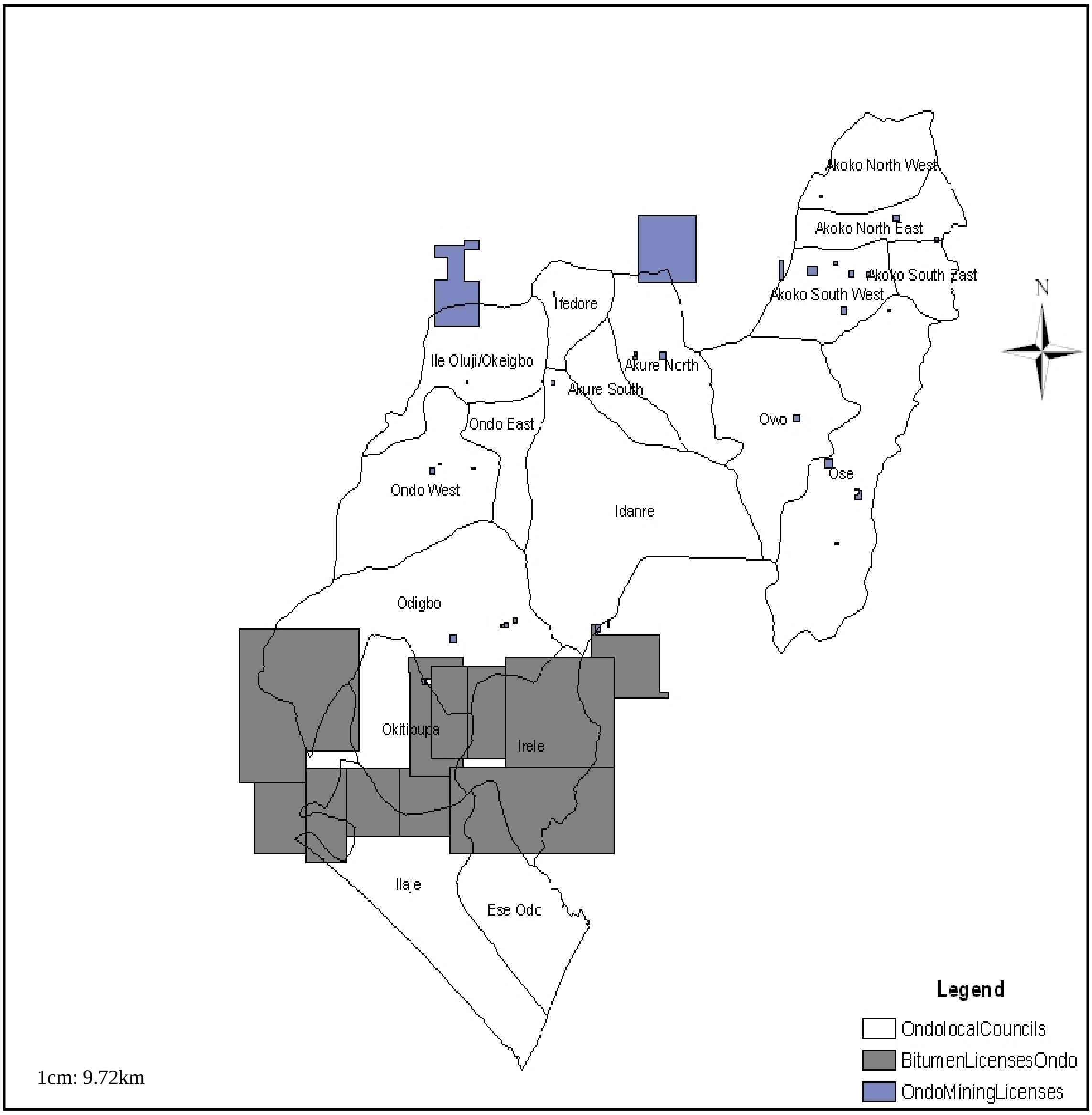


Figure 6.8 Mineral permits in Ondo State in 2009. Quarrying licence dominates mining activities in the state.

In the recent past, the weak level of development of the solid minerals in the state was attributed to the problem of mining land acquisition, bureaucracy and multiplicity involved in processing mining licence. The current land ownership status in the study communities is communal and mostly informal. Despite the recent mining reforms, mining on a large scale has not yet been witnessed. Even at the small-scale level, there is only one recorded mine in the state. Perhaps the search for oil sands which dominates all exploration activities in the state has deterred other mining activities. Western

Goldfields, Aspect Petroleum, Votary Mines, and Carlem Mines are the private companies currently exploring for oil sands, while the government owns blocks 90001, 90002 and 768. The licences have shown that the state government is not directly participating in exploration through any subsidiary company. About 180 boreholes have been drilled in the oil sands belt of Nigeria with around 100 of them falling within Ondo State since the beginning of the last century (Ayoade, 2007). Quarry licences for extraction of construction material are widespread in the state. The quarry industry accounts for 70 per cent of mineral activities. The occurrence of glass sands in the coastal areas has led to the establishment of the government-owned 'Oluwa Glass Company Plc'. There is a large volume of clay extracted by quarry for the ceramic industries that are found across the state.

The settlement pattern in Ondo is largely influenced by topography and drainage, and varies from one settlement to another depending on the concentration of people, and the functions the settlements perform. As noted earlier, Ondo is an agrarian state and so the settlements are rural in nature and dispersed to provide more land space for farming. There are 479 settlements recorded in the state; 38 per cent of this falls within mining-licenced areas. From this proportion, more than two-thirds (about 80 per cent) are located within the oil sands-licenced areas (Figure 6.9). The number of settlements has increased by creating a one kilometre square circumference around the oil sands mining licences. Consequently, all the settlements in Ondo State are found lying at the five square kilometre buffer. The five kilometre square buffer was arbitrarily selected to the extent of the range of the settlements within the oil sands licence. all the settlements are contained in the oil sands licence. This is to indicate the scale at which oil sands mining will affect communities.

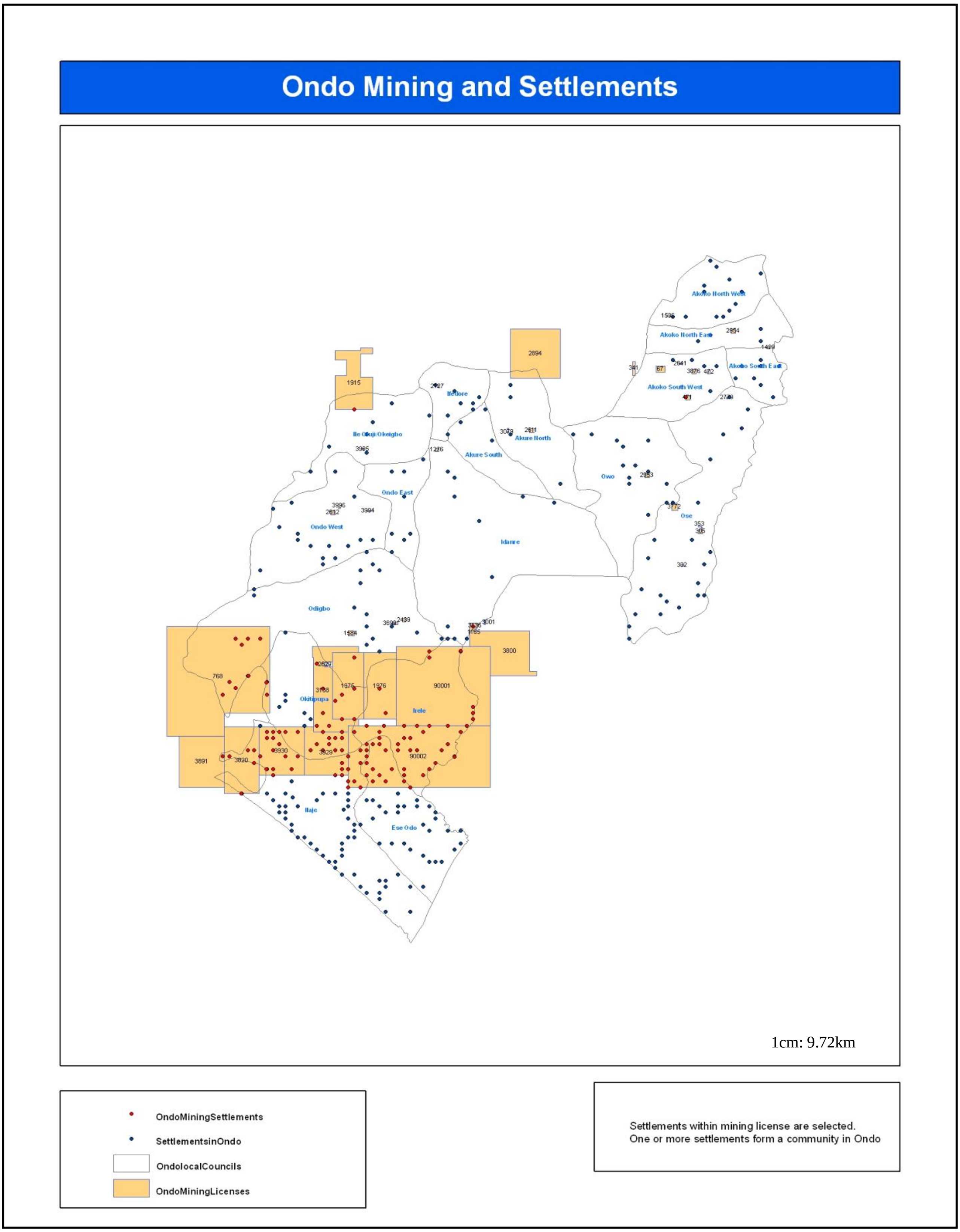


Figure 6.9 Mining licence in settlements areas in Ondo State in 2009.

Undoubtedly, oil sands extraction would have both positive and negative socio-economic and environmental implications for the state. However, the northern parts of the state are less likely to be significantly affected by oil sands mining because only a small number of quarrying are taking place in their immediate surroundings. These local councils include Akure north, Akure south, Idanre, Owo, Ondo west, Akoko northwest, Akoko northeast and Ifedore. Those most likely to host major mining activity - considering the scale of licences and the intensity of exploration - include Ilaje, Okitipupa, Ire, Ese-Odo and Ose. Among them, Okitipupa and Ilalje are likely to derive dual benefits and costs because they are host to both crude oil extraction and the planned oil sands projects. Quarrying as the main mining activity in the state occupies small amounts of operational space compared to oil sands, which extends across the boundary of the state.

6.6 Local Communities and Nigerian Mining Titles

Finally, this aspect of the study narrowed down the scale of analysis to focus on oil sands and local communities. Local government area boundary data were used to quantify the number of communities that are potentially affected by the activities of the planned oil sands mining. The use of local government areas to quantify the communities and people directly affected by oil sands mining only indicate the extent of economic and social organisation of the area The weakness of this estimation, however, is that it either generalises the settlements or combines a number of communities that are not impacted upon by mining activities. At the very least, the analysis provides information that can be used in identifying local communities likely to be affected by oil sands extraction.

Out of the 18 local government areas in Ondo State, one local government was selected where mining appears a potentially significant part of the local economy as it contains the largest number of oil sands exploration licences owned by both the government and private investors. Irele, the selected local council, has recorded 41 settlements with a total population of 144,136 according to the 2006 Nigerian population census, all lying within the oil sands exploration-licenced area.

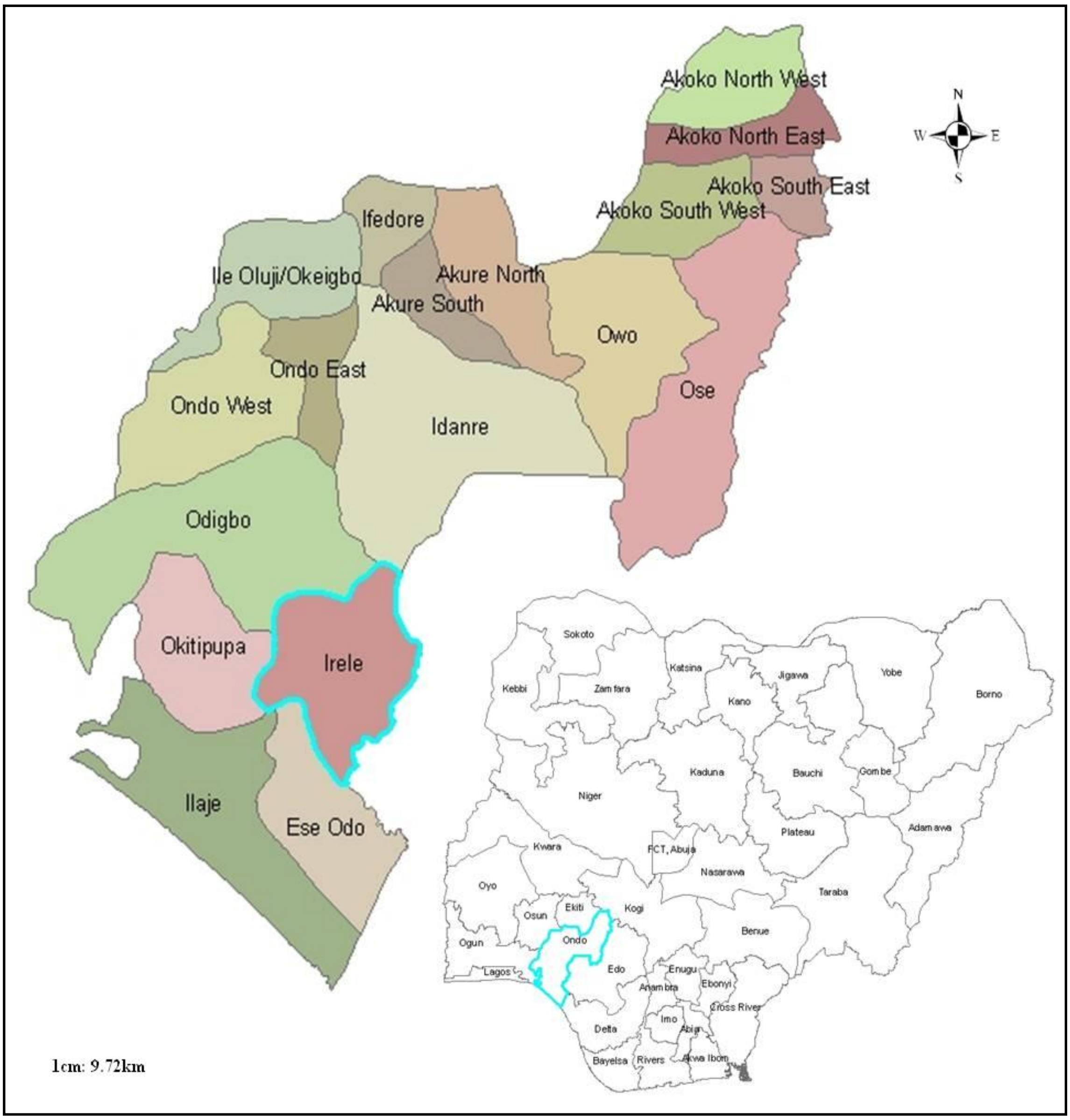


Figure 6.10 Map of Ondo State showing the location of Irele Local Government Council.

Some settlements in Irele (Araromi, Ode-Irele, Omi, Ibini Ogele, Ago Lawrence, Iyansan, Yopeara, Akotogbo etc) appear linear and are formed along a major road, river or stream (Figures 6.11 and 6.13). In Figure 6.11, the coloured blocks are the oil sands licences overlapping communities. These settlements are not isolated compared to those that are rarely proximal to roads and other exploitable natural resources such as fishing and forestry. In the northern part of the local council area, the settlements are dispersed probably because of the existence of a forest reserve that covers two-thirds of the area (Figure 6.13). The people of the local council district engage in timber production, tree crop cultivation and arable farming (see full details of economic activities in Section 7.2).

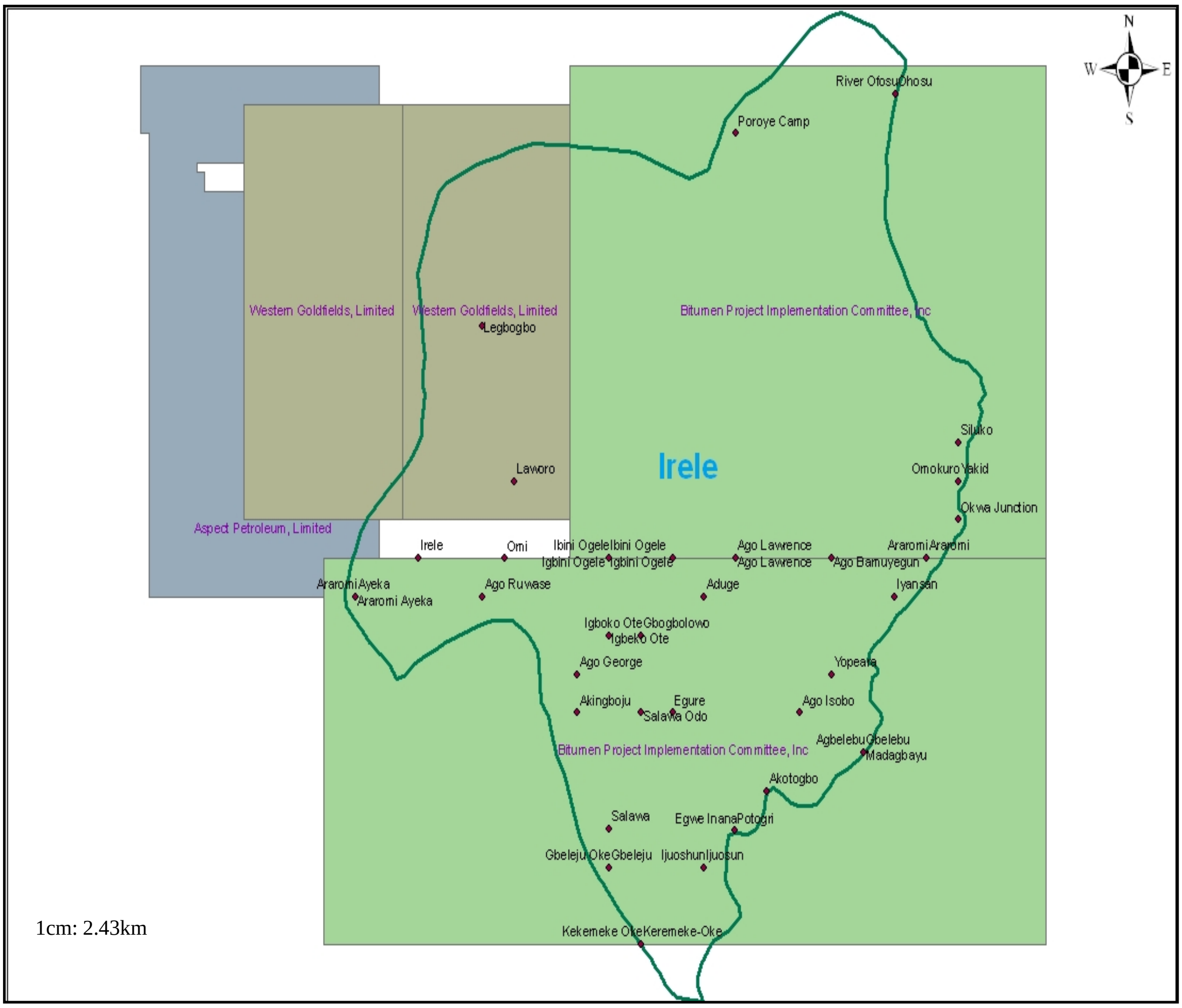


Figure 6.11 How oil sands exploration licences lie within communities in Irele Local Council in 2009.

The oil sands licence number 1975 is a privately owned block that was re-issued after the revocation of the same licence by the federal government in 2003 to Bitumen Exploration and Exploitation Company of Nigeria (BEECON) and NISSAND Nigeria Limited because of their inability to mobilise sufficient financial and technical capacity to exploit the resources (see Section 6.8.5). Blocks 90001 and 90002 (BPIC) are owned by the federal government, and were partitioned for issuance to private investors (Figure 6.12). Most likely when exploration licence 90002 commences extraction it will impact on a larger number of communities than those in blocks 1975 and 90001. This is because licence 90002 has about 27 settlements within its perimeter in Irele local government, out of the total 41 recorded in the entire council district (Figure 6.11). The licence extends to some settlements in Ilaje and Ese Odo local councils.

