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Comprehensive Review of Petroleum Revenue Assessment, Collection, and Management in Ghana

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Abstract

In this study, an empirical examination of Ghana's processes for assessing, collecting, and managing petroleum income is conducted. The study further examines Ghana's legislative framework for managing its oil income. To provide a working document for the assessment, collection, distribution, and use of Ghana's oil income under Article 36 of the 1992 Constitution, the Petroleum Revenue Management Act, 2011 (Act 815) as modified by Act 893 of 2015 was created. The Bank of Ghana, the Ministry of Finance, and the Public Interest and Accountability Committee Reports provided secondary data for the study's analysis. The findings from the empirical review revealed that between 2011 to 2022, Ghana earned US$8.79 billion in total oil revenue. The review also showed that the major sources of oil revenue to Ghana are the Carried and Participating Interest (53%), Royalties (26%), and Corporate Income Tax (21%). In general, the provisions of the Petroleum Revenue Management Act are somewhat adhered to though there were some ministerial discretions regarding the cap assessment of the excess revenue. The result confirms that the passage of the Petroleum Revenue Management Act was indeed timely, as some funds best suited for the Petroleum Holding Fund were wrongly deposited in Ghana's non-taxable revenue account. The paper, therefore, calls for strict adherence to the provisions of the Petroleum Revenue Management Act to help maximize the benefits of the petroleum industry and its sustainability in Ghana.

Keywords: Oil and gas revenue, assessment, collection, management, PIAC reports.

1. Introduction

Access to petroleum resources has always been a top concern for investors hoping to explore, produce, and eventually provide oil and gas to customers since the oil and gas industry was founded in the 1850s. Population growth and economic expansion are predicted to cause the need for energy to increase by 40% by 2030 compared to 2009 estimates. Coal was first exploited in the 18th and 19th centuries, which

allowed for the global industrial revolution. However, oil took over as the primary fuel for industrial processes and all modes of transportation in the 20th century [1].

Therefore, one cannot overstate the importance of oil and gas in the development of basic industrial sectors. The demand for energy and other natural resources significantly increased with the dawn of the twenty-first century, especially in the years between 2000 and through to the post-COVID -19 era. The increase is attributable to the rapid economic expansion that many emerging countries experienced. With petroleum resources now a vital component of the global economic growth and expansion chain [2], it is critical that nations that produce oil have legal frameworks that guarantee fair allocation and management of these resources [3].

The commercial discovery of petroleum resources in Ghana, off the Cape Three Points Block was reported by Kosmos Energy on June 18, 2007, based on the results of the appraisal and well drilling enabling Ghana's admission into the Association of Oil-producing Countries in 2007 [4]. Some policy analysts argue that Ghana's oil discovery was fortunate given the situation at the time, which includes the potential reduction of foreign aid and direct investment to Africa [5]. According to reports, former President John Agyekum Kufuor said, "Without oil, we are still doing well", during his government, which saw the discovery of commercial quantities of crude oil [6].

On December 15, 2010, the third president of the Fourth Republic of Ghana, John Evans Attah-Mills, officially opened the Jubilee Field's valves and began crude oil production, marking the extraction of crude oil in Ghana (4, 6). Currently, Sankofa-Gye Nyame (SGN), Tweneboa-Enyenra-Ntomme (TEN), and the Great Jubilee are the three fields in Ghana that are actively producing crude oil. Ghana had just one field, the Great Jubilee Field, prior to the establishment of TEN and SGN fields in 2016 and 2017, respectively [6, 2]. As held by [6], the Jubilee field has proven reserve of 800 million barrels and an upside-down prospective reserve of 300 billion barrels. In their view, the combined output from the three producing fields for the year 2022 was 51.76 barrels (bbls), which is approximately 6% less than the 2021 total of 55.05 bbls. Of the 59.51 million barrels of benchmark crude oil produced in 2022, the actual output amounts to 87%. The decrease in output on the TEN and SGN fields was the cause of the comparatively lower production volume in 2022. The Jubilee, TEN and SGN fields cumulative production of crude oil between 2011 and 2022 is currently 560.19 bbls [7]. Data from the Public Interest and Accountability Committee (PIAC) further indicate that as of the end of 2022, Ghana earned US$8.79 billion from its oil production.

