International Journal of Management, Economics and Social Sciences
2017, Vol. 6(3), pp.144 – 156.
ISSN 2304 – 1366
http://www.ijmess.com

A Socio-Economic and Environmental Analysis of the Effects of Oil Exploration on the Local Community in Lokichar, Turkana County, Kenya

Josephat Koli Nanok[1]
***Christopher Ouma Onyango**[2]

[1]Strathmore University, Nairobi, Kenya
[2]Kenyatta University, Nairobi, Kenya

Oil exploration activities have been ongoing in Turkana County, Kenya resulting in discovery of a huge amount of oil deposits. However, very little research has been conducted to determine the effects of oil exploration activities on socio-economic and environmental factors in Turkana County. The purpose of this study was to analyze effects of oil exploration on the social fabrics, the economic variables and the environmental factors in the oil exploration areas in Turkana County. The study applied a cross-sectional survey design. Data was analyzed using both parametric and non-parametric statistical methods. The results of the study showed that despite the ongoing oil exploration in the county, the locals have not adequately benefitted from job opportunities created by the exploration companies. In addition, cost of land has also increased. However, the study shows that despite the influx of migrants the trade volumes within oil exploration regions has not substantially increased. Further, oil exploration activities have adverse negative effects on environment, health and education of the locals. The study would greatly help policy makers at national and county levels to develop policies addressing problems associated with oil exploration faced by people living in oil exploration zones of Turkana County.

Keywords: Oil and gas exploration, trade volumes, influx of migrants, employment opportunities, local land pricing

JEL: F18, Q30

Oil exploration started way back in the early 347 AD in China with the first well drilled (Song, 2016). Since then the world has been in the business of oil exploration and production. In East Africa, oil exploration started in early 1930s by the British colonialists although they faced by many challenges until around 1990s when few first oil wells were discovered (Purcell, 2014). The discovery of oil in South Sudan, then Sudan, in 1987 brought many prospects of oil discoveries in East Africa. Since then, a number of oil companies such as Chevron, Africa Oil and Tullow oil have camped in the region acquiring licenses and conducting seismic oil and gas exploration tests in countries such as Kenya, Uganda and Tanzania (Yabs, 2015). As per data

Manuscript received August 25, 2017; revised October 2, 2017; accepted October 27, 2017.
*Corresponding author: conyango@strathmore.edu

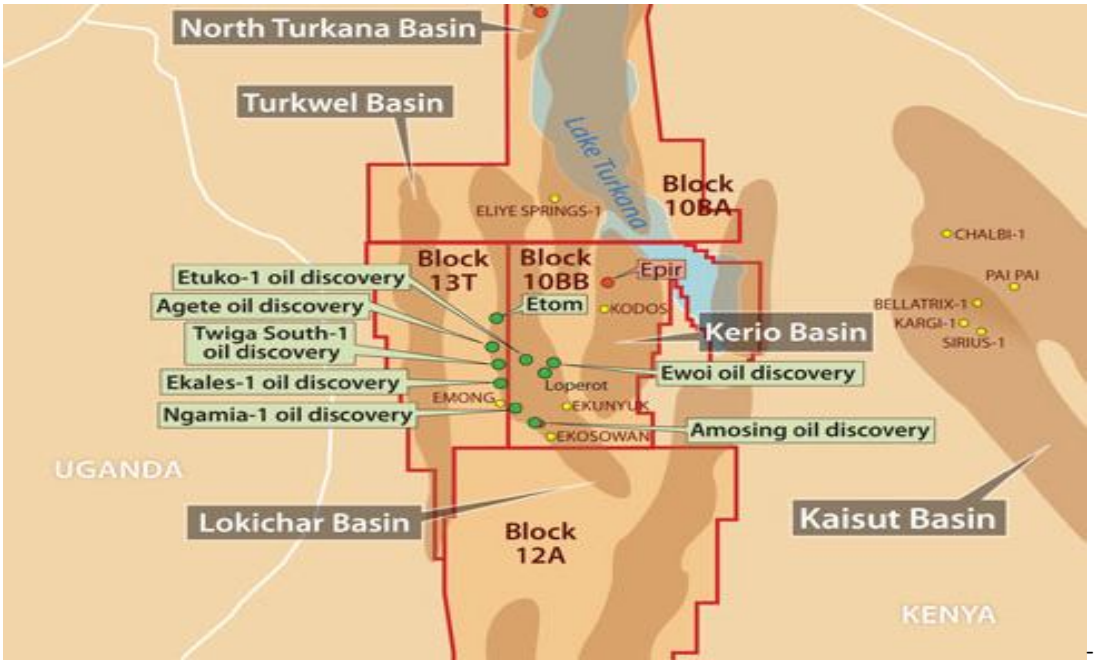
obtained from the International Energy Agency (2016) report, total Africa's proven oil and gas reserves are estimated at 129.6 billion barrels and 496.7 tct (87.7 BoE) respectively. Africa makes up 7.5 percent to 7.8 percent of total proven oil and gas reserves in the world, and with more discoveries expected, its share contribution of proven reserves will rise.

