

**Impact of oil extraction on the livelihoods of local communities
and sustainable development in South Sudan: the case of Unity
State**

By

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DECLARATION

I **Simon Pech Biliw M.** hereby declaring that the work presented in this dissertation is originally my own and has never been submitted for any award in the other institution. Proper citation and referencing has been done where information from other sources have been used.

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Impact of oil extraction on the livelihoods of local communities and sustainable development in South Sudan: the case of Unity State

Abstract

Oil explorations and activities in South Sudan and elsewhere have failed to improve the welfare of their host communities and have contributed adversely to the impact on traditional livelihood assets of the local community, such as pollution and displacement of the local communities in the rural villages of Unity State. This study examines the impacts of oil exploration and production activities on the livelihood assets of local communities as well as sustainable development in this State. The study employs the Sustainable Livelihood Framework and Sustainable Budget Index (SBI) approaches to analyse the level of community vulnerability as the result of oil production and management of oil revenues and expenditures. Survey data were collected from three counties across the five villages adjacent to the oil fields in an attempt to understand the local population's perceptions regarding oil exploration in these areas. Approximately 150 households were interviewed by means of a structured questionnaire. Secondary data for oil revenue and expenditure were obtained from Ministry of Finance and Economic Planning as well as from the Nile Petroleum Corporation.

The results of the survey provided the empirical evidence that oil exploration and activities have severely affected the traditional sources of livelihood of the local communities in this State. The findings revealed that local communities in Unity State adjacent to the oil fields are vulnerable at 0.42 in terms of their livelihood assets, due to oil extraction. These vulnerabilities included access to and availability of clean water, pollution of the environment and sanitation services in the villages, access to land for agriculture and livestock grazing. The findings revealed that oil exploration failed to improve rural communities' access and availability to loans, education, electricity, health services, transport and clean water. Furthermore, the results indicated that 49% of the households were displaced from their original places by oil

extraction. The results revealed a high level of poverty in the State. With regard to the issue of sustainable development, the study found that 98% of South Sudan revenues came from oil revenues over the period 2005 to 2012. Of the South Sudan expenditures: 33% of total government expenditures in this time frame went to salaries and wages; approximately 32% were allocated to operations and only 16% of South Sudan expenditures in this period were allotted to states. Similarly, projects and developments were allocated only 1% of the government expenditures. In terms of sectors' expenditures: the security sector received the lion's share with approximately 36% of government expenditure being allocated to security during the abovementioned time frame as compared to education, health, infrastructure and natural resources and rural development. It is concluded that oil exploration and production in Unity State posed negative threats to the livelihoods of the local communities and that the management and expenditure of South Sudan oil revenue is unsustainable. This situation calls for urgent action to reduce damage and look to the future. It is recommended that oil companies should compensate affected local population and invest in the local project which can improve the livelihoods of local communities, such as education, health, water road and so forth. On the oil revenue management and spending, the study recommends that South Sudan should invest oil revenue in to productive sectors to achieve sustainable development and to allow both current and future generations to benefit equally from oil revenue.

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ABBREVIATIONS AND ACRONYMS

BB/P	Barrels per day
BOSS	Bank of South Sudan
CEEPA	Center for Environmental Economics and Policy in Africa
CNPC	Chinese National Petroleum Corporation
CPA	Comprehensive Peace Agreement
DD	Dutch Disease
DFID	Department for International Development
DP	Development Projects
ECOS	European Coalitions for Oil in Sudan
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GNPOC	Greater Nile Petroleum Operation Company
GOSS	Government of Southern Sudan
Ha	Hectare
HHs	Households
IMF	International Monetary Fund
LVI	Livelihoods Vulnerability Index
MAF	Ministry of Agriculture and Forestry
MARF	Ministry of Animal Resources and Fisheries
MOFEP	Ministry of Finance and Economics Planning
MPM	Ministry of Petroleum and Mining
Nile Pet	Nile Petroleum Corporation
NPA	Norwegian People Aid
SSA	Sub-Saharan Africa
SBI	Sustainable Budget Index
SSCCSE	Southern Sudan Center for Census, Statistics and Evaluation
SDG	Sudanese Pound
SIDA	Swedish International Development Agency
SLF	Sustainable Livelihoods Framework
SPLA	Sudan People's Liberation Army
SPLM	Sudan People's Liberation Movement

SSP	South Sudanese Pound
SS	South Sudan
WB	World Bank
WCED	World Commission for Environment and Development
WNPOC	White Nile Petroleum Operation Company

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Although the search for oil in Sudan began already in the late 1950s, it was not until 1980 that Chevron, a giant United States company, found significant oil reserves in the Unity oil field North of the Bentiu region, currently known as Unity State. This was followed by production from the Heglig field in 1982. Currently estimates of Sudan oil reserves stand between 600 million and 3 billion barrels of oil, constituting 1% of the world oil reserves (Switzer, 2002). Wasselink and Weller (2006) suggested that discoveries of oil in most of the developing countries could be a blessing or a curse. World economies depend on production and trade of fossil fuels as the main energy source, but the production and use of these fuels are associated with severe kinds of damage to the environment. Oil production and transportation affect our human populations, animals, and marine life. Oil waste, such as dumping, production pollution and spills, wreaks havoc on the surrounding wildlife and habitat, posing a major threat which could bring about the total extinction of numerous terrestrial and aquatic species (Dabbs, 1996). Oil discoveries often also result in a battle over control of the resource and its proceeds. In Sudan, oil revenues have contributed to financing and prolonging the civil war in the Southern regions and continue to be the major unresolved border issue after the independence of South Sudan as a new state. The people who have suffered the most from the war are those living close to areas of oil-operations. Regarded as a threat to the security of oil extraction, these populations have been subjected to displacement far from their homelands (Fallet, 2010).

Various studies revealed that oil extractions have negatively impacted the livelihoods of adjacent populations. Hassan et al. (2002) point out that before the discovery of oil in the Niger Delta in Nigeria, people made their living from the exploitation of natural resources such as land, water and forestry as farmers, fishermen and hunters. After years of oil extraction in the region, the native population are no longer able to sustain themselves through farming or fishing and are barely able to obtain water to drink and use for cooking, leaving their lives in severe jeopardy due to oil spillage. Similarly, in

Unity State of South Sudan, prior to oil exploration, cattle rearing, subsistence farming and fishing were the main economic activities providing livelihoods and food security for the local people. However, leakage of contaminating waste into water sources from oil extraction sites reached catastrophic levels threatening people's lives as well as their sources of livelihood (Norwegian People Aid, 2010:1).

1.2 STATEMENT OF THE PROBLEM

Oil spills have become a global dilemma, stretching from the pristine waters of coastal Alaska to the Niger Delta of Nigeria. In South Sudan, examples of more subtle direct and indirect impacts are reported, including displacement of the local people and deforestation, even in the absence of oil spills, and are having a significant, negative impact in some areas; they are perhaps more difficult to halt or mitigate than the dreaded damages of oil spills (Cooper & Catterson, 2007). The Comprehensive Peace Agreement (CPA) signed between the Government of Sudan and Sudan People's Liberation Movement/Army (SPLM/A) in 2005 stated that the utilisation of oil as a non-renewable, natural resource should coincide with the interest of the affected regions and local population in the affected areas. The views of the people who have land rights should be taken into account with respect to decisions to develop subterranean natural resources from the areas in which they have rights and they should share in the benefits of the development phases. The people who enjoy the rights to the land are also entitled to compensation on just terms arising from the acquisition or development of land for the extraction of subterranean natural resources from the areas.

The CPA also emphasises that the contracts must ensure provision of benefits to the local communities affected. The CPA furthermore allocated 2% of the oil revenue to the producing states in proportion to output produced in such a state to contribute to the welfare of local communities. Despite all the above mentioned promises the interests of affected states and local people are largely neglected and the local communities are experiencing serious negative impacts. But compensation remains one of the most difficult issues between local communities and extracting companies. This study intends to investigate compliance with the abovementioned CPA promise in Unity state. Although oil extraction has negative impacts on the environment and the

livelihood of local communities in South Sudan and Unity State in particular, local people in oil production areas possess limited knowledge about these impacts and also very little knowledge of how the resource rent is recovered and used and of their rights pertaining to this rent for their welfare. There is also limited literature on the subject and studies on this matter are uncommon in Sudan. The current study contributes to improving the overall knowledge of how oil extraction affects the environment and livelihoods of local people in the oil regions. Given the massive oil resources and extraction activities in South Sudan, this study attempts to assist in generating critical information and analysis of the said impacts for, specifically, the policy makers and resources management and development planners within the Government of South Sudan, and other interested and affected stakeholders. The study also contributes researched knowledge and information on appropriate options and courses of action for recovery of the oil resource rent, and investment of the appropriate share of it in local socioeconomic development to compensate local communities for the negative impacts of oil extraction activities, including intergenerational equity for the depletion and liquidation of this exhaustible resource.

1.3 OBJECTIVES OF THE RESEARCH

The main purpose of this study is therefore to examine how the oil extractions affected livelihoods of local communities and sustainable development in Unity State. The main goal of this study is to achieve the following specific objectives:

- To investigate how the livelihoods of local communities are impacted by the ongoing oil extractions, particularly from the perspective of their agricultural, fishery and forest resources;
- To evaluate the contributions of the industries involved in oil extractions to improving the welfare of affected local communities and to determine how the resource rents from oil extraction proceeds are spent;
- To examine any potential or existing relationships between ongoing social, economic and political conflicts and oil extraction in the study area;
- To provide recommendations to improve oil extraction management and policy measures that would mitigate the impact on the environment and welfare of

local communities and identify options for desirable investments in socioeconomic development for better livelihoods in the affected region.

1.4 HYPOTHESES OF THE STUDY

To achieve the above stated objectives, this study tests the following hypotheses:

- Oil extraction companies invest very little, if any, of the proceeds from oil production on prevention and mitigation of the damages caused and on socioeconomic development in the region;
- Only a very small share of the resource rent is recovered by the government in the form of taxes and levies (or through sharing arrangements);
- The right of local communities to the resource rent is not considered at all and hence they gain no benefit from oil extraction.

1.5 ORGANIZATION OF THE STUDY

The remaining parts of the research are arranged in the following order: Chapter two provides critical analytical literature on South Sudan. It also gives detailed information for the area of the study in term of socio-economic status, oil reserves and company operations in the area. Chapter three presents a literature review of experiences and theories in Africa and elsewhere of natural resources extraction with particular emphasis on the impact of oil extraction on the livelihoods of local communities and sustainable development. Chapter four addresses the approach and methods employed in this study. Chapter is a discussion of the study findings with chapter six presenting the conclusions and implications of the study.

CHAPTER 2

ROLE OF OIL IN THE SOUTH SUDAN ECONOMY

2.1 INTRODUCTION

As a result of the Comprehensive Peace Agreement (CPA) signed in 2005 between the former rebel movement Sudan People's Liberation Movement (SPLM/A) and the government of Sudan, South Sudan (SS) became independent on July, 9, 2011. This took place following a historical referendum on self-determination in January 2011, to bring an end Africa's longest war of 21 years. SS has a population of 8.26 million, with only 1.4 million of them living in the urban areas, compared to the 6.9 million who live in the rural areas (SSCCSE, 2009). About 83% of rural populations depend predominantly on subsistence agriculture (GOSS, 2011). Table 2.1 illustrates the South Sudan population distribution by areas.

Table 2.1: South Sudan population distribution by areas

	South Sudan	Urban	Rural
Total population	8,260,490	1,405,186	6,855,304
Male	4,287,300	754,086	3,533,214
Female	3,973,190	651,100	3,322,090
Average Household size	7	9	7
Percentages	80	75	91

Source: SSCCSE (2008)

Table 2.2 presents the South Sudan population distribution by state and gender. In a comparison with other states, Jonglei is the most populous state in South Sudan, consisting of 16.4 % of the population, followed by the Central Equatoria State with 13.4% of the population; the least populous state being Western Bahr el Ghazal which has a population of more than three hundred thousand people, representing 4% of the total South Sudan population.

Table 2.2: SS Population distributions by states, gender and percent

State	Total	Male	Female	Percent
Upper Nile	964,353	525,430	438,923	11.7
Jonglei	1,358,602	734,327	624,275	16.4
Unity	585,801	300,247	285,554	7.1
Warrap	972,920	470,734	502,194	11.8
Northern Bahr el Ghazal	720,898	3481,290	372,608	8.7
Lake	695,730	365,880	329,850	8.4
Western Bahr el Ghazal	333,431	177,040	156,391	4
Western Equatoria	619,029	318,443	300,586	7.5
Eastern Equatoria	906,161	465,187	440,974	11.0
Central Equatoria	1,103,557	581,722	521,835	13.4
South Sudan	8,260,490	4,287,300	3,973,335	100.00

Source: SSCCSE (2008)

Table 2.3: SS population distributions by age groups and gender

Age group	Total	Percent	Male		Female	%
			number	Percent	number	percent
Total	8260490	100	4287300	51.9	3973190	48.1
0 - 4	1308691	15.8	687946	8.3	620745	7.5
5 - 9	1300145	15.7	687620	8.3	612525	7.4
10 - 14	1059057	12.8	569467	6.9	489590	5.9
15 - 19	874111	10.6	458580	5.6	415531	5
20 - 24	723186	8.8	359638	4.4	363548	4.4
25 - 29	688225	8.3	334530	4	353695	4.3
30 - 34	542101	6.6	259913	3.1	282188	3.4
35 - 39	475413	5.8	237495	2.9	237918	2.9
40 - 44	348116	4.2	175837	2.1	172279	2.1
45- 49	278844	3.4	150347	1.8	128497	1.6
50 - 54	201863	2.4	106306	1.3	95557	1.2
55 - 59	123794	1.5	68416	0.8	55378	0.7
60 - 64	118667	1.4	65365	0.8	53302	0.6
65- 69	74351	0.9	41916	0.5	32435	0.4
70 -74	61493	0.7	35659	0.4	25834	0.3
75- 79	29814	0.4	17710	0.2	12104	0.1
80- 84	26780	0.3	15286	0.2	11494	0.1
85- 89	11544	0.1	6943	0.1	4601	0.1
90 -94	7626	0.1	4558	0.1	3068	0
95 and above	6669	0.1	3768	0	2901	0

Source: SSCCSE (2008)

Table 2.3 reports the population of South Sudan distribution by age groups. Table 2.3 indicates that a large proportion of the population are categorised in the age groups 19 to 54, which are regarded as the most economically active age groups. In terms of gender, 51% of the population are men, compared to 49% who are women.

2.2 NATURAL RESOURCES AND POLICY FRAMEWORK IN SOUTH SUDAN

Although oil plays a pivotal role in the economy, it is not the only natural resource in South Sudan; there are numerous other potential natural resources in the country, including forestry, fisheries, livestock, water resources and mineral resources.

2.1.1 FOREST RESOURCES IN SOUTH SUDAN

South Sudan boasts extensive and diverse forests and woodland resources which are used to provide timber, poles, charcoal, food, oil and medicines for people as well as a habitat for wildlife (FAO, 2007). Rural and urban populations depend on forests for most of their livelihoods. In the urban areas, people use forests to provide timber for making house roofs as well as for a source of energy. Similarly, in rural areas, forests provide benefits to the people such as grazing land for cattle, hunting, charcoal and shade (Cooper & Catterson, 2007). These forests are commercially valuable if they are properly managed and could contribute to the creation of wealth for the country. However, it was estimated that the existing Teak plantation in South Sudan is able to generate an economic value up to 50 million USD annually in exports (FAO, 2009). The Mahogany plantations could also be used as a source of foreign exchange. Table 2.4 presents the areas covered by forest in the three larger states.

Table 2.4: Areas covered by forests and woodland and annual loss of forests in SS

Areas	Forest in (ha)	Other woodland (ha)	Annual loss	Annual percent
Greater Bahr el Ghazal	14,0481,291	4,029,122	113,958	0.6
Greater Upper Nile	15,165,707	6,33,033	76,192	0.35
Greater Equatoria	14,256,099	3,356,184	87,480	0.5

Source: FAO (2005)

2.3 LIVESTOCK IN SOUTH SUDAN

South Sudan is endowed with a huge potential of livestock resources. The economic value of livestock in the country has been estimated to be about 7 billion SSP (South Sudanese Pounds). Compared to other countries with such a small population, this huge revenue of livestock could give the country the highest per capita income in the Eastern African region (MARF, 2012). South Sudanese livestock ranks 6th in number on the African continent. The production of livestock in this country is a significant proportion of the agricultural activity. South Sudan has a total population of 38.4 million head of livestock of which 11.9 million are cattle, 13.97 million are goats and 12.6 million are sheep (FAO, 2007). Table 2.5 gives an estimated indication of the numbers of livestock. Results displayed in the table reveal that Warrap State has the highest number of livestock (6.1 million head of livestock) followed by Northern Bahr el Ghazal and Unity State with 4.6 million and 4.4 million respectively while Upper Nile State has the smallest number of livestock at 2.1 million .

Table 2.5: South Sudan livestock estimation by state (thousands)

State	Cattle	Goats	Sheep	Total
Upper Nile	990,024	650,503	447,097	2,087,624
Unity	1,188,824	1,511,319	1,784,172	4,404,315
Jonglei	1,475,096	1,423,281	1,227,409	4,125,786
Northern Bahr el Ghazal	1,590,400	1,305,897	1,657,635	4,553,932
Lakes	1,320,032	1,252,096	1,400,919	4,061,047
Western Bahr el Ghazal	1,256,416	1,183,622	1,138,833	3,578,871
Warrap	1,538,712	3,130,788	1,391,907	6,061,407
Eastern Equatoria	894,600	1,041,783	1,151,487	3,087,170
Central Equatoria	882,672	1,286,333	1,172,576	3,341,581
Western Equatoria	679,896	1,188,513	1,151,487	3,019,896
Total	11,816,672	13,974,135	12,611,522	38,402,329

Source: FAO (2007)

Despite the huge number of livestock in the South Sudan, the potential of the livestock sector is adversely affected by the disease burden, low productivity, lack of adequate market infrastructure and poor information for herders and traders. All these challenges are attributed to the lack of a policy framework strategy to govern the sector in the country (GOSS, 2006)

2.1.2 Fisheries and water resources in South Sudan

The fisheries resources in the country are under-utilised. People there use traditional fishing techniques, such as gill nets, and throwing nets and hooks to catch the fish (UNDP, 2010). Sudds are considered as a large potential source of fish in South Sudan. It was estimated that fish production in South Sudan could range from 30,000 to 40,000 tonnes of which 10,000 tonnes could be used for export to Khartoum and 20,000 to 30,000 consumed in the South Sudan (Ministry of Animal Resources and Fishery, 2012). The maximum sustainable yield of fisheries was estimated to be 180,000 tonnes, an equivalent of the economic value of USD 300 million (MARF, 2012). The potential of the fisheries sector in South Sudan has been affected by inadequate fishery management, the lack of a policy, strategy and legal framework, inadequate transport, energy and infrastructure. Limited human resources also pose a significant threat to this sector. In South Sudan it was estimated that there were 157 veterinary and 127 fishery officers (GOSS, 2006) and it has total natural renewable water resources of an estimated 149km²/year of which 80% flows over the borders. Water resources are key features and critically important for the development projects and ecosystems. Most of the wetland resources are located in South Sudan. They are mainly used for fishing to provide livelihoods to the local populations. Sudan consumes only 37m³ of water per year of which 96.7% is utilised by the agriculture sector while the domestic and industrial sectors consume 2.6% and 0.7% respectively

South Sudan is located in the Nile catchment area that receives its water from the highlands of the Democratic Republic of Congo, Ethiopia and Uganda (UNDP, 2010). The Nile tributaries, known as the White Nile and the Blue Nile, are the major source of wetland and water resources for freshwater fish in South Sudan. Sudd in South Sudan covers approximately 57,000 to 100,000 square kilometres of land. It is an inland composed of wetlands, lakes swamps and rivers (MARF, 2012).