Even though, there has been a lot of scholarly interest in oil revenue management, especially in the energy sector, most of these studies focused mainly on accountability and transparency [1, 5, 6, 8, 9, 10, 11] as the primary factors influencing the distribution and management of petroleum resource revenues in less developed nations. With very little emphasis on critical assessment, collection, distribution, and management of oil revenue. Therefore, the focus of this paper is on the assessment and collection of petroleum revenue as set out in the Petroleum Revenue Management Act, 2011 (Act 815) (PRMA) as amended in 2015 by Act 893.

As a result, reviewing Ghana's petroleum revenue management structure and going back to the fundamentals is not only important but also timely. Findings from this study are expected to assist in identifying, and possibly, proffering recommendations that will effectuate the intent of the PRMA (Act 815) as amended in 2015 (Act 893). Hence, the study aims to empirically analyze reports from PIAC, the Bank of Ghana, and the Ministry of Finance, in light of the provisions of the PRMA (Act 815) as amended in 2015 (Act 893).

The rest of this paper is arranged as follows: section two covers the literature review; section three looks at the research methodology; section four provides an analysis and discussion to the data and the final section concludes the paper with its recommendations.

2. Literature Review

This section is sub-divided into three: the first part focuses on the management of petroleum resource revenues, the second deals with the legal framework for the assessment of petroleum revenue sources in Ghana and the last part reviews the key sources of petroleum revenues to oil-producing nations.

2.1 Management of Petroleum Resource Revenues

In what ways have nations that produce and export crude oil responded to the task of handling this wealth? Are the measures instituted to ensure maximum benefits from petroleum resources to the citizenry actually working? Countries that produce and export oil can use their non-renewable natural resources, such as petroleum, to help their citizens prosper over the long-run [5, 12, 13, 14]. The governments of nations that export oil can accomplish this by putting oil revenue aside in budget surpluses or investing in long-lasting infrastructure, social services like education and healthcare, diversification, and oil money to stave off spending pressures [2, 15]. How have certain nations, like Botswana and Norway, assessed, collected, allocated, and managed their revenues from oil and gas? This does not in any way represent a random selection of these nations; rather, it is an attempt to examine some of the most significant and successful producers of minerals and petroleum.

Non-renewable resources include petroleum. There are two possible arguments for this: either petroleum resources are so abundant that they can be considered infinite, and the price of oil and gas is determined by the amount required to keep reasonable inventories of these resources over the long term, or the price determination process gives little consideration to this fact. The profits derived from oil extraction might compel governments to exceed their budgetary allocations or allocate funds to non-essential sectors, such as the GNPC's non-beneficial investment in the Ghana Football Association [16].

The use of oil revenue should be governed by suitable revenue regulations, such as those found in the PRMA (Act 815), which provides that petroleum revenues are assessed, collected, and deposited into the Ghana Petroleum Funds (GPF) for onward disbursement to the Annual Budget Funding Amount (ABFA), GNPC, PHFs [13]. However, others have argued that accountability and transparency from multiple petroleum revenue management institutions are more important than having a framework alone for petroleum revenue management [17, 18].

[19] state that any country that depletes its petroleum reserves in a single generation must choose between using all of the riches for the benefit of the present generation and reserving some for the future. The ability to convert a non-renewable resource into a renewable resource makes this feasible. Raising the standard of life for both the current generation and future ones will require investing the rents received from the resource's extraction in ways that boost the country or region’s capacity for production both domestically and internationally [13, 20].

According to [13], the worldwide benchmark is that nations that produce and export oil may use the proceeds from their oil to pay down public debt and use the remaining oil income to fund social services, infrastructure, diversification, education, and health care. In practice, this means creating an investment fund into which petroleum rent, or a suitable portion of it, is directed. The fund may invest in real estate, corporate stocks, bonds, and other financial assets, all of which can provide the country with real capital in the form of infrastructure, buildings, machinery, and human resource development, among other things

[12]. Oil exporting and producing nations are guaranteed to invest in public infrastructure rather than private goods by prudent revenue management systems. [20] further add that oil earnings ought to be allocated in a manner that allows them to be utilized for funding public goods expenditures. These goods can function as a dedicated vehicle for diversification, private sector investment, and sustained growth. Africa's long-term growth might increase by 2% annually if oil earnings were allocated to infrastructure, education, and other productive economic sectors, according to World Bank research from 2014.