Legborsi (2007) summarizes the reasons why the world has a huge appetite for oil, and the role played by oil exploration in world politics. The paper asserts that, " the lives of people are affected and the destiny of nations is determined by the result of oil explorations" . It is oil that ensures the workings of the industrialized countries, and provides the revenues that enables execution of ambitious national and economic development plans. If deprived of oil, the world will experience slow progress and life itself will be unbearable. Thus, oil plays a major role for economic development in many countries.

Oil Exploration in Kenya

Oil exploration in Kenya started in the 1950s and was characterized by dry wells that discouraged multinational oil companies from conducting more exploratory tests in the country. However, oil discoveries in Uganda in 2006 (Yabs, 2015) triggered new oil exploration prospects for Kenya, hence, a Canadian firm Africa Oil Corporation acquired multiple blocks around Lake Turkana Tullow Oil Plc (2013). Africa Oil Corporation later sold 50 percent of its stake to Tullow Oil Company. The map in Figure 1 shows Tullow Oil Company's licensed oil exploration blocks in Kenya and Uganda (Tullow Oil Plc, 2013). Apart from Tullow Oil, African and Taipan Oil companies acquired 5 licenses to explore oil and gas in Mandera and Anza basins (Purcell, 2014). However, the latter two have not yet discovered any oil reserves in their basins.

In the Rift basin of Kenya and specifically Turkana, Tullow Oil Company acquired licensed Blocks 10BB, 13T and 10BA in 2010 and immediately embarked on conducting aerial surveys and more conventional 2D seismic activities. Within the next 18 months, the first well drilled, Ngamia-1, became a success with 20 meters net column of oil within the Lokichar Basin. Since then, Tullow Oil Company has discovered 600 million barrels of recoverable oil, with an estimated potential of 1 billion barrels, with an evaluation that indicated commercial viability of these resources. Figure 2 illustrates the oil discoveries in Lokichar basin. These successes significantly de-risked the other areas in Turkana County, signaling the acceleration of



Source: Tullow Oil report, 2013

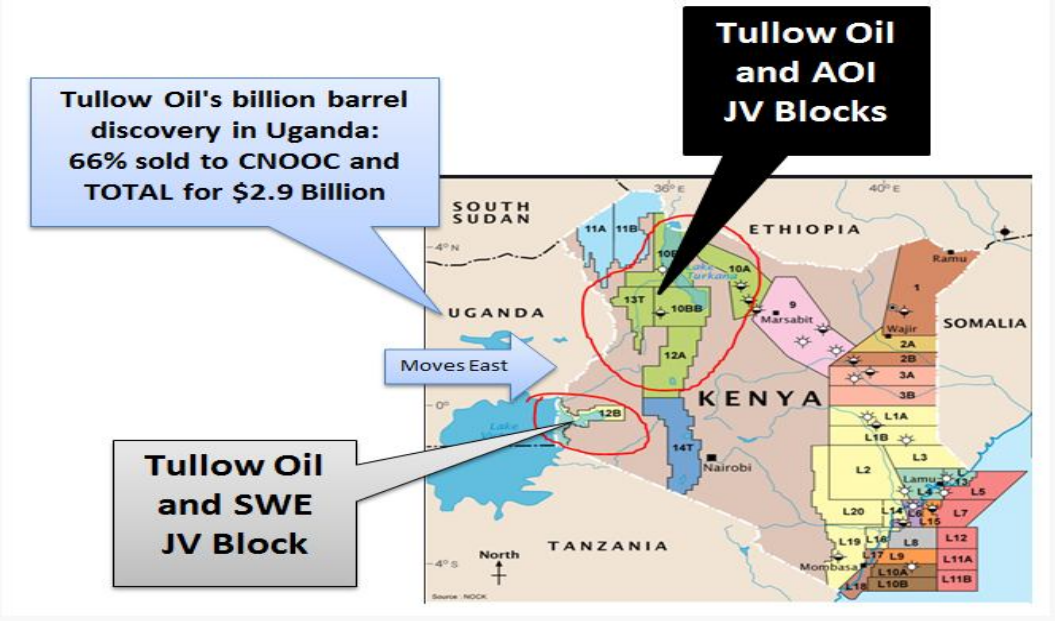
Figure 1. Tullow Oil Company's Licensed Exploration Blocks in Kenya and Uganda