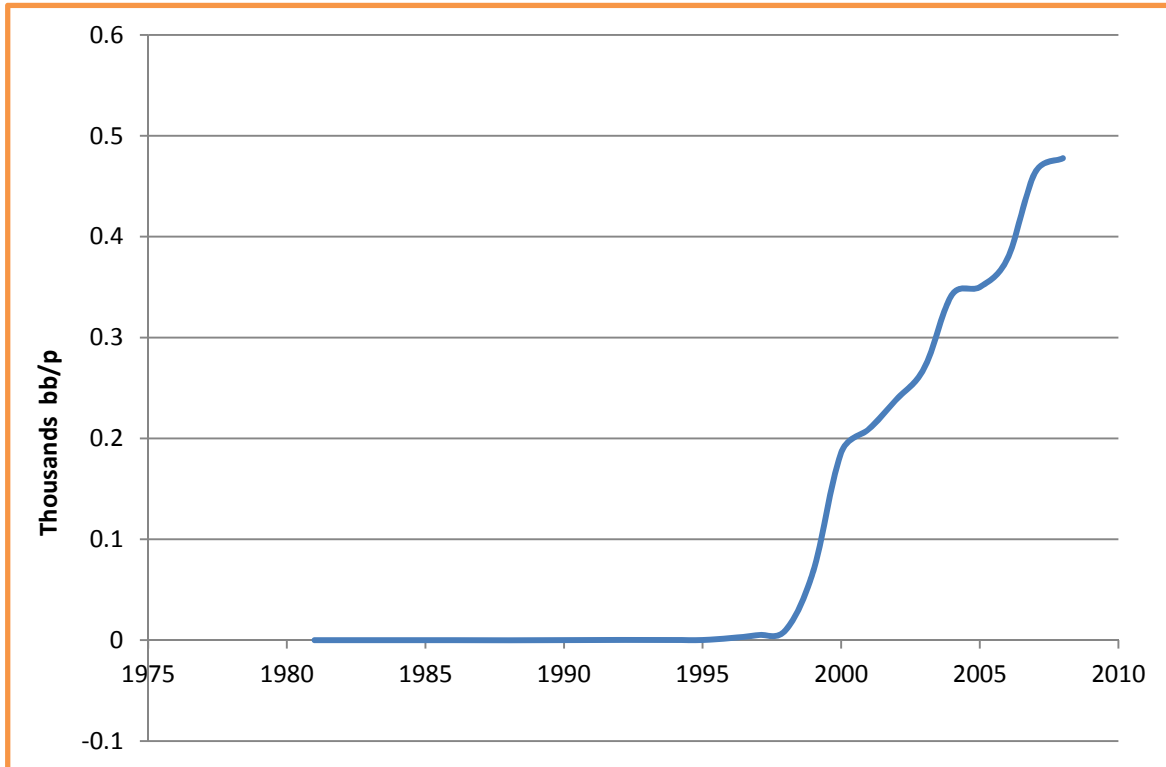
In addition to the above resources, the country possesses huge potential deposits of mineral resources, such as, iron ore, copper, chromium ore, zinc, tungsten, mica, silver, gold and hydropower (GOSS, 2010). As a part of the policy framework to manage natural resources and to diversify the economy of South Sudan, different departments have been established since the formation of the new government to address the challenges facing the specific sectors:

- Ministry of Agriculture and Forestry
- Ministry of Animal Resources and Fisheries
- Ministry of Water Resources and Irrigation
- Ministry of Environment
- Ministry of Petroleum and Mining
- Land Commission.

2.4 OIL PRODUCTION AND PROVEN RESERVES IN SOUTH SUDAN

The South Sudan economy is considered as a mineral based economy since 98% of government revenue is generated from the export of oil (GOSS, 2011). Oil is considered as the only source of foreign exchange by the country. The GDP in 2010 was estimated to be 30 billion Sudanese Pound (SSCCSE, 2010) of which oil contributes more than 71% of the GDP (FAO, 2009). Oil production began in the 1990s and became the backbone of the economy of both North and South Sudan (Gadkarim, 2010). Production of oil output in Sudan commenced at about 2,000 barrels per day (bb/p) in 1993 and by 2009 it had increased to 490,000 bb/p. A report by the World Bank in 2009 indicated that Sudanese oil production appeared to have reached its maximum output in which production is expected to reach 527,000bb/p in 2012 and will begin to decline in 2015 unless new oil fields are discovered. Oil production output has increased steadily since 1996. Figure 2.1 depicts the Sudan oil production output. The figure illustrates the continuous increase in production over the past decade. The graph also depicts the increase in production since 1996 and that it will continue till 2012.

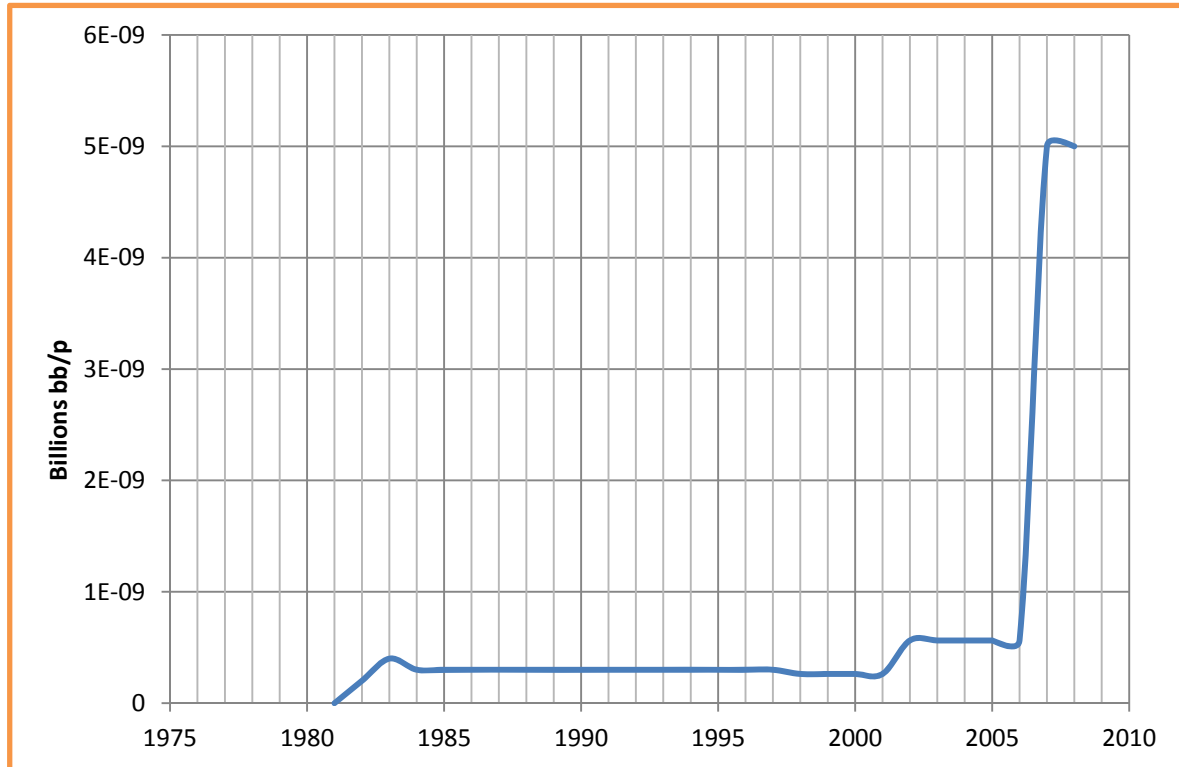
Figure 2.1: Sudan's total oil production (1980-2010)



Source: NILEpet (2010)

Sudan is currently considered one of the newest, most significant, oil producing Sub-Saharan African countries in the world. It is ranked as third largest oil producer in Africa, after Angola and Nigeria (Gadkarim, 2010). Sudan holds proven reserves of 0.5% of the world's oil proved reserves; it also accounts for 0.6% of the world's oil production (Gadkarim, 2010). Figure 2.2 illustrates the proven oil reserves of both Sudan and South Sudan. Figure 2.2 demonstrates that Sudan's oil proved reserves have increased since 1981 and that in 1982 the level of oil proven reserves remained static till 2000 when it again increased over the period 2001 to 2010.

Figure 2.2: Sudan total oil reserves estimated (1980-2012)

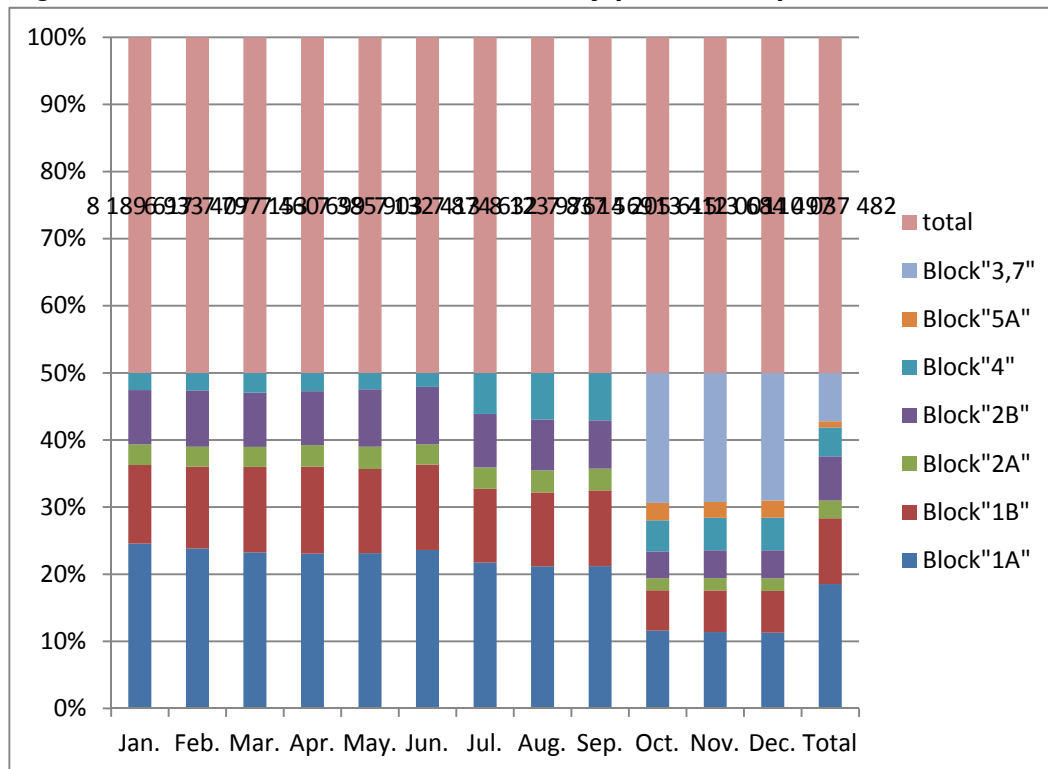


Source: NILpet (2010)

Oil exploitation made tremendous contributions to the economy of Sudan in early 1999 when the country embarked on the enterprise of exporting oil. As a result, the GDP of Sudan increased from USD 10 billion in 1999 to USD 353 billion in 2008. Per capita income increased from USD334 to USD532 based on the constant prices of 2000 while real growth rates increased from 2.5% in 2000 to 44% in 2008 (World Bank, 2010). In 2006, Sudanese exports were estimated at about USD5.813 billion, of which about USD5.244 billion (90%) were generated from oil revenues (European Coalition of Oil in Sudan, 2008). Oil resources were managed and controlled by Sudan before the signing of the CPA between the SPLM and Sudan government. However, after this signing there were dramatic changes in the oil sector management and distribution. The CPA wealth share protocol stipulated that 50% of oil produced in South Sudan territory would be allocated to South Sudan while the remaining 50% would be given to the Government of National Unity. Most of the oil fields are located in South Sudan but the pipelines that export the oil to the Red Sea terminal and the refineries are located in Sudan. South Sudan contains three main oil producing areas: the first area consists of Blocks 1A, 2A and 4 which are located in Unity State; the second area is Block 5A which is fully owned by South Sudan and is also located in Unity State; the

third area comprises Blocks 3 and 7 which are located inside South Sudan territory. Figure 2.3 presents the crude oil monthly production in 2006 by blocks.

Figure 2.3: South Sudan crude oil monthly production per blocks in 2006



Source: Nile pet (2010)

2.5 SOUTH SUDAN OIL WEALTH AND REVENUES

An estimation of USD38 billion for South Sudan's total oil wealth includes the estimates of future revenues of the existing oil fields (GOSS, 2011). Until July 2011, GOSS shared the oil revenues with Sudan as per CPA provisions. The GOSS's shares of oil revenues have been sharply increased since the signing of the CPA. Table 2.6 reports the monthly oil rents which were received by the government of South Sudan from 2005 to 2009 and which reached their highest peak in 2008 as compared with other years. It also indicates that oil revenue windfalls could be attributed to a global oil price surge that occurred in 2008. However, it further reflects that the shares of South Sudan were also badly affected by the dramatic decrease of oil prices in 2009. Table 2.6 indicates that South Sudan oil revenue shares increased from USD798.4millions in 2005 to USD2888.11millions in 2008.

Table 2.6: Government of South Sudan Oil Revenue Share (USD Millions)

Months	2005	2006	2007	2008	2009
January	0	72.4	93.2	231.39	42.07
February	21.2	61.4	60.66	158.48	30.84
March	47	77.9	44.53	237.14	54.5
April	70.9	86.8	85	217.09	51.6
May	70.5	93.1	120.04	207.06	63.43
June	53.9	94.5	113.54	278.47	70.43
July	87.2	84.8	139.55	381.95	
August	102.9	85.6	153.57	370.65	
September	65.9	81.1	97.92	264.32	
October	73.6	73.5	208.36	272.04	
November	96.8	85.8	160.17	150.74	
December	108.5	54.6	181.29	118.78	
Total	798.4	951.5	1457.83	2888.11	

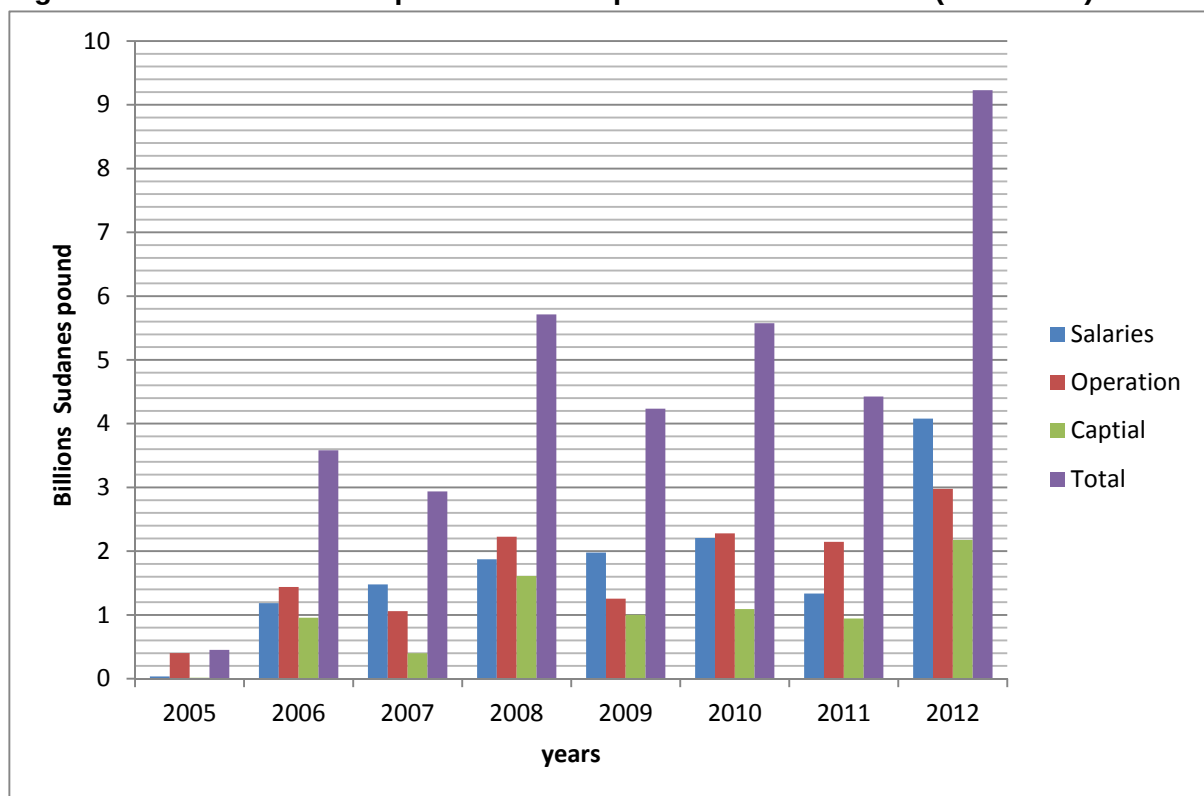
Source: MOFEP (2009)

2.6 MANAGEMENT AND SPENDING OF OIL REVENUES IN SOUTH SUDAN

Natural resources theory advocates that mineral economy countries need to achieve sustainable development by ring-fencing a portion of revenues generated from non-renewable resources and investing them in other forms of wealth to prevent the depletion of the resources and to compensate for the damages caused by the exploitation of natural resources. Oil rent which belongs to the people of South Sudan is not intended for private enrichment and it is important for the government of South Sudan to secure this rent on behalf of the population and manage it well in order to achieve fiscally sustainable development in the country (GOSS, 2011). South Sudan, as in the case of other developing countries, has adopted the production-share agreement to recover the oil rent. Public oil revenues in the world are used for immediate current consumption, public investments in domestic assets and investment in foreign financials assists. Most of the South Sudan oil rents were spent on immediate current consumption items such as salaries, operations and capital sectors. Figure 2.4 depicts the government spending of oil revenues received between 2005 and 2012. The results indicate that large portions of oil revenues which were received by the GOSS during the interim period were spent on salaries followed by

operations and then capital. These findings indicate that South Sudan is engaging in unsustainable spending on its oil revenues. Table 2.7 provides data on government expenditure allocations from 2008 to 2011 which indicate that this country is typical of other developing countries which use most of their resource revenues on current consumption. Moreover, Table 2.7 confirms that South Sudan spends most of the oil revenue on the security sector, which according to relevant theory, is fiscally unsustainable when compared to the education and infrastructure sectors. The maintenance of these sectors is essential in order to prevent the likely future decline of the wealth of a nation that currently depends solely on one form of revenue generation.

Figure 2.4: South Sudan expenditures component in SSP Billions (2005-2012)



Source: MOFEP (2012)

Table 2.7: GOSS expenditures USD millions (2008-2011)

Sectors	Year				Total
	2008	2009	2010	2011	
Security	605	607	604	587	2,403
Roads	401	444	464	491	1,799
Health	1975	193	222	234	825
Education	156	204	249	307	916
Production	30	53	67	78	229
Rural water	29	35	37	37	138
Emergency public sector reform	15	15	15	15	60
Total	1,411	1,553	1,657	1,749	6,349

Source: GOSS (2008)

In addition, Table 2.7 reveals that the Roads sector is second in terms of government expenditure followed by the Production and Rural Water sectors with the least portion of expenditure allocation. The wealth of Sudan is based on the diversity of its tribes, its people and natural resources, not on oil, which will be exhausted in a few years leaving behind a dilapidated environment. Sustainable development always needs a responsible national environmental policy with comprehensive, unified legislation and an integrated and coordinated administration. In South Sudan environmental consequences of oil exploration and production are the major sources of conflict between the government and local communities. Environmental degradation has contributed to resource scarcity and thus to the loss of traditional sources of livelihood for the Nuer and Dinka pastoralist (Switzer, 2002).

2.7 UNITY STATE ECONOMY AND OIL RESOURCES

Unity State has a total area of 37, 837 km² and is one of the ten states of South Sudan, located in the north, bordering Sudan. It is also bordered by four South Sudan states: the Upper Nile and Jonglei states on the east, Lake State to the south, and Warap State to the west. Unity State has a population of 585, 801 (SSCCSE 2008) of which, in a tribal category, about 90% of this population is Nuer. The majority of the population are categorised as being below the economically active age group with approximately 18% under age 5 and 55% under the age of 18. The state has a population density of 15 persons per square kilometre (Skm²). Table 2.8 presents

population, area and population density of Unity State by county. Mayom County is a populous area with 120, 715 inhabitants followed by Rubkona with 100, 236 inhabitants, with the least populous county being Abiemnhom with only 17, 012 people.

Table 2.8: Unity State population, areas and population density distribution by county

County	Population	Area (sq km)	Density
Unity State	585,801	37,837	15.4
Pariang	82,443	9,015.80	9.14
Abiemnhom	17,012	2,380.67	7.15
Mayom	120,715	4,970.65	24.29
Rubkona	100,236	3,597.24	27.86
Guit	33,004	3,432.04	9.62
Koch	74,863	4,397.63	17.02
Leer	53,022	1,612.54	32.88
Mayendit	53,783	3,067.23	17.53
Panyijar	50,723	5,362.90	9.46

Source: SSCSE (2008)

Table 2.9 reports primary school enrolments in the State by gender. Unity State primary school enrolments have increased from 2008 to 2009. The results indicate a gap in educational enrolment between boys and girls in this State.