In addition to funding public projects, petroleum funds can be set up so that the money from oil can help both the current and next generation [21]. Concerns have been voiced by some academics about how petroleum profits can guarantee sustainability. Even with these monies, stabilizing expenditures has always been difficult, particularly for developing oil- producing nations. This makes integrating petroleum income into a nation's broader fiscal strategy challenging at times. Corrupt practices are encouraged in nations that export and produce crude oil and have weak institutions by the ease of access to these petroleum funds as well as the lack of accountability and transparency [22].

The significance of institutions in the management of petroleum resources was highlighted by [23] during their investigation of the connection between the abundance of natural resources and economic growth. Data from more than 90 countries were used by [23] between 1984 and 2005. They verified that endowment with natural resources can boost economic growth provided institutional quality reaches a particular threshold. Natural resource-rich nations have the potential to reap significant benefits from their resources. As demonstrated by Norway, the United Kingdom, the United States, Canada, and Botswana, the revenues from these resources may support the construction of infrastructure, including roads, schools, health facilities, and human resources [24].

A 2013 study conducted in Angola by [25] which looked at the impact of the country's endowment of petroleum resources on economic development, showed a GDP growth of almost 10% from 2004 to 2011. After Nigeria, Angola is Africa's second-largest crude oil exporter. Over 80% of Angola's operating budget, which is approximately US$40 billion, comes from the country's oil industry. The capital of Angola, Luanda, seems to be among the costliest places in the world to live. Luanda is among the world's most disadvantaged urban centers, despite its vast petroleum resource endowment. 90% of its people lack access to power and potable drinking water.

In Angola, just like many other African countries, corruption is pervasive. For instance, political leaders frequently pilfer petroleum income in Angola in order to take advantage of the system and profit themselves. The earlier statements support the research conducted by [26, 27, 28], show that mineral-rich countries, particularly those in Africa, are susceptible to a number of problems including rent-seeking, corruption, and improper handling of petroleum revenue. Petroleum profits collected from the International or Independent Oil Companies (IOCs) are kept confidential, and Angola's petroleum regulatory bodies encourage confidentiality in public accounts. Sonangol, the Angolan version of the GNPC, is surprisingly answerable exclusively to the president. A 2012 IMF report found that US$1 billion had disappeared from their open accounts. Additionally, the IMF discovered in 2011 that Angola's petroleum earnings between 2007 and 2010 was missing in action to the tune of US$32 billion [25].

African nations have long touted Botswana as an example of how to harness its natural resources, particularly diamonds, to promote socioeconomic development. In 1966, after nearly 58 years of British colonial control ended, Botswana had very little infrastructure development and human capital [29]. Due to the successful utilization of its endowment of mineral resources, namely diamonds, for the benefit of its people, Botswana is now a middle-income nation. African nations that produce and export minerals

have been aptly described as being cursed with natural resources and corrupted by them; yet, Botswana has managed to elude these problems. Botswana is the least corrupt country in Africa, according to the 2018 Transparency International Corruption Perception Index. Strong institutions, effective governance, stringent laws, political stability, accountability and openness, and the preservation of citizens' property rights are only a few of the elements that contribute to the nation's prosperity.

[10] opined that the oil and gas industry's institutional and legal frameworks are inadequate. In a comparable Ghanaian study, [5] found that accountability, government effectiveness, institutional quality, and corruption control measures are the primary determinants of the long-term management of petroleum resources. This study uses content analysis to investigate the assessment, collection, and management of petroleum income in Ghana through empirical means.