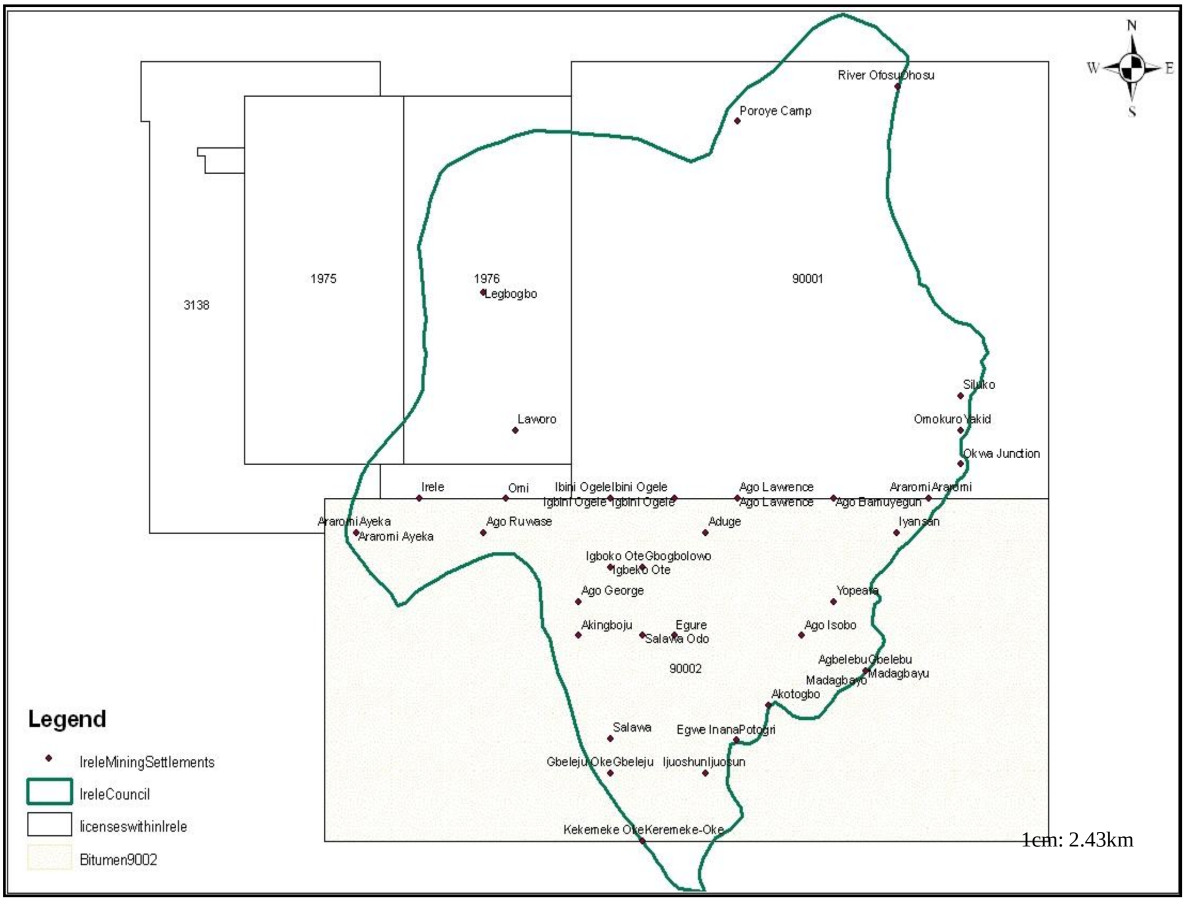


Figure 6.12 Oil sands licences obtained by investors in Irele. The same blocks have been collapsed to three, and are currently undergoing a bidding process.

The commencement of full exploitation of the blocks in the local government area can lead to displacement and relocation of communities that account for more than three per cent of the state’s population. This will inevitably lead to the relocation or displacement of people and their settlements, which could have severe economic, environmental and emotional effects. Effects on water sources, forestry and farmlands will add to the cumulative consequences of oil sands extraction in these communities (Figure 6.13). The figure (6.13) demonstrates how oil sands is likely to displace forestry, land, hydrology and other habitats similar to the case in Alberta and other large-scale mining projects throughout the world.

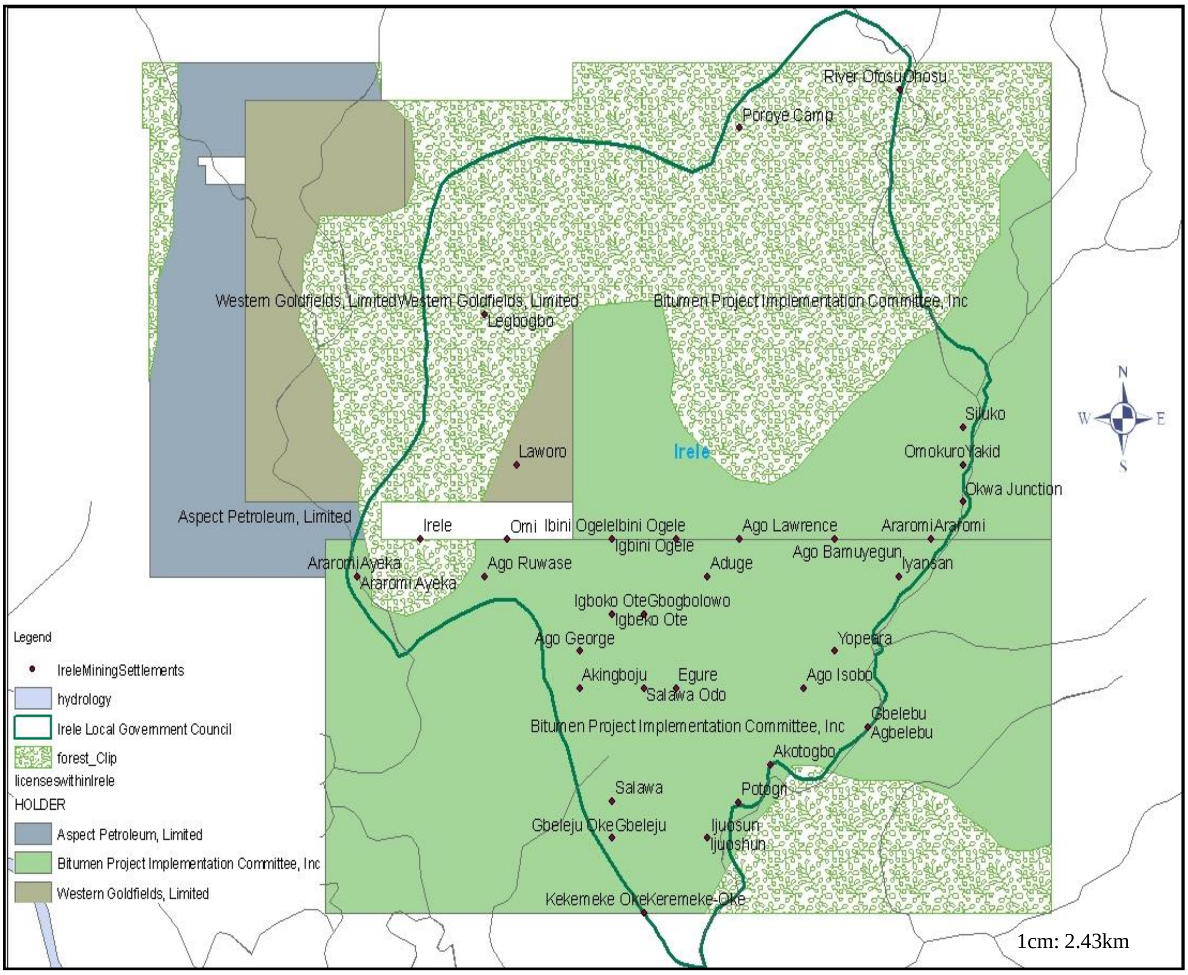


Figure 6.13 Forest covers, oil sands licence, drainage and settlements in Irele. This shows that the beginning of oil sands extraction will affect the natural distribution of forest reserve and water sources.

Considering that all the activities are at the exploratory stage, they are at the most important stage for developing meaningful relationships between the mining companies, the government and affected communities. Local populations seek to benefit from mining activities that take place in their immediate vicinity in ways that contribute to their economic development and social wellbeing. During this phase, adequate information is required on the benefits and challenges of exploiting oil sands and the impact that any displacement by way of relocation could have on their livelihood, and access to water and land. These communities look forward to being better off than they were before relocation. Thus, maintaining a mutually beneficial relationship with the communities based on transparency, respect and participation is fundamental to the long-term success of an exploration project vis-à-vis the communities realising positive socioeconomic impacts, even as revenue accrues to the government.

6.7 Conclusion

This chapter has analysed the stages of mining activities in Nigeria according to the number of licences and permits issued by the MCO. This is against the prevailing notion that the non-oil mineral is considered next to oil in revenue generation. As such, efforts have been intensified to boost solid minerals activity in the country from exploration to small-scale mining and quarrying. However, the increasing mining activity has a corresponding impact on the people and the environment.

This chapter has exhaustively shown that security of tenure is one of the decisive factors that encourage mining investment. Even if the Mining Act guarantees this tenure, the administration of the Act should be implemented fairly, transparently and efficiently. A modern mining cadastre system requires more than just the title holder or the date of grant of application. The database contained by a mining cadastre must be uniform and updated regularly. Therefore, successful management of a mining cadastre requires the development and monitoring of the work progression of the mining project life cycle. It was discovered that a situation whereby public companies are prioritised and information about them deliberately omitted results in duplication of licences and discourages investment, and as a result reduces Nigeria's investment in solid minerals.

Based on the aggressive reforms implemented by the government to revitalise the solid minerals sector, the researcher found that a number of mining companies showed interest as attested to by the mineral titles granted. A study of the mineral titles using the GIS method has identified their intensity and geographical spread. Out of these titles, exploration dominates mineral activity, followed by quarry, mining lease and small-scale mining respectively. The wider spread of exploration across all states of the federation indicates the beginning of intensive mining activities in the nearest future.

In order to understand the effects of overlapping mining licences on the built area and natural environment, analysis was undertaken by overlaying mining titles and settlements. The analysis shows that mining licences are issued in virgin lands and those inhabited by humans. Licences are found issued in local lands, farms, construction areas, water and forest reserves and protected areas. In fact, some minerals are exploited within the boundaries of communities. This is because of lack of data on these other land uses, and the absence of a mining buffer zone. In the absence of a national buffer zone, the study used insights from other countries to determine the number of settlements that are either 'within' or 'near' a mining-licenced area. Based on these findings, there is a need to focus on setting 'no go zones' and 'mining buffer zones' on the course of issuing mineral licence to people and environment from the devastating effects of mining and to ensure their sustainability. Before the commencement of the project, impact zones can also be identified, mapped and incorporated into planning so that communities know the benefits to expect basd on their level of exposure.

Around 3000 settlements with a population of around 12 million people are either affected or will be affected by mining activities in Nigeria. More than two-thirds of the settlements/communities in Irele, Ondo State lie within the oil sands blocks, and will be affected based on their proximity to resources exploitation. As the sector continues to record new licences since the issuance of licence is a daily exercise, the impacts of such effects will only increase. Due to the extent of this scale of impact, how mineral development in Nigeria can benefit these communities. If best practices are to be adopted in managing the resource impact, this research argues for investigating community cases and concerns through consultation to avoid what happened in the past, especially in the oil industry.

Overall, the analysis in the chapter has identified the settlements/communities from which certain criteria were added to select communities for an in-depth study on the impacts of oil sands production. The next section examines the communities that are likely to be affected by oil sands exploitation in Ode-Irele, Ondo State, Nigeria. The two chapters identify potential socio-economic (Chapter Seven) and environmental (Chapter Eight) impacts of oil sands projects.

CHAPTER SEVEN

OIL SANDS HOST COMMUNITIES AND POTENTIAL SOCIO-ECONOMIC IMPACTS

7.1 Introduction

One of the challenges of opening a new large-scale mining operation is to ensure that the negative impacts are mitigated such that the host communities are better advantaged by the presence of the mine. In order to address this, it is necessary to understand the character, concerns and expectations of the communities. Analysis of this type can assist in capturing local information, which can be used in facilitating the planning, operation and closure of mining activities. This is based on the assumption that planned mining activity includes some real or perceived impact on the community. In Chapter Six, the communities that are located in the mining-licenced area were identified. In fact, specifically, some 12 million Nigerians in an extensive area are potentially affected by mining. The communities situated within oil sands-delineated areas would be the most affected upon the commencement of extraction.

The perceived positive and negative impacts that are likely to affect the socio-economic life of the communities as a result of oil sands extraction are presented. First, however, a general overview is presented of the characteristics of these communities based on their geographical, historical, social and economic structures. Discussion about communities' contact with government agencies and accessibility of the communities to the outside world or major towns is also undertaken in the chapter, and the extent of community awareness of oil sands is considered. In practice, Aroca (2011) strongly claim that understanding community characteristics and perceptions of costs, benefits and needs ensures timely and smooth processes of project take-off within the bounded period of government approval (see Aroca, 2001). Ignoring these aspects can affect the extraction plan, and in extreme cases lead to failure of the project (see Regan, 1998 for detailed case study of conflict in Bougainville). The information presented has been derived from group discussions, follow-up interviews and the researcher's observations during the second stage of fieldwork from January to April 2010.

7.2 Case Study Communities: Some Baseline Factors

The remote communities in the study have very similar characteristics to those categorised by the IIED (2002) as 'indigenous mining communities' (Section 2.5), by virtue of population size, tradition, diversification of economic activities and their degree of isolation. The planned large oil sands projects cover remote areas, where they can displace or co-exist with communities that are historically under-prioritised or over-looked by development processes - a typical illustration of what conditional resource communities are. Indeed, six out of the 10 case study communities located in the demarcated areas for oil sands extraction represent some of the most socially, economically and politically marginalised populations around the oil sands belt. This is evidenced by, for example, the lack of, or diminished access to, formal political processes and decision-making structures; marketing of farm produce, and basic social services, including health and education and available infrastructure, such as electricity and tarred roads - which to a certain extent contributes to lower human development, productivity and income. Gboge community is a typical case where the distance to the nearest tarred road is about 20 kilometres and the closest health centre is about 17 kilometres away. Perhaps government's inability or unwillingness to provide them with social amenities is partly related to the uncertainty surrounding their continued existence in their present locations, when oil sands exploitation commences. For example, the absence of a health facility has led to loss of lives of women and children in particular. Based on lack of infrastructure, Gboge, Legbogbo, Ijuba-Ijuoshun and Ajagba communities envisage oil sands investment as an opportunity for development. These communities largely depend on farming as the major means of livelihood. Plantation farming, retail trade, artisans are some of the additional jobs available in Ajagba community.

Communities such as Ode-Irele, Omi and Ajagba in the oil sands belt are made up of a heterogeneous group of people containing smaller, different-interest groups. These towns constitute long-established communities with a diverse economic activity e.g. civil service, artisans, industrial works, etc ready to become home to new large-scale oil sands mines. Ode-Irele, the biggest town in the study area, comprises around 50,000 people from diverse cultural backgrounds – e.g. Yorubas, Ikales, Igbos, Itshekkiris and Ijaws. Irele is the local government headquarters and has attracted people from different parts of the state and the country at large. The people are living together without recording any major recent or historical incidence of internal conflicts involving land tenure disputes or violent confrontations, which may in the future affect negotiation process for oil sands extraction. This is also the case in the remote communities. The remote and isolated communities have fewer than 200 people sharing the same ethnicity, family history and beliefs. Therefore, each of the communities (riverine, linear, towns and remote areas) has its own specific issues and interests that can form the basis for establishing relationships with investors and government – as one size may not fit all. The following three sections contextualise historical, social and economic factors of the study area and communities.

7.2.1 Historical Factors

The communities' lifestyles and economic activities reflect their historical antecedents. Population history reflects the ancestral origins of the communities. Ijuba-Ijuoshun, Legbogbo and Gboge communities for instance are descendents of a single ancestor: inhabitants have a common ancestral origin and are not divided by differences in ethnicity or religion. However, over the years, temporary residents and farmers from neighbouring settlements have joined the communities. Living as a small group of families and clans, the remote community members arrived at a shared vision and attitude towards the development of oil sands, especially as it affects their future existence as a community – although there are some divergence in terms of expectations between the youths and the elders. However, this resolve was demonstrated during the focus group discussions where individuals participated in and contributed to the discussion. The sense of unity exhibited by remote communities can be an important factor in negotiating partnership; yet Ijuba-Ijuoshun and Gboge were neglected by government's earlier attempt at developing a consultation programme on the oil sands project. Conversely, Ode-Irele community being the local government council headquarters was consulted by various agencies of government; Ajagba and Omi were at one time informed about government plans

Community leaders in the study area are elected to the throne based on lineage, not necessarily age or affluence, and are advised by a council of elders. Mobilisation arrangements around any government or communal activity were guided to a large extent by communities' leadership – from the traditional ruler to the chiefs and elders, down to community members. This hierarchy of traditional authority is the channel of communication that has been in practice since the emergence of the communities. With the coming of mining operations, migration of people from different ethnic and historical backgrounds can give rise to divisions between original inhabitants and migrants (strangers). On whether the community is open to strangers, Oba of Omi alluded that 'his community' has the obligation to receive migrants from anywhere.

7.2.2 Social Factors

The social structure of mining communities and the different interest groups within them can affect resource development processes. The issues of ethnicity - language, family structure and gender - are important considerations when relating with these communities. While ethnicity may not be a disruptive factor in remote communities, it can have a divisive effect in the multi-ethnic ones. The division along ethnic lines can be compounded by the various ways inhabitants engage in different economic activities, and as they compete over available land and other natural resources. For example, farmers, lumber persons and fishermen in the towns, as anywhere else, compete over limited land resources. Moreover, high demand for limited land becomes problematic if communities are to be relocated (later discussed in Section 7.5.2).

Religion and language are by far the most important means through which people in the case study form an identity. According to an elderly participant from Gboge; 'you can identify us by our religion or tribe, because we are a religious community'. Two major religious practices dominate all the communities: Christianity and traditional religion. Christianity is dominant among the town population, with traditional religion predominant in the rural areas. Ancestor worship is fundamental to the existence of the communities and sanctity is attached to the shrines and groves in rural communities. The languages spoken consist of segregated dialects of Yoruba resemblance, e.g. Ikale, Ilaje, and Ijaw. The relevance of language and religion in this study is to unravel whether a part of the population's allegiance lies primarily with the traditional authority or is inclined to those tribal/religious interests outside the community. As observed, there might be a tendency for a particular religious sect in a town to follow the directives of its religious leader rather than to follow instructions from the community leader. In addition, some ethnic groups can have more sympathy for people of their own tribes than for their current place of residence.

Remote areas share common customary interests, with respect for community leaders held above any other institution. The traditional rulers themselves receive directives based on hierarchy, from Obas or Olojas. Religion is considered part of a tradition in a typical remote setting. Therefore, it is worth working more intensively to create dialogue through the community leaders in remote areas, even though the researcher is not ruling out the likelihood of factions within the remote communities. In the recent past, one of the communities not part of the case study experienced conflict with the community leader and council of elders when they failed to address the needs of their followers in the course of negotiating for bitumen exploration. The reaction of the inhabitants of that community made collective bargaining difficult and consequently the project was abandoned.

The abilities of host communities to mobilise action on oil sands extraction can be viewed from a gender perspective. This is worth considering because the researcher observed that women, particularly in Ijuba-Ijuoshun, are sensitive and passionate about the impact on their means of livelihood in the case that mining commences. The majority of women and young girls in the communities, like their male counterparts, engage in all-year-round agricultural production mainly for subsistence (see Plate 7.1). They also take part in weaving, fuel-wood gathering, tapping of rubber trees and long-distance trade to generate income for the family. However, they are restricted in their contribution to decisions made on issues that affect the community, even though they outnumber the men in some instances. The non-inclusion of women in oil sands discussions and decision-making power has significantly disempowered them.

