

# Wailing of the people of South Sudan from oil contamination (overview of oil production and effects on people health)

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**Abstract-** The suffering of the South Sudan people from oil contamination occurred in 1997, with the starting of oil production in the then Sudan, followed by reckless exploitation of crude oil and transportation of this crude oil from prospected sites to the Port of Sudan and finally to its way to market through international water.

Handling this activities from wells to tankers and cross 300,000km to its destination was not proper, one can remember how some trucks only makes its environment pollution by not reaching the destination but only to overturn and pours out all the hydrocarbons and no means for cleaning up the site that the incident occurred. Oil contaminated water and soil always have toxics materials or chemicals that may affects people’s health and cause further disaster impacts to the ecosystem(Chu, Feng et al. 2015). Oil extraction is very dangerous for the public health for the people who lives in the area and for the workers who works with the oil sectors, because the oil contaminate water, soil, and air pollution which leads to human illness and subsequently to social demographic distribution(Johnston, Lim et al. 2019). Heavy metals are said to affect the total water under the earth surface, ponds, aquifers, and underground streams are said to be in constant danger from this heavy metal contamination

Such as **lead, copper, zinc, and Cadmium (Anyika, Abdul Majid et al. 2015)**, when the heavy metals enter into the soil, they would persists to travel far more for long time due to that they are not moving quickly in their nature. At the some points there are those heavy metasl that can wash on the process into different soil layers and their elements can travel far to aquifers but their movement cannot be that fast because of their migration, (Sherene 2010).

**Index Terms-** Contamination, health, water quality

## I. INTRODUCTION

It’s obvious that the world is leading into new strategy of dealing with only none polluted energy and minimize usage of contaminated resources like oil, coals almost all the combustible energies, therefore, they comes to introduce the green energy.

After World War 2, the world engaged its self in industrial and technological competition, and to achieve their ambitions, oil played major roles in enriching these countries financially, almost

61% of the total reservoirs worldwide is occupied by oil prospects, and the more it’s found in that part of the earth, the more the contamination is inevitable.

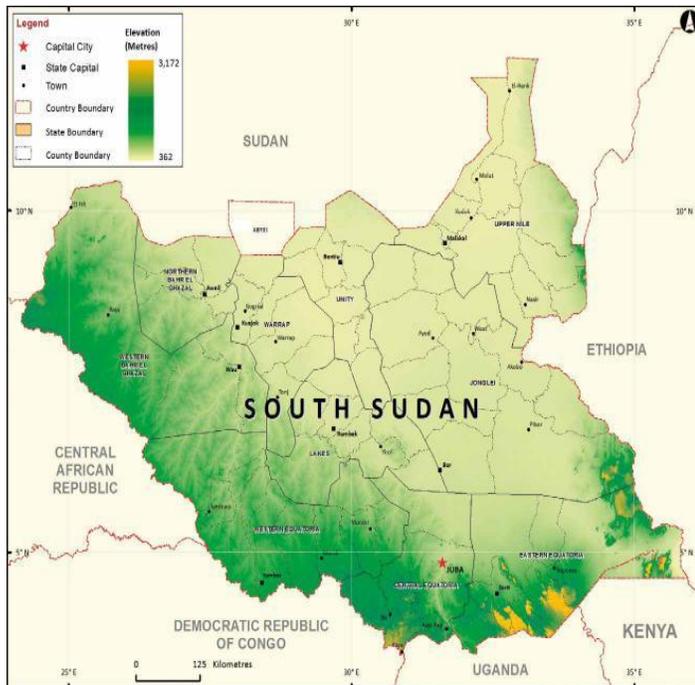
Just as the case of South Sudan people wailing from water, soil, air contamination by oil, this country falls at the center of Africa, with its population of 14 million people, and it has oil revenue which almost acts as the main lifeline of our economic status. In an autonomous referendum, it separated from the old Sudan and forms this new state call South Sudan, with amount of 350,000bb/d, before it’s enhanced to 500,000b/d till 2013, when it plunged into another crisis. The production of these 500,000bd, is what is so interesting about in this paper, how this amount does caused the country to have this grave risked future.