parallel exploration, appraisal and development programs. Tullow Oil Company deployed 4 rigs, expanded its exploration and appraisal operations; with a target of 40 wells in year between 2014 and 2015.

A production development plan to cover the South Lokichar basin is currently under preparation. Apart from conducting oil prospects in the Lokichar basin, Tullow Oil Company also operates licenses in blocks 21A located in Kerio basins shown in the Figure 2.

Kenya is an oil importing country till the date and oil remains its largest import. According to the Institute of Economic Affairs (2016), Kenya's oil consumption constitutes 21 percent of its total energy requirements. Oil is a key determinant of Kenya' s overall economic performance (Simiyu, 2009), as it significantly influences consumption and investment patterns through its direct effect on the country's interest and exchange rates. In its quest to improve its competitiveness in the oil industry and hence lower the cost of imported oil to manageable levels, Kenya partnered with major oil and gas companies, intensified and expanded oil exploration activities across the country and particularly in Turkana County. Profile reports by Tullow Oil Plc. (2013; 2014) give insights into its oil exploration activities in Turkana County. In 2013, Tullow

Oil spent KSH 23.4 billion on their operations in Kenya, with the bulk of it on Turkana County exploration operations. The largest portion (74 percent) of expenditure was on international contractors and another 18 percent outsourced to Kenyan companies operating outside Turkana County. However, only .4 percent of



Source: Tullow Oil report

Figure 2. Oil Discovery in Lokichar Basin, Turkana County

expenses were spent on the local community in Turkana County. This implies that the local community did not benefit adequately from the company activities. Similarly, social investment expenditure of KSH 100 million is inadequate, as it constitutes only .4 percent of total investment. More so, out of 2155 employees by Tullow Oil Company and its business contracted companies, 1276 were residents of Turkana County with 83 percent being semi and un-skilled and only 2 percent in management positions. Tullow Oil cited the lack of local skilled manpower and made decision to recruit from other parts of Kenya and outside Kenya.

In March 2014, Tullow Oil Company implemented a Light Vehicle Scheme (Tullow Oil Plc, 2014) worth $2.5 million to purchase 36 vehicles to be given to local businesses on 3-year lease. These business investments, in additions to few skilled opportunities available to the local community, were perceived by them to be inadequate (Cordaid, 2015). As a result there was increased community dissatisfaction with

Tullow Oil over their business and employment policies, often resulting in violent demonstrations temporarily affecting Tullow Oil operations.

Problem Statement

Although positive prospects of oil exploration activities are good for a country's economy, it has its substantial share of negative effects. The positive impact could range from increased employment opportunities, increased trade volumes, stabilization of the exchange rates and rapid economic growth (Sharma and Arora, 2012). Similarly, a number of negative effects would also occur due to the exploration and exploitation of a natural resources. Oil exploration and subsequent exploitation is known to have created adverse effects on the environment globally while also destabilizing economies especially when cultural and social concerns are not properly addressed (Omorede, 2014).

Many previous studies focused on the social impacts of exploitation of natural resources without seeking to establish to what extent these variables affect the economy and the societal social fabrics. This study seeks to explore the effects of oil exploration on socio-economic and environmental aspects of people living in Lokichar, Turkana County. The specific objectives of this study are mentioned below:

1. To explore how oil exploration has affected economic variables.
2. To determine the correlation among employment, land pricing, trade and migrant influx.
3. To determine the effects of oil exploration on the environmental and social variables.

The rest of the sections are organized as follows: section 2 gives the relevant literature on oil exploration and their effects on socio economic factors. Section 3 provides the research methodology that is adopted in the research. Section 4 presents research analysis and findings. Lastly, section 5 gives discussion of the results and recommendations from the study.