Plate 7.1 Women returning to their communities from their farms along Irele. They are carrying fuel wood for use as sources of energy for cooking and heating. On market days, they sell food products and in return buy some household items such as food ingredients, clothing and farm implements. Source: Fieldwork (2010)

There are instances where women protest their exclusion from consultation and participation in oil resources extraction. In 2002, a community of women in Nigeria proved that a woman has the capacity to bring oil companies operating in the area to the negotiation table. The women from the oil-rich Niger Delta protested in the nude in a desperate attempt to draw attention to the years of community hardship, devastation to the environment and sources of livelihood, which affected them the most. They organised themselves across the ethnicities in the Niger Delta, barricaded the facilities and halted production of one of the oil companies, chanting solidarity songs. This action, referred to as the ‘curse of nakedness’ (Ekine, 2008), probably remains the most successful demonstration by women in their demand for participation and remediation of environmental degradation in oil extraction.

7.2.3 Economic Factors

The earlier section described some of the social characteristics of the case study area. In addition to historical and social aspects, economic factors are important in resolving the similarity or divergence of interests regarding the development of new resources. Two noticeable and important issues are identified from the case study:

a) differences in economic activities and livelihood strategies
b) the extent of economic stratification in the community.

Communities’ dependence on natural resources for their livelihood strategies has shaped their attitudes to those resources. Those in the remote areas are farmers who depend almost entirely on plantations and annual crops for food, medicine and fuel wood. The tree crops are also used as animal feed, and for building and furniture. Conversely, some people, such as shop keepers, petty traders and civil servants in towns like Ode-Irele have relatively little direct use of or dependence on plantations and crops. For example, a 65 year old palm wine tapper in Ijuba-Ijuoshun earns his living from selling palm products, e.g. palm kernel and wine; as such he would resist relocation. These various economic engagements provide an incentive to protect the available resources, and to resist any plans that would ultimately terminate this quest for survival.

People's interest in the development of new resources also varies depending on their economic activity and well-being. Considerable evidence obtained from the fieldwork suggests that people from remote areas are poorer and often depend more heavily on natural resources such as land, water and forestry to meet their subsistence needs than do those who are wealthier. Because of reliance on these resources, they have stronger opinions about the forfeiture of primary land to any destructive and invasive activity such as oil sands mining that does not directly provide for their needs.

One of the palm wine tappers in Legbogbo believes that if all trees are cut, and he is displaced, the only option left to him is death. This kind of extreme situation is less so in towns as people have the opportunity to engage in trading, artisan jobs, civil service and self employment, in addition to exploiting available land, water and forestry resources. Farming is the major occupation of the people and especially for men; but women also own and help in the farms and are engaged in petty trade. Surplus farm produce is sold by women in exchange for household consumables. Table 7.1 shows remarkably similar economic activities that both women and men in the communities engage in. However, there was no sufficient data to indicate the extent of poverty/inequality for the different communities in the table. Nonetheless, one of the ways of diversifying the already existing economies of potential resource towns is to provide infrastructure (such as water, roads and electricity) that will promote economic growth and attract manufacturing to the region (Abdel-Rahman, 2000).

In recent years tenant farmers have increasingly become a major concern to the communities, especially in the areas of perennial crops like cocoa, kola nut, palm trees and rubber plantations. Tensions may heighten at the stage of displacement or relocation and compensation for farm lands used by the tenants as oil sands development projects commence (refer to Section 7.5.2). As with gender considerations, dialogue among the various economic groups deserves attention in the oil sands planning process, otherwise this issue can be an incentive for some groups to disobey their elders and create conflict.

Table 7.1 Major socio-economic activities of the study area

Communities		**Major occupation in order of importance**	
		Men	Women
Towns	Ode-Irele	Farming, trading, artisans, civil service	Farming, trading
	Omi	Farming, fishing, lumbering	Farming, trading
	Ajagba	Farming, trading, rubber plantation work	Trading, farming, plantation work
Linear	Legbogbo	Farming, civil service, trading	Trading, artisans
	Gbeleju-Oke	Farming, hunting	Trading
	Araromi	Farming, trading	Weaving, trading
Remote	Akingboju	Farming	Farming
	Ijuba-Ijuoshun	Farming, lumbering	Farming, trading
	Gboge	Farming,	Farming
Riverine	River Ofosuohu	Fishing, farming	Farming, weaving

Source: Fieldwork (2010)

7.2.4 Communities' Contact with the Government

Findings from discussions show that communities are not informed about the current status of investments in the oil sands belt, including the very serious potential impacts. Remote communities' contact with government officials is very limited, only occurring during an election campaign. Nevertheless, the relationships between the various communities and the bitumen project officials are cordial for the most part, according to a Gboge community leader. Officials who travel to the local communities on occasional tour duty enjoy a positive reception in most cases. The researcher has enjoyed similar reception in Ode-Irele. The Bitumen Field Base Office in Ore is about 20 kilometres from Irele. The field base, now moribund, used to accommodate about 70 field staff with laboratory equipment that would facilitate field operations of bitumen. About 10 years ago, the bitumen field base office was a hive of activity, but the reality is that the office now resembles a cemetery, with the entrance gate permanently locked and structures such as laboratory equipment fallen into disrepair. As such, even if the communities require information, they have no access to a government official nearest to them who can respond to their needs. Thus communities' concerns are not given the attention they deserve, and as such they accuse government officials of being self-centred, representing the interests of government alone and unmindful of those of the communities.

> Anytime public officer comes to us, its government, government and government, what about us? They don't have the answer!
> (LG Youth2, Pers. Comm., 2010).

The lack of trust also stems from the various unfulfilled promises made by government on the exact commencement of exploitation; the closure of BPIC in 2005 made this evidently worse. *Oba* Claudius Olanrewaju-Lebi (The *Olofun* of Ode-Irele) expressed regrets: "It is a story full of disappointment and endless promises" (Pers. Comm, 2010). Driven by frustration and uncertainty, some of these communities have resolved where possible to avoid discussing issues relating to bitumen with government officials, unless otherwise authorised to do so by a higher traditional authority. A spokesperson for the Gboge community categorically stated: "…we don't want to see any government official, except if they are truly sincere and serious". In order to regain the confidence of the communities, government officials must ensure that: (1) practical structures are in place for oil sands extraction, (2) communities are consulted and engaged, (3) any development programmes and community agreement entered into must respond to the basic needs of the local people, and (4) livelihood must be sustained. Rather than engage the entire oil sands communities, selective consultation is the case. This is through the different ways government chose to relate with the communities: (1) Government limited her contact with the communities by concentrating only on the towns and their community leaders, (2) the remote communities are hardly ever contacted, (3) linear settlement makes contact with government officials on transit.

7.2.5 Accessibility within the Case Study Communities

Linear communities and towns are easily accessible by land; however, remote and riverine ones do encounter problems with access. The most difficult terrain is the coastal flats (riverine), which are only accessible by small canoes and boats that are fitted with outboard engines. Accessibility is made more difficult by the highly invasive water weeds, which form dense floating mats and underwater growth that transporters have to cut their passages through. Accessibility is problematic as most of the roads in the hinterland are in a deplorable condition that is further exacerbated by erosion. In the hinterland, accessibility is by roads (tarred and non-tarred) as well as bush tracks and footpaths (Plates 7.2, 7.4 and 7.5 for comparison).

Plate 7.2 One of the road networks in the mangrove forest leading to the remote communities. This part of the road leads to a section that is difficult to cross; the bridges are made of wood planks that are set for a vehicle to cross. This road was created by a drilling company some 15 years ago and is maintained by lumber trucks. Source: Fieldwork (2010)

Ode-Irele, Omi and Legbogbo are linked by a tarred road while linear settlements occur along the road network that stretches from Ore to Igbokoda. Non-tarred roads, such as the one in Plate 7.2 are created by timber trucks and bulldozers used for drilling access by either BPIC or past investors. Many trucks can be seen loading logs from the nearby forests for urban saw mills. Remote communities simply rely on these truckways and footpaths for mobility. On one occasion the researcher and his field assistant had to follow a path through the rainforest to the community. These roads are only accessible during the relatively drier season of the year. Some tarred and non-tarred roads lead to river channels that are without bridges, thereby posing serious hindrances to vehicular mobility. One such channel is the River Ogbese between Ogbese and Okeluse towns (not covered by the study area) - canoes are the only means of crossing during the peak of the wet season. The difficulty in accessing remote communities is affecting their well-being and access to information from the government about oil sands.

7.3 Community Awareness of Oil Sands

Since the 1990s, communities are becoming increasingly sensitive to oil sands extraction, and have tended to form a common framework within which to relate with stakeholders, through a well established system of traditional authority in which traditional rulers and chiefs, religious institutions and community groups play an important role. The traditional system of authority indicates that consultation is communally strengthened and supported by all subsystems, including religious and cultural institutions. It appears that this traditional system of authority flow is fundamental to general community awareness and partnerships. When the government was seen to be committed to developing oil sands resources from 1999, a number of pro-community NGOs and community-based organisations sensitised the host communities on the need to demand for their rights in accordance with the law. Prominent among these NGOs was the Environmental Rights Action (ERA) group, which organised a national consultation on bitumen exploration in 2003. Some of these voluntary efforts, although presently inactive, have tried to create awareness about the oil sands. The traditional rulers have expressed their apprehension about the environmental and social outcome of bitumen activities at various forums. Just as the contention and excitement was rising about oil sands extraction, the BPIC was dissolved in 2005. The dissolution contradicted government promises in the past that the project had come to stay. So, this implies that initially communities welcomed this type of project – but now attitudes have changed. Angered by this development, the traditional rulers have since been demanding explanations from the government as to why the aspirations of the people were abandoned.

Some of the traditional rulers are well informed about the possible gains and costs of bitumen extraction in their locality as indicated during the community leaders' interviews. As sources of information to their people, it would be expected that awareness about bitumen has reached the most remote community in the state. Sadly, this is not often the case; for instance, Legbogbo community youth leader knows bitumen, but only by its physical appearance. This therefore indicates that the level of literacy of a particular community leader to an extent limits his understanding of bitumen, and subsequently his ability to transmit information about bitumen to his people. As an example, the *Olofun* of Ode-Irele, HRH *Oba* Claudius Olanrewaju-Lebi was educated to postgraduate level in the United Kingdom, worked, and relocated to Canada and the United States, before retiring home to become a traditional chief. He is using his understanding of oil sands extraction in Canada to advocate for the adoption of best practices for his communities. He is at the same time pursuing the government to develop the resources because of the negative impacts being experienced, particularly in areas where subsurface bitumen oozes out from beneath the earth.

In one of the focus groups, the chiefs narrated their struggle with government regarding the welfare of their people and environmental protection. For example, the government has confirmed its commitment to resettle communities that may be affected by extraction since the 1990s. While participants from Ajagba, Ode-Irele and Omi are aware of that the exploitation of oil sands can lead to the provision of infrastructure and more jobs, participants from Ijuba-Ijuoshun, Legbogbo, Gbeleju-Oke, Akingboju and Ofuoshun only know oil sands by its physical appearance and its effect on their lands. Youth groups in Legbogbo have very limited understanding of the potentials of the resources in their locality, and as such they are restricted in how they express the view of the community. As an exception, one of the rural communities (not covered by the fieldwork) has engaged a lawyer to document their concerns. Typical comments regarding awareness of oil sands in the communities are as follows:

> I know tar sands very well in Canada. It has affected so many communities in Edmonton and has led to fast development of the area. I have interacted with investors and hope my kingdom looks like Edmonton when extraction finally starts (HRH *Oba* Claudius Olanrewaju-Lebi, Pers. Comm., 2010).
>
> When JEREZ came from Canada they did drilling for testing. Before the drilling, no one came to us directly, they went through someone who came and dictated to us (Gboge community elder, Pers. Comm., 2010).
>
> We see it on our farms but we don't know what to do with it and how it will affect us. When they were doing the borehole, bitumen came out and disturbed them from drilling. So they went away and we don't have water from borehole again (Youth group, Legbogbo, Pers. Comm., 2010).

One of the reasons why information was concentrated at the top hierarchy of traditional authority was because civil societies (NGOs) and community-based organisations

(CBOs) are not narrowing the gap in disseminating knowledge to the local communities. It appears that the communities do not know the extent of the impact of oil sands extraction. As a result, with limited understanding, the people have perceived the planned projects with mixed feelings, even in their desperate need for development: Legbogbo wanted water, Gboge wants hospital, Ijuba-Ijuoshun is in need of schools, Ajagbaand Omi wants job opportunities etc. These perceptions are discussed in Sections 7.4 and 7.5. Understanding community perceptions and expectations is vital in addressing problems of confrontation, dependence or isolation to positions of mutual agreement and interdependence regime that would sustain benefits and mitigate costs.

7.4 Socio-economic Impacts: Perceptions of Benefits and Problems

The communities' perceptions of socio-economic and environmental problems and their expectations have strongly influenced their receptiveness and attitudes to governance of oil sands. In each group session, the communities identified a number of factors they perceived beneficial and the problems they believed would emerge as a result of the project. The perceptions collated from community leaders, youths and women tended to be mutually reinforcing; the communities identified what they perceived were the positives and negatives about the impacts of oil sands extraction. Loss of land for agricultural purposes, the fear of displacement, rising costs of living and crime were generally considered negative, while the provision of infrastructure for health and education, business opportunities, increased personal income and job creation were considered positive. However, there is variance in priorities set by communities as to potential benefits and costs. The following are what communities believed would improve their individual quality of lives and enhance the local economy.

7.4.1 Provision and Improvement of Infrastructure and Social Amenities

The availability of basic amenities and infrastructure in a community would add value and support the community's need for social interaction, as well as contribute to the physical well-being and material comfort of local people. The major infrastructure facilities in this regard are roads, electricity, education, health, pipe-borne water and recreation facilities. However, variation in the provision of infrastructure among the communities is noticeable. Those located on the tarred roads (Omi, Ajagba, Irele) have at least some basic form of infrastructure and social services, while remote communities lack any of these. Primary schools are the common facility available to every community except Ijuba-Ijuoshun; the facilities that were not available in most of the communities were tertiary institutions and community halls. Pipe-borne water, fire services, recreational media and hospitals are the facilities that are not commonly available. Table 7.2 shows the available infrastructure and basic social amenities in the study area. Based on the table, Ijuba-Ijuoshun is the most impoverished community.

In education for example the local council headquarters and two other settlements (Omi and Ajagba) have education facilities with a range of nursery, primary and secondary schools run by the government and private individuals. Schools in these communities more often than not have a shortage of teachers and lack instructional materials such as chairs and books, apart from being too small for the growing population of school-going children. Perceptions of the provision of health care facilities to the communities appeared to reflect the current non-availability of health facilities, particularly in remote areas. Health facilities such as hospitals, dispensaries and health centres are not widely dispersed. Medical health centres are found in the towns with specialist hospitals found only in Akure. Worse still, primary health care centres that cater for maternal and child health and minor illnesses are not accessible and affordable to the people in remote communities as they have to travel long distances to access one.

> Last year we lost women during birth because of labour complications that our traditional birth attendant is unable to handle. During the over 10 kilometre journey they gave up the ghost
> (Gboge Community Elder C, Pers. Comm., 2010).

The communities not connected to an electricity supply are upset that they have been left out. Youths in Legbogbo were aggrieved that their community is not being considered for the provision of electricity even though high tension electric cables have passed through the village to supply power to towns like Ode-Irele. "Look up and see the electric cable, but for them (referring to government) to provide step down and a transformer for us to enjoy light...*na wahala* (difficult to actualise)" (Pers. Comm., 2010). As an exception, Ijuba-Ijuoshun community contributed money and installed a power generator for the village and the villagers also help with fuelling and servicing the generator. One of the community elders elucidates:

> This is the only way the community can have access to electricity, because government has failed. After farm work, the generator works for few hours at night for us to rest and listen to radio before we sleep. In your (researcher) presence we put on the generator so that the discussions can be smooth; otherwise all of us will be miserable
> (IJ Chief, Pers. Comm., 2010).

All communities recognised that the failure of government to provide amenities was purely a political issue, and a lack of concern for the rural people. Therefore, they (the communities) anticipate with enthusiasm that the coming of bitumen can at least provide some basic infrastructural facilities. Communities recalled that the free and compulsory basic education policy has motivated them to send their children to school; but the increasing number of children has put added pressure on the already insufficient and dilapidated school infrastructure (Plate 7.3). Therefore, participants in all the communities believe strongly that bitumen corporate responsibility will have a very positive impact on the quality of education children are receiving by employing more teachers, together with providing up to date instructional materials and books. As already stated in Section 4.3.1., the new mining law requires that before the commencement of mining in any community, there should be a Community Development Agreement (CDA) between the host community and the mining company. Some of the benefits derivable from CDA community include the provision of infrastructure and social amenities such as schools and hospitals, water and roads.

Plate 7.3 The only existing primary and junior secondary school in Gbeleju. The primary school is over 50 years. There are no adequate chairs and other teaching aids; in fact pupils come with their chairs and desks from home. Source: Fieldwork (2010)

These findings about perceived infrastructure benefits to host communities support the argument by Bridge (2004) that new mining communities are potential beneficiaries of a wide range of new social services, as well as access to better education, health and water. However, these benefits that will improve quality of life have to date typically been not realised in the Nigerian oil communities (e.g. Oloibiri from Watts, 2008) and their solid minerals counterpart (e.g. Azara from Channda et al., 2010).

Table 7.2 Availability of infrastructure in the case study

Basic Amenities/ Infrastructure	Communities/Settlements									
	Ode-Irele	Omi	Ajagba	Legbogbo	Gboge	Ijuba-Ijuoshun	Akingboju	River Ofosuohu	Gbeleju Oke	Araromi
Electricity				x	x	x		x	x	
Hospital		x	x	x	x	x	x	x	x	x
Market				x	x	x		x	x	
Health centre				x	x	x		x	x	
Primary school						x		x		
Secondary school		x	x	x	x	x	x	x	x	
Tertiary institution	x	x	x	x	x	x	x	x	x	x
Police post			x	x	x	x	x	x	x	
Mobile telephone service				-	x	-	-	x	x	
Fire service	x	x	x	x	x	x	x	x	x	x
Banking service		x	x	x	x	x	x	x	x	x
Tarred road				x	x	x	x	x	x	
Piped water				x	x	x	x	x	x	
Borehole water				x	x	x	x	x	x	-
Community halls		x	x	x	x	x	x	x	x	-
Recreational facilities (such as parks and stadia)	x	x	x	x	x	x	x	x	x	x

Source: Fieldwork (2010)

Key

x = Not available √ = Available - = No information

7.4.2 Enhancement and Prosperity of Businesses

The communities believe that all the phases of oil sands mining can boost economic activity and create opportunities. Business enterprises, such as banks and mining equipment sellers opened up offices in Akure, the state capital, in anticipation of increased economic activities when pronouncement was made by government at the ground breaking ceremony in 2003. Unfortunately, the companies had to close down because of lack of activity. Despite this initial disappointment, the contribution of mining oil sands to the rise of businesses was viewed positively in all the local communities. Focus group participants were of the opinion that oil sands extraction would create an avenue for petty trading of agricultural products and increase local business opportunities for artisans and traders of non-farm products to a greater extent. The economic potentials of remote communities would also manifest when agreements are made on establishing small firms that would provide services to the companies.

The arrival of people in search of jobs would certainly increase demand for food and other goods, thus increasing pressure on the local people to produce more food crops to sell. Food production might be limited by the amount of land that would be relinquished to oil sands. Local stores would supply easily accessible daily consumables/necessities; as a woman interested in trade stated:

> If bitumen starts, I can sell my farm to open a store so that my people and everybody can come and buy from me without waiting for days to travel to Ode-Irele or Ore town to buy them
> (IJ Woman2, Pers. Comm., 2010).

A local store provides employment opportunities and availability of consumables on the doorstep of communities for convenient purchase without having to make the long journey to Ode-Irele. Ijuba-Ijuoshun and Gboge do not have local stores, but items are usually found sold in a tray or on a table in front of a house (Plate 7.4).