Table 2.9: Unity State primary school enrolment by county

	2008			2009		
County	boys	Girls	Total	Boys	Girls	Total
Unity State total	95,283	48,820	144,104	97,205	48,019	145,224
Pariang	8,356	5,030	13,386	6,856		
Abiemnhom	1,983	1,662	3,645	1,504	1,595	3,099
Mayom	15,346	6,988	22,334	13,802	5,301	19,103
Rubkona	15,708	6,557	22,265	21,628	7,598	29,226
Guit	9,594	5,161	14,755	9,922	5,245	15,167
Koch	10,936	5,225	16,160	11,131	4,899	16,030
Leer	11,619	5,730	17,349	10,836	6,393	17,229
Mayendit	10,198	6,015	16,213	13,675	8,254	21,929
Panyijar	11,545	6,452	17,997	7,851	4,289	12,1401

Source: Ministry of Education (2009)

Table 2.10 presents sources of livelihood of people in South Sudan both in urban and rural areas by State. People in Unity State depend on agriculture for their livelihoods, with the results indicating that 69% of the population in the state depend on agriculture such as crop farming, animal husbandry and fishing. The results further illustrate that in Unity State only 11% of the population make their living by earning wages and salaries.

Table 2.10: Sources of livelihood in South Sudan by state and areas in percent

State	Crop farming	Animal husbandry	Wages salaries	own businesses	Prosperity income	Remittance	Pension	Aid	Others	total
South Sudan	71	7	11	3	1	0	0	0	7	100
Upper Nile	45	14	20	9	2	0	0	0	10	100
Jonglei	73	13	8	1	0	0	0	0	5	100
Unity	59	10	16	4	0	0	0	0	10	100
Warrap	82	5	4	2	0	0	0	1	6	100
N.Bahr el Ghazal	79	1	6	5	0	0	0	0	7	100
W. Bahr el Ghazal	63	1	21	8	1	0	1	1	4	100
Lakes	86	3	7	2		0	0	0	2	100
W.Equatoria	90	1	6	2	0	0	0	0	1	100
C. Equatoria	57	1	19	4	1	1	1	1	15	100
E.Equatoria	74	12	6	2	3	0	0	0	2	
Urban	22	2	44	12	3	1	1	1	13	100
Rural	79	7	5	2	1	0	0	0	5	100

Source: SSCCSE (2009)

As discussed above, agriculture is a primary economic activity in Unity State. The main crops produced in the state are sorghum, maize and groundnut, and depend upon rainfall availability. Table 2.11 indicates the different areas' harvest, and cereal, production in 2009 in Unity State by county. The results illustrate that Unity State harvested 3, 708 (ha) of land in 2009.

Table 2.11: Unity State production of cereal and hectares of land harvested by county

County	Areas Harvested(ha)	Yield (t ha)	2009 gross cereal production(tones) 1	2009 net Cereal Production (tones)2	Population mid 2010	Consumption/year	Surplus/ deficit
Unity	37084	0.61	22543	18034	645465	57541	-39507
Returnees	2167	0.48	1036	829	33332	3333	-2504
Pariang	5249	0.69	3615	2892	86149	6892	-4000
Abiemnhom	681	0.78	534	427	17777	1422	-995
Mayom	5734	0.42	2413	1930	126141	10091	-8161
Rubkona	2371	0.71	1678	1343	104742	13616	-12274
Guit	1853	0.86	1595	1276	34488	2759	-1483
Koch	5132	0.67	3436	2749	78228	6258	-3509
Leer	4039	0.67	2704	2164	55405	4496	-2269
Mayendit	4263	0.67	2854	2283	56201	4240	-2213
Panyijar	5597	0.48	2677	2141	53003		-2099

Source: MAF (2009)

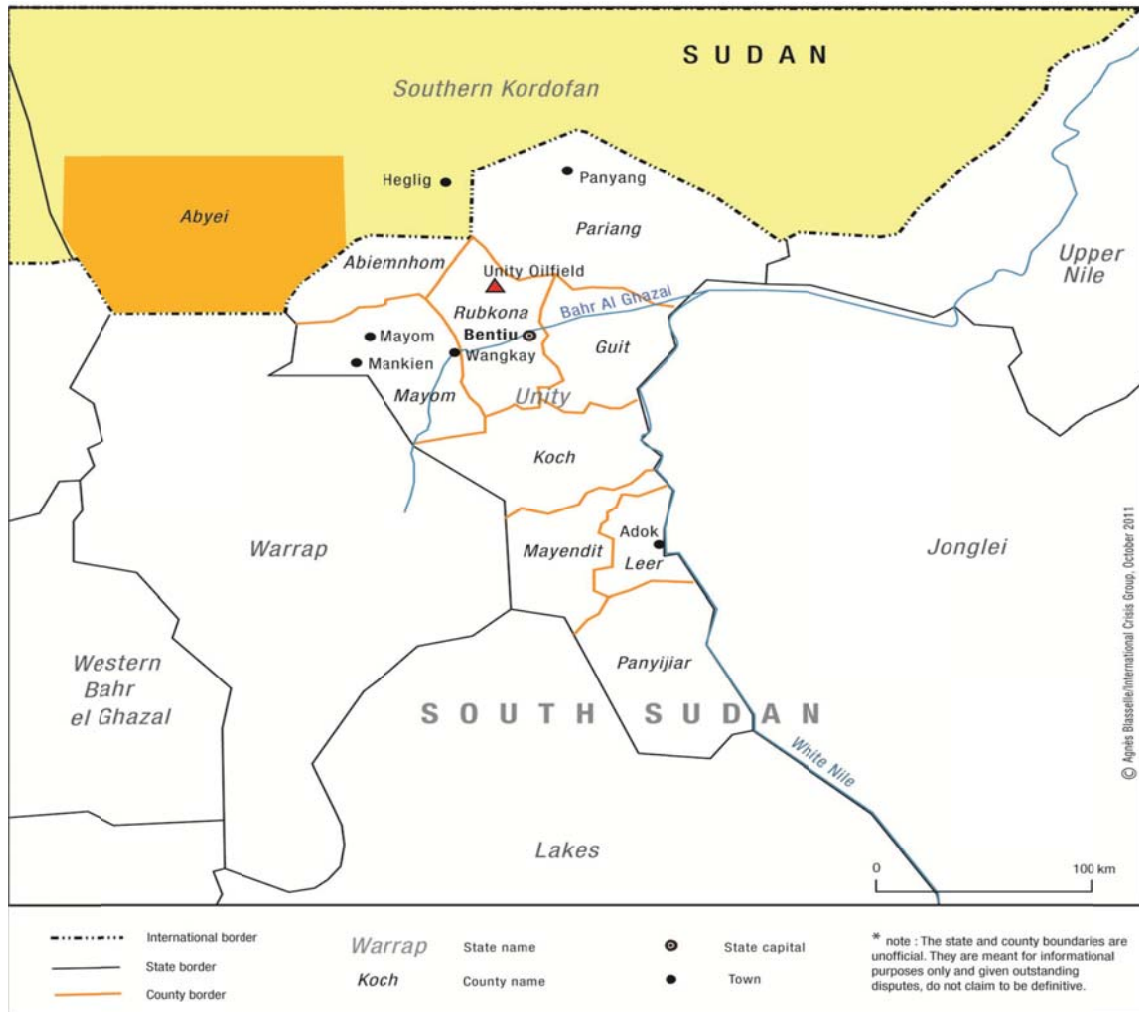
Unity State is also known for its considerable livestock capacity which is used by the local population as a source of traditional wealth accumulation. Table 2.12 records the cattle estimates from 2003 to 2009 in South Sudan by state. The results show that Unity State had thousands of head of cattle from 2003 to 2009: an estimated a total number of (by thousands) 594 head of cattle in 2004 which increased to (by thousands) 1, 230 of cattle in 2008. In comparison to the other ten states, it is third in terms of number of cattle after Warap and Jonglei states.

Table 2.12: South Sudan cattle estimation (in thousands) by state (2003-2009)

State	2003	2004	2005	2006	2007	2008	2009
W. Equatoria	678	100	680	690	701	703	675
C. Equatoria	893	881	895	908	922	926	878
E. Equatoria	881	893	883	896	910	913	888
Jonglei	1472	1857	1475	1497	1521	1526	1465
Upper Nile	988	494	990	1005	1021	1024	983
Unity	1186	594	1189	1207	1226	1230	1180
Lakes	0	1510	0	0	0	0	1311
Warrap	1535	921	1539	1562	1586	1592	1528
N. Bahr eL Ghazal	1254	750	1590	1615	1640	1646	1579
W. Bahr el Ghazal	1587	546	1256	1275	1295	1300	1248
South Sudan	10474	8546	10497	10655	10822	10860	11735

Source: MARF and FAO (2012 and 2009)

Figure 2.5: Map of Unity State



Source: International Crisis Group (2011)

2.8 OIL AND OTHER NATURAL RESOURCES IN THE UNITY STATE

As stated earlier, Unity State has huge potential in terms of natural resources such as forests, fisheries, water, animals and oil resources most of which, with the exception of oil, are exploited by the local population. This state's government, as in the case of other South Sudan states, has not yet adopted any policy framework strategy to develop these non-oil resource sectors. The local population cuts down the forest for firewood and to make charcoal commercially as a source of energy for cooking. Local populations also engage in traditional fishing to generate income. Although institutions

such as the MAF and the MARF have been established, there is a lack of proper policy and strategy to regulate the utilisation and ownership of the natural resources in Unity State, arising from the limited capacity in these institutions. However, as Unity State is an oil producer 98% of state revenue currently comes from oil production. The introduction of the oil fields opened new opportunities of income for labourers (FAO, 2008). As previously discussed, Unity State was allocated 2% of oil revenue produced in the state since 2005 as stipulated in the CPA wealth sharing protocol. Referred to in the earlier discussion, the average production of oil in both Sudan and South Sudan was estimated to be 470000 barrels per day from the all blocks (Nile pet, 2012). There are 4 oil blocks located in Unity state where oil exploration activities are taking place including (block 1, 2, 4, 5A). In 2011 it was estimated that the combined oil production of blocks 1, 2 and 4 was about 120,000 bbl/p. Similarly, block 5A was also estimated to have produced 15000bbl/p. There are two major oil companies operating in the said areas: the Greater Nile Petroleum Operating Company (GNPOC) and the White Nile Petroleum Operations Company (WNPOC). The GNPOC was given concessions in Unity State from 1996 and it has been responsible for oil extraction in Blocks 1A, 1B, 2A, 2B, and 4. The GNPOC is a consortium comprising a 40% share held by China National Petroleum Corporation (CNPC), a 30% share by PETRONAS of Malaysia, a 5% share by SUDAPET and 25% shares by Araki. The White Nile Petroleum Operation Company (WNPOC) is operating in the Thar Jal area of Unity State and is responsible for Block 5A. Table 2.13 reports the monthly crude oil production in 2006. It indicates that in 2006 Unity State produced 92.1 million of barrels a year in the four blocks located within the state. Block 1A alone produced 40.1 million barrels in 2006 followed by block 1B which produced 21.6 million barrels.

Table 2.13: Crude oil monthly production by blocks in Unity State 2006

Item	Block"1A"	Block"1B"	Block"2A"	Block"2B"	Block"4"	Block"5A"	Total
Jan.	4,024,850	1,917,819	502,088	1,325,312	419,548		8,189,617
Feb.	3,303,465	1,694,828	410,057	1,164,130	360,927	-	6,933,407
Mar.	3,625,269	1,987,393	466,555	1,260,840	457,096	-	7,797,153
Apr.	3,442,200	1,932,788	481,051	1,197,721	406,939	-	7,460,699
May.	3,416,926	1,855,272	489,069	1,263,966	360,670	-	7,385,903
Jun.	3,369,552	1,813,090	432,495	1,221,614	295,662	-	7,132,413
Jul.	3,420,893	1,731,791	503,486	1,255,258	963,204	-	7,874,632
Aug.	3,443,739	1,782,971	535,018	1,234,095	1,128,153	-	8,123,976
Sep.	3,325,042	1,768,904	505,613	1,128,971	1,109,039	-	7,837,569
Oct.	3,296,315	1,703,991	513,466	1,132,906	1,319,022	734,735	7,965,700
Nov.	3,050,819	1,664,793	491,704	1,115,305	1,298,675	635,558	7,621,296
Dec.	3,091,697	1,701,861	516,526	1,140,730	1,329,635	696,959	7,780,449
Total	40,810,767	21,555,501	5,847,128	14,440,848	9,448,570	2,067,252	92,102,814

Source: Nile pet (2006)

2.9 UNITY STATE OIL REVENUES SUSTAINABLE MANAGEMENT AND EXPENDITURES

Table 2.14 records the 2 percent of oil revenue accrued to Unity State as CPA provision. The results show that this State generated USD389.6 million from oil revenue over the period 2005 to 2009. Table 2.15 reveals that in 2005 alone, Unity State received USD45 million from oil produced in the state. In 2006 the state revenues from oil increased from USD45 to USD55 million. As referred to earlier, the global hike in the oil price in 2008 doubled the value of state oil shares from USD82.4 million to USD181.4 million in 2007 and 2008 respectively.

Table 2.14: Unity State's 2% share of oil revenues 2005-2009 (million USD)

Months	2005	2006	2007	2008	2009	Total
January	0	4.08	5.77	11.88	3.94	25.67
February	1.09	3.47	3.62	8.12	2.58	18.88
March	2.56	4.41	2.65	11.86	3.69	25.17
April	3.86	4.92	4.91	10.67	4.59	28.95
May	3.88	5.29	7.53	10.5	4.67	31.87
June	3.03	5.36	6.58	18.45	5.7	39.12
July	4.97	4.85	8.32	26.27		44.41
August	5.89	5.38	8.5	24.35		44.12
September	3.87	5.07	5.15	19.11		33.2
October	4.21	4.41	10.94	18.87		38.43
November	5.51	5.14	8.98	11.88		31.51
December	6.17	3.29	9.44	9.39		28.29
Total	45.04	55.67	82.39	181.35	25.17	389.62

Source: Ministry of Finance and National Economy Sudan (2009)

Oil rents, as for any other non-renewable resources, should be reinvested in productive investments. Theory advocates that mineral revenues such as oil revenues can be used for investment in foreign financial capital, infrastructure and human capital, public consumption as well as for private consumption, the latter by distributing some portion of revenues to citizens (Lange et al. (2003:54).

Table 2.15 describes Unity State expenditures from 2010 to 2011. The result indicates that this State spent SDG 119.4 million in 2010 in various sectors. About 26% of expenditure went on maintaining the Rule of Law, while 22% of expenditure was allocated to infrastructure. Lesser amounts of 11% and 12% were allocated for education and health sectors respectively. As in the instance of the national level, only a small portion of resources reached local levels which are heavily impacted by oil activities. Table 2.14 further indicates that Unity State transfers only 3% of its expenditure to county level with 97% of expenditures being used at state level in 2010. Similarly, in 2011, Unity State expenditures reached a total of SDG 173.4 million in different sectors, as compared to 2010 expenditures. Though there was a minimal reduction, a large portion of expenditures, i.e. 20%, were also spent on maintaining the Rule of Law in 2011. Spending on education increased from 11% in 2010 to 12% in

2011. There was a considerable reduction on spend in the infrastructure sector from 22% in 2010 to 8 percent in 2011. One of the positive, significant 2011 expenditures was sharply increased revenue transfers to local levels. Table 2.15 also indicates that revenue transfers to the counties' level increased from 3% in 2010 to 14% in 2011: reflecting an increase of 11 percent.

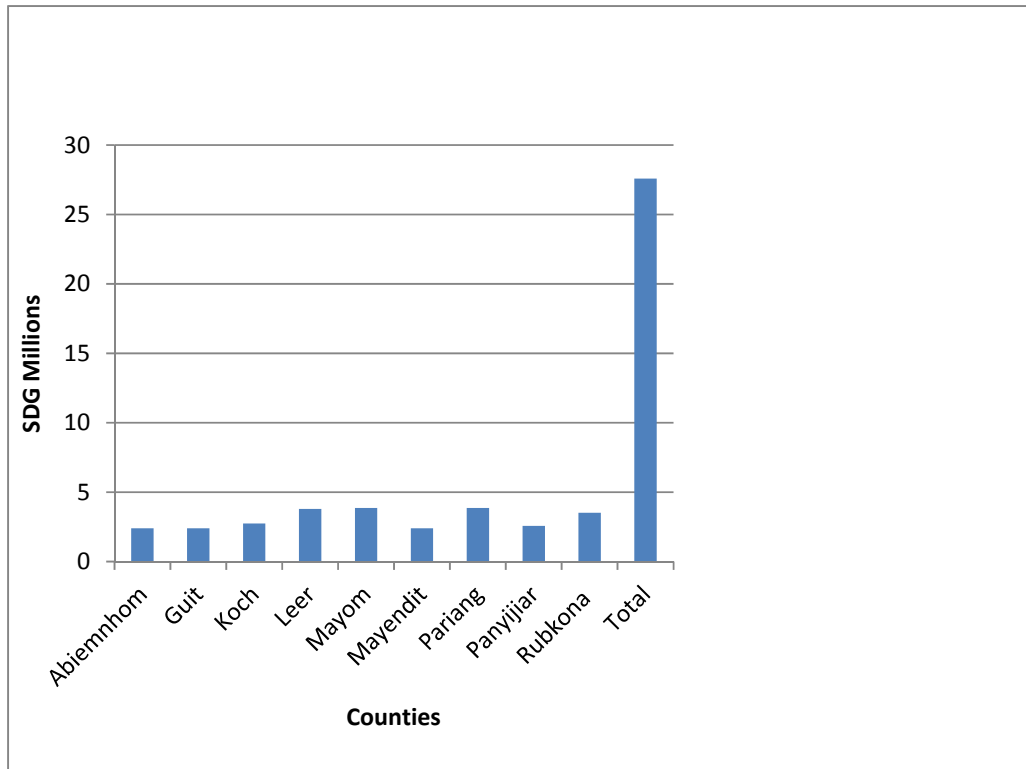
Table 2.15: Unity State expenditures from 2010-2011 (Million in SDG) and percentages

Sector	2010	%	2011	%
Accountability and Economic	14,044,527	12%	22,904,164	13%
Education	12,549,773	11%	20,663,926	12%
Health	14,248,532	12%	16,240,906	9%
Infrastructures	26,157,985	22%	13,884,135	8%
Natural Resource	4,236,996	4%	10,938,567	6%
Social Development	686,400	1%	2,405,916	1%
Public administration	13,497,659	11%	27,581,894	16%
Rule of Law	30,972,221	26%	34,618,492	20%
Transfers to Counties	2,999,999	3%	24,210,313	14%
Total	119,394,092	100%	173,448,313	100%

Source: Ministry of Finance and Trade Unity State (2011)

Figure 2.6 indicates the Unity State expenditure by county in millions of Sudanese pounds. Unity State spent SDG 27.6 millions in nine counties that included both the state allocation budget to counties and direct transfers from national government. The expenditure on counties was determined by their size and populations. For example, the figure indicates that the two larger counties, Mayom and Pariang, were allocated SDG 3.9 million each, followed by Leer county which was allocated SDG 3.8 million. The four smaller counties, Abiemnhom, Guit, Mayendit and Panyijiar, were each allocated SDG 2.4 million.

Figure 2.6: Unity State expenditures by county SDG (Million)

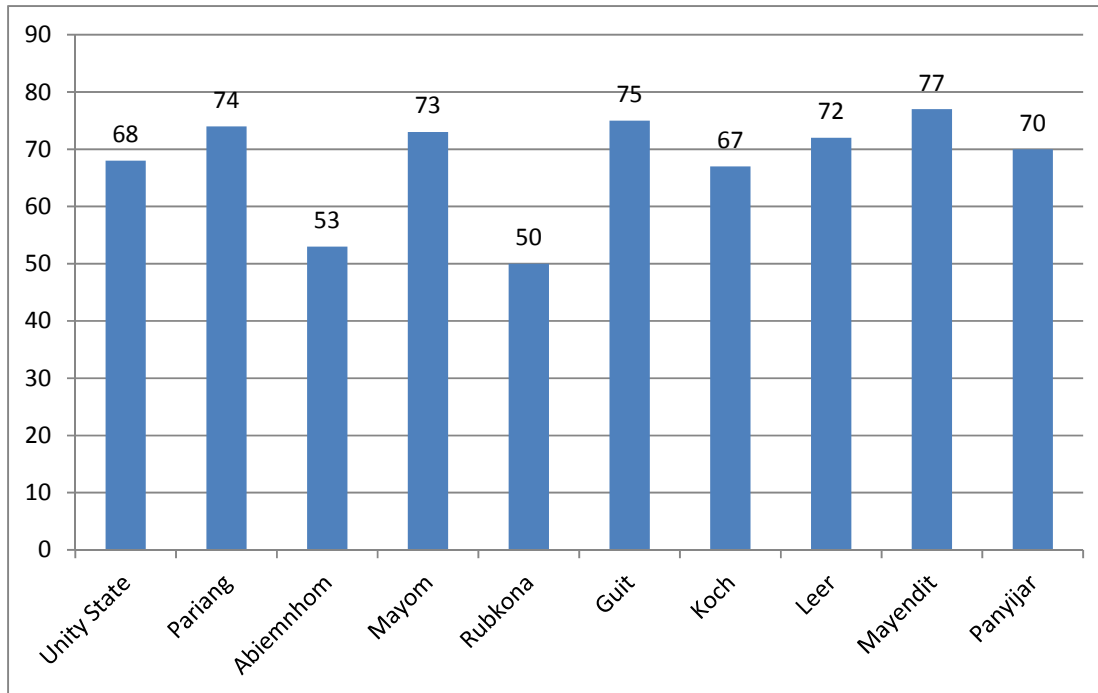


Source: Own calculation based on Unity state expenditures

2.10 UNITY STATE POVERTY RATES

Although there are massive oil operations in Unity State, the level of poverty in the state remains high with 68% of the people living on less than 1USD a day (SSCCSE, 2008). Figure 2.7 indicates the poverty rates in Unity State by county. The results confirm that most of the counties near to the oilfields have a high poverty level.