LITERATURE REVIEW

According to a qualitative phenomenological study on the assessment of the impact of oil resource exploitation on selected communities of Nigeria's Delta State conducted by Omorede (2014), it was found that several social problems are associated to the oil exploration. Some of these included oil spillage, ill

health of workers, soil infertility, displacements of people and retardation of vegetation growth. The study adopted the qualitative phenomenological methodology.

A socio-economic assessment of oil exploration in Barmer region of Rajasthan yielded results indicating 83 percent of the sampled population felt oil exploration and its related ventures, brought with it a myriad of opportunities of regular employment and encourages sectorial mobilization (Sharma & Arora, 2012).

A report presented by the European Parliament (2011) asserts that negative health and environmental impacts of the oil industry posed a greater challenge to the Sub-Saharan African economies. Oil spills more so, the small ones, almost albeit go unreported and these destroy pockets of environments and degrade livelihoods. Gas flaring continues to happen in oil producing countries for instance Nigeria, even with the available technology. Cost effective approaches are urgently needed to cushion the communities from these health risks while making the resource affordable for communities to access energy.

Authors like Porter and Kramer (2011) argue that for business success to be realized companies must align their business models to reconnect with social progress, environmental infrastructure and this should underpin business and stakeholder relationships. Such a business model that addresses community needs and challenges with a business model will help avoid the experience in Nigeria where a study (Dadiowei, 2003) on Nigeria and Ecuador raises concern over increased health risks to communities as a result of pollution from oil exploration, and transmitable diseases brought by migrant population.

A study conducted by Ebegbulem *et al*. (2013) to determine the relationship between oil exploration and poverty in the Niger Delta region of Nigeria, found out that the social problems affecting the region's communities were a direct effect of oil companies' operations in the delta. Several forms of environmental pollution have been witnessed in the area since the emergence of the region as an oil-producing region. The findings show that the net total effect of all these externalities cannot be quantified. According to (Chindo, 2011), the perceived socio-economic impacts of the oil sand extraction in Nigeria, bears both positive and negative impacts. The positive would include infrastructural development for health and education, business opportunities, employment and personal incomes while the negative would constitute loss of land for farming, rise in cost of living, and general increase in crime related incidences.

As pointed out by AFP (2013), oil and gas extraction in Amazon basin in South America has caused immense ecological degradation and social troubles that continue to afflict local people's lives in Ecuador. This has resulted in a law suit against Chevron Oil Company in Ecuador for failing to compensate the local people and the local government for the massive environmental damage caused. Although it may seem mineral extraction processes involve unsustainable dealings the oil industry can be able to institute and execute policies that guarantee environmental sustainability.

A survey by Cordaid (2015) on community perceptions of the oil exploration operations in Turkana County revealed that a majority of the community rated the economic factors highly. Respondents also expressed their dissatisfaction with the way the companies and their contractors were either unfairly recruiting employees or supplying goods from outside Turkana County yet these were available locally.

In a related paper Legborsi (2007) discussed the adverse effects of oil exploration and production and the experience of the Ogoni people of Nigeria, the findings assert that oil exploration activities in the major oil fields have adversely affected the health of Ogoni community, the health of their domestic animals through oil pollution namely; the impact of the seismic survey, gas flaring and oil spills, and discharge of effluent into surrounding environment.

In Joromo District (the western region of Ghana), Arye and Oijie (2013) studied two communities which revealed the likelihood of a significant and negative relationship between household income, nutrition and education. Further to this, Obeng (2010) argues that though the discovery of oil in Ghana was received with pomp and pageantry, it was more tempered with fear of socio-economic political stagnation, potential for conflict-arising, and overdependence on oil.

Serrat (2008) asserts that in the prevailing labor market, the level of education, the health status and available environment effect human capital asset, whose quality and quantity in a household directly affects the economic situation of a human group. The inadequacy of it particularly of skills and education, affects the ability to secure a livelihood.

Given the oil industry requires mainly a highly skilled labor force (Rakodi, 2002 a:10) to conduct delicate operational tasks, skilled personnel are sourced externally. This does not augur well with the local community whose expectations for employment remains raised despite their lack of requisite skills for the

specialized jobs. The dashed hopes, often create a tense relationship between communities and oil companies (Tullow Oil Plc., 2013; 2014).

Research gap

Though there exist literature on social and economic effects of oil exploration and extraction across the world, there is very limited research that has been conducted on effects of the ongoing oil exploration in Turkana County particularly on social, economic and environmental variables.