Oil is the most dangerous substances that can contaminate soil and water through(Appiah-Adjei, Baidu et al. 2019) and their contamination can biodegrade the soil for a long time, putting human and animals lives at stake. Oil products are the danger to soil, due to their toxicity, spreading scale, and migration ability(Sushkova, Minkina et al. 2019) and (Weihang Shen a and Pingxiao Wu a 2015).

The elements that contaminate the soil are (Radon, Asbestos, lead, creosote and chromatid copper arsenate) the total petroleum Hydrocarbons like (PAHs) spreads into environmental as toxicants basically formed at the time of incomplete combustion of hydrocarbons, And other organic substances (i.e, coal, kerosene, lubricants oil, coal and fossils )..(Sushkova, Minkina et al. 2019)

As the result of this, the world is working tirelessly to overcome such a deadly future by introducing some mechanisms to avoid depletion of ecosystem sustainability and serve the services of natural ecosystem in check by remediating the contaminated soil(Shen, Ashworth et al. 2016) and clean the sites with kerosene oil(Huu-Tuan Trana and 2018). Planting a plant seeds to grow a trees which may become a forest would eventually minimize, mitigate, clean the contaminated soil(Mohammad Nazrul Islama Available online 27 June 2017) this phytoremediation used currently because it’s cheap and emit nothing to the ecosystem. It has both beneficiary as it enhance and absorb the pollution and clean up the soil (Gou, Yang et al. 2019).

## II. SOUTH SUDAN MAP



Data Source: USGS SRTM

Water produced from oil in Paloch oil field( source UN environment South Sudan)

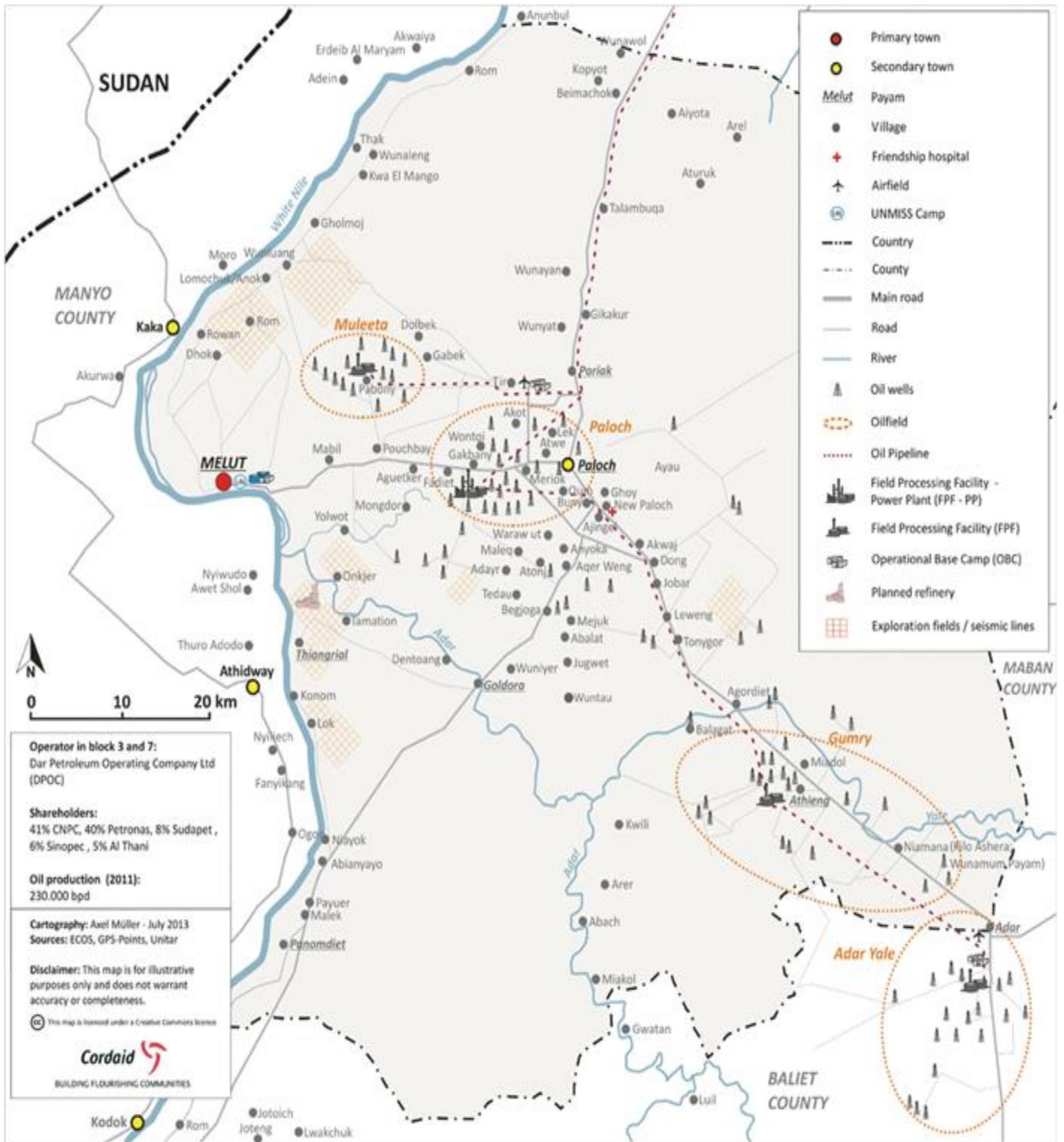
### Oil and the people health in South Sudan