2.2. The legal framework for the assessment of petroleum revenue sources in Ghana

[18], many had anticipated that the wealth would be used for the benefit of all Ghanaians when petroleum resources were discovered in the country in 2007. For instance, a stakeholder engagement meeting on how Ghana might wisely handle its oil revenues was held in 2008 to make this a reality. Following a two-day meeting with other oil-producing and exporting nations, Ghana concluded that creating a legislative framework to help improve institutional quality and assure long-term management of petroleum earnings [18]. In response, the government of Ghana passed the PRMA (Act 815), which was later revised as Act 893 in 2015 to establish a legal framework for determining the value of, obtaining, and administering the nation's petroleum revenue.

Consequently, the PRMA (Act 815) in section 6 assigns the Ghana Revenue Authority (GRA) the responsibility of determining, collecting, and accounting for all petroleum earnings owed to Ghana from the many sources listed in the PRMA Act. The PRMA seeks to govern the collection, distribution, and use of Ghana’s oil money [16, 30]. Another argument put forward for the establishment of the legislative framework was to assist Ghana in escaping the oil curse confronting many oil-rich countries [5, 18, 31].

In order to assess, collect and distribute petroleum earnings as stipulated in the PRMA, the PHF was founded [6, 16]. Under Section 2(1) of the PRMA of 2011 (Act 815), the PHF was established as a public fund to receive and disburse petroleum revenue owed to the Republic of Ghana. Petroleum revenue is paid to and withdrawn from the PHF in compliance with the PRMA regulations. The legislative basis for Ghana's Distribution of Petroleum Revenues is depicted in chart 1. The main focus of this study, however, is an empirical examination of Ghana's processes for assessing, collecting, and managing petroleum from 2011 to 2022.

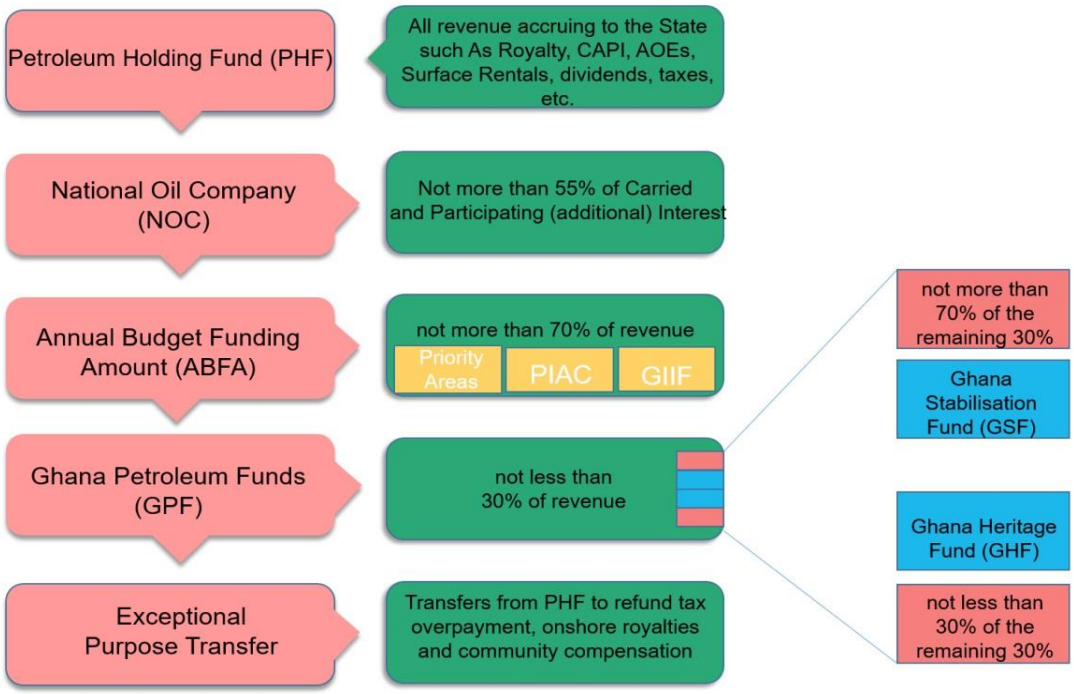

Figure 1: Legal Framework for the Distribution of Petroleum Revenue in Ghana
Source: PIAC Construct (2021).