Figure 2.7: Poverty rates in Unity State by counties (in percentages)



Source: SSCSE (2008)

Only 54% of the population have access to clean drinking water which is similar to the average South Sudan where 55% of residents have improved water to drink. 98% of people are living in tukuls while 89% of the population do not have access to toilet facilities. However, 80% of the population do own mosquito nets. The infant mortality rate is 64 per 1000 live births while the mortality rate for children less than 5 years is 82 per 1000 live births and the maternal mortality rate is 173 per 100,000 live births. The average per capita income is 72 South Sudanese (SSP) per month whereas the average consumption per poorer is 36 (SSP) per month compared with 148 (SSP) for wealthier people in Unity State; these figures indicate a significant disparity in income. Environmental degradation contributed to resource scarcity and thus to the loss of traditional sources of livelihood for the Nuer and Dinka pastoralists (Switzer, 2002). According to the statement by the Southern Sudan Vice-President, Dr. Machar, in 2006 at the Conference on Sudan's oil future, environmental degradation, as the result of oil extraction activity needs more attention.

CHAPTER 3

LITERATURE REVIEW

3.1 INTRODUCTION

Literature relevant to this study is presented in a discussion addressing issues such as natural resources booms and the curse of being mineral rich. A concept of livelihood and the impacts of oil extraction on the said livelihoods is also discussed along with the theory of conflict and natural resources, particularly that of oil. Lastly, the literature sheds more light on resource rent and a sustainable livelihoods framework.

3.2 NATURAL RESOURCES BOOMS AND THE CURSE OF MINERAL WEALTH

There are those who regard countries with abundant natural resources, such as oil, as lucky to have this “black gold” to finance their developmental ambitions; enhance economic growth; create jobs; increase government revenue to finance poverty reduction and to be able to improve infrastructure (Karl, 2009). While it is well-known that oil contributes significantly to boosting the revenues and growth in oil rich countries, estimates suggest that Sub-Saharan African (SSA) governments will receive USD 200 billion in oil revenues over the next decade (Gary and Karl, 2003). Sub-Saharan Africa’s largest oil producing country, Nigeria, has thus far generated USD350 billion from the oil sector in the last 35 years (Sala-i-Martin & Subramanian, 2003). Table 3.1 indicates the percentage shares of oil revenues of some top Sub-Saharan Africa countries in terms of GDP, exports as well as governments revenues.

Table 3.1: Percentage share of oil in GDP, export and Government revenues of selected SSA countries

Country	%GDP	%export	%Government revenues
Nigeria	40	95	83
Angola	45	90	90
Congo -Brazzaville	67	94	80
Equatorial Guinea	86	90	61
Gabon	73	81	60
Cameron	4.9	60	20

Source: World Bank and IMF: 2002

Table 3.1 clearly portrays how oil has made significant contributions to Sub-Saharan African countries' economies, which range from GDP ratios to government revenue generation. If the oil revenue is well managed it will therefore have profound impacts on the livelihoods of the people in the region. Catholic Relief Services asserts that it is committed to helping to ensure Africa's oil booms improve the lives of the poor through increased investment in education, health, infrastructure, water, roads, agriculture, and other vital necessities (Gary, 2003). Despite huge revenues generated from oil, there is credible evidence that many oil-rich countries have experienced poor economic performances and dramatic declines in livelihoods of their people (Sarch & Warner, 2001). Karl (2009) indicates that oil-led countries are known for slow economic growth, poor social and welfare performances and high levels of poverty, income disparities and unemployment rates. Moreover they are also known for poor governance and a culture of rent seeking. It is recognised that countries where the livelihoods of people depend on natural resources and oil revenues continuously face environmental and health deterioration as well as high incidences of conflict. The summation of all these negative results is regarded as what economists describe as "the curse of the oil rich" (Auty & Warhurst, 1993). The so-called resource curse is described as an inverse relation between high levels of natural resource abundance, particularly oil and economic growth rates (Karl, 2007). Gary and Karl (2003) clarified the concept that oil booms result in a "curse" due to the following phenomena:

- Oil booms raise expectations and increase the appetite for spending; oil wealth dramatically encourages the expansion of government and not only affects how governments behave but also affects people's work ethics and undermines productivity.
- During oil booms governments tend to rapidly increase public spending based on unrealistic revenue projections.
- Oil booms decrease the quality of public spending and encourage rent seeking among the people of rentier state.
- Oil booms encourage loose fiscal and inflation controls, thereby hampering growth, equity and alleviation of poverty efforts.

- Oil booms are used to replace more stable and sustainable revenue streams, thereby exacerbating transparency and accountability problems. This is due to oil revenues having the effect of decreasing reliance on non-oil taxes; they may even actually replace existing taxation systems.
- Oil booms severely affect links between the people and their government that constitute the essence of popular control.

Theories and experience suggest that countries with abundant natural resources, including oil, do not enjoy rapid economic growth rates (Sachs & Warner, 2001). The impact of oil booms hinders economic performance through revenue gained through alternative channels. According to Sala-i-Martin and Subramanian (2003) there are three channels through which the “resources curse” affects growth rates and economic performances. Firstly, natural resources generate the rent, which always leads to rent seeking and adversely affects the political economy of the country. Rent seeking is regarded as an effort, both legal and illegal, by some individuals to find ways of controlling opportunities to earn rents. In oil-rich states, capturing the oil proceeds through unproductive means is found to be a widely practiced behaviour in the public and private sectors (Karl, 2007). Rent seeking is invariably associated with political power and governance in such a country. According to Mako (2010:83) rent seeking exists because:

- Political leaders and their agents consistently worry about their political survival; therefore they are likely to be engaged in a tradeoff where materials will shape the political loyalty of their supporters.
- State actors, politicians and bureaucrats may intentionally engage in redistribution of economic favours to maintain their political support base. To do this, politicians and bureaucrats turn public institutions into instruments for their own goals.
- Interest groups typically create links with the bureaucracy and pursue rent seeking very effectively.
- Rentier states adopt an egalitarian current consumption policy over sustainable development projects in order to prevent social conflicts.

- Finally, rent seeking is also associated with corruption. Rent seeking may be regarded as corruption in situations where politicians and bureaucrats are engaged in manipulating the system.

Rent seeking is a common practice in oil boom countries. As discussed above, rent seeking also impacts institutional quality (Brunnschwieler and Bulte, 2008; Sala-i-Martin and Subramanian, 2003). Natural resource ownership exposes countries to commodities' price volatility that could yield adverse impacts on growth rates. Sarchs and Warner (2001) indicated that abundant natural resources raise commodity prices and consequently lower export growth. A "natural resource curse" was found to remain even after the control of commodity price trends (Sarch & Warner, 2001). Price volatility also has a negative impact on investments, income distribution and poverty reduction as well as the cost of production, consequently impeding economic development (El-Gamal and Jaffe, 2009). Thirdly, natural resource ownership also makes a country vulnerable in a way known in the literature as the Dutch Disease (DD), a phenomenon by which the real exchange rate of a country appreciates in response to natural resource booms and causes contraction in tradable sectors (Sarchs & Warner, 2001). According to Shelley (2009), during the DD process, capital resources are drained from agriculture and manufacturing sectors and moved into services, transportations, construction and other non-tradable economic sectors. (Clarke, 2001) explained that the DD is a syndrome characterised by following components:

- Initial large inflows of foreign capital and diversion of domestic resources into a new export sector
- Inflows of foreign capital result in the increase of wages and prices and decreased competitiveness of pre-existing export and import sectors
- Rapid increase in the government personnel and services and large expenditures on large-scale of domestic projects or subsidies
- Expanding budget deficits, causing increases in borrowing and a deteriorating balance of payments position.

Torvik (2001) asserted that the “natural resource curse” is also likely to diminish welfare and production. Using data from mineral-rich countries, Sala-i-Martin and Subramanian (2003) indicated that natural resource abundance is negatively correlated with economic growth. In addition, the development of minerals resources is also widely regarded by many as enclave activities, because the activities and impacts of the resources extractions are always restricted to immediate areas surrounding resource activities and the benefits generated as tax revenues and other forms accrue to national governments (Clarke, 2001).

The oil curse is also always associated with environmental damages and negative economic and social impacts, which include inflation, migration and reduced competitiveness of other sectors in the economy (Stuart, 2004). In some countries however, the development and extraction of oil resources have led to huge economic development and social welfare gains such as in Norway and Indonesia (Schubert, 2006), where resource rents from oil extraction have been prudently managed and used. Although African countries are endowed with substantial natural resources such as oil reserves, only Botswana has managed to adopt a prudent economic policy to combat the negative impacts associated with abundance of natural resources. Given the said economic, social, political and environmental impacts of the said resource curse, it is essential to design policies and instruments to prevent these occurrences in resource-rich countries. Mako (2010) suggests revenue diversification and sterilization; good saving and investment policies, especially in natural resource funds; open trade; good institutions; transparency and good governance for proper management of natural resources booms.

3.3 LIVELIHOODS AND IMPACTS OF OIL EXTRACTION

The modern concept of livelihood goes back to early classical French geography which particularly focused on human-land relations (Owusu, 2009). Currently, the concept of livelihood is described by scholars as a composite of capabilities and assets that include both material and social resources and activities needed to sustain a way of living

(UNDP, 2009). According to Abew and Temeng (2009), livelihood is defined as the means, activities, entitlements and assets by which people make their living. A livelihood is considered sustainable when it is able to cope with and recover from stresses and shocks and maintain or enhance capabilities and assets both in the present and future while not undermining the natural resources base (Carney & DFID in Babulo, 2008). Livelihood assets refer to human and non-human resources upon which livelihoods are built and to which people need access. These assets consist of stocks of capital that may be stored, accumulated, exchanged or allocated to activities to generate a flow of income or means of livelihood or other benefits (Rakodi in Babulo, 2008). Categories of livelihood assets are illustrated in Table 3.2 below.

Table 3.2: Livelihood assets components

Livelihood assets	Meaning
Human assets	These represent the skills, knowledge, education, ability to labour and good health that enable people to devise different strategies to achieve livelihood
Social assets	This category refers to status in society as well as access to an extended family and other social networks, such as membership of more formalised groups. It also includes relationships of trust and reciprocity that facilitate cooperation, reduced transportation costs and can provide the basis for informal safety among poor people
Natural assets	These are natural resources which people can access to build livelihood such as agricultural land, forests, water resources and others
Physical assets	These include livestock, land, shelter, tools and equipment, but may also be community owned, such as road infrastructure, communication network, schools, information technology and communication (ICT) and sanitation
Financial assets	Financial resources including savings, credit, and income from employment, trade and remittances (UNDP, 2009)

Source: DFID (1999) and UNDP (2009)

Given the importance of livelihoods for evaluating progress of development efforts, the British Department for International Development (DFID) has developed a tool called the Sustainable Livelihoods Framework (SLF). This tool aims to analyse factors affecting a person's livelihood and how these factors interact with each other (UNDP, 2009). Chamber, in Singh and Hiremath (2009), defined sustainable livelihood as the level of wealth, stocks and flows of food and cash which provide for physical and social well-being and security against becoming poor. Livelihood diversification is defined as the process by which rural families or households construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their living standards (Ellis, 1998; Owusu, 2009). This definition indicates that livelihood diversification is more than just income, but additionally consists of both cash and non-cash incomes, as well as social institutions such as kin, family compounds, villages and so on. Livelihood diversification also includes access to benefits derived from social and public services provided by governments such as roads, water supplies and health services (Owusus, 2009). Some of the positive impacts of livelihood diversification include: smoothing seasonality of employment and consumption, risk reduction, higher income, environmental and gender benefits. On the other hand one negative impact of livelihood diversification is the increasing income distribution disparity between the poor and rich people (Ellis, 1999). While the impacts of oil extraction range from local to global levels, for the purpose of this study, however, only local level impacts are considered and examined in detail. Oil extraction is associated with a number of environmental impacts, for instance, in case of offshore drilling and transportation, the pollution of marine environment is put at serious risk. Land base oil extraction and transportation through pipelines may also pose pollution problems as well as disturbing the natural habitat (Jackson & Jackson, 1996:249).

Sophies (2007) explained that oil extraction affected a local population largely as a result of three major factors:

- Mismanagement and corruption, inaccurate derivative calculation, discretionary transfer, poor fiscal reporting, disincentives for investment and inefficiency in absorptive capacity.

- Worsening poverty through erosion of the local tax base, unreserved incentives to lower tax rates and volatility, loss of national fiscal flexibility and local DD effects.
- Conflict escalation.

The impacts of the oil extraction on the livelihoods of a local community can be illustrated based on the effect on livelihood-related assets. The above researcher described oil extraction impacts on livelihood assets of local communities in four categories:

- Natural assets: Risk of significant environmental impacts from all oil extractions which include gas flaring, pollution of local land, water, air and species.
- Economic assets: There are numerous immediate positive impacts on local people as a result of oil extraction in the initial stages, such as: individual compensation and employment opportunities during construction, which are likely to improve housing, farming and transportation infrastructure at the local level.

However, the benefits of oil extraction on physical capital are usually outweighed by potential negative impacts. As a consequence of oil extraction local communities typically face the following problems:

- Rising inflation in the cost of housing and rising prices and scarcity of local food commodities
- Increased site impacts on land use and household viability from extensive land appropriation which invariably results in the displacement of people and loss of agricultural land
- Other problems arise from local DD effects which induce the local government to provide infrastructure investments in roads, markets, transport, shelters, clean water, energy, education, health, and communication.
- Social and human capital: Oil extraction is expected to contribute to local poverty reduction programmes through community development initiatives. Oil development also has the negative potential to increase disease incidence such

as HIV/Aids and Sexually Transmitted Diseases (STDs) associated with the migration of temporary workers.

- Financial capital: rural livelihoods inevitably suffer from limited access to financial capital which contributes to high levels of poverty and this also reduces their access to credit.

In South Sudan, oil discovery has created a demand for the lands of pastoral communities living there and practising their traditional livelihood of cattle rearing and subsistence agriculture due to the fact that oil fields comprise the contested areas between the forces of Sudan and South Sudan (Switzer, 2002). People are displaced to areas where there are oil fields particularly in Unity State and Upper Nile due to oil exploration activities.

A report by South Sudan's leading newspaper (Sudan Tribunes, 2008) revealed that in 2006 around 27 people adults and children died and 1000 people fell sick in Koch county of Unity State as a result of water contamination and other oil pollution diseases. There are also many complaints from villagers about severe losses of cows and goats. Local populations in the areas of oil activities in Unity State experience displacements as result of continued oil explorations particularly in the counties of Mayom, Koch and Rubkona.

Oil exploration and production are carried out as large industrial activities which have major and adverse impacts on the human and ecological environment (Cooper & Catterson, 2007). These activities include: construction of temporary roads to access exploration and permanent roads for production; setting seismic lines or other instruments for exploration; generation of sanitary and other waste during exploration and in production camps; production and disposal of large volumes of diggings, mud and other waste during extraction activities. Finally, the possibility of oil spills from production wells, pipelines, transportation.

All these mentioned activities are carried out in the oil production fields of the Unity State in South Sudan. Conversely however, oil extraction activities do generate tremendous social, economic and political benefits, such as jobs and business investment activities, providing infrastructure for rural communities such as roads, electricity, education and health (Darkwah, 2010; Bassey and Orke, 2009).

Table 3.3 uses the example of the experiences of the Chad-Cameron oil pipeline project to illustrate the impacts of oil extraction on the local community livelihood assets.

Table 3.3: Impacts of COTCO pipeline project on local communities of Cameroon

Livelihood assets	Negative impacts	Positive impacts
Natural Capital	Destruction of important reef near Ébomé Noise during construction dispersed fish population; and fishery stocks have decreased since the pipeline was built Natural capital 'mortgaged': fear of pollution that could damage natural capital in the future	
Human capital	Increase of AIDS and STDs-no quantitative data Employment only temporary, mainly during construction	Increased schooling for Pygmies Increased health services Employment opportunities
Social capital	Increased conflict between Bantou and Pygmies over compensations Increased local conflicts between Bantou communities over compensations Increased distrust of government and COTCO due to difficult compensation process and lack of consultation Construction of pipeline resulted in increased demographic flux	Development and adaptation of community institutions: Management committees created to manage compensations in villages Foster collective action: fishermen get together with NGO to resolve, compensation issue with COTCO More participatory and equitable decision-making regarding coastal zone development in Kribi
Physical assets		Refurbishment of public infrastructure in Kribi, roads and updating of telecommunication network New infrastructures such as schools, health centres, freezers and wells
Financial assets		Increased cash flow due to increased economic activity Livestock in compensation (potential for increased income and used as safety nets)

Source: Badjeck (2005)

3.4 NATURAL RESOURCES ABUNDANCE AND CONFLICTS

An abundance of natural resources is widely regarded as having a strong correlation to high levels of conflict in countries thus endowed. The concept of “conflicts resources” is used to define natural resources whose control, exploitation, trade, taxation or protection contribute to armed conflicts (LeBilion, 2003). Although the relationships between conflicts and natural resources are not straightforward, the correlations vary from the onset of conflict to prolongation of the duration of conflicts. Various studies carried out by political scientists and economists have proved that there is substantial evidence that a country with an abundance of natural resources such as oil, diamonds and other such resources is at high risk of conflictual situations. A study by Gilmore et al. (2005) suggests that there is evidence of a strong correlation between natural resources, especially diamonds, and conflict, particularly when the country is divided along ethnic lines. Karl (2009) analysed data from oil exporting countries such as Sudan (1983-2005), Angola (1975, 2002), Nigeria (1980-1984), Yemen (1990-1997), Iraq (1985-1992) and the Republic of Congo (1997,1999) and found that civil wars and conflicts in all these countries were strongly associated with the country's natural resource abundance and that most of the conflicts in these countries were separatist wars. Collier and Hoeffler (1998 & 2004) suggest that such abundance is associated with a high risk of civil wars and that rebels usually loot the resources to finance the fighting. Ross (2004) identifies four causal mechanisms by which resources may ignite conflict:

- Looting mechanisms: this happens when the rebels are able to extract the resources and sell them; therefore, there is a strong possibility of war. According to Collier and Hoeffler (2004) rebels use the looted resources' wealth to buy arms and hire soldiers to start the rebellion.
- Grievances: when resource extraction creates grievances among the local population because of the appropriation of their land, environmental hazards, insufficient opportunities and the social disruptions caused by labour in migration.

- Location of resource abundances in the country: when the resource is located in an area with a small ethnic minority, this usually gives local residents a strong incentive to demand their separate state, thereby increasing the risk of civil war in the country.
- Weak fiscal policy: this is a common issue in the oil exporting countries because oil wealth invariably makes the governments inefficient in collecting the tax revenues, which in turn results in the state becoming less responsive to its citizens. In addition, oil wealth also affects the ability of the state to resolve social conflicts (Karl, 2009).

In addition to frequently being responsible for the onset of civil wars, natural resources have also been seen as the main factor behind prolonging conflicts. Ross (2004) discusses three ways in which the abundance of natural resources and their discovery do so: firstly, if the rebels can finance themselves from the natural resources, they will continue to fight for a longer period, slowing the pace of concluding negotiations to bring about peace; secondly, there are different opportunity costs associated with periods of war and times of peace, if the war is more profitable to the rebels (typically soldiers and commanders), it is likely that the condition will be prolonged; thirdly, if rebels signed an agreement with the ruling government to have autonomy, it will be unlikely for that government to abide by this agreement because the government will try to extend its use of these resources as long as it can.