The health of the civil population in the country part of the Upper Nile is endangered by the exploration and production of the oil activities, first it started with displacement of some population in Unity State, where block 1, 4 & 5A is abased, to Melut, Adar, blocks 3 and 7 , in the Northern part of the country.

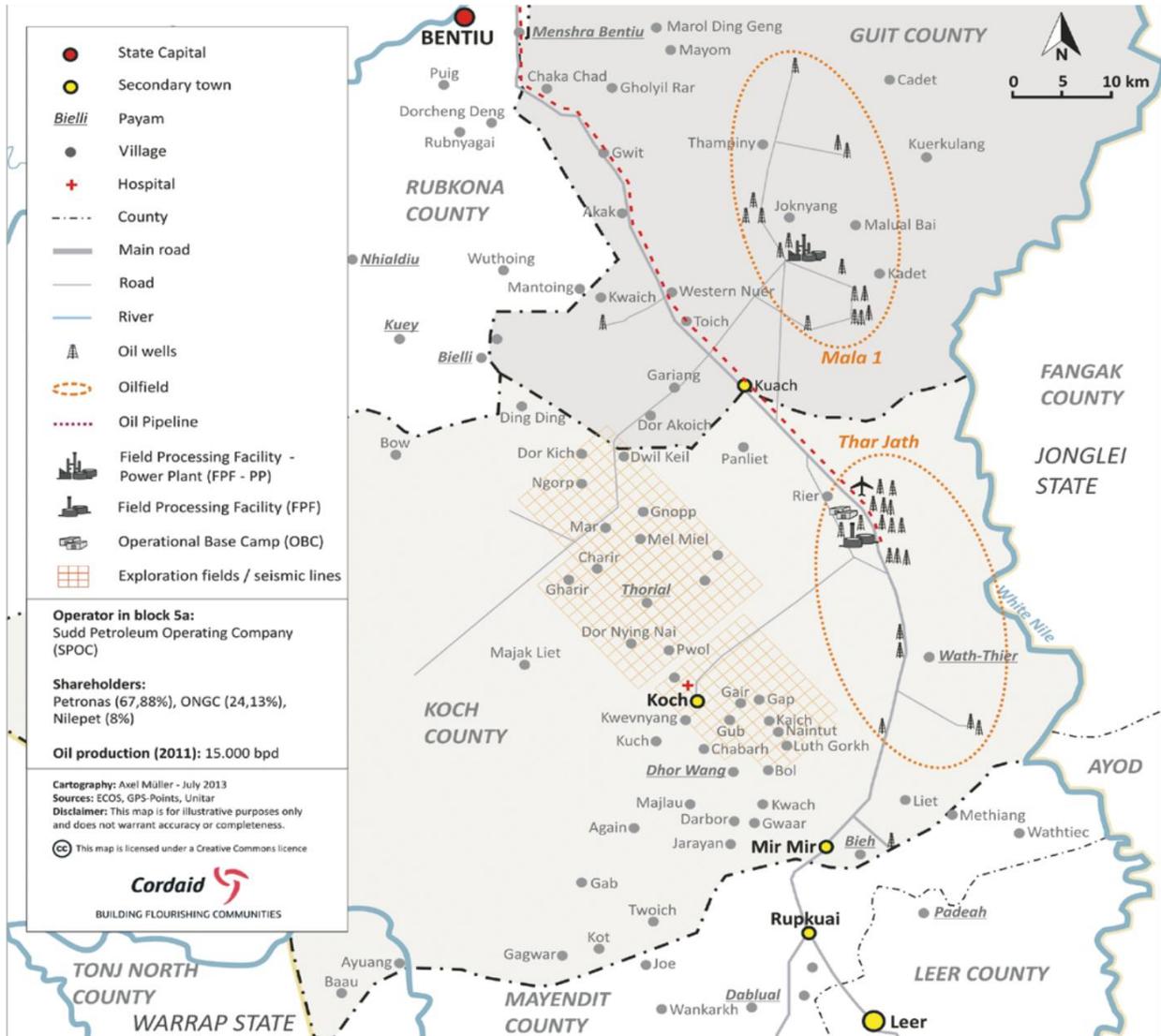
This practical displacement was only for peoples whose areas falls under exploration prospects and they get little or none compensation from either government or the business companies in the blocks, beside their health, mass movement of people as the result of their drinking water pollution because most of the people drinks from the open lakes and streams of water flowing from the Nile and its tributaries. Hence, the crude oil spills from the constructing sites, dumped wells, and overflowing storage tanks contaminates soil and water (Sarmadi, Zohrevand et al. 2019), moreover, some elements go as far as contaminating ground water (Appiah-Adjei, Baidu et al. 2019) .over 80% of the women living in the affected areas have given birth with children's that have missed limbs, blinds, and deform images( NBS, 2014) The scientific studies shows that the pollution from the oil industries are causing health difficulties including rising numbers of the females infertilities, miss carriages, birth defects, and eyes and skins irritations (Cordaid, 2014) .