2.3 Sources of Petroleum Revenues in Ghana

The various sources of oil revenues according to PRMA shall include but not be limited to: Royalties, Carried and Participation Interest (CAPI), Corporate Income Tax (CIT), Additional Oil Entitlements (AOE), Surface Rental fees, income earned on the PHF as well as receipts from gas [7]. Similar to many petroleum-producing nations, the key sources of petroleum revenues to Ghana are discussed in this sub-section.

2.3.1 Carried and Participation Interest (CAPI) Component of the Petroleum Revenues

According to [3], CAPI is a mode of state engagement that ensures the state receives its just portion of economic rents from petroleum exploration and development projects, regardless of the government's lack of financial obligations. The CAPI, also known as the working interest, is defined in an operating agreement as the share of production and exploration costs that each party will pay as well as the share of production that each party will get [32]. The National Oil Company (NOC) typically represents the state in these situations; for example, in the case of Ghana, the GNPC collaborates with the Independent Oil Company (IOC) to carry out exploration and development projects. As a result, [32] opined that IOCs are required to pay the NOC, which represents the state, an amount known as the equity cost.

It is, thus, settled that when this operation agreement is reached between the NOC and the IOCs following the completion of the upstream agreement, the NOC is granted a participation stake [33]. Consequently, it is expected that by allocating a stake to a NOC, the IOC's risks and responsibilities under the upstream project agreement will be passed to the NOC, even though this is against the terms of the upstream agreement. This really means that the IOC's obligations under the upstream agreement will be reduced, [33] further added. Since NOCs cannot participate in the operations as real partners like a petroleum contractor, it is an issue of how financial arrangements should be structured so that a NOC can accept a participation interest in the joint operating agreement without taking on a commitment or risk.

The structure, scope, and timeliness of state participation agreements that are in effect, vary greatly. Fixed State Participation starts on the International Petroleum Agreement (IPA) Award Date or on any other predetermined date. According to [3], the NOC is given a defined participating stake in the IPA, which is equivalent to a fixed percentage of output for the duration of the agreement. A Variable Progressive State participation that takes effect on a predetermined date and is triggered by various criteria, such as production volumes, will be included in the IPA [3, 34].

Optional State Participation is available for use at the Host Country (HC) or its NOC election upon the fulfilment of certain conditions outlined in the IPA, such as the IOC declaring a commercial discovery or the achievement of predetermined production levels [3, 34,35]. State participation is intended to be a carried interest during the exploration phase, enabling the NOC to take part in joint venture administration and control from the moment the IPA is signed by serving as an operating committee representative. This kind of involvement, as stated by [3], is frequently linked to the extra right to exercise a participation option upon the announcement of a commercial discovery. The IPA applies the same principles regardless of the procedure selected. Therefore, the NOC's participation interest takes the form of a carried interest, whereby the IOCs pay the NOC's share of expenditures up to a predetermined point (often commercial discovery), after which the NOC pays all previous costs back in cash or uses its own resources to cover the costs [3, 35]

2.3.2 Oil and Gas Revenues from Royalties Payments

Though the assessment of a fiscal regime may be made concerning economic benefits that will come to the HC and the IOC in terms of petroleum revenues, the elements that make up the agreement need to be examined to safeguard the interests of both parties' (NOC and the IOC) fields [3, 34]. Royalties also known as ad valorem responsibilities is the value of production among other means used to raise revenues in the licensing or concessionary agreements [34]. Royalties take the form of a percentage of crude production payable mostly in cash to the NOC representing the commercial interest of the HC [3]. Royalties are meant to compensate the owner of the subsoil for the exploitation of its irreplaceable non-renewable crude reserves.

Royalties, however, vary from country to country and are mostly traditionally set at 12.5% i.e., $1/8^{th}$ of crude production [3]. In certain countries, like the US and Canada, royalty rates might go as high as 50% and 40%, respectively, when bidding is used. However, Ghana's lifting per the PRMA; ranges between 5% to 7.5% on the gross production. Similarly, some countries like Papua New Guinea adopted a very low royalty rate of 2.0% [3]. Studies have shown that countries with well-established production systems tend to increase their take of revenue from the royalties.