Plate 7.4 A typical settlement in a remote community. In front of the house one can spot the only petty shop (local store) for the sale of food ingredients in the community. Source: Fieldwork (2010)

Plate 7.5 Settlements along the main road to Ode-Irele. The community looks deserted because the majority of the occupants are working on the farms. The sachet water on sale is considered 'luxury' and not affordable to all. Source: Fieldwork (2010)

There was general consensus among communities that apart from local shops and petty trade opportunities, contractors and construction companies working for the company will establish a base in their localities. The community leaders opine that the supply of equipments and construction materials would open new markets and labour in the project area. There will be demand for more local manufacturing of cutlasses by artisans because of an increase in demand for cutlasses for use in cutting/clearing trees: "...even our blacksmiths can be able to produce more cutlasses, so that people can buy, and use it to cut grass for the oil sands companies" (Youth, Pers. Comm., 2010). A different argument concerned the sustainability of businesses after mine closure, when compared to the conditions surrounding traditional farming. The arguments by youth participants pointed to the fact that the community has to engage in other economic activities rather than completely depending on farming. They have come to the conclusion that, at present, farming is aging; and that people continue to farm because of the lack of other opportunities. On sustaining businesses after mine operations ceased, a central opinion is that saved income gathered from mine related businesses can be used to start another business, such as consumables.

> Bitumen can never finish in my lifetime...If it does finish, I will use my savings to start another business like selling modern farm implements or consumable goods to that sustain me and my family. You know people will go back to farm and there will be demand for them (LG Youth3, Pers. Comm., 2010).

The above quote is an indication that the respondent does not have a clue on the invasive nature of oil sands operation. By the time surface mining is commissioned, there may no land left in the surrounding area that will be suitable for farming.

The riverside communities are optimistic that oil sands extraction would offer the chance for fish markets to expand: "…when bitumen come I go sell fish well-well because company people go buy am" - meaning: with bitumen extraction, my fish market would significantly expand with rising demand from company employees. Fresh, smoked and fried fish will be prepared and sold to both miners and locals for consumption as a source of protein. If the fish market was boosted, local boat manufacturers would construct more boats for fishing, thus expanding their businesses. Ode-Irele expects industrialisation and improvement of commercial activities of the community, since it is likely to be the occupational community of oil sands operations. However, Auty (2006:136) argued that prosperity such as domestic expenditure from mining employment stimulates little economic activity – the level of which falls well below communities' expectations. Furthermore, a community's ability to capture some or more of these benefits is dependent on the three factors outlined by Ritter (2000:5).

7.4.3 Job Opportunities

The traditional economic base in the case study, as with any other rural economy, is agriculture. Men and women of all ages are engaged in direct farming using local tools. In nearly all the communities, a large number of people are engaged in farming as their livelihood. Riverine areas engage in both fishing and farming. At Ode-Irele, Omi and Ajagba, a part of the young population earns a living by engaging in commercial motorcycle business (commonly referred to *Okada*), transporting people and goods to and from the remote areas. The rural communities also engage in multiple jobs; a farmer is able to grow crops and harvest fruits and tap palm wine concurrently. This might be a result of the limited land available to the growing population for full-scale farming, and who have to share what communal land there is available.

The local people believe that an investment in bitumen extraction would provide opportunity for employment in non-farm activity and encourage local economic growth.

Employment by an oil sands company allows individuals to take care of themselves; it can also:

> ...provide the money that will use to care for our families. For now, there is nothing to do apart from farming, and one cannot go out of the village to look for other jobs because of limited education. So if employed even as labourers it is better [than nothing]
> (LG Youth Leader, Pers. Comm., 2010).

Besides, being employed allows employees to buy whatever they need: "If employed I will be able to buy the things that I need such as clothes; a house; a hunting gun and more wives" (Pers. Comm., 2010). New oil sands operations are expected to create local and regional jobs. The local communities anticipated direct employment with bitumen extraction companies and considerable indirect employment with contractors and servicing companies.

This study uses information from Fort McMurray in Alberta as a model to verify anticipations for job availability. Fort McMurray is located near the Athabasca oil sands in Alberta region. The city is a diverse and multicultural community, with about 73,000 people who are indigenous and the remainder from other parts of Canada and beyond. The Athabasca oil sands produces about 760,000 barrels of oil per day (Government of Alberta, 2011) and employed about 15,000 people in 2008 excluding those employed for short-term construction and facilities maintenance purposes (The Oil sands Development Group, 2009). Thus about 20 per cent of the population are engaged in the extractive economy. By comparing the production and employment figures, at least 50-70 people are required to produce 1000 barrels per day. Taking the study area into context, one open-cast oil sands mine that can produce about 50,000 barrels of synthetic crude will require at least 5000 employees. This is about four per cent of the total population of 145,000 inhabitants in Irele local government. This figure is almost five times more than the total population of the communities visited.

The construction phase that follows exploration involves many activities, which require both skilled and un-skilled labour in which the local population can be engaged on a short-term basis considering their low level of education. The demand for unskilled labour creates opportunity for local people to work, and improve their skills and income, which would lead to a rising standard of living. As the company progresses to production, long-term contracts require mainly skilled and semi-skilled workers; thus limiting the chances of local labour supply. One of the ways to maximise opportunities for local employment of any mining project is to build human capital with preference given to the host communities. Direct education and training (ranging from apprenticeship to university scholarship) based on areas consistent with the needs of the company can be given to community members to take on skilled employment, especially as the projects may span decades.

The Nigerian Local Content Act operational in the oil sector can be adopted to govern requirements for skills development and local workforce quota at the junior cadre (NCDA, 2010). As the vast oil sands reserves are being exploited by different companies, the number of employees is expected to be much higher, which would place additional pressures on existing infrastructure and other resources (Auty, 2006:138). The concern is: will investment be made to provide adequate infrastructure to be able to cope with the growing population and who would provide them? It is expected that these issues are being taken into account and agreed upon by the federal government, communities and the investors through streamlining roles and responsibilities in the provision of infrastructure.

In terms of preference, youths would prefer jobs with mining companies, rather than urban or government jobs. Government jobs were considered low paid especially for unskilled workers, and a minimum educational qualification is required, which the locals do not have. In their opinion, the Bitumen Company pays several times the amount paid in government employment, and employs unskilled labour. However, this perception becomes difficult to substantiate, in view of the fact that oil sands employment is yet to begin. Anticipation was largely based on the welfare packages and remuneration of various oil companies operating in the Niger Delta. Oil sands activities can have a positive multiplier effect through indirect employment in other sectors such as manufacturing and retail businesses within and outside the host communities, as in the case of indirect mining employment in South Africa. HRH *Oba* Adesayo of Ajagba land affirms: "...bitumen development comes with benefits especially employment of our youths and even outsiders though they are not educated" (Pers. Comm., 2010).

The possibility of job opportunities extends to other areas of the country. For example, people would move from areas where employment is scarce to bitumen areas in order to secure jobs and directly participate in the bitumen development process. The salaries and wages earned will often sustain extended family members who have stayed behind. These assertions concur with Auty's (2006:136) assertion that even as mining employs a limited number of people, they are relatively well paid. The desire of local youth for employment and related economic advantages supports their receptiveness to the oil sands project despite the very real threat of environmental degradation.

The communities are yet to realise that the demand and supply for labour in oil sands mining is dependent on the commodity ‘boom’ and ‘bust’ cycle. Perhaps they have indirectly experienced the bust cycle, which has affected investment in the bitumen projects. As identified by Freudenberg (1992) in the literature review, the ‘boom’ cycle comes with rising commodity prices that result in the search for new projects and/or expansions of existing ones. The outcome is often a scarcity of labour - which then makes room for the employment of local labour. In contrast, a ‘bust’ period is accompanied by decreased commodity prices, unmet production costs and job losses where the local unskilled labour is most affected. Indeed, mining communities that have abandoned their primary economic activity to mining are left with hardly any other alternative employment opportunities, and suffer economic and social upheavals.

7.4.4 Poverty Alleviation and Increased Personal Income

On one hand, mining can reduce poverty within host communities through job opportunities and through creating opportunities for business growth – all of which form the communities’ positive perceptions. Out of these poverty reduction routes, Ritter (2000) considers employment creation and income generation as having the most important direct impact at the local level. Indirectly, mining contributes to poverty alleviation through investments in social services and catalysing improvements in physical infrastructure such as clean water, transport, energy, health and education. On the other hand, mining can also be a cause of poverty. The sudden closure of mine and cessation of mining, as in the case of some settlements in Jos led to sudden end of the economic opportunities it has created and increased local poverty levels severely (Dung-Gwom, 2007; Gyang and Ashano, 2009). Loss of land and displacement, pollution of water sources and destruction of ecosystems are issues that can cause tension and conflict, and adversely affect food security, health and well-being and means of livelihood of communities in similar manner to the experience of Jos, if no appropriate precautions are taken by all the stakeholders, principally government and the company (see Section 7.5).

An investigation using the focus groups to determine the income characteristics was particularly difficult as participants have no full understanding of their monetary earnings from farm products. Generally, records of income from the sale of farm produce are not kept and the participants had to struggle with their memories to estimate the income earned. The figures quoted in the three remote communities are generally less than the ₦7, 500 (US$50) per calendar month minimum wage in Ondo State, far short of the national minimum wage of ₦18, 000 (US$120) per month, and less than the one dollar (equals 150 Nigerian Naira) per day benchmark of reducing poverty and hunger stipulated by the Millennium Development Goal I. As a result, the average local person is not able to afford some basic life necessities such as clothing and shelter. Personal income from other communities is not significantly different, ranging from N7, 000 – N10, 000 per month.

The income from oil sands employment or businesses will be spent on buying goods and services produced by the same local people, which in turn would boost the income of the people in the community. Incomes also provide additional incentive for being able to fund funerals and weddings events, as individuals or as a community:

> It will bring the money that people can use to take care of their families much better - buy cloth and send them to schools; otherwise with poverty one will be unable to marry (Laughed). The remaining money can be used to help our community to buy like tractor or modern farm equipments for our own good
> (IJ Youth9, Pers. Comm., 2010).

Increased income to members of the community would promote collaboration for community development. In the past, the Gboge community struggled through communal efforts to raise money to repair the roof of a primary schools damaged by the helicopter of a former Canadian bitumen company (JEREZ). Yet the community presented such a positive view of mining because they are in need of development in the form of social infrastructure and amenities. The uncertain nature of local earnings makes it impossible to set a fixed amount of money as monthly contribution for the execution of communal projects, such as drilling a well for water supply during the dry season. Youths in Legbogbo indicated that even though agriculture accounts for nearly the total income of a particular individual or household, the selling of food crops and menial businesses can complement income from farm activities. Here are the communities' socio-economic fears about oil sands mining.

7.5 Perceived Socio-economic Problems

The planned surface extraction of oil sands would require stripping the overburden to access the resources. Thus the impact on the surface would be more visible for the duration of the extraction project, affecting humans, animals and plants in the entire area of production and in adjacent communities. For example, 4,750 square kilometres of land is forfeited to surface mining of oil sands in the Athabasca Region (ERCB, 2009a). The extraction and production of Nigerian oil sands have some negative impacts (such as Adebiyi et al., 2006; 2008) that will take similar pattern. When the belt was delineated into six blocks, they occupy a total area of 4,103.91 square kilometres (Ayoade, 2007). Thus, the negative socio-economic perception of communities that are potentially threatened by large-scale oil sands operations is documented in this section.

Local communities agreed that just as mining could bring a number of positive benefits, adverse impacts on their social and economic setting will no doubt be felt. Numerous problems that would affect the individual, family and community are therefore envisaged if an oil sands project comes into being. Some of these problems are already experienced in some of the communities. When the government pronounced the commencement of oil sands extraction, the associated challenges were easy to identify. Both towns and remote residents faced the clearance of forest and farm-lands for movement of heavy duty machines on already dilapidated roads and pathways:

> I will talk about what bitumen has started doing to us. Bitumen comes with problems. First of all it affects our plantation and the contractor has damaged our road and rain is washing away everything
> (Pers. Comm., 2010).

When asked about the anticipated negative side of oil sands extraction, the most emphasised socio-economic problems and concerns to all the communities are gathered together in order of sensitivity and discussed in the following sub-sections. Indeed, the general consensus among communities is that every development activity, not just oil sands, could result in some undesirable conditions.

7.5.1 Loss of Communal and Agriculture Land

As noted in Chapter Five, oil sands extraction may involve the appropriation of at least 100 square kilometres area of land, and displacement of communities within the mining licence area when in fact, local people depend on the land as a major source of food and income. In reality, the communities with past experience of bitumen exploration are facing increasingly limited access to farmland. The proven reserve of natural bitumen on a seven square kilometre area of Agbabu is about 1.1 billion barrels of oil. The land where oil-impregnated sands occur is gradually degrading farmlands. Bitumen extraction in this area is not yet operational, but the start of full operations would depopulate the present 400 inhabitants and the surrounding smaller farm settlements such as Temidire village. This was confirmed by the researcher during his visit to Agbabu area, where the natural outflow of bitumen through platform seepage has affected large areas of farming land and ecosystems. While it is important to understand the extent of land that has been affected by the oozing of natural bitumen to the surface and how it degrades farmlands, such study has yet been undertaken in the past. Nonetheless, the researcher's observation captured in Plate 7.6 indicates the gradual outflow of natural bitumen and discharge to the adjoining water sources. If people are already effectively being prevented from using land by seepages/pollution, the development of oil sands will make it even worse.

Plate 7.6 One of the locations in Agbabu where highly viscous natural bitumen comes out to the surface through any fault plain or through seepage. Source: Fieldwork (2010)

As indicated in Table 7.1, the larger population of the communities, whether linear, remote, riverine or town dwellers are peasant farmers subsisting on agricultural products. The long-term implications of loss of land for the individuals, family and community put them at an immediate disadvantage of having to face food insecurity, increased poverty and degradation of environmental resources. Community leaders are worried that loss of land would severely impact on the people. Chief Bayo Ogunje queried the sincerity of government in promising compensation, citing instances where communities were short changed and left in limbo:

> "If agricultural land that contributes immensely to the economic well-being of our people is taken, what is the guarantee compensation will be given at all and will it equal farming?" (Pers. Comm., 2010).

The allocation of land to individuals and organisations for residential, agriculture and commercial purposes is guided by the 1979 Land Use Act already referred to in Section 4.6. By this law, communal land can be transferred or forfeited based on 'public interest' to another body for commercial development; in this case, mining. In the last decade, the Nigerian government started to amend mineral policies to stimulate investment in the mining sector. The transfer of land for mineral operations can be appropriated for use by foreign and local mining companies with the Land Use Act. This Act placed more interest on the extractive industries and the treasury, and limits local communities to compensation for the value of the revoked land.

The 1979 Land Use Act has transferred the payment and entitlement of compensation on the forfeiture of land for the purpose of mineral or oil use to the relevant Mineral or Mineral Oil Acts: "...the holder and the occupier shall be entitled to compensation under the appropriate provisions of the Minerals Act or the Mineral Oils Act or any legislation replacing the same" (Land Use Act, 1979:29:2). The communities that occupy the land where the licence was issued are compensated based on the asset value of the existing surface goods that would be lost. These surface goods which at the time of writing had not been estimated or valued include buildings (houses), annual and perennial crops, economic trees and plantations, and fishing grounds. However, the long-term implications of the loss of access to these livelihood resources are not considered in the formula used in working out the compensation. Thus, community leaders alleged that the Land Use Act and other legal provisions of mineral ownership have completely relegated them from participation in the governance of oil sands, and that they are left to bear the consequences. Moreover, law courts are prohibited from attending to litigations arising from adequacy of compensation paid to people who have lost access to their land due to mineral extraction: “No court shall have jurisdiction to inquire into any question concerning or pertaining to the amount or adequacy of any compensation paid or to be paid under this Act” (Clause 47(2), Landuse Act 1979). Given that the land in the linear and remote communities are communal and hence any compensation would be made to the ‘community’ rather than an individual, guidance as to how this should be allocated within the community is contained in the Revised Draft of the Nigerian Minerals and Mining Regulations (2010:18-19).

Based on the above provision, Ajagba and Ijuba-Ijuoshun communities made reference to the difficulties faced by oil communities in Niger Delta on how the non-availability of land has resulted in mass migration to neighbouring Ondo State. For example, the Itshekiris residing in Ijuba-Ijuoshun left their original villages because their land was appropriated for oil exploitation. Catalogues of references exist on how oil production exacerbated the poverty of the oil-producing communities. In developing the Nigerian petroleum sector, the clear objective was to generate national revenue, and the gathering of information to understand potential and actual poverty-related impacts of the industry to the communities was relegated to the background. Given this track record, and with emphasis of developing oil sands to complement oil revenue as against development in its entirety, it is possible that the same scenario could replicate the oil sands sector.

7.5.2 Possible Displacement, Resettlement and Compensation

Oil sands extraction, like any other mining activity, requires excavation over a large area of land, causing significant changes to the landscape and affecting agricultural soils, and the related intense activity leads to the displacement of land inhabited by local people. No doubt, the communities in the study are lying right in the middle of bitumen-demarcated areas; as such, most are likely to be displaced upon the commencement of operations. The communities and number of people who face displacement has being indicated in Chapter Five. In fact, Gboge community is aware of the relocation plans by one of the drilling companies that visited the community in the past: "they will move us away from here; they have been saying it that, they will move people away from here" (Pers. Comm., 2010). Similarly, Gboge, Ijuba-Ijuoshun, Gbaoge, and Gbeleju-Oke are among those communities likely to be relocated. Based on the results presented in Section 6.6, oil sands operation is invasive and likely to depopulate the entire study area with the exception of Ode-Irele because of its constitutional role as a council headquarter.

Opinions vary on the willingness of communities to be displaced and resettled. Community leaders are willing to assist in the relocation of people if absolutely necessary, but on the condition that: relocation should respect the rights of the communities and should follow proper procedures, not in an exploitative manner as was the case in the Niger Delta when oil drilling started. The communities should consent to, and be fully informed about any planned relocation. The women's group in Ijuba-

Ijuoshun vehemently objected to the idea of relocation, arguing: “what happens if farms and crops are all destroyed and the new land given to us is not as productive and as vast as the former land? ” The issue of adequacy of compensation remains pressing. Even if the Land Use Act is to be implemented, women still regard the short- to long-term statutory levels of compensation as grossly inadequate. The following is an excerpt of the arguments:

> IJ Woman5: What are we going to be eating, if they compensate, will they give food?
>
> IJ Woman4: Will the compensation be forever?
>
> IJ Woman3: No, I think it is one-off. The compensation will be like what they are paying in Warri (referring to an oil city in the Delta).
>
> IJ Woman7: If we are displaced, they must guarantee our food same as we eat till the time we are able to grow our own food in the new place, otherwise it will be difficult to just drive us away.
>
> IJ Woman8: That is right. Anybody that wants to use our land should give us what will benefit us up till our unborn children.
>
> (Pers. Comm., 2010).

The concerns of the women are based on their role in the society and the fear of a sustained alternative livelihood when relocated. There are documented evidences of problems arising from the relocation of oil communities in Nigeria and elsewhere. For example, the promulgation of legislations such as Land Use Act has led to landlessness either by voluntary or forced displacement of people close to oil operations, whose basic sustenance as peasant farmers and fishermen has been negatively affected as a result of oil extraction (Celestine, 2003). The relocation of people by Bulyanhulu mine in Tanzania led to the complete loss of livelihoods and the standards of living has fallen sharply because the compensation only covered short-term subsistence (Hyndmann, 2001). Despite supporting the arguments raised by the women, members of the community would still accept relocation provided that suitable and acceptable compensation is given. In line with Ijuba-Ijuoshun's community leader's point of view, compensation should be for the development of the community. The River Ifuoshun community fears that inadequate compensation signifies taking away their means of subsistence (fishing) and being left in a state of uncertainty and loss. Gbeleju-oke would resist land acquisition without fair compensation. To be fair means to pay adequately, even at a loss. The Omi community leader is indifferent.