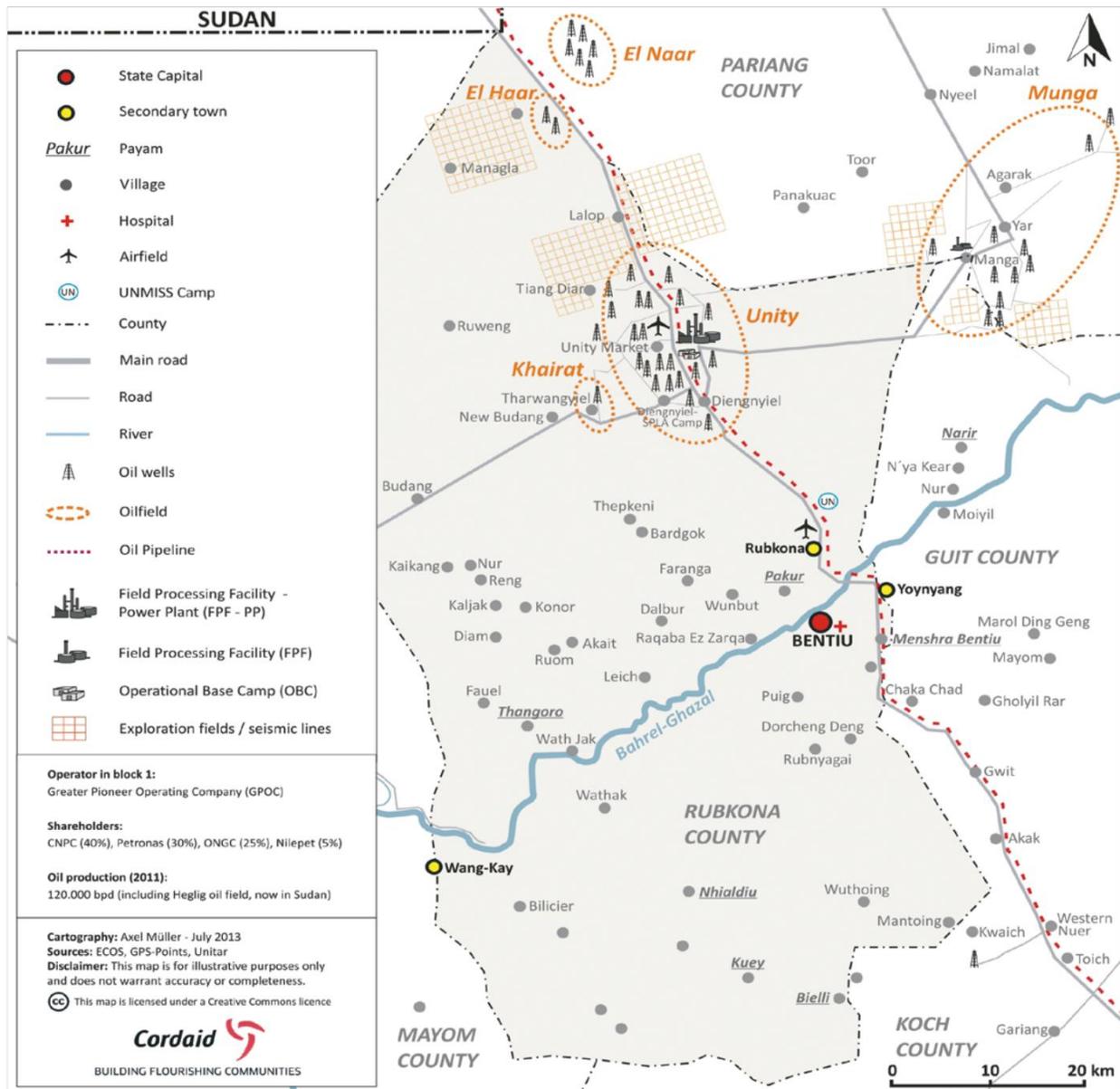
Oil production in Melut County( taken from Cordaid)