In addition to initiating and prolonging conflict, an abundance of natural resources affects the process of democratisation in a country. Many scholars consider that an increase in income may encourage a government towards establishing democracy, however, this idea has been disproven by the oil-wealthy countries in which incomes have increased but the ideals of democracies have deteriorated (Ross, 2001). Oil-rich nations such as Nigeria, Venezuela, Indonesia and the Asian oil-rich states have become less democratic as the oil wealth increases incomes sharply. Ross further discusses three fundamental issues linking abundance of natural resources, particularly oil; to autocratic rule

- The Rentier effect is defined as a situation in which the state generates most of its revenues from the external rents. This concept is associated with the countries which derive most of their revenues from the export of oil occurring as a result of the following issues:
- Taxation effect, or a situation in which the government generates most of the revenues from the sale of oil and then will likely levy lower tax rates on their population and make them less accountable,
- Spending effect, where accumulation of oil wealth leads to huge spending by the government on forms of patronage, which reduces the tendency to democratization in the country,
- Group formation effect, which implies that when the oil wealth generates a lot of money for the government, the latter will use a large portion of oil money to halt formation of social and cultural groups which are independent of the government and may challenge its activities.
- Repression effect: the phenomenon of a government spending much of the oil revenue on internal security to block the population's democratic aspirations.
- Modernisation effect: this situation was derived from the modern logic which states that democracy is caused by a number of social, economic and cultural changes, such as occupational specialisation and higher education.

Most of the conflicts and civil wars associated with resource rich countries are separatist conflicts and civil wars. The study by Collier and Hoeffler (2006:b) found that if a country exports primary commodities such as oil and diamonds, it faces a high risk of separatist conflict. Similarly (Ross, 2004) confirmed substantial evidence that oil as a commodity exerts a greater influence on separatist conflicts than other primary commodities. Other scholars, including Collier and Hoeffler (2006), concur that oil is more associated with separatist conflicts to the extent that it is predictable whether the conflict will be a separatist or non-separatist war. Gilmore et al. (2005) suggested that diamonds are only secondarily associated with separatist conflict since they may be easily extracted by the

rebels themselves, using the traditional model of diamond extraction. Similarly, Collier and Hoeffler (2004) in their research showed by means of a statistical test that most of the conflicts are motivated by oil rent. Calain (2008) argues that there are many reasons why oil extraction is considered a fundamental cause of armed conflicts, because most countries in Sub-Saharan Africa (SSA) with large oil reserves are known for armed conflicts (civil wars, inter-ethnic conflicts), interstate disputes and human rights' violations and abuses. Oil booms are typically linked to practices of corruption and allocation of large shares of the budget to military expenditures. In addition, complex relations between multinational oil companies and security organs of the host government are frequently generated. Moreover, substantial adverse economic, political and social impacts which affect local people create grievances that lead to armed conflicts (Calain, 2008). Table 3.4 corroborates the position that abundant mineral resources and the onset of conflicts, secession conflicts and prolonged duration of conflicts have a strong correlation. Table 3.4 validates the notion that conflicts associated with oil continue longer than conflicts linked to other natural resources. In Sudan for example, oil was not the original cause of the civil war and hostilities in the country which date back to the 1950s. However, conflict and fighting resumed in 1983 after a short period of peace, when the location of the recently discovered oil became a major area to be contested between the government in Khartoum and the Sudan Peoples' Liberation Army (SPLA) (Shelley, 2009). Oil discovery played a vital role in triggering and prolonging the second war between South and North Sudan (Moro, 2009 & Fallet, 2010).

Table 3.4: Mineral resources secession wars

Country	Region	Duration	Resources
Angola	Cabinda	1975	Oil
Burma	Hill Tribes	1949	Tin ,gems
DR Congo	Katanga/Shaba	1960-65	copper
Indonesia	West Papua	1969	Copper, gold
Indonesia	Aceh	1975	Natural gas
Morocco	West Sahara	1975-88	Phosphates ,oil
Nigeria	Biafra	1967-70	Oil
Papua New Guinea	Bougainville	1988	Copper ,oil
Sudan	South	1983-2005	Oil

Source: Ross 2004

3.5 RESOURCE RENT AND SUSTAINABLE DEVELOPMENT

As discussed previously, the said abundance of natural resources is vital for generating rents which can be used by a country to accumulate wealth and finance economic growth. The classical concept of economic rent was initially studied by David Ricardo (1962) in his theory of land and was later applied to mineral resources' development. The Ricardo Economic Rent was derived to describe the excess of economic returns on a project over project costs. Governments, as custodians of the resources to be exploited, transfer property rights to extracting companies in exchange for some amount of economic rent, which is termed the resource rent since it is derived from exploitation of natural resources (Clark, 2001). Rents are defined in two ways:

- Monopoly rent refers to a price margin higher than the competitive market price due to some market power allowing the monopolist to influence the price by restricting supply, rather than constraints arising from resource scarcity. According to Hotelling (1925) the owner of a non-renewable resource must decide at what rate to extract the resource. The owner could extract all available stocks of the resource now and sell at current prices (assuming that this will not affect total market supply of the resource and its price) or wait and extract and sell the resource over a period of time. In such a case the rent is based on the

opportunity cost of extracting now versus doing so in future, i.e. representing scarcity value (Lange et al., 2003:2).

- Resource rent: generally, the resource rent, which is often referred to as economic rent, is defined to be the surplus value or difference between the price at which a resource or output from it can be sold and its respective extraction and production costs including normal profits. It is sometimes referred to as super-normal profits. Resource rent, according to Palmer (1980), is the profit remaining after deducting the extracting company's income that corresponds to the minimum return necessary to attract investment to a new project. Lange et al. (2003:1) argue that the resource rent is a central concept for natural resources management and valuation. Resource rents can be categorized into differential, scarcity and entrepreneurship rents (Scherzer & Sinner, 2006).
- Differential rents are rents which arise because of the difference in quality of resources, goods or output, due to production site characteristics for example.
- Scarcity rents are rents which arise from the excess demand for the resource over supply.
- Entrepreneurship rents, on the other hand, are referred to as rents which are derived from the skills of an individual.

There are numerous reasons for recovering the resources rent from companies exploiting any natural resource. Scherzer and Sinner (2006) provide three important reasons for recovery of resource rents: firstly rents are collected to reward owners with their rightful benefit from the use of this resource; secondly, rents are collected to prevent inefficiency in allocation and use of the natural resources and thirdly, to ensure inter-temporal equity (the rights of future generations).

The degree of success achieved in recovering rents has been used to evaluate natural resource management and policy regimes in term of economic efficiency, sustainability, and achieving other socio-economic objectives such as inter-generational equity

(Lange, 2003). Issues of importance in terms of economic efficiency include what portion of the rent is being recovered by the government and how the collected rent is spent. Sustainability issues address whether the rent collected from exploitation of a non-renewable resource is being reinvested in alternative forms of wealth or capital and to what extent pricing policies promote sustainable exploitation of renewable resources. Other socio-economic concerns address managing the resource rent, related to whether resource development policies account for the welfare of, and equity among, all current and future generations. There are a number of methods of recovering this revenue including: auctions and tendering, royalties, production share agreements and taxes on resource use (Scherzer & Sinner, 2006)

The resource rent tax is a newly introduced approach to mineral taxation in developed countries designed to tap the resource and monopolistic rents at the same time as it taxes normal profits (Hughes, 1975). The resource rent tax may have an effect on the extraction path, may influence entry and exit decisions and is also likely to exert negative effects on total investments (Hughes, 1975). To accumulate wealth from exploiting natural resources, an optimal portion of revenues needs to be reinvested in other forms of capital. This is vital for non-renewable resources such as oil since it will be depleted in the long run. Lange et al. (2003) propose three conditions they regard as necessary and sufficient for successful management and conversion of such resources into other forms of wealth:

- Natural resources must be managed to maximise the generation of rents;
- Rents must be recovered by an agent capable of reinvesting them;
- Rents must be used for productive investments.

With regard to the recovery of resource rents, various scholars have differed about who, or what entity, is suitable to recover the resource rents. Lange et al., (2003) stressed that it is vital for the resource rents to be recovered by the government for the following reasons:

- In the case of non-renewable resources, economic theory of sustainability demands that some portion of resources should be reinvested to avoid the

declining of the wealth of a nation and depletion of its resources. However, if the resources are exploited by foreign companies it is highly likely that most of the resources will be taken out of the country rather than re-invested in the resource provider country. Similarly, even if the resources are extracted by home companies, private companies may not necessarily re-invest their resources in the public sectors, which are more vital priorities in the most underdeveloped countries.

- In the case of renewable resources, low taxation of the rents may result in overexploitation of the resources beyond their maximum sustainable yield and thus rent on excess capacity might dissipate.
- Low recoveries of rents induce private companies to speed up the overexploitation of the natural resources in anticipation of a change of government policy with regard to recovering the rents over the long term.
- The aim of rent recovery is to promote intergenerational equity and to invest the revenues in the public sectors in order to provide benefits to the whole society instead of only to those populations adjacent to the resources.
- The tax levy on the rents is not distorted compared with other taxes,
- Failure to recover the rents invariably accrues huge profits to the private sector and consequently reduces the economic and efficient production process.

The literature on natural resources and environmental accounting (NRA) provides theoretical foundations and operational frameworks for sustainable management and use of natural wealth (Perrings & Vicent, 2003:1) and Maler & Dasgupta, 2000:5).

3.6 SUSTAINABLE LIVELIHOOD FRAMEWORK

The concept of a sustainable livelihood was introduced for the first time by the Brundtland Commission on Environment and Development as the way of linking socio-economic and ecological considerations in a cohesive and relevant policy structure. It indicated that sustainable livelihoods could serve as an integration factor that allows policy to address development, sustainable resources management and poverty

reduction simultaneously (WCED, 1987). The conceptual Sustainable Livelihood Framework (SLF) is defined as an approach which helps to improve understanding of livelihoods, particularly the livelihoods of the poor people (DFID, 1999). It also gives insight into the deep relationships among the livelihoods. The livelihoods approach is based on evolving thinking about the poverty reduction, the way the poor and vulnerable live their lives and the importance of structural and institution issues (Krantz, 2001). However, these relationships may be examined in an index of vulnerability levels. Different studies propose various concepts that define vulnerability, with some researchers regarding it as the external environment where people exist in which livelihoods and the wider availability of assets are critically constrained by factors such as shocks, trends and seasonality (DFID, 1999). However, (Serrat, 2009) stated that vulnerability is characterised by the lack of security of the wellbeing of individuals, households and communities in the face of changes in the external environment. He further contends that vulnerability has two facets: the external facet that arises due to shocks, stresses and trends and the internal facet that culminates as the result of a lack of ability and means to cope with damages and loss caused by said shocks.

(DFID, 1999:34) describes the context in which vulnerability exists as comprising the following essential elements:

- Shocks represent those factors which directly destroy assets, such as floods storms, war and conflicts, which invariably force people to leave their land .
- Trends/stresses are predictable and therefore represent factors which may or may not be more harmful.
- Seasonality describes factors such as shifts in price, wages and policies.

The use of the vulnerability context draws attention to the fact that this complex influence is directly or indirectly responsible for many hardships faced by the poorest populations around the world (Serrat, 2009). The SLF approach has been adopted by various international organisations and agencies to assess the impact of their activities on livelihoods amongst local communities. Among the said organisations are UNDP, Care International, DFID and SIDA (Krantz, 2001).

- For UNDP, the SLF approach serves primarily as a programming framework to develop a set of integrated values to support activities for improving sustainable livelihoods among poor and vulnerable groups through strengthening their resilience, their coping mechanisms and adaptive strategies. UNDP also indicated that this process is open-ended, which lends emphasis to technological, economic and social investment as policy and governance issues are essential for sustaining peoples' livelihoods.
- Care International, in 1994, adopted the Households Security Livelihoods as a framework for programme analysis, design, monitoring and evaluation of its activities.
- DFID, on the other hand, used the SLF approach to enhance organisational effectiveness in poverty alleviation in two ways:
 - o It was mainstreamed to set a core which determined that poverty focused development activity should be people-centred: responsive and participatory, multi-level and conducted in a partnership and under dynamics which are sustainable.
 - o It applies a holistic perspective in the programming of support activities to ensure that those correspond to issues or areas of direct relevance for improving poor people's livelihoods.

In addition, DFID uses the SLF approach in an analytical way to facilitate a broad and systematic understanding of various factors which affect or enhance livelihood opportunities and indicates how they are related to each other.

- Similarly, SIDA adopted an action programme to promote a sustainable form of livelihood in order to improve the income level and standard of living for the poor which, in many respects, builds on principles similar to those of SLF.

CHAPTER 4

APPROACH AND METHODS OF THE STUDY

4.1 INTRODUCTION

The research into the impact of oil exploration research is complex due to the difficult nature of oil extraction and its impact on the livelihood of a community. However, an integrated methodology is required to accurately assess the vulnerability level of a community against the impact of oil extraction. This study adopted the SLF approach to this end and also employed SBI to evaluate efficiency management of oil resource spending.

4.2 CONCEPTUAL FRAMEWORK

The SLF approach is used as a tool designed to measure changes in which the households have access to livelihood assets, institutional structures and relationships between changes in livelihood strategies. This approach captures the dynamics of livelihoods by looking at vulnerability and how that vulnerability changes over time in relation to a context. Livelihood vulnerability is defined in two ways by Han, et al., (2009): first, it is considered as the presence of vulnerable situations arising from high levels of shock and stress in the domain of livelihoods, such as the example of pollution of the environment as a result of oil extraction activity; the second definition of livelihood vulnerability is described as a combination of vulnerable situations with regard to community livelihood assets, such as strategies and processes which will most likely affect the overall sustainability of a community.

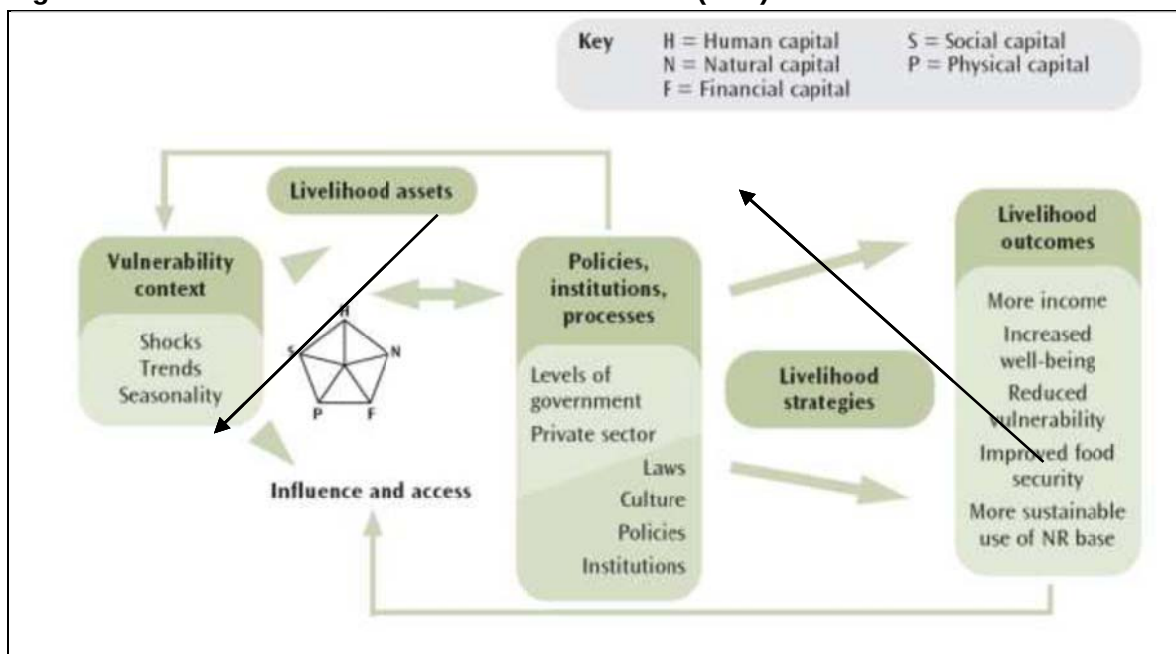
There are a number of such vulnerable situations that have arisen due to the adverse effects of oil activities in Unity State, including displacement of people, pollution of clean water, farming land, grazing land for livestock, the environment and reduction of the availability of firewood.

The SLF approach is considered as people-centric, holistic and dynamic and its framework is based on the following key indicators:

- Livelihood assets and activities
- Vulnerabilities and coping strategies
- Policies, institutions and process
- Livelihood outcomes.

The figure below illustrates the livelihood sustainability framework.

Figure 4.1: The Sustainable Livelihood Framework (SLF)



Source: DFID (1999) and FAO (2000)

Figure 4.1 (SLF) indicates how vulnerability may be examined. It constitutes a complete (SLF) model, in which vulnerability is a major determinant of the sustainability of livelihood assets as it directly influences livelihood strategies, institutional policies and livelihood outcomes. Negative impacts of oil exploration such as pollution, displacement etcetera have been categorised under the vulnerability index of SLF. The levels of community vulnerability determine the impacts of the adverse impacts of oil activities on

that community's livelihood assets, strategies and outcomes. This study intends to assess extreme impacts faced by a local community in Unity State by calculating the livelihood vulnerability index (LVI). The components which are the indicators of vulnerability of a community to oil activity are listed in Table 4.1 below.

- Weighted averages of these indicators contribute to the calculation of the livelihood vulnerability index (LVI).
- The components are categorized under five different livelihood assets, such as Human , Physical, Social, Natural , Financial Capital and Oil Impacts
- There are many sub-components listed under each main component in the table.

Table 4.1: Livelihood assets, components and sub-components of livelihood vulnerability index (LVI)

Assets	Components	Sub-components
Natural	Land	Percent of HHs who were farming before
		Percent of HHs who have not farmed before
		Percent of HHs who have access to farmland
		Percent of HHs who do have not access to farmland
		Percent of HHs reported declining of agricultural production due to oil exploration
		Percent of HHs who experienced adverse impact of oil exploration in their community
	Forest	Percent of HHs using only firewood as a source of energy for cooking
		Average time to fetch firewood
		Percent of HHs reported that firewood increased during the last 20 years
		Percent of HHs reported that firewood became scarcer in the last 20 years
		Percent of HHs reported that firewood availability was the same as the last 20 years
		Percent of HHs using traditional stove for cooking
		Percent of HHs using modern stove for cooking
	Water	Percent of HHs who had heard of water conflict in the community
		Percent of HHs who had not heard of water conflict in the community
		Percent of HHs who obtain water directly from river/pond/stream
		Percent of HHs who obtain water from tap
		Average time to fetch water
		Percent of HHs who have a daily water supply
		Percent of HHs who have no daily water supply
		Inverse of average water storage
Financial	Assets	Inverse of average land holding index by HHs
		Inverse of average livelihood diversification index by HHs

	Finance	Percent of HHs who have regular income
		Percent of HHs who do not have regular income
		Percent of HHs who reported that their income did not change in the last 20 years
		Percent of HHs whose income has changed in last 20 years
		Percent of HHs who do not have someone working in the oil companies
		Percent of HHs who have someone working in the oil companies
		Percent of HHs whose lives did not improve
		Percent of HHs whose lives improved
		Percent of HHs who did not take loan from oil companies /other CBOS
		Percent of HHs who took a loan from oil companies /other CBOS
Human	Health	Average time to reach nearest health centre
		Percent of HHs that reported one chronically ill family member
		Percent of HHs that reported no one as a chronically ill family member
		Percent of HHs reported a death of a family member from an oil related disease in the past 20 years
		Percent of HHs reported that no member of the family died of oil related disease in the past 20 years
		Percent of HHs reporting at least one member of family injured in oil related activity
		Percent of HHs reported no member of family injured in oil related activity
	Food & nutrition	Average months of food insufficient for HHs
		Inverse of average crop diversification
	Knowledge & Skill	Percent of HHs who have TV at home
		Percent of HHs who have no TV at home
		Percent of HHs who have radio set at home
		Percent of HHs who have no radio set at home
		Percent of HHs reported at least one member of family attended vocational training
		Percent of HHs reported no member of family having attended vocational training
Physical	Transport	Percent of HHs who do not have electricity at home
		Average time to reach nearest transportations stations
		Percent of HHs who have transportation access b/n their villages and state
		Percent of HHs who have no transportation access b/n their villages and state
Social	Demography	Percent of HHs headed by a female
		Average family members in the HHs
Oil Impacts		Percent of HHs displaced due to oil exploration
		Percent of HHs displaced due to war
		Percent of HHs displaced due to flood/drought
		Percent of HHs reported that clean water has been polluted by oil exploration
		Percent of HHs reported that sanitation services have been polluted by oil exploration
		Percent of HHs reported that their farm lands have been polluted by oil extraction
		Percent of HHs reported that their grazing land for livestock has been polluted by oil
		Percent of HHs reported that fuel wood has been reduced due to oil extraction
		Percent of HHs reported that their health services have been polluted by oil extraction
		Percent of HHs reported no impact on their jobs or income made by oil extraction

4.3 SOURCES AND METHODS OF DATA COLLECTION

This study primarily requires quantitative data, even though the qualitative data were essential to achieve other objectives. To calculate LVI, quantitative data were required for the indicators mentioned in Table 4.1. Qualitative data were also needed to assist in analysis of the theoretical aspect of the results.