Since commercial oil exploration is new in Kenya, there is need to develop a basis for policy formulation by stakeholders to guide oil exploration activities that would benefit to both local communities and the national government. The study, focused on how oil exploration affects changes in land pricing, trade volumes, influx of immigrants and the environment, and how these variables relate with each other.

Conceptual framework

The conceptual framework highlighted in Figure 3 below.

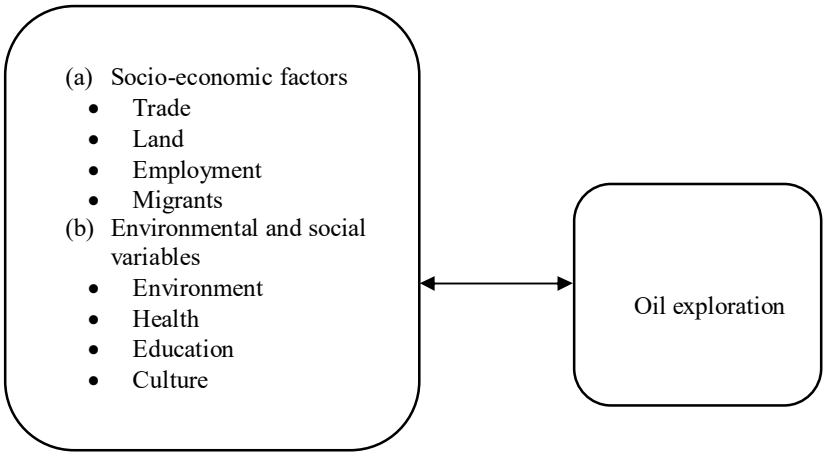


Figure 3. Conceptual Framework

As shown in above figure, oil exploration is the main factor affecting the economic, environmental and social variables. A percentage increase in land prices, school enrolments and migrant influx were the instruments to measure land, education and migrant variables respectively. For trade and employment, net change in volumes of trade and employment opportunities were the instrument to measure, net effects on local

environment and erosion of societal norms and cultural behavior were the measures for environment and culture.

METHODOLOGY

Population, Sampling and Research Design

The study adopted a cross sectional research design. Chi-Square test, correlational analysis and factor analysis were applied to study the relationships between different factors considered in the survey. The study area for this research was in Turkana County covering community living in Lokichar location, Turkana South Sub-County. This geographic area was chosen because of its proximity and location within the South Lokichar oil exploration basin.

According to the Kenya National Bureau of Statistics (2010) report on the 2009 census, the population of Turkana County was 855,399, with Lokichar Location having a population of 23,452. In order to determine the sample size for large population sizes, a method developed by (Cochran, 1973:1977) was applied using 0.05 level of significance. A total sample of 385 persons was obtained for the study. Proportional sampling to size was used to obtain representative samples from each of the locations as shown in Table 1 below.

Lokichar Town	Total population	Sample target population distribution
Lokichar sub location	10,820	178
Kapese sub location	12,632	207
Total	23,452	385

Table 1. Sample Households Cluster Distribution

RESULTS

Effect of oil exploration on land prices, employment opportunities, trade volumes and influx of opportunity seeking migrants

Table 3 below a chi-square hypothesis test carried out to determine whether there is a relationship between the responses among different communities and the effects on land prices, employment opportunities, trade volumes and influx of opportunity seeking immigrants. Comparing the Pearson' s p-values and the level of significance i.e. $\alpha = 0.05$. It is noted that p-values are all greater than the level of significance for all the

economic variables. Therefore, the results show that all the economic variable are being affected by oil exploration activities in Lokichar area of Turkana County.

	Variable	Description/Measurement
1	Oil exploration	Extent to which it has affected each economic, social and environmental variable
2	% Change in Land pricing	Percentage change in prices of land indicates the net increase/decrease in prices due to oil exploration
3	Employment	Has oil exploration increased opportunities for employment in the county? Discreet variable taking 1 for Yes, and 0 otherwise
4	Trade	Volume of trade in terms of net change with regard to oil exploration boom.
5	Education	Percentage change in school enrolment
6	Health	Effect on health situation of the people
7	Migrants	Percentage change in influx
8	Culture	Refers to societal norms and cultural behaviors. Have they been eroded by the oil exploration? If Yes, 1, 0 otherwise.
9	Environmental degradation	Net effect of oil exploration activities on the local environment. Yes or No. 1 for Yes, 0 otherwise