Royalty systems have their own merits and demerits depending on the percentages agreed upon by both parties. On the positive side, royalties are appealing to the HC because it can earn revenues as soon as production begins, and as to whether the IOC project earns any profits or not [3]. They are also simple and easy to administer. Contrarily, it can become disadvantageous to the IOC because huge production volumes do not necessarily equal higher profits; [3] further indicate.

2.3.3 Oil and Gas Revenues from Corporate Income Tax (CIT) Payments

Compared to CAPI and royalty, CIT is usually tied to the profits of the projects [36]. Under the general tax legislation and principles applicable to any business, IOCs are obliged to pay the HC a tax on profits earned using the general corporate tax law which in the past 20 years has been reduced from 50% to the ranges of 30% to 40% [3], and 35% for Ghana's upstream oil and gas industry [36]. This however, in many countries are supplemented by a special petroleum tax legislation, needed to deal with the

complexities of the upstream petroleum activities [3]. It is worth noting that special petroleum tax legislations are usually promulgated by HCs as anti-avoidance schemes.

A high CIT rate does not guarantee a high government take by the HC every year because at the early stages of extraction, the IOCs are entitled to allowable deductions from their gross income to amortize their capital cost [3, 35]. When compared to royalties, CIT has the advantage of guaranteeing the HC a sizeable portion of oil production profits, while, avoiding the IOCs from feeling entirely discouraged from making investments in less lucrative fields [34].

2.3.4 Annual Surface Rental Fees or Payments

In most oil and gas-producing countries, an annual surface rental also known as rental fee is paid to the HC during exploration and exploitation stages depending on the legislation and the terms of the agreement [3]. [3] further add that to discourage the preservation of exploration areas and expedite the relinquishment of those areas where no exploration is being conducted, the annual fee per unit of surface area often increases with time. The rental charge per unit or the annual surface fees are typically specified in regulations [3,34, 36]. The inclusion of the annual surface fees or rental charge per unit in contractual agreements with HCs help minimize likely disputes on future amounts payable to the HC.

3. Research Methodology

This section presents the approach and processes employed to collect data to achieve the research objective. The justification for the use of the qualitative approach to inquiry is also discussed. According to [37], empirical review enables better interpretation and coding of textual content that makes sense for the context in which they are used.

3.1 Data collection and source

The research relied on PIAC reports from 2011 to 2022, data from the Central Bank of Ghana (BoG), and other revenue management agencies including the Ghana Revenue Authority (GRA) and other relevant stakeholders in Ghana's oil industry. These institutions are mandated to gather and publish relatively valid and reliable information to users. Evidence obtained from these varied sources not only reduce the likely bias associated with a sole source [38], but also enhances the reliability of the research findings and the credibility of conclusions drawn from the enquiry [39]

3.2 Data analyses

The paper empirically examined Ghana's processes for collecting and managing petroleum income. The main provisions of the Petroleum Revenue Management Act, 2011 (Act 815) as amended in 2015 (Act 893) were reviewed to assess the level of compliance with the established framework for the collection of petroleum revenue in Ghana. Specifically, the relevant Acts affecting different sources of petroleum resource revenues were identified, along with the proportions of each source's contribution to the PHF. The paper also looked at macroeconomic difficulties that relate to managing and projecting petroleum revenue. It is important to note that very few researchers take into account the potential for further analysis of previously gathered data. Yet, [40] are of the view that secondary data represents information gathered for reasons other than the researcher's study. So, the discourse analyses employed by this paper seeks to offer a complete solution to the vacuum left by the secondary data in this area of research.

3.3 Limitation of study

The analysis and conclusions of this paper were based on petroleum revenue data from the 2011 to 2022 fiscal years. The only periods with available data on Ghana petroleum revenue receipts, at the time of the research; with the 2011 fiscal year being the first-time Ghana recorded petroleum revenue receipts.