**Oil production in Koch and Guit counties ( source is cordaid)**



**Oil production in Rubkotna and Panrieng counties (source cordaid)**



**Water- soil contamination**

The main water sources in the country is the Nile river and precipitation water from the rain, these water from rain and Nile comes through lakes and braided streams for the domestic use.

But the waste water from oil industry acts as a pollution point source due to lack of technology for treating water pumped out from oil formation(Genovese, Denaro et al. 2008), the oil companies are using bioremediation to contain, treat and clean the heavy metal from contaminating the ground water. Thus, there bioremediation acts as the treatment hubs for the waste pumped materials, and pass them through different stages for microbial clean up(Embar, Forgacs et al. 2006).

The most awful threat of the environmental nowadays, is the hydrocarbons spillages that flows from pol production activities and tends to have relations to the petrochemical industry unlawful disposal of petroleum products. The petroleum elements

are classified and tabled as belong to neurotoxic organic contaminants.

Bioremediation to the group of carcinogens as an accepted technology of incineration and composting security of landfills has become extremely cheap and affordable for the local business entities who has no capacities to build membrane reactor for treating and handling these produced water from oil(Das and Chandran 2011) in the events that the amount of hydrocarbons or any other organic and inorganic compound become too much, Mechanical and chemical concepts generally should be used to treat or remediate hydrocarbons from polluted areas can also be expensive(Denyas, Parisien et al. 2014). Bioremediation is the newest way of treating the waste from oil and other sites because its cost effectives and it makes total mineralization. Bioremediation's primary works is to biodegrade soil from the contaminants, which can leads into transformation or organic contaminants into  $CO_2$ ,  $H_2O$ , inorganic compounds, and proteins or