Table 2. Summary of Variables and Measurement

Analysis of effect of oil exploration on land pricing			
	Value	***df***	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	11.650	15	.705
Analysis of effect of Oil exploration on employment opportunities			
Pearson Chi-Square	7.081	15	.955
Analysis of effect of Oil exploration on Trade volumes			
Pearson Chi-Square	19.707	15	.183
Analysis of effect of oil exploration on influx of opportunity seeking migrants			
Pearson Chi-Square	12.443	15	.645

Table 3. Chi-Square Test for Oil Exploration Activities on Economic Variables

Correlation among economic variables

Figure 4 below shows that as the number of employment opportunities increase there is a corresponding increase in trade volumes, and land price. However, migrants' influx does not significantly increase trade

volumes neither do the land prices significantly increase. This means that the migrants are only interested in job opportunities provided by the oil firms but do not significantly promote the local trade.

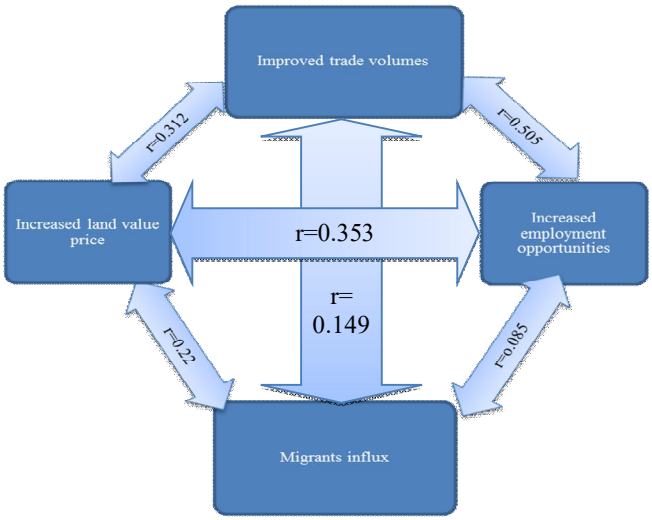


Figure 4. Correlations among Economic Variables

The results also showed a positive correlation coefficient (r =0.085) between migrants' influx and increased employment opportunities in the oil exploration zones of Turkana County. This is the lowest correlation among all other variables

Effects of Oil Exploration on Environmental and Social Variables

Multivariate Factor Analysis was applied to extract the most significant environmental and social factors that were influenced by oil exploration activities. Factor analysis is a data reduction method that utilizes the Eigen values and relative variance to determine the extent of influence of one factor on the other factors in a study. In factor Analysis, the higher the extraction coefficient the more the influence on the other factors in a study. Table 4 below shows the relative variation on each of the factors on oil exploration based on Eigen values.

It was noted that environmental factors, school enrolment and health factors were strongly affected by oil exploration accounting for 78.7 percent, 78.2 percent and 73.4 percent variance respectively. The least affected though positive, was cultural norms and practices factors which accounted for 39.1 percent.

Factors	Raw	
	Initial	Extraction
Oil exploration has had an effect on cultural norms and practices	.854	.391
Oil exploration has had an effect on the environment/vegetation	.993	.787
Health situation of the people has been affected by the oil exploration	.979	.738
School enrolment levels have been affected by oil exploration	.943	.782

Table 4. Factor Analysis on Environmental and Social Variables

CONCLUSION AND RECOMMENDATIONS

The results of the study show that despite the ongoing oil exploration in the county, the locals have not adequately benefitted from job opportunities that are offered by the exploration companies. Besides, the cost of land has increased since the inception of oil exploration and will continue to further appreciate as exploration activities continue. Also, oil exploration activities have led to an increase in the number of non-residents who come mainly to acquire land and engage in small scale businesses within the oil exploration area in anticipation of benefitting from the oil boom production period.

However, the study shows that despite the influx of migrants, the trade volumes within the oil exploration zones of Turkana County have not substantially increased. Further, oil exploration activities have adverse negative effects on environment, health and education of young children. The results of this study are consistent with those by Omorede (2014) on the assessment of the impact of oil resource exploitation on selected communities of Nigeria's Delta State and by Ebegbulem (2013) studied the relationship between oil exploration and poverty in the Niger Delta region of Nigeria. This study was limited to Lokichar basin of Turkana county. A comparative analysis should be done in other basins such as North Turkana, Turkwel, and Kerio to determine whether these findings are consistent with those from such areas.