The data used in this study were both primary and secondary. Relevant primary data for the indicators identified in Table 4.1 were collected from the study area through household surveys while secondary data for oil revenues and government expenditures were obtained from the South Sudan Ministry of Finance and Economic Planning and Nile Petroleum Corporation (Nilepet). Data for other variables such as the education profile, population profile, health status and poverty rates were obtained from the South Sudan National Bureau of Statistics. The primary data were collected by household survey questionnaire. A total of 150 households were interviewed in face to face interviews in Mayom, Rubkona and Koch counties across five villages adjacent to the oil fields in Unity State to establish their views on oil exploration. Approximately 40% of people interviewed indicated that they had lived in their current location for 10 years or more. About 70% of respondents were aged between 40 to 60 years. Interviews were conducted in the Nuer language.

4.4 DATA PROCESSING AND TOOLS

The data collected were processed and transformed into Microsoft Excel in order to calculate the necessary indices used to obtain a LVI. Data obtained in different measurements were converted into their standard form so that they were expressed in the same unit. Han et.al (2009) indicated that a LVI uses a simple balanced weighted average approach where each sub-component contributes in the same way to the overall index, although each major component has different livelihood assets. The fact that each of the sub-components is measured on a different scale, made it necessary to

initially standardise the individual components as indices. The equation used for conversion calculations was adopted from that of the human development index formula that is always used to calculate life expectancy: the ratio of difference of actual life expectancy and a pre-selected minimum and the range of pre-determined maximum and minimum life expectancy (UNDP, 2007).

The Index equation is calculated in the following manner:

$$Index_i = \frac{Observed\ valued - minimum}{Maximum - minimum}$$

Where i means that the index may represent human, social, physical, financial or natural livelihood assets.

These minimum and maximum values were used to transform the indicators into a standardised index, so that they could become equivalent indices.

To calculate the index of livelihood diversification, such as the Average Land Holding Index, the formula is calculated as follows;

$$Inverse = \frac{1}{1 + observation\ number_i}$$

Variables are measured in frequencies, for instance: a certain percentage of households reported that their farm land was polluted by oil exploration; the minimum and maximum values were selected to be 0 and 1 respectively. The range values of LVI lie between 0-1. For interpretation purposes, 0 indicates the least vulnerability whereas 1 indicates highest (increased) vulnerability.

4.5 THE SUSTAINABLE BUDGET INDEX (SBI)

The Sustainable Budget Index (SBI) is a method that was adopted by the Botswana Ministry of Finance. The objective of this approach is to monitor whether the mineral

revenues collected are being used to promote the sustainable development and transform them into other forms of assets. The SBI is defined as a ratio of non-investment spending to recurring (non-mineral) assets.

$$SBI = \frac{\text{Spending non – investments}}{\text{revenue recurring}}$$

If the SBI is equal to 1 or less it implies that the government's current consumption is sustainable as it is financing the latter out of revenues rather than from mineral revenues and that all the mineral revenues are being re-invested. If the SBI is more than 1, this implies that current government consumption is dependent on mineral revenue which is fiscally unsustainable. This approach will be used in this study to evaluate how the government of South Sudan invests oil revenues into other forms of wealth. Since the said government has sole property rights over the oil resources, it is the responsibility of this government to ensure that oil revenues are used for productive investment

CHAPTER 5

ANALYSIS AND DISCUSSION OF THE RESULTS

5.1 INTRODUCTION

This chapter presents the analysis and discussion of the results regarding the findings, of the impact of oil exploration and production activities on access to and availability of the local community's livelihoods in the Unity State villages adjacent to the oilfields. It additionally examines the level of community vulnerability in terms of their livelihood assets as a result of oil activities. A discussion and analysis of the management and spending of oil revenues is included and, finally, an evaluation of the sustainability of the South Sudan budget index is provided.

5.2 ATTRIBUTES OF POPULATION IN STUDY AREA

As referred to previously, a total of 150 households (HHs) were interviewed from Mayom, Koch and Rubkona Counties in five villages adjacent to oilfields. Questionnaires were evenly spread among three counties with 33% of the questionnaires distributed in each. Table 5.1 provides descriptive statistics of sample population attributes. Most of the HHs are headed by males (73%) and only 27% of the HHs are headed by females. The major economic activities of the communities of Unity State are: agro-pastoralist farming, running their own businesses and fishing. Results indicate that 47% of the HHs are farmers, and that 32% of the HHs depend on their economic activity as agro-pastoralists. The remaining HHs' livelihoods depend on the following economic activities: 13% on fishing, 3% on salary and 5% on respondents running their own businesses. The majority of the people in the villages in Unity State do not read or write. The study found that 65% of respondents do not know how to do so, with about 23% having completed primary school and only 7% and 5% respectively having completed secondary school and university level.

Table 5.1: Descriptive statistics of attributes of the sample population

Items	Households (HHs)	Percent
HHS	150	100
Male	110	73
Female	40	27
County		
Mayom	50	33
Rubkona	50	33
Koch	50	33
Economic activities		
Farmer	71	47
Agro-pastoralist	48	32
Salary	4	3
Fishing	20	13
Doing own business	7	5
Level of education		
No Formal school	97	65
Primary	35	23
Secondary completed	11	7
University	7	5

Source: Households survey

Table 5.2 presents the period of time that a HH has been in its current location. Many of the respondents revealed that they have been in their current locations for more than ten years. Questionnaire results show that 40% of the respondents have been in their current locations for more than 10 years, while 29% of HHs lived in their current locations for between 5-10 years, 23% of HHs have been residing in their current location for 1-5 years and only 8% of the respondents stayed in their current locations for less than a year.

Table 5.2: Current location status of the sample population

Period	Households	percent
<1year	12	8
1-5 years	35	23
5-10 years	43	29
10 years and above	60	40

Source: Households survey

Table 5.3 presents the HHs' sources of livelihood. The results revealed that 37% of HHs base their livelihood on agro-livestock. Fishing and running their own business supports 23% of households. Although oil activities have been carried out in the area for more than 10 years, only 3% of the respondents indicated that they depend on an oil sector salary for their livelihoods. Approximately 13% of the respondents mentioned that their livelihoods depend on forest products such as timber, charcoal and firewood.

Table 5.3: Descriptive statistics of the sources of livelihood of the sample population

Source of livelihood	Households	Percent
Agro-livestock	56	37
Fishing	34	23
Doing own business /trade	35	23
Salary from non-oil sector	7	5
Casual labour	4	3
Timber, charcoal, and firewood	19	13
Salary from oil sector	5	3

Source: Households survey

Table 5.4 presents the period of oil exploration in the villages. During the survey the majority of respondents stated that oil activities had been on-going for more than 10 years; while about 53% percent of the respondents indicated that oil exploration had been going on for more than 10 years in their villages, 31% indicated that exploration had been continuing for 1-5 years while 16% of respondents said exploration has been going on for 5-10 years.

Table 5.4: Duration of oil exploration in the study areas

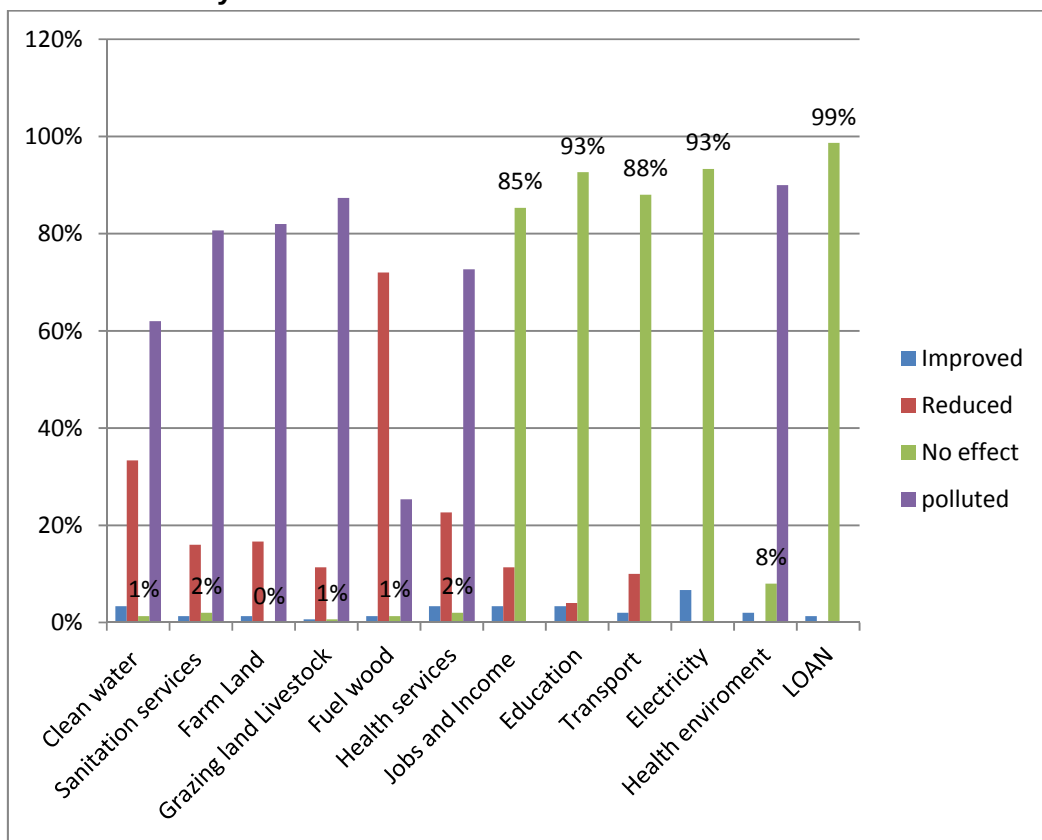
Years	Household	Percent
<1year	1	1
1-5 years	46	31
5-10 years	24	16
10 years and above	79	53

Source: Households Survey

Based on the responses of the respondents it was found that oil exploration and production activities in Unity State have severely affected access to and availability of the community's livelihoods in the villages adjacent to the oil fields. Figure 5.1 presents the influence of oil exploration on the local communities' access to and availability of means of livelihood. The results in Figure 5.1 reveal only the broad impacts of oil on these aspects of the said livelihoods of local people. However, the later sections detail the effects of oil exploration by estimating the level of a community's vulnerability. The results revealed that with regard to clean water, about 62% of HHs indicated that their clean water has been polluted by oil activities while 33% of the respondents indicated that their access to clean water has been reduced. On the question of sanitation services: 81% of the respondents report that oil exploration has polluted the sanitation services in their villages. On the farm lands, 82% of the HHs stated that they no longer have access to farm lands because these have been polluted by oil activity. The same problem applies to 87% of the local people who depend on their livestock grazing lands for their livelihoods; their responses revealed that grazing lands have been polluted by oil extraction. People in these villages have traditionally depended on fuel wood as their source of energy but after oil exploration began in the villages, the forests have been depleted by ongoing oil activities; these findings were confirmed by 72% of the respondents indicating that fuel woods had been reduced rapidly by oil extraction. Similarly, 25% of the respondents said that oil exploration had polluted their fuel woods. With regard to health services, 73% of the households reported a number of outbreaks of diseases because of the oil exploration and production affecting both people and livestock in the villages. Oil exploration is widely perceived as creating various opportunities for the host communities, but contrary to this, in Unity State, 85% of the respondents indicated that oil extraction did not create significant positive effects for the

local people in terms of employment and income generation; most of the employees of the oil companies were not residents in the adjacent villages. Furthermore, 93% of respondents reported no change has taken place on the educational front in the said villages as a result of oil exploration. Concerning the issue of transport, 88% of respondents reported that even though oil companies have built weather roads, in their villages most of the areas are still inaccessible due to lack of transport. In addition, 93% of the respondents stated that oil extraction has not brought electricity into the villages. One old man said that they “always see electricity only at oil companies’ compounds”. With regard to obtaining loans, 99% of the respondents reported no improvement by oil exploration. Therefore, the study found that oil extraction and production in the villages of Unity State, South Sudan had negative significant impacts on the access and availability of the livelihoods of local population in the villages adjacent to oilfields.

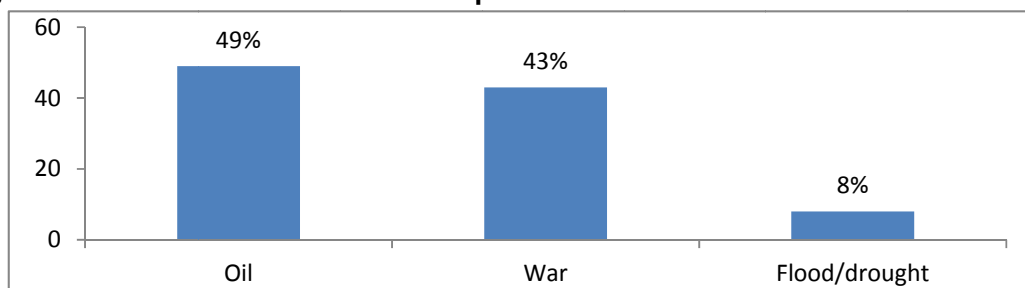
Figure 5.1: Impacts of oil exploration on the access and availability of livelihoods of the local community



Source: Own calculation from households survey data

In addition to the abovementioned adverse effects of oil extraction on the livelihoods of local communities, oil exploration and production have also contributed to significant displacements for the host communities adjacent to oilfields. Figure 5.2 presents the cause of displacements of HHs. The results indicate that about 49% of the respondents were displaced from their homes by oil exploration, compared to 43% who were displaced by war and 8% who were displaced due to flood/drought. Thus oil exploration plays a major role in the massive displacements of the local communities in Unity State which in turn has significantly contributed to the high levels of poverty across rural communities. This was due to their no longer being able to farm as they were forced to relocate and become itinerant due to these frequent displacements by oil exploration and activities in the villages.

Figure 5.2: Causes of households displacements



Source: Households Survey

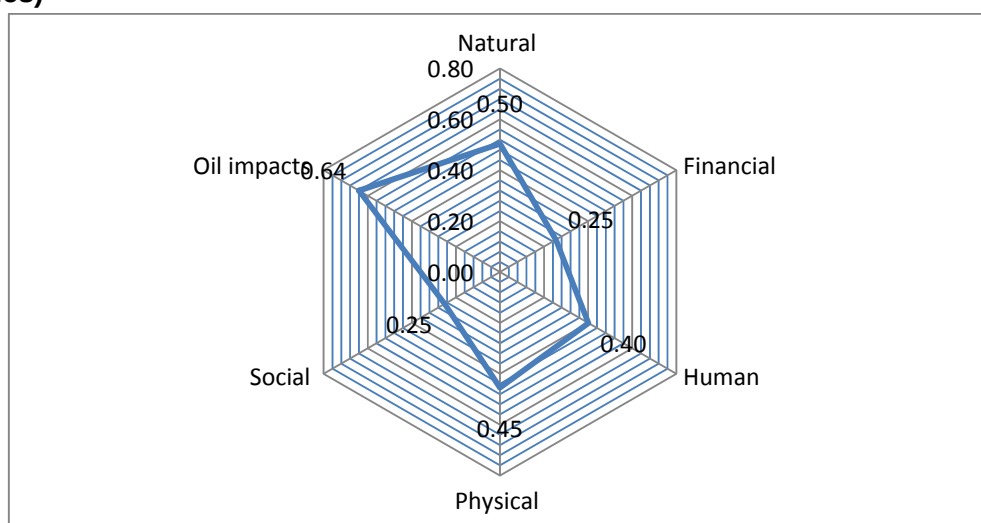
5.3 SUSTAINABLE LIVELIHOOD FRAMEWORK ANALYSIS RESULTS

This section presents the LVI. Figure 5.3 depicts the summarised results of vulnerability as regards livelihood assets while Figure 5.4 illustrates the summarised results of vulnerability with respect to the components of livelihood assets. In Figure 5.3 the results revealed that the host communities are vulnerable at 0.52 in terms of natural capitals. These vulnerabilities could be attributed to various factors affecting local people's natural capital livelihoods. On the financial capital, Figure 5.3 indicates that communities are vulnerable at 0.25 in terms of financial assets which was very moderate. Communities are vulnerable at 0.4 in terms of human capital; the major factor of these vulnerabilities consists of health problems in which the respondents reported

that it took them an average of 152 minutes to reach the nearest health centre. About 92% of respondents reported at least one member of their family as suffering from chronic illness. Another factor to which this is attributed is food insufficiency: the respondents revealed that on average they experience 3.04 months of suffering from food shortages. Other important lacking factors are knowledge and skills; 93% of respondents reported that they do not have television at home, 82% of HHs do not have radios at home while 93% of respondents have reported that no member of their family has attended vocational training. Communities are further vulnerable at 0.64 in terms of the impacts of oil exploration. Vulnerability of community, in terms of oil impacts, is very close to 1 which is the highest level of vulnerability. This high level of vulnerability demonstrates that oil activities are a threat to the sustainability of the livelihoods of local communities in Unity State.

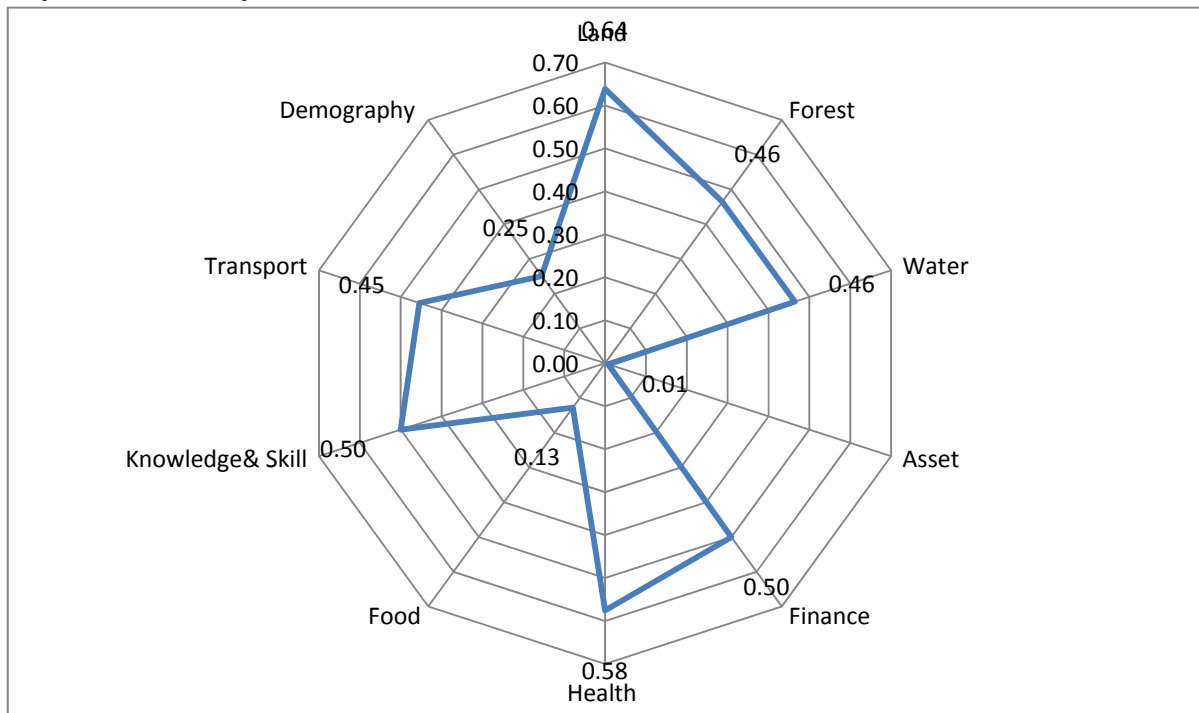
Table 5.5 provides a comprehensive summary of the results of Livelihood Vulnerability of Communities in Unity State. Findings indicated that the overall livelihood vulnerability of communities of Unity State in three counties was 0.42. This made communities of Unity State's three counties moderately vulnerable to the impacts of oil exploration. The results of livelihood capitals and components are discussed separately in subsequent sections.