Compensation for land is predominantly a contentious issue for local communities. Some landowners fear that the application of the 1979 Land Use Act in the compensation process will cause conflict because land owners will lose out whereas tenants will receive compensation. Landowners argue that compensation packages that give consideration to tenant farmers to the exclusion of the land owners can result in even more disputes. Therefore, there could be serious conflict between landlords and tenant farmers with respect to crops versus land compensation. Section 107, subsections (a-b) of the Mineral Act stipulates that compensation is to be paid by the mineral investor, thus placing the investor in a tenuous position as often, when commitments failed or communities felt unfairly treated, conflict ensued. The use of the surface rights rather than the physical value of land was emphasised as part of the conditions for compensation entitlements:

> 107 (a) reasonable compensation for any disturbance of the surface rights of the owner or occupier and any damage to the surface of the land on which the exploration or mining, is being or has been carried; and
>
> 107 (b) in addition pay to the owner of any crop, economic tree, building or work damaged, removed or destroyed by the holder of the mining title or by any of its agents servants, compensation for the damage, removal or destruction of the crop, economic tree, building or work.
>
> (Mining Act 2007:38).

The Mining and Land Use Acts have undermined communities' security of tenure, and may allow prospective oil sands investors to operate with little consideration for the impacts of their activities on the livelihood of surrounding communities, also contravening global environmental standards at the same time. The result is conflict over the control and ownership of land as a means of livelihood to the communities and the oil sands operators who depend on the resource beneath the land (see Frynas, 2000 for details on conflict for land in the Niger Delta). Furthermore, a much more coherent interface between corporate social responsibility and national legislation is required. It is documented that large-scale international mining corporations are some of the bidders for the oil sands blocks; if so, the minimum national legal requirement may not be enough for their operation. Based on the corporations' reputation, they may choose to adopt international and global best practices to develop a comprehensive relocation or compensation plan for the development of oil sands. If this is a welcome development, then the gap between local and international legislation must be bridged considering that relocation and compensation is dealing with extreme form of extraction.

For as long as these constitutional powers remain and compensation is not adequately paid to commensurate the long-term loss of those that would be affected in the exploitation of oil sands, conflict for land possession is imminent. Therefore, the land owner should be compensated for the value of the land while the financial worth of the properties or crops/plantation which exists on the land goes to the tenant in cases of land lease, based on the prevailing market value. Adequate compensation can be achieved by surveying and documentation of genuine land owners; however, caution must be taken in the case of land speculators that have started making false claims by carrying out their own surveys in secret, including quietly surveying lands belonging to other people.

The communities are also concerned about the effects of the destruction of their protected areas, particularly places of worship and ancestral homes of their deities. [Accordingly, such ancestral homes not only serve as places of worship, but bring about social cohesion and serve as recreational spots for yearly events such as the yam festival – an annual celebration to mark the end of a farming season, which socially and spiritually unites the communities. Relocation was heavily contested in remote areas that indulge in traditional worship – due to the ancestral value vested in the land. The central opinion was that relocation would be a difficult decision and that it can be sorted only when real investors arrive.

7.5.3 Proliferation of Social Vices, Crime and Violence

Local communities are able to stay safe from armed bandits and robbers on the grounds that *vigilante* groups (voluntary local law enforcers, made up of mainly hunters) and deities safeguard life and property especially in the absence of state law enforcement officers; for instance the police. The fear for the proliferation of crime as migrants from various social backgrounds arrive to participate in bitumen operations was a source of worry to Omi and Ajagba. In such instances there is little the *vigilante* can do to maintain law and order, hence the need for local police. Remote communities use their traditional justice system to decide about civil cases and deliver appropriate punishment based on customs for minor offences; serious cases such as murder are referred to the police and local authority by the committee of elders. The problem is the willingness of a migrant to be punished under the customary tenet of the host communities.

Based on group responses, the opening of bitumen mining can result in some anti-social activities that are intolerable to the communities. The influx of foreign and non-local migrants to the communities brings banditry, alters local lifestyle, and increases competition for existing natural resources. The Omi community leaders have observed that the community is relatively safe from robbery at present, but are worried that mining comes with the threat of petty theft, and assault on mine workers and the local people. Despite the fact that traditional rulers have very limited control over migrants, they are nonetheless unwilling to condone any act of abomination or sacrilege within the community. However, participants from Ode-Irele believed:

> There is no place without vices...the community will require more law enforcement agents to do their job because the state is in charge of security (OI Elder1, Pers. Comm., 2010).

To buttress this view, Gibson and Klinck's (2005) study of indigenous communities in Canada indicates that income earned from oil sands employment has also led to detrimental negative social impacts such as alcoholism and drug abuse. Ijuba-Ijuoshun, Legbogbo and Araromi communities, however, hold the conviction that any violent crime is likely to be committed by an outsider, and not by a member of the communities. These communities defer to a deity that serves as an agent of control, and which possesses powers to punish offenders and criminals. Participants from these communities share similar opinions that crimes such as robbery and prostitution are disgraceful and shameful acts; the humiliation can pass down through the unborn generations of the offender.

The fear of women regarding promiscuity in the mining industry was a source of concern. Concern was born out of the stories heard about how young females attract male oil workers. Migration of young ladies in search of men rather than jobs increases prostitution and the spread of sexually transmitted diseases. This happens especially when jobs separate men from their families for an extensive period of time.

> As men stay away for a long period (weeks to months, depending on on-off shift) without us (wives), uncontrolled desires push for temptation to have a mistress (IJ Woman4, Pers. Comm., 2010).

The implication is that venereal diseases and HIV/AIDS can be contracted through extra-marital affairs and spread to the wives and possibly any unborn child. Separation from the family was seen as less of a problem to the youths from Legbogbo because mine employees could spend their off-period at home with the family. As such, the issues raised regarding the repercussion of unfaithfulness would be minimised.

7.6 Conclusion

This chapter has provided examples of communities in the case study area and has sought to explain their peculiar characteristics. Considerable effort was made to analyse these characteristics because communities are complex and dynamic in space and time. How the local situations of the communities shape their thinking and perceptions of mining, with often more emphasis on infrastructure and loss of farmlands, was described. In Nigeria, the provision of infrastructure to remote mining communities by mining companies has a significant effect on local economic growth and performance. The results of this analysis have shown that perceptions about the social and economic aspects of opening a new oil sands extraction provides a foundation from which to consider how a mining project impacts a community. Hence, the role of the three major mining stakeholders, the government, the company, and the communities involved, is to ensure that dialogue is maintained in the design and implementation of development plans and processes that respond to and prioritise local developmental needs.

Furthermore, the lack of adequate infrastructure in remote oil sands host communities was an indication of failure on the part of government and local authorities. As a result, communities relate to oil sands extraction with high expectations of improved living conditions and strong opposition to any negative externalities. This is rooted in the belief/knowledge that mining companies in several countries have been able to transform their host communities. The findings suggest that Nigerian government needs to review its relationship with communities. Identification of communities and consultation must be meaningful, beneficial and aimed at gaining their free, prior and informed consent as enshrined in the Mining Act. This process has clearly not occurred in past attempts at developing the sector.

The case study has shown that oil sands operations have the potential to play a leading role in the provision of local infrastructure, and proliferation of local businesses. In the medium- to long-term, oil sands extraction is viewed as the means for economic growth in the state and the nation in general. Unfortunately, the over reliance on oil sands operators to perform government responsibilities, particularly the provision of infrastructure, although laudable, is not sustainable. So, the critical issue for companies and government is to maintain dialogue on the extent to which the government would continue to sustain and maintain communities when mining closes. The potential for social disruption makes oil sands investments inherently high-risk, especially in Nigeria where environmental legislation is poorly governed. The current lack of communication, lack of transparency in disclosing the projects' potential impacts and the lack of involving with local communities, if not managed and regulated at this initial stage, only heightened the risks and is likely to be a curse than a blessing. If the risks cannot be mitigated, oil sands exploitation should not proceed, given Nigeria's antecedence in managing resources. The proposed scale of oil sands development could lead to irreversible environmental damage to the ecosystem, available farmlands, water quality and other sensitive areas. Therefore, environmental impacts of oil sands operations as perceived by the case study communities are contained in the next chapter (Chapter Eight).

CHAPTER EIGHT

PERCEIVED ENVIRONMENTAL PROBLEMS AND EXPECTATIONS

8.1 Introduction

Chapter Seven highlighted a number of social and economic benefits as well as their likely negative outcome. According to Dunlap and Jones (2002:245), "the degree to which people are aware of problems regarding the environment is the fundamental aspect of environmental concern". While it is a difficult task to accurately determine the level of environmental impacts to be expected from large-scale oil sands mining in Nigeria, given that specific investors and the technical details of how the resource will be extracted appear as yet undetermined, it is still possible to raise questions about the potential risks, especially on those who will feel the immediate impact throughout the cycle of operation - oil sands mining have the potential to cause environmental impacts from exploration through post-closure stages.

Thus, this chapter investigates how local communities perceived environmental problems associated with planned oil sands mining. The environmental impacts of mining oil sands, such as greenhouse gas emissions, heavy metal contamination of water and soils, acid drainage, land occupation, tailings legacy and associated socio-economic risks have been of topical concern (e.g. Charpentier et al., 2009; Dogaru et al., 2009; Gosselin, 2010; Woynillowicz et al., 2005). Environmetal issues as they appear in this chapter present greater challenge to the development of oil sands in Nigeria. Information gathered across communities reveals considerable and widespread anger about the environmental impact of oil sands development, which is primarily negative. This chapter, therefore, draws out the main environmental issues identified by local communities, such as loss of biodiversity, destruction of habitats and water quality, and pollution (gas emission, dust and noise) – all from the actual presence of oil sands and the earlier preliminary works done by companies in the past. The chapter further extends the discussion by examining how communities can be involved in addressing these environmental concerns. Mineral host communities in Nigeria have largely borne the brunt of extractive activities in Nigeria (see Amnesty Report, 2009 and UNEP Report, 2011). The extent of the impact on those communities has varied according to the type of mineral extracted, type of activity and sensitivity of the communties; with the environment of remote commmunities being particularly adversely affected. Table 8.1 lists the general environmental impacts of oil sands resources from exploration to post-closure.

Table 8.1 Potential environmental impacts connected with mining of oil sands

A. Increased air emissions • Dust • Engine exhaust • Volatile hydrocarbons of bitumen • Carbon intensity B. Increased availability of aqueous transportable materials • Inorganic • Organic • Suspended/dissolved solids C. Change in ground water regime • Physical • Chemical D. Solid waste generation • Solid –mine dumps • Liquid-tailings dam	E. Surface changes • Increased risk of landslide • Destruction of existing vegetation and farmland • Alteration of habitats • Drainage diversion F. Increased noise • Mobile equipments • Drilling machines • Blasting G. Seismic and core hole disturbance, well pads and pipelines • Affects species of wildlife • Occupies communal lands

Source: Environment Canada (2009b) and summary based on empirical data.

The findings contained in this chapter are based on the focus group discussions and observations undertaken during the second stage fieldwork between January and April

2010. Table 8.2 summarises the problems associated with the environment that the communities expect and how these are likely to affect them. The first section examines possible disturbances to water quality as a result of extraction and how it affects sources of water for domestic usage. The second section brings to light possible loss of habitats and biodiversity and how this would affect food supply, health and the economic well-being of local communities. The third section focuses on pollution and emission of harmful dust and gases to the environment. After the presentation of environmental perceptions, the fourth section provides specific issues on how to avoid/mitigate or maximise the socio-economic and environmental issues discussed. Section 8.6 documents how the communities can partner with government and investors.

Table 8.2 Perceptions of environmental impacts of oil sands

Concerns	Consequences
Water availability and quality	1. Pollution of fishing water, and impact on other aquatic organisms such as crabs 2. Diversion of communal sources of water 3. Long distance travel to access water because of pollution of proximal water sources by natural bitumen 4. Flooding caused by barriers placed on natural-flow canals 5. Contamination of surface and underground water making it unsafe for drinking and cooking 6. Reliance on unclean water causes diarrhoea and dysentery
Loss of biodiversity and destruction of habitat	1. Cutting of forests and plantation at varying operational scales limits local opportunities for employment, food and income 2. Reduction in the availability of arable land 3. Loss of primary sources of protein and medicine 4. Extinction of certain animal and plant species
Pollution-noise, dust and gas emissions	1. Pollution of the quality of air to the surrounding environment 2. Cause of variation in rainfall pattern 3. Contraction of airborne diseases such as those affecting the lungs 4. Long-term hearing problems 5. Machinery noise and movement upset domestic animals and children

Source: Fieldwork (2010)

8.2 Water Sources and Quality

The environment in general and water sources in particular has been impacted by the presence of bitumen prior to mining. The commencement of oil sands operation can have significant impacts on water sources and water quality. The use of water is an integral part of oil sands processing. A large quantity of water is particularly required during the production stage. Oil sands use water to extract oil and other petrochemicals in both open pit and in-situ operations. In open-pit mining, water is mixed with oil sands as part of the separation process. The water is drawn directly from nearby freshwater channels. With in-situ extraction and processing, the water is usually sourced from underground aquifers rather than from surface water systems. The actual volume of water required by the two methods varies. For example, the literature estimates that oil sands open-pit mining in Canada utilises between 2.2 and five barrels of fresh water per barrel of synthetic crude (Shell, Canada Ltd, 2010), while the in-situ operation uses half a barrel of water per barrel of bitumen (CERA, 2009).

As it is difficult at this stage to estimate the volume of water required from the drainage system for oil sands processing, it can be inferred that oil sands projects would collectively withdraw water from nearby drainage systems. River Oluwa and River Oke are examples of rivers likely to serve as the source of water for bitumen projects. The challenging issues in this context include adequate water supply, pit dewatering, tailings dam management, groundwater protection and land reclamation – all of which affect the local environment and host communities. For these reasons, host communities are concerned about the pollution of water sources and associated health problems. These fears were substantiated by Gbadebo (2010) and Adebiyi and Asubiojo (2011) who analysed the total hydrocarbon and metal contents of seepages of bitumen in areas close to Irele. The rivers have high concentration of hydrocarbons, which represent a significant threat to big rivers and small streams due to their toxicity and potential for bioaccumulation in fish (Gbadebo, 2010:1510). Generally, the metal content (nickel and zinc) of the rivers are within permissible limits, but zinc and cadmium are higher than the values recommended by WHO, thus indicating contamination. The consumption of this water could affect the kidneys and cardiovascular system. The exploitation of oil sands without proper environmental assessment and management can only exacerbate this problem due to the mobility of heavy metals in soil, sediments and rivers.

The availability of clean water in both quantity and quality within a reasonable distance is of importance and appears the most pressing problem to the case study communities. Water is used for drinking and cooking as well as for other domestic uses. However, some water-borne diseases can be transmitted to the communities where contaminated water is used for drinking and domestic use. A checklist of piped water was presented in Table 7.2. The major challenge faced by the communities with regards to accessing a supply of clean water for drinking is distance. Remote communities of Gboge and Ijuba-Ijuoshun travel long distances and carry heavy containers on the head to collect domestic water from shallow streams and carry it home. Although water is available from dug wells, boreholes and occasionally pipe stands, residents in Ode-Irele and Ajagba spend many hours queuing to collect drinking water at the few water collection points available.

During the dry season, when precipitation ceases (usually for two to three months), surface water is naturally lost to evaporation and underground seepages, and as a result communities suffer from acute scarcity of clean water and have to walk much further to collect what they need; or put more pressure on the very limited available water found in existing wells and boreholes. As a result of scarcity, residents in Akingboju are often forced to depend on pools of water that they consider unsafe. People from Legbogbo have to walk for half an hour to fetch drinking water, whereas the Ijuba-Ijuoshun community has access to water following a short walking distance to the stream, in addition to a borehole. The riverine communities do not experience water scarcity because they depend on the nearby river that flows all year round. The quality of the water from the river though is doubtful, owing to a lack of proper sanitation, and pollution along the river banks. The river banks are used for bathing, latrine purposes and washing of clothes and dishes, among other activities, which pollutes the water. In this situation, the general assumption is that clean water will be made available by oil sands investors, citing instances of Niger Delta communities that are benefitting from clean water courtesy of oil companies. This expectation comes from the promises made by companies in the past, and from the experiences of the neighbouring oil communities.

The entire communities are at risk from unprotected dug-wells, boreholes and rivers whenever there is effluent discharge and contamination at any of these common sources of water and collection points. Poor sanitary conditions along the river banks also increase the risk of water contamination. These are the realities of water availability that the communities have had to contend with, as access to an adequate water supply for domestic and other productive uses through the public water supply is simply not available to all. Therefore a detailed baseline study of water quality is required, and should be monitored at least quarterly during the project development phase, followed by biennial monitoring in the early years of operation. Proper annual monitoring of water quality should follow the pattern set by environmental evaluation studies (EES). By monitoring, it will be possible to detect the occurrence of any shift in the balance set by the Nigerian water standards.

The above perceptions of the communities are in conformity with Mendoza et.al (2006), Razo et al. (2004) and Younger et.al (2005) empirical findings about mining induced surface and underground water contamination and transportation of heavy metals along water catchment. Given that oil sands projects are still in their planning stages, the communities' sources of water supply should be considered because access to clean water is already a problem and mining could make it worse. The questions investors should answer, relating to water use is: where to source water from? What type of treatment technology would be used, and how would waste products be disposed of?

8.3 Possible Loss of Biodiversity and Destruction of Habitat

Oil sands in the case study lie between mangrove and rainforest savannah that are characterised by complex plant and animal species diversity. In many areas, the vegetation is a chaotic mixture of trees and plants of all shapes and sizes. There are rubber, cocoa, oil palm and banana trees plantations and there is also the cultivation of exotic trees such as timber and teak in the study area. The presence of oil palm plantations specifically bears evidence of human occupation. Furthermore, rainforests play an important role in sustaining the local communities by virtue of the basic and fundamental resources they provide including soil stability, herbs for medicines, wood for fuel, shelter and wildlife habitats. Box 8.1 below provides an insight into the current state of biodiversity and how habitats are lost for other economic gains.

Box 8.1 Characteristics and causes of biodiversity loss ahead of oil sands extraction

The bitumen belt in Nigeria lies between equatorial evergreen tropical forest and mangroves, a climate zone endowed with different plants and animal species. It consists of tall trees and undercover shrub layers in great amounts of growth. In areas where the forest is relatively undisturbed, tall, medium and small tree strata can easily be distinguished. The tall trees otherwise known as timber trees are up to 40 metres high and include *Iroko*, *Sapele* and *Obeche*. The medium stratum is made up of a variety of trees of about the same height and forms the continuous forest canopy. The medium trees consist of diverse species such as *Cola Monodora*. The small trees are covered by the medium stratum with an estimated height of about two to four metres. Shrubs and herbs are found, but their growths are hampered by the low light intensity at ground level. The trees described above present an extremely complex plant community and enough ecological niches both for the vertebrate and invertebrate wildlife fauna. There are a number of animal species identified by the communities to include antelopes, monkeys, elephants, hyraxes and other carnivores. Rodents (excluding bats) were a common sight as the researcher and field assistant drove along the rainforest. Birds such as hornbills and cuckoos are found in the study area. Seeds and insect feeding birds were also encountered in areas where the forest has been cleared for agricultural purposes. At present most of the rural economies derive sustenance from the availability of biodiversity; as such the destruction of habitat is expeditiously carried out. Biodiversity has served as sources of food - wild animals, birds, fishes, snails, termites and snails are sources of protein. Local herbs are used in treating ailments - such as diarrhoea, fever and dysentery. Trees are raw materials for industrial usage - rubber provides latex to rubber industries and *Iroko* is a source of wood. The natural vegetation has, therefore, given way to cultural vegetation. Plantations of kolanut, oil palm, cocoa, rubber and other economic plants such as fruits and vegetables dominate the scenery. Farming is considered the major cause of loss in biodiversity in the study area. Farming activities is characterised by a short fallow period - the traditional method of alternating some years of farm production to check and remediate loss of soil nutrients. The establishment of both small- and large-scale plantations for cash and food crops leads to indiscriminate falling of trees and bush burning, all resulting in the destruction of fauna and flora habitats.