REFERENCES

AFP. (2013). Public and merit goods. Retrieved from http://www.bized.co.uk/virtual/economy. Washington.

Arye, A. A., & Oijie, G. (2013). Implication of oil exploration on livelihood of residents around oil rig environment and assessment of oil exploration policies: A case of the Ghana Jubilee oil. *Annals of Humanities & Development Studies*, 4(1): 1-11.

Chindo, M. I. (2011). Communities Perceived Socio-economic impacts of oil sands extraction in Nigeria. *Journal of Studies & Research in Human Geography*, 5(2): 69-77.

Cochran, W. G. (1973). Sampling techniques (2nd ed.). New York: John Wiley & Sons.

Cochran, W. G. (1977). Sampling techniques (3rd ed.). New York: John Wiley & Sons.

Cordaid. (2015). Oil exploration in Kenya: success requires consultation. Nairobi, Kenya: Cordaid, 1-46.

Dadiowei, T. E. (2003). Niger Delta fund initiative - Women, environmental impact assessment (EIA) and conflict issues in the Niger Delta: A case study of Gbaran oil field communities in Bayelsa state. Lagos, Nigeria: Earth Rights Institute.

Ebegbulem, J., Ekpe, D. & Adejumo, T.O. (2013). Oil exploration and poverty in the Niger Delta region of Nigeria: A critical analysis. *Journal of Business & Social Sciences*, 4(3): 279-287

European Parliament. (2011). The effects of oil companies' activities on the environment, health and development. in Sub-Saharan Africa. Brussels: European Parliament: Policy Department, Directorate General for External Policies of the Union, 1-61.

Institute of Economic Affairs. (2016). Situational analysis of energy industry, Policy and strategy for Kenya. Nairobi: Institute of Economic Affairs, p.25.

International Energy Agency (2016). Mideum-term oil market report: Market analysis and forecast to 2021. World Energy Outlook 2015. IEA, p4.

Kenya National Bureau of Statistics. (2010). Population and housing census 2009: Population distribution by administrative units. (Vol. 1A). Nairobi: Kenya National Bureau of Statistics, 1A, 129-130.

Legborsi, S. P. (2007). The adverse impact of oil pollution on the enviroment and wellbeing of a local indegenous community: The experience of the Ogoni people of Nigeria (Paper presented at the forum of International Expert Group Meeting on Indigenous Peoples and Protection of the Environment ed.). Khabarovsk, Russian Federation: United Nations; Department of Economic and Social Affairs, p.16.

Obeng, O.F. (2010). Avoiding the oil curse in Ghana: Is transparency sufficient? *African Journal of International Affairs*, 13(1&2): 89-119.

Omorede, C. K. (2014). Assessment of the impact of oil and gas resource exploration on the environment of selected communities in Delta State, Nigeria. *International Journal of Management, Economics & Social Sciences*, 3(2): 79-99.

Porter, M. E. & Kramer, M. R. (2011). *Shared value*. Harvard Business Review.

Purcell, P. (2014). Oil and gas exploration in East Africa: A brief history. AAPG International Conference & Exhibition. Turkey: Geological Consultats Pty Ltd, Scarborough, WA, Australia, 1-21.

Rakodi. (2002 a:10). The fisheries sector, livelihoods and poverty reduction in Eastern and Southern Africa. In F. Ellis , & A. A. Freaman, Rural Livelihoods and Poverty Reduction Policies (pp. 256-273). London: Rout Ledge.

Serrat. (2008). *Natural resources abudance and economic growth*. Cambridge, MA: NBER.

Sharma, R. & Arora, R. (2012). Socio-economic assessment of oil exploration in Barmer region of Rajasthan. *Asian Journal of Management Sciences & Education*, 1(1): 28-38.

Simiyu, B. B. (2009). National competitiveness of Kenya and its oil cluster. MBA Dessertation presented at Strathmore University, Nairobi.

Song, S. (2016). The perfect play of salt, bamboo and gas. . AAPG 2016 Annual Convention & Exhibition. Calgary: College of Geoscience.

Tullow Oil Plc 2013. Tullow in Kenya; Tullow Kenya profile. Tullow Oil Plc, 1-12.

Tullow Oil Plc 2014. Tullow in Kenya: Tullow Kenya Profile. (T. O. PLC, Ed.) Nairobi.

Yabs, J. (2015). Potential economic effects of oil and gas in East African countires. *International Affairs & Global Strategy*, 28, 1-4.