Figure 5.3: Vulnerability radar diagram for five livelihood assets of Unity State (three counties)



Source: Own calculations from Households Survey

Figure 5.4: Vulnerability radar diagram for major livelihood components of LVI for Unity State (three counties)



Source: own Calculations from HHS Survey data

Table 5.5: Summary results of livelihood assets components and sub-components of LVI in Unity State

Capitals	Component	Sub-components	Unit	Value	Max	Min	VI
Natural	Land	Percent of HHs who farmed before	percent	89	100	0	0.89
		Percent of HHs who did not farm before	Percent	11	100	0	0.11
		Percent of HHs who have access to farmland	Percent	57	100	0	0.57
		Percent of HHs who do not have access to farmland	Percent	43	100	0	0.43
		Percent of HHs reported declining of agricultural productions due to oil exploration	Percent	90	100	0	0.90
		Percent of HHs who experienced adverse impact of oil exploration in their community	Percent	93	100	0	0.93
	Land Vulnerability index (weighted average of land indicators) 0.64						
	Forest	Percent of HHs using only firewood as a source of energy for cooking	Percent	100	100	0	1.00
		Average time to fetch firewood	Hrs	1.88	6	0.5	0.25
		Percent of HHs reported that firewood increased in the last 20 years	percent	29	100	0	0.29
		Percent of HHs reported that firewood became more scarce than in the last 20 years	Percent	61	100	0	0.61
		Percent of HHs reported that firewood was the same as in the last 20 years	Percent	10	100	0	0.10
		Percent of HHs using traditional stove for	Percent	93	100	0	0.93

Capitals	Component	Sub-components	Unit	Value	Max	Min	VI
		cooking					
		Percent of HHs using modern stove for cooking	Percent	7	100	0	0.07
	Forest Vulnerability Index (weighted average of forest indicators) 0.46						
	Water	Percent of HHs who heard of water conflict in the community	Percent	91	100	0	0.91
		Percent of HHs who did not hear of water conflict in the community	Percent	9	100	0	0.09
		Percent of HHs who obtain water directly from River/pond/stream	Percent	81	100	0	0.81
		Percent of HHs who obtain water from tap	Percent	19	100	0	0.19
		Average time to fetch water	Minutes	74.6	240	10	0.28
		Percent of HHs who have a daily water supply	Percent	82	100	0	0.82
		Percent of HHs who have no daily water supply	Percent	18	100	0	0.18
		Inverse of average water storage	Liters	0.042	60	0	0.00
	Water Vulnerability Index (weighted average of water indicators) 0.46						
	Natural Capital Vulnerability Index (weighted average of water, Land & Forest) VI0.52						
Financial	Asset	Inverse of average land holding index by HHs	Ha	0.5	200	0.1	0.00
		Inverse of average livelihood diversification index by HHs	Percent	0.04	3	0	0.01
	Finance	Percent of HHs who have regular income	Percent	88	100	0	0.88
		Percent of HHs who do not have regular income	Percent	12	100	0	0.12
		Percent of HHs who reported that their income did not change in last 20 years	Percent	87	100	0	0.87
		Percent of HHs whose income changed in last 20 years	Percent	13	100	0	0.13
		Percent of HHs who do not have someone working in the oil companies	Percent	77	100	0	0.77
		Percent of HHs who have someone working in the oil companies	Percent	23	100	0	0.23
		Percent of HHs whose lives did not improve	Percent	81	100	0	0.81
		Percent of HHs whose lives improved	Percent	19	100	0	0.19
		Percent of HHs who did not take loan from oil companies /other CBOS	Percent	85	100	0	0.85
		Percent of HHs who took loan from oil companies /other CBOS	percent	15	100	0	0.15
	Financial Capital Vulnerability Index (Weighted average of Finance & Asset Index) 0.25						
Human	Health	Average time to reach nearest health centre	Minutes	152	420	9	0.35
		Percent of HHs reported one chronically ill family member	Percent	92	100	0	0.92
		Percent of HHs reported no chronically ill family member	Percent	8	100	0	0.08
		Percent of HHs reported a death of family member from oil related disease in the past 20 years	Percent	81	100	0	0.81
		Percent of HHs reported that no member of family died of oil related disease in the past 20 years	Percent	87	100	0	0.87
		Percent of HHs reported at least one	Percent	11	100	0	0.11

Capitals	Component	Sub-components	Unit	Value	Max	Min	VI
		family member with an injury from oil related activity					
		Percent of HHs reported no member of family with an injury from oil related activity	Percent	89	100	0	0.89
	Health Vulnerability Index (weighted average of health indicators) 0.58						
	Food& Nutrition	Average months of food insufficiency for HHs	Months	3.04	4	3	0.04
		Inverse of average crop diversification	1/1+#Crops	0.429	2	0	0.21
	Food & Nutrition Vulnerability Index(weighted average of food &nutrition indicators)						
	Knowledge & Skill	Percent of HHs who have TV at home	Percent	7	100	0	0.07
		Percent of HHs who have no TV at home	percent	93	100	0	0.93
		Percent of HHs who have a radio set at home	Percent	18	100	0	0.18
		Percent of HHs who have no radio set at home	Percent	82	100	0	0.82
		Percent of HHs reported at least one member of family attended vocational training	Percent	7	100	0	0.07
		Percent of HHs reported no member of family has attended vocational training	Percent	93	100	0	0.93
	Knowledge & Skill Vulnerability Index (weighted average of knowledge & skill indicators)						
Human Capital Vulnerability Index (weighted average of Human capital indicators) 0.40							
Physical	Transport	Percent of HHs who do not have electricity at home	Percent	97	100	0	0.97
		Average time to reach nearest transportation station	Minutes	145.1	360	9	0.39
		Percent of HHs who have transportation access b/n their villages and state	Percent	60	100	0	0.06
		Percent of HHs who have no transportation access b/n their villages and state	Percent	40	100	0	0.40
Physical Capital Vulnerability Index (weighted average of all physical indicators) 0.45							
Social	Demography	Percent of HHs headed by female	Percent	27	100	0	0.27
		Average number of family members in the HHs	People	8.5	30	2	0.23
Social Capital Vulnerability Index (weighted average of all social indicators) 0.25							
Oil Impacts		Percent of HHs displaced due to oil exploration	Percent	49	100	0	0.49
		Percent of HHs displaced due to war	percent	43	100	0	0.43
		Percent of HHs displaced due to flood/drought	percent	8	100	0	0.08
		Percent of HHs reported that clean water has been polluted by oil exploration	percent	62	100	0	0.62
		Percent of HHs reported that sanitation services have been polluted by oil exploration	percent	81	100	0	0.81
		Percent of HHs reported their farm lands have been polluted by oil extraction	Percent	82	100	0	0.82
		Percent of HHs reported their grazing land for livestock has been polluted by oil	Percent	87	100	0	0.87
		Percent of HHs reported that fuel wood has been reduced due to oil extraction	Percent	72	100	0	0.72
		Percent of HHs reported that their health	Percent	73	100	0	0.73

Capitals	Component	Sub-components	Unit	Value	Max	Min	VI
		services have been polluted by oil extraction					
		Percent of HHs reported no impact on their Jobs and income by oil extraction	Percent	85	100	0	0.85
Oil Explorations Vulnerability Index (weighted average of all oil impacts index)							
0.64							
Livelihood Vulnerability Index (LVI)(weighted average of all livelihood capitals plus oil impacts index)							
0.42							

This section discusses the results of the findings present in Table 5.5, Figure 5.3 and Figure 5.4 above, in terms of their respective livelihood assets.

5.1.1 Natural capital

Although 89% of HHs mentioned during the survey that they had been farming previously, 90% of the HHs complained that agricultural production had been declining in recent years due to ongoing oil exploration which had forced many people to leave their farms because the latter were either crossed by a pipeline or affected by drilling of wells in the ground. About 93% held similar views with regard to the numerous negative impacts ascribed to oil activities which affected their natural livelihood capitals, such as: dumping of chemical substances by oil companies affecting farmland productivity, pollution of water and lack of an appropriate compensations policy from the government and oil companies for those who had lost their properties due to exploration.

Firewood was described as a major energy source among local communities in Unity State. This was verified by the survey in which 100% of the respondents mentioned that they are dependent on firewood as their main source of energy for cooking, making them very vulnerable at 1. In addition, respondents indicated that forests are massively depleted, resulting in households requiring an average 1.88 hrs to fetch the firewood for cooking. In addition, local people insisted that firewood availability had been reduced as compared to past years: 61% of the respondents indicated that firewood had become very scarce in comparison with the last 20 years, prior to extensive exploration in the villages. Therefore, it seems probable that the forests in the villages will be destroyed, thereby posing a threat to local people's livelihood sustainability. It was found that 93%

of households use traditional stoves for cooking as compared to 7% who use modern stoves for cooking. Lack of clean water is a major problem in Unity State and communities are vulnerable at 0.46 in terms of water. A relevant factor could be conflict over water: approximately 91% of the respondents revealed that they had heard about such conflict. With 81% of households obtaining their water directly from rivers or streams, they indicated that it takes them an average of 74.6 minutes to fetch water. Water may be available; this was indicated by 82% of respondents who reported having water daily, but they further indicated that most of the water in the nearby villages has been polluted by chemicals poured into river by oil companies. HHs store an average of 0.042 litres per day, indicating scarcity of water in these areas.

5.1.2 Financial capital

Financial capital is usually associated with the sustainability of livelihoods. Sufficient finance helps to overcome external risks and shocks. Communities in Unity State were found to be vulnerable at 0.25 in terms of financial capital. In terms of assets, the results show that communities holding an average 0.5 hectare of land were the least vulnerable. Those communities which diversify their livelihood assets are correspondingly less vulnerable at 0.1 in terms of livelihood diversification. This can be attributed to the fact that households which report more than one livelihood may be able to escape the adverse impacts of oil activities. Due to oil being such a lucrative business, it is always expected that local people who reside at the oil extraction site are able to reap many benefits, especially in terms of finance and employment. Contrary to this supposition, in Unity State results of the HHs survey indicated that 88% of respondents do not have a regular income while about 87% of the HHs mentioned that their income did not change in the past years. In terms of employment, 77% of the respondents revealed that they do not have anyone from their family working in the oil companies compared to 23% who reported that they do have someone from their family working employed by the oil companies. Most of the people employed are casual labourers, earning only low wages for their survival, which cannot make a significant contribution to their way of life. Oil companies are also able to contribute to the

improvement of local people's livelihood by providing loans to them to finance local projects, such as schools, health, and small micro-finance. However, the results show that 85% of respondents have never taken a loan from oil companies or other community based organisations (CBOs) as compared to 15% of the HHs who took loans from oil companies and other CBOs. Moreover, 82% of respondents mentioned that their lives did not improve in the last 20 years.

5.1.3 Human capital

In terms of human capital, as previously stated, the survey reveals that it takes communities an average of 152 minutes to reach the nearest health centre when they are ill. Similarly, 92% of HHs reported at least a family member being chronically ill and 82% of respondents mentioned death of family member from oil related disease in the past 20 years. In Unity State there are always foods and nutrition shortages and this was verified by the findings that households have an average 3.04 months to struggle to have sufficient food. In term of knowledge and skills, 93 percent of HHs do not have TV at home, 82% of the HHs do not have a radio set at home while 93% of the respondents reported that they do not have any member of their family attending vocational training; however, all these factors contributed to making communities more vulnerable at 0.5 in term of human capital. Thus, oil extractions did not add value to improving livelihoods of local communities in the areas. Some of the HHs reported that there may be one school or health centre which was built by oil companies, but there are no teachers or health workers.

5.1.4 Physical capital

For physical capital, the survey shows that communities were vulnerable at 0.45 in these terms. This could be a result of the following factors: lack of electricity: results indicated that 97% of the HHs do not have electricity at home as compared to 3% who do. Although 60% of respondents reported that they have access to transport between

their villages and the state capital, it takes them an average of 145.1 minutes to reach the nearest transportation centre.

5.1.5 Social capital

In terms of demography, the results indicate that 27% of the HHs were headed by females while there are an average of 8.5 people staying in HHs as family members.

5.4 IMPACT OF OIL EXPLORATION

Communities are vulnerable at 0.64 in terms of oil exploration. The vulnerability index of oil impacts is observed as the highest impacts on these livelihoods. The factors of these adverse impacts are: community displacement, with 49% of the respondents reporting that they were displaced by oil extraction from their homes; and 62% reporting that their water has been polluted by oil activities. Many people in the villages complained that oil companies pour chemical substances and by-products into the rivers and streams which people use as sources of water to drink and to give to their livestock. Oil extraction contaminants were identified by communities as affecting their sanitation services. Results of the survey indicated that 81% of the HHs responded that oil exploration has a major impact on sanitation services in the villages. With regard to the use of land for farming and livestock grazing, 82% of the HHs were forced to stop farming because their land has been polluted by oil exploration whereas 87% of respondents said that they experienced grazing land shortages for their livestock due to oil pollution. As mentioned before, fuel wood is one of the major energy sources for cooking in the rural communities of Unity State, but in recent years there have been dramatic reductions in its availability: 72% of the respondents reported that they have observed a dramatic decline in this respect due to oil activity. Jobs and income are major expectations which the local communities have of positive opportunities arising from oil exploration in their areas. In Unity State, though, 85% of the respondents indicated that there were no such positive impacts on jobs or incomes in their villages as result of oil exploration.

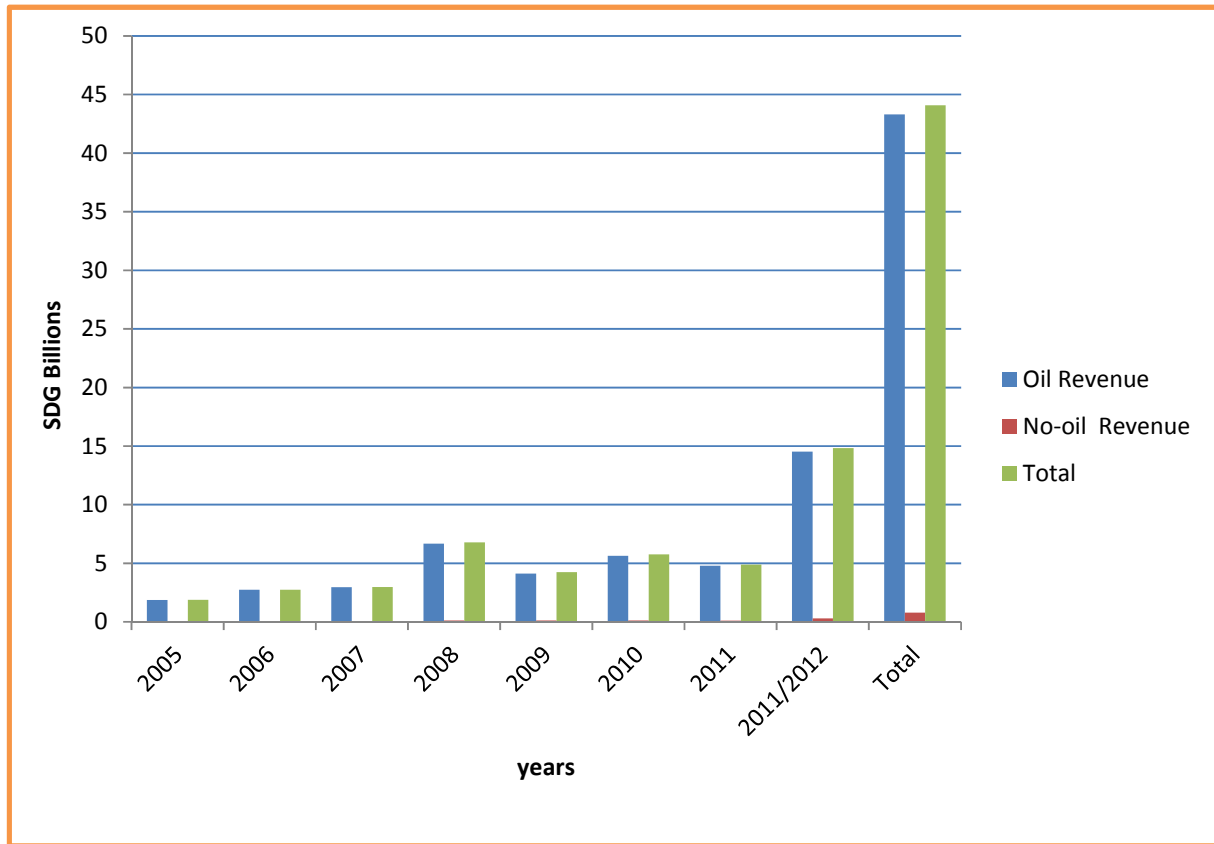
5.5 RESULTS OF THE SUSTAINABLE BUDGET INDEX (SBI) ANALYSIS

This section reports the results of oil revenues generated by South Sudan and indicates how these revenues were efficiently spent on productive investments to alleviate the adverse impact of oil activity that affected adjacent communities.

5.1.6 South Sudan oil revenues

South Sudan generated a total of SDG 44.1 billion in revenues between 2005 and January 2012, of which SDG 43.3 billion (98%) was generated from oil resources before the cessation of oil production by this country in 2012. Figure 5.5 presents total income generated by the GOSS from both oil and non-oil revenues with South Sudan generating SDG 43.3 billion from the oil sector between 2005 and 2012. It also reveals that oil revenue accrued to this country increased steadily in 2008, 2010, 2011 and 2012. The surge of oil revenues in 2008 and 2010 could be associated with global oil price hikes that occurred in 2008 and 2010, respectively. This increase could additionally be attributed to an expansion of oil production and exploration of new blocks. An increased oil revenue in 2011 and 2012 was the result of South Sudan becoming independent in 2011, thereby having 75% of the total oil production in the Sudan attributed to its total figure.

Figure 5.5: South Sudan Revenues of oil and non-oil (2005-Jan.2012)



Source: MOFEP (2012)

5.1.7 Oil sustainable management and expenditures in SS

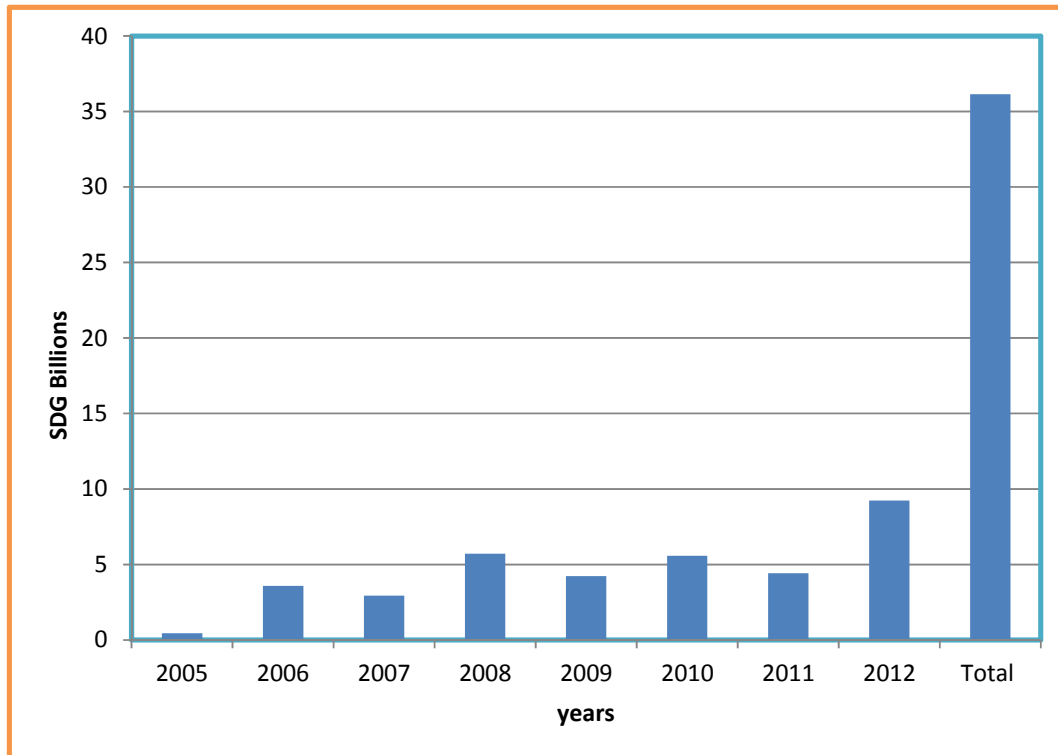
Sustainability theory states that revenue from non-renewable resources such as oil can be prudently managed and spent on productive investments which can create employment for future generations and compensate for the damages incurred as a result of natural resource explorations. Directives for South Sudan oil management and utilisation were stipulated in the CPA which stated that oil resources, as non-renewable resources that will be depleted in the future, may be utilised and managed for:

- the national interest and public good ,
- the interest of the affected states or regions,
- the interest of the local population in the affected areas,

- The development of national environmental policies, biodiversity conservation guidelines and cultural heritage protection principles.

South Sudan spent a total amount of SDG 36.2 billion from 2005 to 2012. Figure 5.6 indicates total expenditures between 2005 to January 2012. These expenditures have increased proportionally to the increase in oil revenues. Figure 5.2 indicates that South Sudan increased its spending sharply in 2008, 2010 and 2012. The surge in those particular periods may be attributed to increased oil rents in 2008 and 2010. Similarly, an increase of expenditures from 2011-January 2012 may be attributed to South Sudan fully owning the oil revenue after independence in July 2011.