Source: Emma-Okafor et al. (2010) and Fieldwork (2010)

Plate 8.1 shows land clearing for sourcing of borehole water in Irele area. The cutting down of trees covering hundreds of kilometres is seen to aggravate this situation and lead to secondary ecological crisis, particularly when the soil nutrient is held in vegetation. Oil sands deposits are concentrated along the upper fringe of the Delta lying from less than 10 feet beneath the rainforest and plantations mentioned above. Any planned oil sands extraction method – along with other factors - causes habitat destruction and loss of the biodiversity beyond the limits of the areas underlain with oil sands. Remote communities such as Gboge and Ijuba-Ijuoshun, and Legbogbo and Gbeleju-Oke will be negatively affected during bitumen project execution and implementation. The prevailing feeling in the communities is that the oil sands companies will disrupt the ecology, thereby destabilising the people and forest resources.

Plate 8.1 The land being cleared for drilling a water borehole in one of the study communities. The vegetation was cleared and the ecosystem disrupted in an effort to supply the water required by the community. This is an example of development trade-off that the communities referred to. For water to be available, a certain part of the plantation has to be cleared, resulting in the loss of the benefits derived by the community. Source: Fieldwork (2010)

The case study appears to be situated in one of the important timber- and plantation-producing areas of Ondo State. Ironically, this area has the largest concentration of demarcated areas for oil sands activities - features of Blocks A and B are all located in the case study area - some of which investors have already expressed an interest in exploiting. There are no exact estimates on the approximate hectares of land that oil sands extraction will account for in the medium to long term because proper operations have yet to commence. However, when it does start, surface mining, for example, will put an end to nearly all existing wildlife and plant habitats similar to what has occurred in Alberta region. Baseline study of the habitat was conducted in the past, but researcher was unable to acquire a copy. Whatever the scale and extent of operations, it will destroy the diverse range of fauna and many terrestrial animal species, such as antelopes, monkeys, elephants, hyraxes, gorillas, mandrills, hornbills and cuckoos in the area. While there is no categorical statement about the relocation or recreation of habitats, baseline study, risk assessment and mitigation measures are required under national legislation (see Section 119 of the Mining Act (2007) and Section 140 of the 2010 Mining Regulation.

During the surface oil sands extraction process, hydraulic shovels are used to remove the land surface containing forests and habitats to dig out the overburden, and then to dig deeper into the oil sands layer. The overburden and oil sands ore are both transported by trucks to the processing plant. The construction of the roads used for the movement of these trucks is made possible by the clearing of forest. Thus, an open pit operation represents a serious threat to the vast forest resources, and is further threatening the abundant biodiversity of Nigeria's rainforest. In this case, restoration and re-vegetation as contained in the Amnesty Report (2009) and the UNEP Report (2011) will prove a huge challenge especially in Nigeria where environmental laws are flouted. Thus, calling on the need for international community to monitor and ensure that an oil sands operation in Nigeria is in compliance with international best practices.

The remote communities, Gboge in particular, strongly argue that the appearance of surface mining leads to loss of biodiversity, which has significant economic implications, notwithstanding the benefits accruable from such activities. Group participants in all the communities identified plants and animal species that the communities directly or indirectly depend on:

> The opening of bitumen to foreign investors would definitely cause destruction and complete disregard to our people that have lived in these areas surrounded by forests for centuries and our people are using the resources in a way that generations too benefit
> (Chief Bayo Ogunje Pers. Comm., 2010).

For example, Gbeleju Oke, Ijuoshin and Akingboju communities are concerned that snails and mushrooms that are the primary sources of food protein will no longer be available. Medicinal plants are vital for remote communities and there are fears that their collection can become impossible due to local extinction following the commencement of bitumen extraction. The communities have demonstrated, in a way, that biodiversity sustainability is important to their survival. In particular, Ijuba-Ijuoshun community was able to protect herbs that are for their medicinal benefits.

The extent of the consequences of oil sands on the local environment has not been fully assessed, but the impact on the surrounding ecology of the oozing of natural bitumen out of bedrock (even though a natural process) is obvious. The researcher witnessed one such site in Agbabu, where bitumen naturally pumps up to the surface: the bitumen spread over a large area of land preventing farming, fishing and herding. A constant loud roar accompanied the discharge of thick dark bitumen and water to the surface, where it then floated on the surface of the water. The bitumen that is rising from sub-surface has been accumulating for about a century now. Tayo (Pers. Comm., 2010) stressed that: "as the accumulation continues our fear is it consumes the other side of our houses and farms". This implies that the longer period taken to extract the bitumen has resulted in it becoming a natural hazard, rather than a mining-induced one. Baseline environmental studies and environmental impact assessment of the project is required by law; only at the point when potential investors are identified. At the time of writing, no investor was identified that would proceed to the stage of undertaken EIAs.

As the land where local people live is facing large-scale disruption - for the corporate benefit of companies and government - it was recalled that:

> The companies sometimes behave without conscience just like JEREZ did...they take away resources, make profit and destroy us...the government that is suppose to help us is unable to control their activities because they also benefit. Where do we go so that our rights can be protected?
> (Gboge Elder A, Pers. Comm., 2010).

What is more, the loss of breeding ground for animals and birds caused by cutting down of trees for drilling has already had an impact on animal and birds numbers. Thus, there will be a dramatic fall in the propagation of bird species (such as hornbills, flycatchers, barbet, turacos and cuckoos) and animals (such as manatee, monkeys, pangolins, hares, hyraxes and antelopes) in areas of oil sands operations for the duration of the project life (Emma-Okafor et al. 2010). Humans are equally endangered by oil sands wastes that lack proper environmental remediation. The following section provides a synopsis of the very real fear that pollution will affect hearing, vision and air quality. The theme was identified based on the community's perception about pollution in the neighbouring Niger Delta communities.

8.4 Pollution: Noise, Dust and Gas Emissions

Apart from water and loss in biodiversity, noise, dust and gas emission were seen as factors that are capable of degrading the local environment and the people's health. The results obtained from a series of air measurements have established air quality of the oil sands belt to range from moderate to high quality with regards to particulates which are well below the WHO and Federal Environmental Protection Agency (FEPA) limit (FEPA, 1988). However, it is to be expected that during all phases of the project, air quality may be degraded, even if slightly, as seen in Arrocha et al.'s (1991) study of air quality in the Venezuelan Orinoco bitumen belt. Mining activity involves the use of machines that, although not particularly loud as such, to some extent become noise (e.g. the vibrations from compactors, drillers, loaders, excavators). As land is being drilled, excavated and transported, dust cover extends beyond the perimeter of the operations. In particular, oil sands extraction utilises gas for energy in the process of extraction, production and upgrading of bitumen to oil.

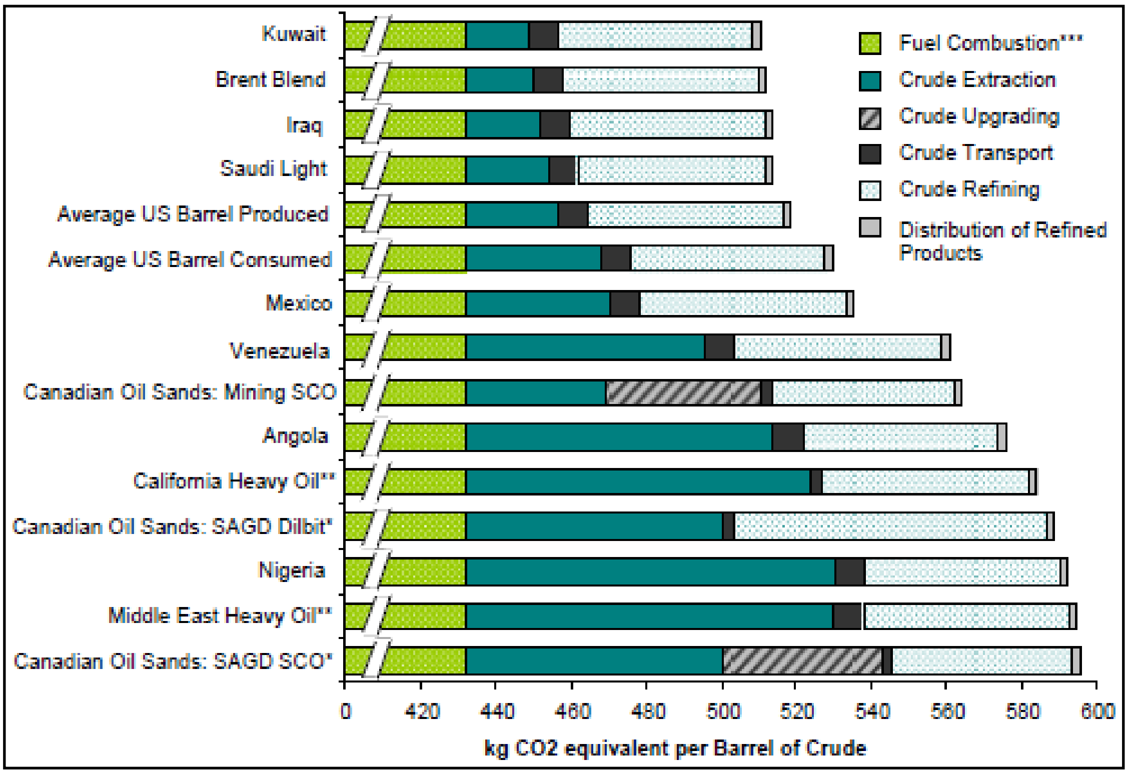


Figure 8.1 Well-to-wheel GHG emissions. Source: IHS CERA (2009)

If Figure 8.1 is taken into context, the beginning of oil sands extraction can only add to the emissions of GHG in Nigeria, and the immediate environments would be the hardest hit – a process that if not managed would lead to another Niger Delta. Drilling rigs just across Gboge community, for example, caused significant disruption to the day to day lives of the people. Recalling experiences with JEREZ, participants complained that their animals (goats and sheep) were upset, buildings cracked from the vibrations, and the school building roof was blown off by a helicopter. JEREZ was exploring for oil sands in areas within and around Gboge community. As an example, the first indication that one of the communities was being approached by JEREZ was the sound of a drilling machine. If the communities remain in their current location and full exploitation starts, with machines often emitting different sounds, there is an increased tendency for long-term hearing problems to develop. It is interesting to note that one of the participants in Ode-Irele fears that the emission of harmful gas into the atmosphere is capable of affecting the pattern of rainfall. Based on past experience of drilling, Gboge community is worried that the land across which JEREZ conveyed heavy equipment was loosened, and years later, the soil is gradually being washed away due to removal of vegetation, and soil exposure.

Once the projects become operational, there is the problem of oil spills not mentioned in any of the communities. Oil spills are a tragedy in the Niger Delta and have left a major environmental footprint in the region. An estimated 2.3 million barrels of spill was recorded between 1976 and 1996 alone (Nwilo and Badejo, 2006). In Ogoniland for example, 40 years of oil spill left heavy metal contamination that is still present in land, swamp and offshore environments, despite repeated clean-up attempts (UNEP Report, 2011). At present Nigeria imports heavy crude oil from Venezuela. The oil is trans-shipped to a coastal terminal at Escravos near Warri from where it is transferred through a 674 kilometre pipeline network to Kaduna refinery (Appendix One). The pipeline route from Escravos to Warri and then to Kaduna traverses highly sensitive environments home to mangrove swamps, freshwater swamps and freshwater swamp/farm mosaic across the study area. Although the ecological impacts of such spills of heavy oils have not been properly documented, it is reasonable to expect that because of the physico-chemical characteristics of these oils, the long-term impact on aquatic flora and fauna would be serious. The higher sulphur content of the heavy oil will increase corrosion on the pipeline and eventually lead to more spills. The release of crude product from oil sands is of major concern to especially riverine communities along River Ofuoshun because oil sands spill may be 10 to 100 times more toxic, mutagenic and carcinogenic than petroleum crude, and oil sands are insoluble in water. Consequently, there is the potential for a negative impact on water quality if these oils are allowed to spill into water bodies. Based on the impacts associated with the pipeline mentioned above, opposition to this kind of pipeline project is at this time mounted by environmentalists, religious leaders and celebrities on the planned Kingstone XL pipeline that transports syncrude from Canada to the Gulf Coast.

Lastly, all the communities in the case study fear that they are not likely to benefit from the royalties and taxes that are paid by these multinational companies. As mentioned in Chapter Four, mineral taxes and royalties are paid by companies directly to the federal government, and only a meagre amount comes back to the host communities in the form of physical infrastructure. The communities have not benefitted from the millions of dollars realised by the Federal Government from past bidding processes. Given that a limited amount of this money will be invested for the development of host communities, they fear that, after the wealth and resources are taken away, they would be left with the relics of a degraded environment similar to that of Jos in North-Central Nigeria.

8.5 Communities' Expectations

As part of the group discussions, participants were encouraged to brainstorm on their contributions to the development of oil sands and their community. When coded for emergent themes, participants' expectations centred on socio-economic benefits discussed in Chapter Seven, environmental management, mutual respect and government responsibilities. Some of these expectations are unrealistic and impose burdens on companies as they try to strike a balance between profit, corporate responsibilities and community needs. On communities' contribution to the development of the oil sands project, two major themes emerged - peace and security of mine workers and their facilities.

The recognition of host communities as partners in the development of oil sands by the investors might forestall cases of conflict, protest and vandalism of company facilities. The perception of the environmental consequences of oil sands extraction in the host communities may define a role for them in the management and monitoring of the environment. Indeed, participants from the communities remain resolute about maintaining a harmonious relationship with the government and potential investors, despite the enormous challenges posed by oil sands extraction to their livelihoods. Remote communities in particular are craving for development, and the oil sands project is seen as the opportunity that would improve their poor socio-economic conditions and mitigate government neglect:

> Our people are by nature tolerant and are willing to give-up whatever it takes to make the project work...if investors come and cooperate with us, our people will reciprocate by partnering with them so that the benefit goes to all. We can guarantee their security together with government security agents
> (Ode-Irele Pers. Comm., 2010).

One of the participants in Ijuoshun who used to live in Warri (one of Nigeria's oil-producing communities), lamented the devastating effect of oil on the environment that limited people from farming and fishing and even increased their isolation because of lack of access. The reason why the people are unable to produce food crops or harvest fish was attributed to the apathy of the oil companies and the government concerning the needs of local communities. It is no surprise then that the damage to land and water caused by 50 years of oil extraction could take another 30 years to clean up (UNEP, 2011). The report recommended government and companies to engage and dialogue with the communities and continue to educate them on the effect of extraction resulting from operational failure or illegal activities.

Learning lessons from the oil region, participants including elders, community leaders and youths have consistently stressed that if companies' partner with their host, the gesture would be reciprocated by guaranteeing the safety and protection of company staff and facilities. This finding is in accordance with recent research (such as Bridge, 2004) that shows how dialogue between extractive industries and communities of interest reduces the risks of antagonism to investment decisions and destruction to facilities. Consistent dialogue with the communities allows for the company to produce and maximise shareholders' return. According to the Department of Environment and Resource Management (2011:2): "a properly conducted consultation program can enhance the likelihood of informed discussion leading to better definition and greater support of the project, either as proposed or subject to agreed compromise". This will give the communities a sense of belonging and therefore forestall the occurrence of riots and communal disturbances that may affect the project implementation. In Australia for example, any mining licence above five hectares must: "include a proposal detailing how current community attitudes and engagement expectations will be identified" (Department of Primary Industries, 2008:14).

Ineffective interaction between government and investors in the past was one of the factors heightening unrealistic community expectations from potential investors. For instance, in the focus group discussions, the local, state and federal government were accused of being one-sided; communities were not informed about the depth and extent of any effects that resulted from core drilling that was carried out in the past. There was criticism about companies in the past for not instituting an all-inclusive and structured consultation programme with the communities. Similarly, this criticism has repeated itself with the numerous drillings performed by MSMD in the last couple of months. Some of the villagers in Gboge were neither consulted nor compensated when their land and crops were lost to clearing the right-of-way for drilling and sampling. The land was cleared by some exploration companies in the past and now the government.

It is possible that the failure of the past drilling exercise to comply with land access was based on the perception that the best practical way to deal with the people is through government at local and national level, instead of dealing with them directly – the result was community dissatisfaction. To encourage community consultation and avoid re-occurrence of the past, Gboge and Gbeleju Oke plan to insist on a detailed EIA and community agreement by an independent body before the commencement of oil sands extraction. Although EIA and Environmental Rehabilitation and Protection programme is a requirement of the law, the communities have slim prospect of appointing an independent body to carry out the study. This is because Section 140(2) of the Mining Regulation stated that the title holder is the one responsible for undertaken EIA.

However, communities can argue for the appointment of an independent observer on the course of the CDA.

The capacity of the large number of local, state and federal government agencies and departments to enforce environmental regulations and standards is also in doubt. However, a rather optimistic view related to the latter proposition was expressed:

> Both oil sands development and environmental protection can be tackled simultaneously. With sincere government commitment to complying with global environmental standards in oil sands operations; oil sands can be developed for the benefit of host communities and the Nigerian economy, while also protecting and meeting environmental sustainability
> (LG Youth1, Pers. Comm., 2010).

During all the group discussions, participants indicate how much they expect from the oil sands operators. These needs and expectations are rooted in the current development needs of the remote towns and linear communities ranging from water supply, poor sanitation, lack of health facilities within reach and other social indicators of human well-being and development. For various reasons attributed to deliberate marginalisation by the local council, it has been impossible for the Gboge and Ijuba-Ijuoshun communities to benefit from the provision of infrastructure. Therefore, to reduce the pressure on the investors, they expect the government to shoulder its state responsibilities of providing municipal infrastructure, while the companies complement government efforts. Lack of proper understanding of royalties also wrongly raised expectations. Communities expect royalties to be paid to them directly; they are unaware that royalties are paid directly to the government by the mining companies. In any case, the communities desire the transfer of a certain proportion of royalties to them as direct benefit for the improvement of quality of life and to offset any hardship in the event of mine closure.

The lack of governance structure in place to ensure that communities receive information about the status of oil sands project is infuriating. In the first instance, the government was blamed for lack of communication and insincerity in the bidding process. The belief that companies are being selected secretly without consultation was another reason to apportion blame. Third, communities believed that the government may have finally decided to abandon the project and would gradually shut down the moribund offices in Akure and Ore. Truly; the communities have been vindicated regarding the criticism that government has not been communicating or relating with the local communities about the current status of oil sands project:

> Honestly the communities are not in reality aware of the progress made except through the media. Our strategy is to reach somewhere before informing them about all the processes taken so that they can be convinced that this time the government is serious. Hold on...right now, the state is involved and I think they are aware of all the steps taken. It is not easy to reach the rural communities and that is why the states involved are first informed
> (MSMD official Pers. Comm., 2010).

This assertion buttresses the need for government to communicate with host communities through community leaders about the steps taken to ensure that the project is revived by credible investors. At the time of writing this report, oil sands investors had not yet been identified by MSMD, so the researcher could not have access to information on a company's policy on local communities. Box 8.2 contains an excerpt of an interview (with a government official and a member of the bitumen committee) admitting the errors that were made in past bidding processes. It includes the steps government is taking to strategise the exploitation of oil sands resources, as at April 2010. Since the time of this interview, no progress has been made. Yet, another committee was set up to review the 2009 bidding and provide a road map for oil sands development. To ensure getting it right this time, awareness, transparency at all levels of transactions, community engagement and capacity building would be instrumental in bridging the gap between perceptions and expectations and harmony.