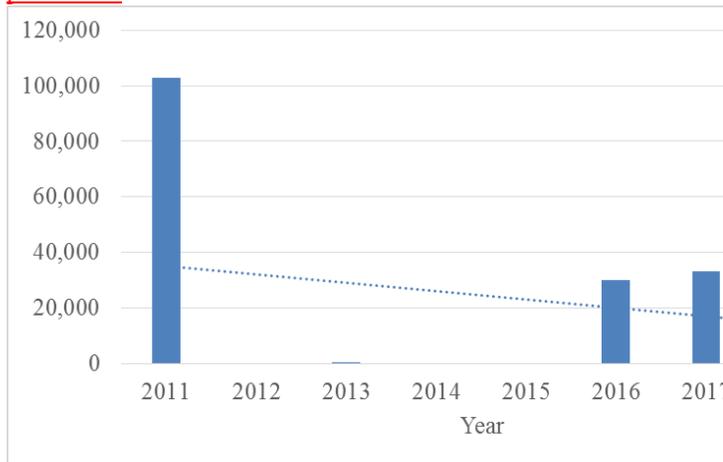
changes of complex organic body into any other simplest organic compounds using biological catalyst like microorganisms. Largest amount of these indigenous bacteria in the water or soil are only able to degrade hydrocarbons contaminants. In this paper we will only overview the contamination of the soil and water only in the South Sudan caused by oil exploration and flow of the oil and how the people manage this.

**Trend of oil production in the last eight years and their potential contamination**

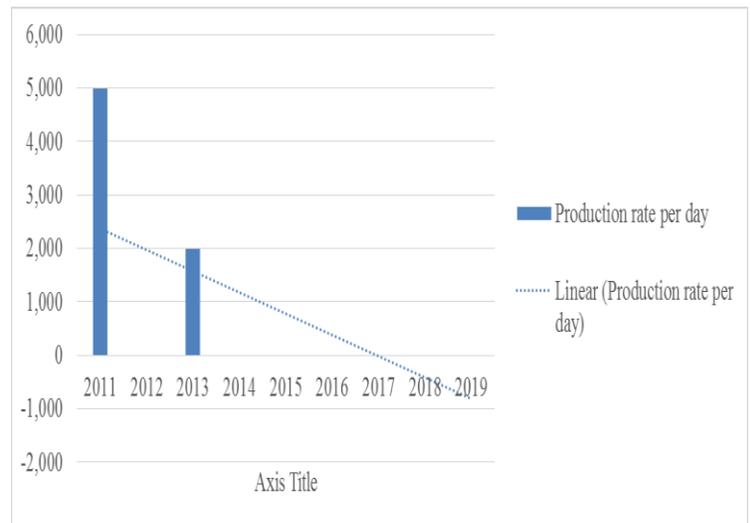
Unity Oil production

year	Production per a day
2011	103,000 b/d
2012	0.00 b /d
2013	50.00 b/d
2014	0.00 b /d
2015	0.00 b/d
2016	30,000 b/d
2017	33,000 b/d
2018	30,000b/d

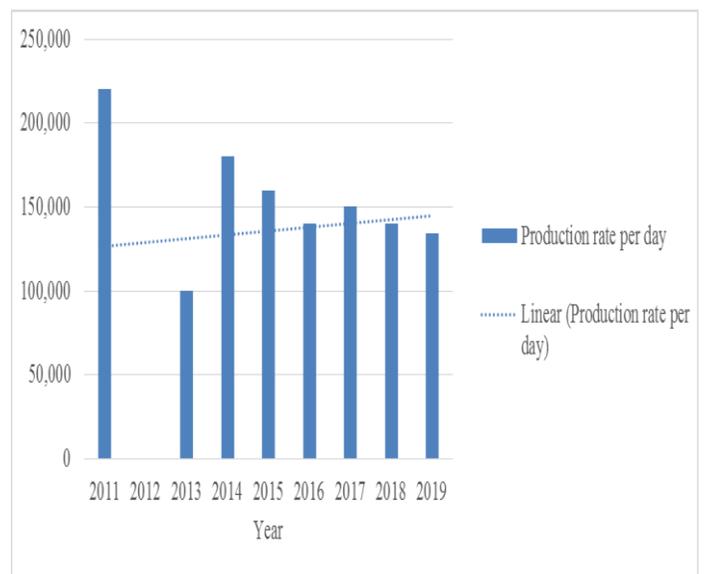
Trend of oil contamination per a year in Unity oil field production



Trend of oil contamination in Tharjath oil field production per a year



Trend of Oil contamination in Paloch oil field production per a year



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