Figure 5.6: South Sudan total expenditures from 2005-2012



Source: MOFEP (2012)

Natural resource theorists argue that agents who capture the resources rents should reinvest them into productive investments such as infrastructure, human capital, and health as these factors have the capacity to continue to improve the welfare of citizens after the depletion of resources. However, it is vital to assess the South Sudan

expenditures of oil revenue on the basis of these arguments: these expenditures have been categorised into five components: salaries, operations, capitals, transfers to states and transfers to development projects. Table 5.6 depicts ratios of expenditures in the above mentioned components and indicates that South Sudan used 33% of its total expenditures for salaries from 2005 to 2012; 32% of its expenditures on operations and 19% on capitals. Between 2005 and 2012, only 16% of its expenditures were allocated to its states. Despite the fact that South Sudan is a young nation and one of the least developed countries in the world in dire need of infrastructure, health, education, water and roads it allocated only 1% of government expenditures to these development projects between 2005 and 2012.

Table 5.6: South Sudan Expenditures; ratios to Salaries, Operations, Capitals, Transfers to States & DP

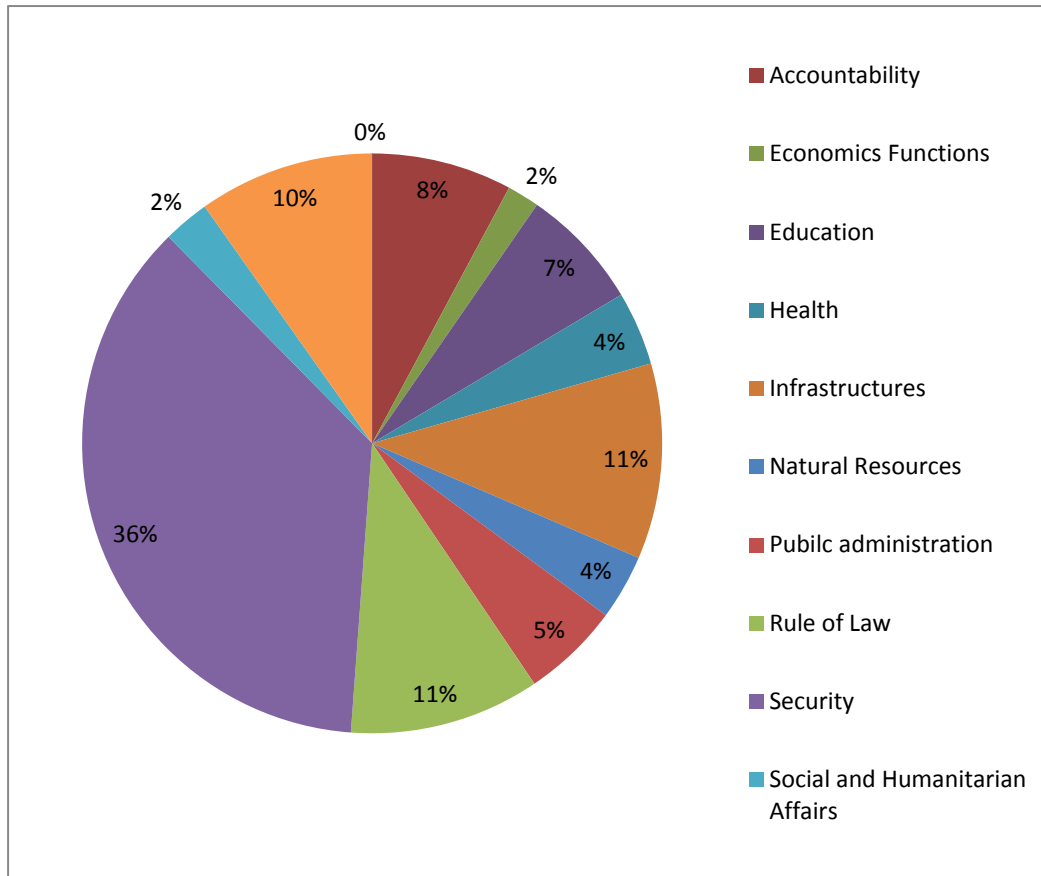
Year	Salaries ratios	Operations ratio	Capitals ratio	Transfers to states ratio	Transfers to development projects ratio
2005	5%	59%	2%	34%	0%
2006	28%	34%	23%	12%	3%
2007	40%	29%	11%	17%	3%
2008	29%	34%	25%	10%	2%
2009	37%	24%	19%	20%	0%
2010	32%	34%	16%	18%	0%
2011	26%	41%	18%	15%	0%
2012	37%	27%	20%	16%	0%
Total	33%	32%	19%	16%	1%

Source: Own calculations based on South Sudan expenditures components

In terms of the economic sectors, South Sudan expenditure has been classified into: Natural Resources and Rural Development, Education, Health, Security, Accountability, Rule of Law, Public Administration, Social and Humanitarian Affairs, Infrastructures and the Economic Functions Sector. Figure 5.7 reports the proportion of each sectors' expenditures. The results indicated that the country spent a large portion of its oil revenues on the security sector, accounting for 36% of the country's expenditure. The said sector took the lion's share of allocated revenue justified by the profound need to restore security stability in the country after ending Africa's longest conflict. However, the security situation in South Sudan remains volatile despite this huge allocation. This

has resulted in questions about whether that money was prudently spent. As discussed in the above sections sustainability theory advocates that to protect the welfare of current and future generations, revenues generated from non-renewable resources such as oil should be reinvested in the productive sectors such as education, health, infrastructures and other productive sectors to create employments and other opportunities after depletion of the resources for both current and future generation. However, the findings tabled in Figure 5.7 indicate that South Sudan spends only 7% of its revenues on education, 4% on health and 11% on the infrastructure sector. In spite of the reality of the majority of the South Sudan population depending on the agricultural sector for their livelihoods, Figure 5.7 reveals that only about 4 percent of expenditures were allocated to the natural resources sector which includes agriculture, animal, fisheries, water and rural developments. To share oil revenue with the local population is the overarching objective of resources theory and the directives of the CPA, but Figure 5.7 shows that South Sudan transferred only 10% of its oil revenue to its states during the period 2006 to 2010.

Figure 5.7: South Sudan expenditures by sectors from 2006 -2010

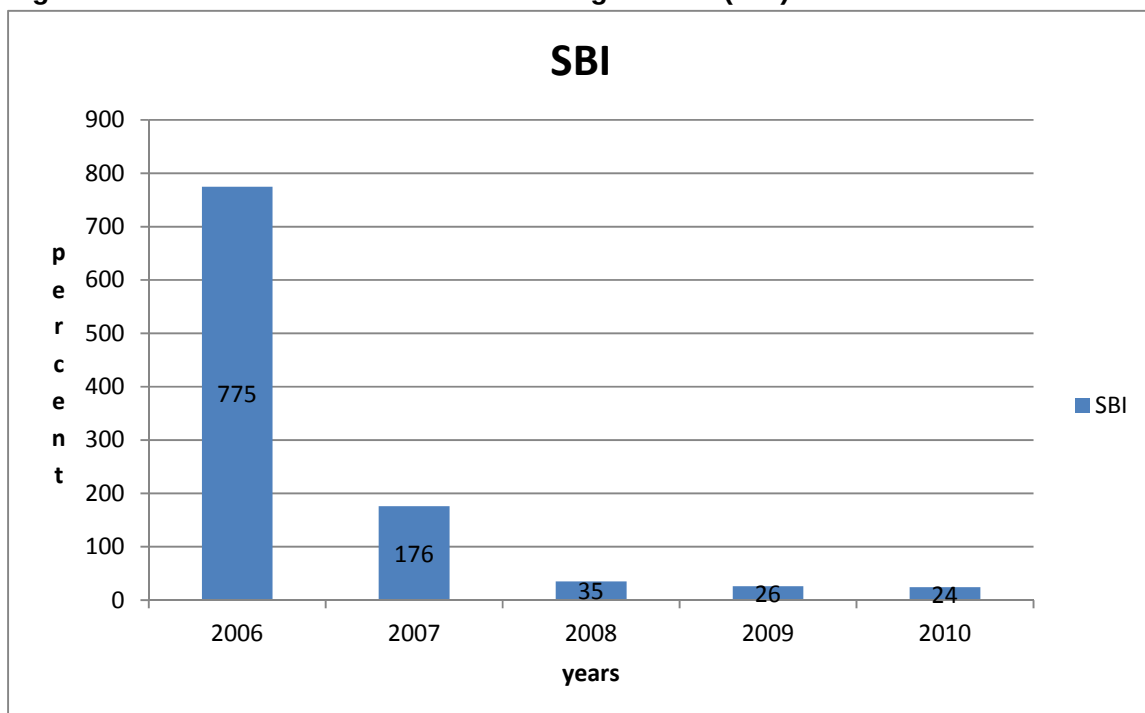


Source: MOFEP (2010)

Although there are no specific guidelines on how to reinvest natural resources rent into productive investments, as mentioned the Botswana Ministry of Finance has developed a Sustainable Budget Index (SBI) to evaluate whether their diamond revenues were being spent on productive investments. It is therefore essential to use SBI to check whether South Sudan current consumptions were financed out of oil revenues. Figure 5.8 presents the South Sudan Sustainable Budget Index from 2006 to 2010. South Sudan (SBI) was calculated as the government expenditures excluded the health, education, Infrastructure and natural resource expenditures to the ratio of non-oil revenues. The results reflected in Figure 5.8 indicated that the country does not finance its expenditures out of oil revenues. In addition, this figure confirms that South Sudan is entirely dependent on revenue generated from oil resources to finance its current consumption expenditures. It additionally confirms that oil revenue in the country is not

invested in productive sectors which would enable job creation after oil depletion. It also indicates that South Sudan's SBI figures are greater than the rule of thumb of SBI, being 1. Figure 5.8 indicates that the SBI figures of South Sudan in 2006 were 775, 176 in 2007, 35 in 2008, 26 in 2009 and 24 in 2010 which were greater than 1. Therefore, it may be concluded that South Sudan's expenditures based on oil resources are fiscally unsustainable.

Figure 5.8: South Sudan's Sustainable Budget Index (SBI)



Source: Own calculation based on South Sudan expenditures

CHAPTER 6

SUMMARY, CONCLUSIONS AND IMPLICATIONS OF THE STUDY

6.1. SUMMARY OF THE STUDY

The objective of this study was to examine how oil explorations and production activities affected the livelihoods of local communities and sustainable development in Unity State, South Sudan. The study therefore examined the impacts of oil exploration on the livelihoods of the local communities, particularly from the perspectives of their agricultural land, fishing, and forest and water resources. A second objective was to evaluate whether oil revenues generated by South Sudan had been prudently spent and managed to improve the welfare of communities and in what manner the oil industries have contributed to the welfare and upliftment of local people.

The study employed the SLF in order to assess the impacts of oil exploration and production activity on the livelihoods of host communities. LVIs were calculated to examine the level of impacts oil extraction had on the local community's livelihood assets and were focussed on such assets as natural, human, social, physical and financial. The study used the household survey primary data which were collected from the three villages adjacent to the oilfields. A total sample of 150 households participated in the survey. Data were collected through administered structured questionnaires. The Sustainable Budget Index (SBI) approach was also employed in the study to evaluate prudent management and expenditures of the oil revenue in South Sudan. To understand the oil revenue management and expenditure, the study used data which were obtained from the Ministry of Finance and Economic Planning and the Nile Petroleum Corporation (Nilepet) utilising records from 2005 to 2012.

The results of the study provided empirical evidence that extraction of oil has severe impacts on the livelihood assets of the host communities. The findings further confirmed that most of the rural communities of Unity State depend on agro-livestock for their livelihoods. In comparison to others, it was indicated that 37% of people depend on

agro-livestock, followed by fishing and 23% of people running their own businesses. Forest based products also played a pivotal role in sustaining the livelihoods of rural communities in the Unity State: findings revealed that 13% of the households participating in the survey indicated that they depend on timber, charcoal and firewood to sustain their livelihoods. Unity State generates almost half of the oil product in South Sudan, particularly Mayom, Koch and Rubkona Counties, but the findings show that only 3% of households interviewed depend on a salary from the oil sector to provide their livelihoods. It was further evidenced that access to and availability of livelihood assets of communities adjacent to the oil fields are polluted and reduced. Moreover, the study indicated that oil extraction did not have any significant positive impact with regard to improving communities' livelihoods or conditions in areas such as education, increased income, provision of electricity, access to loans and improved transport. The findings indicated that oil exploration in Unity State has failed to improve the welfare of the local communities, instead resulting in producing the symptoms of the "resource curse": for instance there is a significant disparity of income among poor and rich, high levels of mortality rates, high levels of illiteracy and only few people have access to clean water and health care. Oil exploration has also contributed to huge displacement of local communities with results indicating that 49% of households who participated in the survey reported that they left their original places of residence due to oil exploration and production activities. In conclusion, livelihood assets of the local communities in Unity State are negatively affected by the ongoing oil exploration and production: there is a high level of poverty with approximately 68% of the people living on less than one dollar a day. It may be concluded from the findings that these severe impacts have contributed to the deterioration of health, a lack of clean water, low levels of education enrolment ratios and the decline of farm land due to pollution from the oil activities. The study provided empirical evidence that local communities adjacent to the oil fields are highly vulnerable in terms of their natural, financial, human, physical and social livelihood capitals. However, policy strategies are required to regulate negative impacts of oil activities which affected local people livelihood assets.

Efficient management and expenditure of oil resources is pivotal in mineral sustainability theories. The results provided the empirical evidence that in South Sudan, oil contributed 98% of government revenues from 2005 to 2012. Non-oil revenue contributed only 2% to South Sudan's revenues. In terms of expenditure, South Sudan spent a total amount of SDG 36.2 billion between 2005 and 2012. Salaries and wages absorbed 33% of total expenditures, while 32% of expenditures went to operational expenses and 19% of government expenditure was allocated to capital spending. South Sudan allocated only 16% of its total expenditure portion to ten states in the period 2005 to 2012; similarly, only 1% of total expenditures went to project development. In terms of departmental expenditures allocation, the security sector spent the most, amounting to 36% of the total expenditures for the same period. The findings also proved that South Sudan financed most of its current consumptions from oil revenue: this was empirically supported by the SBI analysis over the same time period which is above 1 according to the rule of thumb. The above findings provide evidence that South Sudan spent most of its oil resources on non-productive investments which are unable to mitigate the negative impacts which accrue to host communities as a result of oil exploration.

6.2. CONCLUSIONS OF THE STUDY

Based on the above it is concluded that oil exploration and production in Unity State posed negative threats to the livelihoods of the local communities and that the management and expenditure of South Sudan oil revenue is unsustainable. This situation calls for urgent action to reduce damage and look to the future.

6.3. IMPLICATIONS AND RECOMMENDATIONS OF THE STUDY

Policy strategies are required to regulate negative impacts of oil activities which have affected local people's livelihood assets. The study recommends that oil companies responsible for extraction should make appropriate mechanisms to compensate affected communities both household and community levels. In the household level,

companies should compensate households whose the livelihoods are affected by oil extraction according to damages. In the communities level, oil companies should invest in local projects, such as, water, school, roads, health, micro-finance and so forth to allow host communities to reap the benefit of oil production and compensate the damages caused by oil extraction in the areas as given above. Study also recommended that oil companies should increase employment allocation to local communities. In addition to companies the study recommended that government should include in its contracts with oil companies that companies should use environmental friendly technology in extraction with minimum negatives impact on local people livelihoods and advise the companies to put in their budget of operational cost community development fund.

The other recommendations of the study are based on oil revenue management and spending, the study recommended that since oil is a non-renewable resource which will deplete in the long run, it is vital to invest oil revenue money into productive sectors like education, health, infrastructures, and industrial which will benefit both current and future generation and keep sustainability of country revenue after oil depletion. Oil revenue contributed 98% South Sudan revenue, however, the fact that oil prices are determined by international markets and South Sudan is a small which cannot influence world market, solely depending on oil revenue could place the country in a great risk. Therefore, the study recommends that South Sudan need to use the oil proceeds to diversify its economy by developing other sector of the economy namely, mining, agriculture, water, forestry, fishery and so forth to avert any future oil price fluctuation.

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APPENDIX I

Questionnaire:

Impacts of oil extraction on the livelihoods of local communities and sustainable development in South Sudan: the case study of Unity State

Household questionnaire

Interviewer:	Date :
Checked By:	Time :
Respondent Village :	Oil Block :
Respondent County :	
Respondent age :	
Respondent Sex:	

Part A.

1. Household socioeconomic status:

a. Gender:

(i) Male (ii) Female (iii) Age (iv) Number of the people in house:

b. Level of Education:

(i) No formal education (ii) Primary (iii) Secondary (iv) College /University

c. Occupation:

(i) No work (ii) Farming –including subsistence (iii) Own business (iv) Wage labour (v) Salaries employee (vi) Fishing (vii) Pastoralist

2. How many years you have been in this village /location?

(i) Less than a year (ii) 1- 5 years (iii) 5-10 years (iv) 10 years or more

2a. Where was your original place before moving to this location? -----

2b. why you leave your original place?

(i) Due to war (ii) Due to oil exploration (iii) Flood or drought

3. What are the sources of the livelihoods of household?

Sources of livelihood	Average income per month	Total Annual income in (SSP)
Agricultures and Livestock sale of product (farming)		
Fishing		
Business /trade		
Salaries employment in the non-oil sectors		
Causal labour		
Trade in Forest products (Timber, Charcoal, Firewood, and Carpentry.)		
Salaries employment in the Oil companies		

4. Is there oil exploration in your area? (i) Yes (ii) No

5. What is the name of the company?

6. How long the oil exploration has been carried out in your area?

(i) Less than a year (ii) 1—5 years (iii) 5-10 years (iv) 10 years or more

7. How has oil exploration affected your livelihood with respect to availability and access to:

Indicators	✓ Tick
Clean water	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Sanitation services	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Farm land	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Grazing land and livestock	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Fuel wood	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Health services	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Jobs and income	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Education	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Transport	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources

Electricity	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Healthy environment	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources
Credit/loan	(i) Improved (ii) Reduced (iii) No effect (iv) Polluted resources

Part B. Impacts of oil extraction on livelihoods

1. Natural Capital

i. Land

- Have you ever farmed? Yes: No:
- If Yes "to above question are you still farming now?
- If "No" to above question why are you no longer or not farming?
- Do you have access of farm land? Yes : No:
- Has there been declining or increase in your agricultural production?
- What has been your farming experience since the oil exploration started in your community?

ii. Forest

- What is the source of energy of cooking for household?
Firewood: Petroleum: Electricity or solar:
- How long it take to collect firewood for family?
- What is current situation of availability of firewood compare with the past 20 years?
More than before: Less than before: The same as before:
- Cooking stove: Traditional : Improve :

iii. Water

- Have you ever heard about water conflict in your community?
No: Yes:
- Where do you collect your water from? Tap: River/ pond/streams:
- How long it take (Minutes) to get to the source of your water?
- Is this water available every day? Yes: No:
- What containers do you often store water? How many liters?

2. Financial Capital

i. Assets

- How much land does your family have?
- Apart from land what are the others assets does family own?

ii. Finance

- Does your family have a regular income?
- Has your income change in the past 20 years?
- Is there any member of your family employ in the oil companies? yes: No:
- If yes has his/her income contribute to improve family life? Yes: No:

- g. What is the other source of cash for family?
- h. Does your family have taken credit service from any CBO/Financial Institutions or oil Companies?
Yes: No:
- 3. Human Capital
 - i. Health
 - a. How long does it take to reach the nearest health centre from your house?
 - b. Is there anybody in your family chronically ill? Yes: No:
 - c. Has anyone in your family die with sickness related to oil activities in the past 20 years (pollution, displacement) Yes: No:
 - d. Has anyone in your family been suffered from TB, Aids, Cholera or other communication diseases in the past one year? Yes: No:
 - e. Has anyone in your family injury due to oil activities related? Yes: No:
 - ii. Food and Nutrition
 - a. How many months do your family get sufficient food from your own land production?
 - b. What are the types of cereals crops do your family grow in the same plot of land a year?
 - c. What is the other source of food for your family?
 - iii. Knowledge and Skill
 - a. Do you have TV in your house? Yes: No:
 - b. Do you have radio set in your house? Yes: No:
 - c. Is there any member of your family has taken any kind of vocational training? Yes: No:
 - d. Could you please say which level of education the children less than 15 years of age at your family attend? (i) No formal education (ii) Primary
- 4. Physical capital
 - a. Do you have electricity in your house? Yes: No:
 - b. How many minutes does it take to reach nearest land or air vehicle station?
 - c. How many times it take to reach nearest telephone centre from your home?
 - d. Is there a transportation service between your village and state capital?
Yes: No:
- 5. Is there anything you would like to say which not mention in this questionnaire?

Thanks for your Cooperation!