Box 8.2 Current Status of Nigeria's Oil sands Project

"Nigeria has now recognised the need to develop bitumen. It is long awaited and the time to develop it is not any later than now. For government (I mean MSMD) to do that in a more transparent and coherent manner, a committee was inaugurated to put up for bidding of the bitumen blocks. The committee was inaugurated last year and is made up of stakeholders including professionals and intellectuals and the Bureau for Public Enterprises (BPE)-government agency for privatisation. The bitumen blocks that were formerly six are now collapsed into three namely A, B, C. Blocks A and C has been put up for Expression of Interest (EoI). About 16 companies showed interest in writing. Nine of these companies are 100 per cent foreign while the remaining seven are local with either technical or financial partnership with a foreign company. From the rigorous assessment of these companies, nine were able to meet the minimum criteria for the EoI. I can tell the exercise was rigorous and transparent for the first time in the history of bitumen development in Nigeria...the reason is that the committee can't afford to repeat the mistakes of the past where companies without any wherewithal of bitumen extraction were offered blocks that were never utilised. So far, the companies that won were communicated of their success and the losers were also sent appreciation letters for their interest in investing in Nigerian bitumen...
...Not to be consumed by the pitfalls of the past; the committee requested for the assistance of the World Bank to assist the committee with a technical assessment on bitumen project. For your information, the World Bank has been partnering with the Ministry for the development of the solid minerals in Nigeria. The technical assistant will work with the committee at the bidding process in line with World Bank guidelines on developing this huge and hitherto environmentally sensitive mineral deposit. Currently awaiting his arrival in the country. As he arrives, we are going to look at what we have, what we lack and what we need to do so that the bidding process can be launched. Any winner that emerges through the bidding process must be able to sustain production. So, the arrival of the World Bank partner would kick-start the bidding process. The EoI winners are communicated intermittently on any development. In summary we are now at the process of commencing bidding for the A and C blocks bidden on by the nine companies, pending the arrival of the World Bank expert. The bitumen committee is still active; and is still carrying out drilling for scientific studies and reserve estimation in some of the remote areas".

Source: MSMD official Pers. Comm. (2010)

8.6 Conclusion

The work presented here used a case study of oil sands projects in the Ode-Irele area of Ondo State to underline how communities perceive environmental effects of resources development. This chapter has identified perceived environmental degradation in communities that are on the verge of being exposed to significant environmental impacts of bitumen production. Highlights of the existing environmental conditions, perceptions and expectations were documented in communities that are potential hosts to where the bulk of Nigeria's oil sands will be produced. Participants' perceptions about the impact of bitumen on the environment were patently negative, particularly in areas where damage to the ecosystem and economic activities is evident even before the start of production. The perceptions shared between and among community members about immediate impact of oil sands development include damage to water sources and quality, loss of biodiversity and destruction to both economic plants and animals. Contamination of air and emission of chemical substances are impacts perceived to come with full project development.

Group participants largely agreed about the damage that oil sands extraction would cause to their immediate physical environment. In remote areas, the pollution of water sources and its related health problems is typically the most commonly perceived impact on the environment. However, there is no credible evidence to support the common account of pollution in remote communities being caused by contaminants released by past oil sands drilling. There are also fears that the environmental resources such as forests, animals and plants that play an important role in sustaining the local communities by virtue of the basic and fundamental resources they provide may be lost. Pollution of air, and gas emissions, even though considered elements of environmental degradation, were not perceived as a problem in most areas as not much emphasis was given to this issue. Noise was regarded as unpleasant in one of the communities that experienced core drilling a few metres from the community leader's house. Thus, there are also important differences in perceptions and concerns between communities. These differences are partly defined and shaped by individual experiences, the media and information from the neighbouring delta areas. For example, communities with experiences of drilling know more about it and use that to support their arguments. The difference is also shaped by the unequal access to the use of resources. For example, the pollution of a nearby stream will directly affect remote communities that completely rely on the water for drinking and other domestic uses, as compared to towns that have multiple sources of water supply. In addition, the extent of local economic activities and expectations shapes their attitudes towards the environment. People in the towns complain little about environmental impact of bitumen production because the socio-economic benefits such as job opportunities are overwhelmingly stacked against the need to protect the environment.

Oil sands projects generally involve a number of distinct and sequential stages. The various methods for oil sands development entail various activities executed using various plants, surface facilities, machineries and equipment, located often in environmentally sensitive areas, as are those in the case study. At each progression stage of development, the community within the proximal operation area is impacted in different ways. Moreover, proximity of the project to areas of agriculture, fisheries and sources of water also determines the extent of impact. Therefore, communities' understanding, views and expectations of the environment needs inclusion during the various cycles of the project, using mechanisms that are appropriate to the culture and sensitivity of the local host communities. Worthy of note is a growing awareness about the importance of sound environmental management amongst communities, and a declaration that before, during, and after mining, environmental regulations are adhered to. This implies that through community consultation, relevant strategies acceptable to the communities can be incorporated into any environmental impacts mitigation that is in place throughout the project life cycle, and which can remain sustainable after project closure for the communities to benefit from. However, social issues change over time, and perceptions of experiences over the life of the mine project also change with no policy infrastructure in place to facilitate this.

In the past, the failure of government agencies and oil sands investors to communicate adequately with remote communities regarding the costs and benefits of bitumen extraction has undermined communities' expectations for the provision of infrastructure from investors. As a result, communities view potential investors as surrogate government, with high expectations and accompanying criticisms of any negative impact. If their expectations have been undermined – then surely they would not expect anything. However, communities remain committed to a peaceful dialogue with stakeholders and where needed, to guarantee the security of people and installations. From the foregoing therefore, the Nigerian environment is apparently battered by current oil field practices. The addition of oil sands mining to the already polluted environment of the delta will worsen the consequences, if appropriate environmental standards and best practices are not adhered to, from the planning stage. Based on the findings presented, enormous responsibilities lie with appropriate government agencies to strive towards ensuring that communities and environments are protected against any impact. The implications of the environmental and host community consideration in oil sands development in general are discussed in the concluding chapter of this thesis, Chapter Nine.

CHAPTER NINE

CONCLUSIONS AND RECOMMENDATIONS

9.1 Introduction

This chapter draws together the findings from the literature, the GIS analysis and the case study to explore the implications of the research for theory and practice. The chapters have elaborated comprehensively the three aims of the research. The first of those aims was to contribute to the development of a more 'critical approach' to resource geography in Nigeria in particular. The second was to conduct a survey of mining in Nigeria to determine its spatial pattern, and to identify 'mining communities' - those that are involved in or affected by mining. The third aim was to undertake an assessment of the potential social and environmental impacts of opening oil sands extraction near communities. These three aims have been achieved through the analysis of documentation, GIS, focus group discussions, interviews and direct observation.

The next section (9.2) of the Chapter summarises the key findings of the thesis by relating them to the aims of the study. The third section (9.3) explores the contributions and limitations of the research. Section 9.4 recommends policy options for the development of oil sands in Nigeria. The last section (9.5) considers potential areas for future research.

9.2 Summary of Major Findings

The major findings of this research are presented based on the four research objectives that addressed the aims outlined in Section 9.1.

9.2.1 Research Objective One: Survey of the academic and policy-making literature and the international experience of the impact of mining.

The aim of this primary objective was to gather baseline information from the literature to understand the relationship between resource abundance and development on one hand, and the impact of resource extraction on the other. One of the first conclusions drawn from this research is the particular role that mineral resources (particularly oil) have played in the Nigerian economy. Since the oil boom of the early 1970s, Nigeria became a 'minerals-based economy' and has now become extraordinarily dependent on the oil sector: it accounts for over 90 per cent of exports, close to 90 per cent of government revenues, and one third of the country's GDP (Revenue Watch Institute, 2010; USEIA, 2009). The research has shown that enormous oil wealth has not transformed the relatively undeveloped non-oil sectors to cushion the impact of a reduction in export earnings.

In addition to Nigeria, many other mineral economies (such as Argentina, Mexico, Peru and Venezuela) provide examples of economic underperformance. By contrast, other countries (such as Australia, Norway, Canada and Botswana) realise positive outcomes from mineral-based development. Nigeria's poor state of development is a result of the pathologies that collectively are known as the 'resource curse'. The thesis has examined a range of literature on the resource curse from various authors who adopt a variety of approaches. Evidently corruption, government complacency, the Dutch disease, lack of public accountability, neglect of education, excessive external debt/borrowing overhang, and conflict in oil-producing communities are all hampering the development goals of the country. The thesis thus concurs with Sachs and Warner (1999), Collier and Hoeffler (2000), Xavier and Subramanian (2003) and Watts (2008) that the advent of oil wealth is a leading factor contributing to conflict, poor economic performance and human development. The non-diversification of the Nigerian economy is also one of the key reasons that the country has suffered from resource volatility.

Similar to oil, mining of solid minerals is vital in the economic development of countries. Botswana, Canada, South Africa, Chile and Australia historically have largely depended on their mineral wealth. Furthermore, the extraction of non-oil minerals is regarded as a strategic factor for the inducement of future economic and industrial development. Chapter Four reviewed the minerals industry in Nigeria and Chapter Five specifically focused on oil sands. As a result, the research concludes that Nigeria is adopting a policy of promoting the exploitation of different minerals to complement the revenue from oil, as against diversifying the broader economy by using the minerals sector as a catalyst. The research, therefore, argues that a far less obvious means of promoting diversification, but one that is more important to the Nigerian context, is the use of mineral revenues to promote structural change in infrastructure and society through good governance, transparency and accountability. With poor administration and non-compliance to international best practice, mining can be as devastating as its revenues are useful.

In spite of extractive industries' contributions to national economic growth and development, they are inherently disruptive to the environment and impact negatively on human existence. Mining itself has a number of stages or activities, each of which exhibits potential impacts on the natural environment and communities, across a wide-ranging spatial scale. Communities in close proximity to mining operations are more prone to a larger scale of impact (Ritter, 2000). This thesis therefore concludes that there is increasing consensus that the economic contributions of mining can be maximised, social conditions can be improved, and environment degradation can be minimised if best practices are entrenched and are genuinely implemented by all mining stakeholders throughout the stages of the mining cycle.

The resource curse argues that resource-abundant countries are not growing at a rate higher than resource-poor countries (Auty, 1991, 2001; Sachs and Warner, 1995). This explanation has spurred a range of theoretical and empirical work from a variety of approaches. The problem is that studies of this nature typically rely on national statistics to analyse the relationship between resource abundance and growth on the basis of cross-country, comparative studies of growth. As Davis and Tilton (2005) argue, while mineral extraction might benefit a nation as a whole, local communities usually bear the costs. Gibson and Klinck's (2005) study of indigenous communities in Canada found that although oil sands activities contribute to Canada's economic growth and global energy security, they had a detrimental social impact such as alcoholism and drug abuse, partially as a result of increased income earned from mining. This study, like that of Gibson and Klinck (2005), further emphasises the need for research into the impact of the mining sector on the local scale.

An analysis of the communities that could potentially host oil sands extraction shows how the exploration stage of mining is perceived to have a range of impacts. Thus, this research concludes that mineral extraction can be either 'nationally cursed' or 'locally blessed' and vice versa. Indeed, the Niger Delta represents the resource curse at the local scale because of "administrative neglect, crumbling social infrastructure and services, high unemployment, social deprivation, abject poverty, filth and squalor, and endemic conflict" (UNDP, 2006:9). This is an indication that the Nigerian case is doubly cursed, i.e. at the national and local level.

Since the oil sands project is new, it may turn out to locally blessed, if the following steps can be adopted. First is the identification and definition of potential host communities (e.g. such as those covered in this research). Second is to determine the baseline socio-economic characteristics of the potential communities (some of whom are also covered in the research). Third, the integration of SIA and EIA into broader assessment plan taking into account local capacity, legislation and sustainability issues. Fourth, a multi-stakeholder forum to be administered by an independent body to plan means for achieving community goals; ranging from revenue distribution, 'de-enclaving' of the mine, education and skills acquisition, conflict resolution to mine closure.

9.2.2 Research Objective Two: A GIS based on mineral titles to show their spatial distribution and identify communities that are in proximity to the various types of mining in Nigeria.

Part of the government reform to promote the solid minerals sector as a third pillar of the economy after oil and agriculture appears to have started paying off, judging by the number of mineral titles issued since the introduction of these reforms. The study found that a number of mining companies are showing interest in exploration, small-scale mining and quarrying. Chapter Six analysed the stages of mining activities in Nigeria according to the number of licences and permits issued by the Mining Cadastre Office (MCO) as at April 2009. Results from the GIS analysis identified the geographical spread of exploration, mining, quarrying and small-scale titles. A total of 2,793 titles were analysed. Out of these titles, more than half are for exploration (56 per cent), followed by quarrying (34 per cent); mining leases are about six per cent and the smallest numbers are for small-scale mining (four per cent). The spread of exploration licences across all states indicates the widespread dawn of mining.

The thesis presents pioneering research in a Nigerian context by identifying the scale of the potential impact of mining based on the analysis of mineral titles and settlements. Mining and settlements datasets were overlaid to understand the effects of mining licences on the built area and natural environment. The analysis shows that mining licences are issued in both virgin and inhabited areas Licences are issued on local lands, farms, construction areas, water sources, forest reserves and protected areas, and some were issued where there are existing communities. In the absence of a legally established buffer zone in Nigeria, the study had to use buffer zones based on legal requirements elsewhere. A buffer zone similar to those required in Scotland, Canada and Australia was used to determine the proximity of settlements 'within' or 'near' a mining licence area. In this context, using a 100-150 metre buffer zone revealed that 10 per cent of all the settlements in Nigeria either fall within or are located on the perimeter of a mining licence. Exploration licences are offered on over 3,600 settlements, representing about eight per cent of the total settlements in Nigeria. Sixty one local governments, home to 12 million people (eight per cent of Nigeria's population) have active mining licences. Exploration is an extensive programme with limited impact on the surrounding communities. The impacts begin to expand through construction and into the production stage.

The MSMD (2010) suggested surface operation as the eventual extraction method of oil sands projects. Thus, the extraction process in the case study is probably by surface mining because the oil sands are close to the surface. In Agbabu area where natural bitumen deposits occur, they can also be surface-mined. The information in Section 5.5 and Table 6.4 is not exhaustive, but it comprehensively presents the issues associated with oil sands extraction. The risks identified can be associated with Nigeria's oil sands project, even taking into account the difference between the local environment surrounding the proposed project and the boreal forest where oil sands are extracted in Canada. For the duration of surface mining, which is likely to last for generations, the affected landscape will not be available for the use of local communities. For example, over 600 square kilometres of land within a span of 100 years have been disturbed by oil sands mining operations, which in turn have destroyed boreal forests and biodiversity, and were shattered indigenous communities. The invasive nature of surface extraction and tailings disposal in Alberta tagged it the largest man-made structures on earth (Greenpeace Canada, 2009). Given the overall scale of impact of proposed mine option, there is a need for environmental management that imposes strict limits on impacts to ensure that local environmental thresholds are not exceeded.

9.2.3 Research Objective Three: Identification of the communities located within oil sands-licenced blocks to determine the case study communities.

The Nigerian oil sands belt extends through four states, Ondo, Ogun, Edo and Lagos. Meyer et al. (2007) indicated that the Nigerian oil sands deposits (about 40 billion barrels) are the largest in Africa and in the global top ten with significant development potential. It has been indicated that oil sands reserves can double the country's proven reserve of crude oil; but due to the long period of government neglect of the oil sands sector, it has remained unexploited. However, changes that have occurred in the last decade represent a systematic strategy of the government to diversify the economy, where oil sands is expected to offer an important economic advantage to Nigeria.

Mineral rights, including the rights to oil sands, are held by the Federal Government, which demarcates and grants titles to organisations and individuals. Chapter Six reported that unlike other non-oil minerals and because of its similarity to oil, oil sands are demarcated into blocks and are subject to bidding and other evaluation processes before the licences are issued. Over half of the oil sands licences are located in Agbabu and Ode-Irele in Ondo State. An analysis of the settlements indicated that 38 per cent of the 479 settlements in Ondo state fall within mining licence areas. About 80 per cent of them are located within an oil sands block on a one-kilometre buffer. A further extension of the buffer to a five-kilometre zone found that all settlements in the region are lying within oil sands blocks. These findings indicate that the impact of mining will be felt in at least one-third of the communities, since activities in the sector are now at the exploration stage. A similar approach was taken at a local scale. Irele was selected among 18 local governments because it contains the highest proportion of oil sands exploration licences. Irele recorded 41 settlements with about 145 thousand people in total. The nature of mining process suggests that some communities where oil sands will potentially be mined will simply have to be relocated or may simply disappear.

9.2.4 Research Objective Four: A detailed case study research in potential oil sands host communities.

A central aspect of this research is to explore the characteristics of oil sands communities and to investigate their perceptions of impacts of oil sands development.

In this regard, the impetus and methodological approach was influenced by the Nigerian resource curse phenomenon and in particular the Niger Delta experience, whereby the research aimed to assess the potential impact of oil sands development to communities that are near the oil sands blocks. Through this approach the research has distilled the ‘concerns’ of these communities for the first time in the history of oil sands development in Nigeria. A baseline study of the remote communities indicated that their population size, tradition, economic activities and degree of isolation correspond to the description offered by the MMSD (2002:200). The MMSD (2002:200) refers to these communities as ‘indigenous’ because the local people have special attachments to their ancient lands and cultural affinity endemic to their territories prior to and after the discovery of resources in their locality.

In the case of this study, the communities all live with hardship and scarcity. Six out of 10 of these communities represent some of the most socially, politically and economically marginalised populations; evidenced by the lack of basic social services and infrastructure, and diminished access to decision-making structures - all contributing to lower human development, productivity and income. In one instance, the nearest tarred road is about 20 kilometres and the closest health centre is about 17 kilometres. Any prospect for oil sands extraction is expected to bring security and certainty livelihood. While remote and riverine communities are poor and impoverished, the towns in the study area are home to a heterogeneous group of people with a diversified economic base ready to host oil sands development.

This research contests that the characteristics of the remote communities are closely linked to the case of ‘conditional resource communities’- i.e. communities that are host to mineral resources - but that they are marginalised because of government's thinking that the start of resource extraction in the immediate future would displace them. This is evident in the way that the remote communities exist without infrastructure and accessibility and are not sure of their long-term existence as a community. Remote communities depend on their natural environment for survival and therefore have 'strong opposition' towards any negative externalities associated with oil sands. Given the limited knowledge of oil sands, the arrival of exploration is viewed as an opportunity to improve their lives: but when exploration fails to fulfil expectations of communities, it may be difficult to ascertain the establishment of future good relationships (Wiriosudarmo and Lestari, 2001:21). The provision and improvement of infrastructure, poverty alleviation, and business and job opportunities correspond to Ritter's (2000) assertion that employment creation and income generation are the most important direct benefits local communities gain from resource extraction. Some of the negative perceptions include loss of agricultural land, displacement and compensation, and social vices.

Communities' perceptions of environmental impacts were patently negative, particularly in areas where damage to the ecosystem and economic activities is evident even before the start of production. The perception shared among community members was that oil sands development will damage the quality of water sources, resulting in loss of biodiversity and destruction of both economic economically valuable plants and animals - these were recognised as immediate impacts. Contamination of air and emission of chemical substances are impacts perceived to come with full project development. These issues are not different from those experienced in parts of the world that exploit similar resources (Bridge, 2005; Environment Canada, 2009a; Miranda et al., 2003; Rogner, 2000; World Resource Institute, 2002). Most scholars and analysts however would concur with the judgement that the understanding of impacted communities' characteristics, needs and concerns would constitute the most critical imperative for community engagement strategies. It is important to note that the mining industry cannot live without consultations and dialogues with the communities the state and federal level. For example, Wiriosudarmo and Lestari (2001) espoused that environmental issues range from local to global and so would require proportional dialogue at all levels.

Direct communication between the government and the communities concerned just does not exist and the gap continues to increase. Having been excluded from activities in the oil sands sector, the communities are unfamiliar to a great extent with the consequences of oil sands development. The lack of information on the current status of the oil sands projects and the various unfulfilled promises has subsequently infuriated the communities. In the first instance, the federal government was blamed for lack of information during the oil sands bidding process. Second is the belief that companies are being selected secretly without communities' consent. Third, the government may have finally decided to abandon the projects. Considering the attitude of government towards the communities, *Oba* Claudius Olanrewaju-Lebi grimly summed up the lack of communication: "a tale of disappointment, deception, endless promises, and as in a movie, the story is suspense". Transparency and communication can prevent mineral-based conflicts, whereas secret company-government agreements harbour conflict (Bray, 2003).

To resolve situations of this nature, the government should keep the communities informed about major developments in oil sands through the channel of the local authority. In situations where there is too much concentration on the ‘power centres’, the majority of the residents can be marginalised. The establishment of community relations in the earlier stages of oil sands mining should be institutionalised and sustainable throughout the mine cycle to resolve issues of interest to the communities. This way, the likelihood of tension will be minimised and over-expectation during the exploration stage can be avoided.

Despite the perception that the government and industry are indifferent to the communities, there is a powerful sense of resolve that companies should conform to established regulations before starting any extraction. By so doing, they will enjoy peace from their host:

> Our people are by nature tolerant and are willing to give up whatever it takes to make the project work...if investors come and cooperate with us, certainly we will reciprocate by partnering with them so that our people can also benefit. We can guarantee their security together with government security agents (Ode-Irele Pers. Comm., 2010).

This commitment agrees with Bridge’s (2004) view that dialogue between extractive industries and communities of interest reduce the risks of antagonism. In any case, a key factor that may determine a community's ability to partner in oil sands development is its pre-existing social organisation and strong desire for development.

The current strategy of oil sands development is still a long way from accommodating the basics of good governance. As suggested by the experiences of Canada and the case study, the potential for local impacts and the emissions of carbon makes investments in oil sands a high-risk venture. The risks are heightened by the current lack of transparency and communication about the projects' potential impacts and the lack of participation and engagement of the involved communities. Unless it can be genuinely demonstrated that the costs identified can be fully mitigated and the benefits maximised and sustained, the oil sands projects should not continue and alternative means of sustaining the communities should be proffered. Given the extent of the resources and possible impacts, and Nigeria's weak governance and poor enforcement of environmental laws and regulations, it appears doubtful that the government can collaborate with investors to produce a credible and sustainable risk management plan. Real lessons can indeed by learnt from the experience of Alberta.

It is possible for mining to contribute to the development of local communities in a variety of ways, mostly through some of the benefits outlined in the case study. However, mines have a finite life span and the different stages of development exhibit different levels of impact through the value chain activities. The impacts are not static - they change in terms of scale and intensity from exploration to mine closure - thus making it difficult to sustain benefits while necessitating the need for dialogue. Host communities' expectations of a greater share of the benefits of the finite resources are clear. The underdeveloped and impoverished state of remote communities makes them expect realisable benefits in return for the loss of their lands and other impacts. Therefore, if mining oil sands is to contribute to the sustainable development of the communities, the benefits must far outweigh the costs, and must continue long after mine closure. The structure in Figure 9.1 shows the steps to obtain the greatest benefits from mining for communities' sustainability and poverty reduction. In the figure, the steps taken should be executed out throughout the various phases of mining.

Data collection

The gathering of data on mining to include geological resource, fiscal, economic, social, and environmental impacts of the mining industry. Data can include size of mining operations, location, production, revenues, investments, financial performance, employment, exports and imports, sources of local supplies, and impacts on local communities and regional and national economies.

Consultation

Well-designed consultation processes are an effective measure for understanding local impacts, both for the company and for the government. Focus can be on health and environmental issues, as well as issues pertaining to local communities' patterns of opportunity and income.

Clear objectives and Sound policy environment

•A sound policy framework that take into account early planning for mine closure and effective mitigation of negative health, environmental and social risks.
•A sound licencing regime which provides a level playing field, with ease of entry and responsible exit, freedom from political interference and selection of companies with mining pedigree.
•A regulatory regime that address questions of ownership, land and water use, socio-environmental standards, procedures for public consultation and information, and occupational health and safety standards, ensuring responsibilities are clarified, implementation is monitored and information and education is provided.
•The adoption of international regimes through national primary legislation.

Information and Communication

•Allow communities to narrate their own accounts, in tandem with a company, of the potential effects of mining development.
•Factors, such as readability, literacy level, language understood and preferred channel will need to be considered when developing or disseminating information at the community level.
•Local resource centre to coordinate the flow of information about a specific mine
•Clearing houses that offer information on impacts agreements, community-company agreements, and social and environmental impact assessments.
•Encourage communities to disseminate information in which stories, experiences, technical data and useful information are shared among stakeholders and the wider international community.
•Capacity-building programme to enable communities to participate in mining development decision making.
• Community members can be trained to monitor socio-economic or environmental changes experienced in their communities.

Revenue distribution, Projects and Linkages

•Change in policy that would allow collection of moderate portion of excise tax; imposition of real estate tax on mining companies and certain percentage of operation cost to be donated to a development plan used at community level.
•Establishment of an investment fund whose purpose is to spread some of the wealth derived from mineral operations across a broad swath of the population
•Equity contribution from any project developed as a result of exploration on the land of the communities.
•The funds disbursed to communities from mining should be paid into a local economic development fund and revenue distribution to be decided through decision-making structures involving representatives of the affected stakeholders.
•New structures and guidelines to handle the distribution and sustainable use of compensation and other monies in line with best practices.
•The incorporation of mining into local development plans to assist in sustaining benefits and ensuring a diversified resource base.

Gender Disparities

•Providing access to project services and through direct and indirect employment.
•Provide neo-natal health care for women in host communities.
•Access to bank lending to women to encourage diversification.
• Incorporation of women in consultation.

Figure 9.1: Steps for maximising local impact of mining. With acknowledgement to Weber-Fahr et al. (2001) and Gibson (2001).

9.3 Reviewing the Research

This section of the thesis provides a critical reflection of the research, outlining the main contributions of the study and noting key limitations.

9.3.1 Contributions of the Study

This research makes significant contribution to existing knowledge in resource geography, resource curse and the wider human geography community. It takes a distinctive approach to the study of mining communities, analysing in detail the perceptions and concerns of communities awaiting the exploitation of oil sands in Nigeria. The design was to identify mining communities as a 'noun' by location, and an 'adjective' by the characteristics and diversity of the communities, as against relying on the definition of 'communities' contained within government documentation. The identification of communities as stakeholders is a 'best practice' that should be considered during the early stages of the mining cycle (ESMAP, World Bank and ICMM, 2005). The relevance of this fundamental practice is the ability to identify who the communities are by their proximity to mining licences. Hence the actual communities where the resource economy hits the ground are taken into context, as against measurement of the impact when resource becomes operational, which form the basis for the resource curse thesis.

Considering mining as a localised activity, the study used geographical techniques to identify mining activities at their various stages of development. This is the first study to use a geographic information system (GIS) to map the distribution of mineral titles in Nigeria in order to understand the spread of these activities and their possible impact on existing communities. This research has added another dimension to the literature in human geography, proving that GIS tools applied to resource development can be used in communities affected by mining based on proximity in Nigeria. If this idea is adopted, it must also be accepted that information gathered in this way can help to fill some of the knowledge gaps and to establish mining buffer zones when dealing with mining communities. In practice, the approaches described in the thesis can be adopted by the Mining Cadastre Office to enhance the issuance of mineral titles, taking into account existing communities, protected areas or locations where mining is prohibited.

This research has added to the resource geography literature, shedding light on the growing concerns about national government benefitting from mine development, while the communities bear the consequences of such development. The changing landscape of mining and the emergence of global concerns about communities will reshape the way resources are developed. The emergence of Nigeria as an oil sands producer will no doubt challenge the view of resource development and communities' sustainability. The minerals industry, by their very nature operates at a local scale, and by the nature of their impact is geographical, local, national and global. With the opening of a new mine, there is the potential for communities to be shattered, for environments to be destroyed and for carbon dioxide to be emitted. Furthermore, this research has added to the literature on mining impacts that predominantly sits within EIA or company corporate responsibility, which focuses mainly on biophysical environment with little attention to varying communities' perception of the environment. This research suggests further investigation into conditional resource communities in areas awaiting large-scale resource extraction.

One of the challenges in the Nigerian minerals industry is the increasing conflict between operators and host communities (Madueke, 2009:26). Moreover, Nnimmo (2003) comments that: “Nigerian government and its co-promoters are silent on the social and environmental costs of bitumen exploitation and how to mitigate those costs”. Therefore, another important contribution of this thesis is the examination of the oil sands host communities. This is also the first study to conduct empirical research in some of the remote areas that are host to potential oil sands development. Advancing knowledge of this nature follows best practices by ensuring that community issues are identified and understood, options are provided for resolution, and foundation is laid for appropriate choices to be made in the future. Lack of similar studies in the early stage of oil extraction has led to community protests, conflicts and even confrontations that have affected the Nigerian economy.

9.3.2 Research Issues

On the whole, both the first and second fieldwork research phases in Nigeria progressed smoothly, despite logistical delays. The first fieldwork phase was a resounding success; within four weeks all the data required were accessed. Although the second fieldwork phase started six months behind schedule, the amount of information obtained was significant. Focus groups, direct observation and interviews were conducted within three months. The timely and sensitive nature of the study is indicated by the level of access granted to high-ranking government officials, official records and communities.

This research, however, is not without some limitations: to some extent the methodology was constrained by certain circumstances beyond the researcher’s control. As pointed out in Section 3.8, the second-stage fieldwork was affected by logistics, limited finance, bureaucracy and language barriers. Despite acquiring a cross-section of participants for focus groups in all the communities visited, the thesis would have benefited from more direct observation of the wider community; for example, to assess how oil sands is affecting farming and sources of water, as indicated in some of the visited communities. A further limitation of this research is the absence of investor participation, in the form of interviews. Considering the role investors played in the past, it would have been desirable to hear their side of the story. As one of the conclusions of this thesis is the need for a tripartite partnership (government, communities and investor) for improving socio-economic benefits and minimising environmental footprint, interviews with potential investors would have been invaluable. In this regard, the researcher attempted to establish contact with potential investors, but his actions were without success. Nonetheless, this research has achieved its aims despite these limitations.

Attending local seminars, conferences and community events are the common means for the dissemination of the research findings, in addition to publication in journals for wider knowledge dissemination within the academic community. Other methods being considered are a research summary document and a policy brief. Key findings in the form of a research summary document are to be made available to potential investors.

9.4 Implications for Policy

The commercial quantity of solid minerals in Nigeria is substantial and can be harnessed for human, industrial and technological development. Therefore, mineral development strategies should be harmonised with the wider framework for economic diversification, especially given the increasing global demand for mineral resources.

Nigeria views minerals as being critical to the economy, but does not appear to ascribe sufficient credence to the importance of mining-related secondary and tertiary sectors. A mining investment code should, therefore, give equal weight to the development of mining sectors and encourage the growth of linkages. To successfully reform the mineral sector, which has historically been overwhelmed by fraud and excessive bureaucracy, global best practices need to be entrenched. Adoption of global initiatives such as the EITI represents a significant acknowledgement of the importance of transparency and accountability for resource wealth. The Nigerian chapter of EITI has since been institutionalised; as such this research suggests that the autonomy of NEITI will be a means of addressing some of the issues of the resource curse, particularly in the wake of the rush to non-oil minerals. The entrenchment of global best practices in the Nigerian mining sector can be achieved if IFIs and donor agencies mentioned in Box 1.1 support the implementation of administrative, fiscal, environmental and investment risk regimes optimally and transparently. Any violation of global best practice in oil sands dealings should be sanctioned as in the case of Kimberly Process and Zimbabwean mining. The role of the civil society can extend the role of EITI to include contracts and licencing that ensures only credible and reputable companies are involved in oil sands operations.

The vast potential of oil sands for revenue generation for the government and profit for companies demands laws and regulations to govern how regulators and producers conduct their business. Oil sands laws in Canada, for example, address matters of tenure, royalty, drilling, conservation and environmental protection and restoration that are specific to the industry. The same can be demonstrated for oil sands in Nigeria in the future rather than a generic mining act that covers all non-oil minerals. Similarly, a specialised institution - not a committee - with expertise in the industry would be better suited to administer the law and regulate the industry, just like the Department of Petroleum Resources (DPR) in the Nigerian petroleum sector, and the Energy Utilities Board (EUB) for the Canadian oil sands. The primary regulatory body will be responsible for shaping most of the economic, social and environmental policies that guide oil sands development. As production is envisaged in the near future, the policy problems that remain unresolved will only increase. For example, Nigeria has no policy concerning the release of greenhouse gases (GHG) by future oil sands projects. It could run into the same problems as Canadian oil sands in the EU were they are considering banning imports because of the high GHG emissions. Part of the environmental policies to limit oil sands GHG emission is setting up an absolute limit on emissions, instead of reduction per unit of production, as is the case in the oil industry. In such instances, only projects with adequate social and environmental plans would be granted permits.

The GIS has multiple applications in mining cadastre administration with tools to gather, compile, process, display, analyse, and archive extensive volumes of data, and the MCO has the potential to apply GIS in such administration. However, this modern approach can only succeed if executed in a transparent manner, and with strict compliance with and recourse to the Mining Act. This research suggests that information about settlements; the environment and areas excluded from mining should be obtained and integrated in the cadastre system, to avoid future conflict.

Finally, the government at all levels must be fully involved in addressing community issues. Responses gathered suggest that the government at the federal level is not communicating with the communities and the local state. Hence, the people are apprehensive about economic deprivation, cultural displacement, sustainability and the government's apathy towards them. These perceptions and concerns, whether real or imaginary, are bound to affect the government's desire to attract foreign investment. In order to restore confidence, free and informed consent from the communities must be obtained prior to the approval of a mineral project, as contained in the United Nations Declaration of Indigenous People and the Nigerian Mining Act. The communities should be allowed to participate in decisions related to social, economic and environmental impacts at all phases of the mining operation. Situations where just a small number of people are selected, who are often accountable to themselves, or to the chiefs and elders, rather than the wider community, will also lead to a lack of trust in the government and investors among the community members. In order to avoid any agreement or initiatives from just staying on paper and effectively being ignored in the future, an implementation or monitoring team comprising government officials, civil society, community members and company representative should be constituted.

9.5 Areas for Future Research

The following areas are suggested as a further extension of this research project.

9.5.1 Diversification to Solid Minerals

The research highlighted plans to develop the solid minerals sector to raise the current GDP contribution of the sector (Ishola, 2008; MSMD, 2008a). The rapid development of the mining industry in the country could increase the sector's contribution to the national economy. The thesis, however, disagrees with the government that developing the oil sands sector is an economic diversification strategy. Since both oil sands and crude oil have similar geological and chemical characteristics, reliance on both of them cannot be regarded as *economic* diversification but *resource* diversification. Nigeria's case for promoting the exploitation of oil sands in a situation where Nigeria is heavily dependent on oil further exposes the country to boom and bust cycles of this commodity. Furthermore, given Nigeria's bad reputation in the oil sector, the case study confirms the possibility of trepidation concerning the conventional oil conundrum in the oil sands sector. The huge revenue derived from oil has not led to any meaningful development in the communities, but rather the spread of poverty and declining human development. Nonetheless, more research could be undertaken on how mining can be a basis for or catalyst of developing the broader economy, with a with a particular focus on the positioning of the six strategic minerals particular focus on the rest of the six strategic minerals (gold, iron ore, limestone, barite, lead/zinc and coal)to contribute to national development.. This type of study would add to the body of knowledge on the potential contribution of solid minerals to the Nigerian economy, and their impacts. In addressing one of the limitations of this study, future research on the six minerals should include discussion with the investors regarding business environment and host communities.

9.5.2 Economic Viability of the Nigerian Oil Sands

The development of oil sands is highly dependent on the level of demand. As the global demand for this unconventional oil rises, countries (such as Canada and Venezuela) are striving to harness their oil sands wealth by granting more permits and licences to investors. An extension of the oil sands element of this research would focus on the feasibility of developing oil sands for import substitution and revenue generation, relative to crude oil production. An essential part of this research could explore how to integrate the development of oil sands into the mainstream national economic framework, because at present oil sands is not tied to the economic vision and development plans of the country. Another issue is to consider the possibility of harmonising inter-ministerial issues relating to oil sands extraction.

9.5.3 Communities Matter

A similar approach could also be applied to a case study of communities that are neighbours to active mining operations. As indicated, the impacts of mining are more pervasive in areas of newly-established operations or those at the point of closing down. This strand of research has emerged from Chapter Six, where mining licences are found to be overlapping in a number of neighbouring settlements. Such studies could focus on the impact of solid minerals production on the communities' livelihoods; consider any compensation issues; and identify money received from the government and mining company and how it was utilised in the communities. This study could measure the 'resource curse' phenomenon at host-community level during mining production, and findings would add to the body of knowledge on the local scale of resource curse, as against relying only on country-level measurements as in work by Auty (1993), Ross (1999), and Sachs and Warner (1999).

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Appendix One: Energy Map of Nigeria

Appendix Two: Mineral Resources Map of Nigeria

Appendix Three: Sample of Focus Groups Leading Questions

1. Tell me a little bit about your community.
2. What are the infrastructures available in your community?
3. Can we talk a little bit about your daily life?
4. Do you know what bitumen is?
5. Any idea why I am here to talk about bitumen?
6. When was your first contact with bitumen?
7. Was there any bitumen activity in the past or at present in your community?
8. Can you tell me why there is or there is no bitumen activity?
9. Let's talk about your first contact with any government agent or company staff
10. What is your understanding about the benefits of bitumen?
11. Did you benefit anything from bitumen drilling in the past?
12. Now, let's talk about the good benefits of bitumen
13. I understand some communities benefitted from bitumen in the past. Are you one of those communities?
14. What about the negative side of bitumen? Any experience?
15. Has any aspect of your community or life changed since the drilling of the past?
16. Will you agree to relocate if need be for the development of bitumen?
17. What are your expectations?
18. Any specific needs from community leaders, elders, youths and women?
19. How do you think you can partner and in what capacity?
20. Any other issue of interest that you will like us to discuss?

Appendix Four: Sample of Interview Questions

Researcher (R): Bitumen has been on the sheet of government programme for a long time now. Please tell me about the current situation of the bitumen project?

R...and what is the current situation?

R: What do you mean when you say experiences of the past?

R: What do you think is the fall-out of the bitumen road show conducted in London about six months ago?

R: Do you think investors have confidence in the solid minerals in general and the exercise you are carrying? This is against the background of policy inconsistency and somersault in Nigeria.

R: There are a number of conflicts between oil majors and host communities. How are you trying to avoid conflict in oil sand belt? The communities are complaining that they are being excluded even before bitumen production commences.

R: The government has never contacted some communities regarding bitumen. Is that so?

R: Communities are an integral part of bitumen development. Let's talk them?

R: To the best of your knowledge do you think that the communities are in informed about the status of bitumen development? The communities are anxious to know where they stand.

R: Where do you want to see bitumen in the next few years?

R: Are you not over ambitious? How committed is the government?

R: Any clear policy on methods of extraction and use of bitumen products?

R: In relation to extraction, sir, is it true that bitumen can be developed on a small-scale?

R: Lastly Sir, is there any clear policy on bitumen that is tied to development plan such as the vision 20:2020?

R: Thank you for sparing the time to respond to my questions.

Appendix Five: Informed Consent Statement

Purpose of the study: The main purpose of this aspect of the research is to investigate host communities concerns and expectations of extracting oil sands in the near future. (Full details are verbally explained to the participants/communities).

Procedure: Participants will be asked to discuss among themselves and the researcher about certain key issues. Participants are freely allowed to bring out related issues of concern to them as individuals or as a community. Video and/or audiotapes will be used to record discussions. The tapes will be transcribed by the researcher only and stored in a locked cabinet.

Participant confidentiality: Your name will not be published and be shared with any other organization that is not connected to the research. Information about you will not be shared unless required by you. Permission granted on this date to use and disclose your information remains in effect indefinitely.

Participant certification:

<table>
<tr><td></td><td colspan="2">Please tick</td></tr>
<tr><td>1. I confirm that I have read and understand the information sheet for the study described in the participant information sheet, and that I have had the opportunity to ask questions.</td><td colspan="2"></td></tr>
<tr><td>2. I understand that my participation is voluntary and that I am free to pull out from the study at any time, and I do not have to give a reason for this.</td><td colspan="2"></td></tr>
<tr><td>3. I agree to take part in the study described in the participants information sheet</td><td colspan="2"></td></tr>
<tr><td rowspan="2"></td><td colspan="2">Please delete</td></tr>
<tr><td>Yes</td><td>No</td></tr>
<tr><td>Include/delete as appropriate
4. I agree to the interview/focus group/consultation being audio recorded</td><td></td><td></td></tr>
<tr><td>5. I agree to the interview/focus group/consultation being audio recorded</td><td></td><td></td></tr>
<tr><td>6. I agree to the use of anonymised quotes in written work or reports based upon this project</td><td></td><td></td></tr>
</table>

Name of Participant	Date	Signature

Name of Researcher	Date	Signature