4. Discussions and Analysis.

Our empirical examination of revenue collection in Ghana revealed that the country earned US$8.79 billion from petroleum production between 2011 and 2022 [7]. The $8.79 billion in petroleum revenues is made up of the following sources: surface rentals, Additional Oil Entitlement (AOE), CIT on the net profit earned by the concessionaire (IOCs) in Ghana, CAPI by the GNPC, royalties paid by the IOCs, both in kind or by cash, and taxes, including a special petroleum tax on windfalls [7]. As previously mentioned, Ghana's petroleum revenue sources are clearly indicated in sections 6 and 7 of the PRMA (Act 815) as amended as the PRMA (Act 893). Legislation mandates that all petroleum earnings be deposited into the PHF at the Central Bank. The petroleum revenue received by Ghana overall between 2011 and 2022 is shown in chart 1.

The first part of this section deals with the legal framework for the assessment of petroleum revenue in Ghana. This is followed by focuses on the main sources of oil and gas revenues in Ghana. The second part analyses how petroleum revenues are allocated by the GNPC, ABFA, and the GPFs from the PHF. The final part highlights how petroleum funds, especially, the ABFA are allocated and managed among the government priority areas.

~~Petroleum receipts per the PRMA come from Royalties, CAPI, CIT, Surface rental fees, AOE,~~

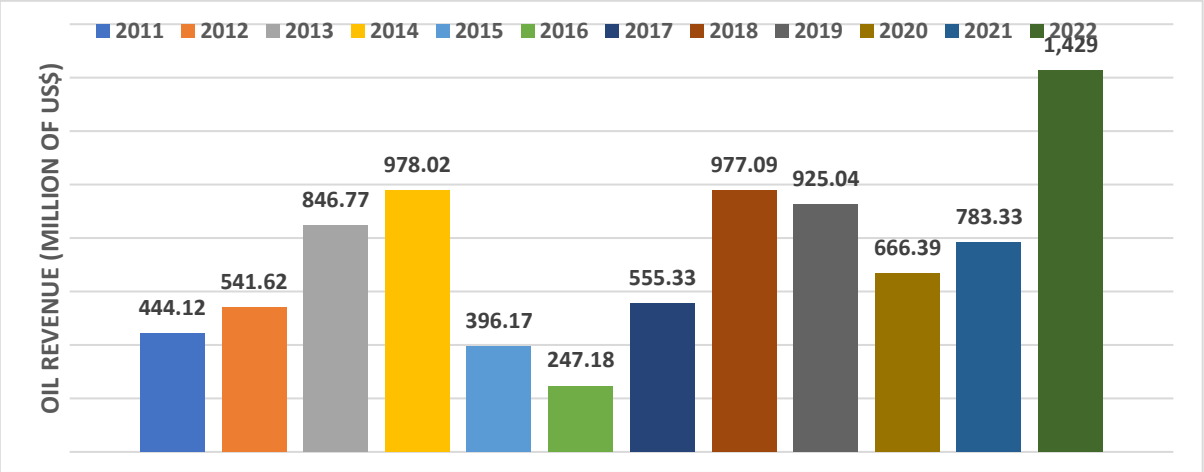

Chart 1: ***Ghana's receipts for petroleum revenue between 2011 and 2022.***
Source: ***Authors' construct with data from PIAC (2022)***

Data obtained revealed that the PHF has been receiving petroleum revenues since 2011 and has disbursed them per the PRMA's (Act 815) provisions, as revised in 2015 (Act 893). According to PIAC, the $8.79 billion in petroleum revenues earned between 2011 to 2022 accounts for more than 10% of Ghana's GDP. From Figure 1, the GNPC is expected to get 55% or less of the CAPI, as per the aforementioned legislative framework. The ABFA gets 70% or less of the anticipated revenue. A portion of the oil revenue allocated to the national budget is known as the ABFA. Many priority areas, such as modernizing agriculture, industrial development, providing physical infrastructure for education and health, building capacity, particularly in the oil and gas industry, and allocating some funds to PIAC and the Ghana Infrastructure and Investment Fund (GIIF), rely on the ABFA. The remaining 30% of the benchmark revenue is divided between the Ghana Stabilisation Fund (GSF) (21%) and the GHF (9%), with the GPFs receiving it all.

With additional monies going towards debt reduction and emergency reserves, the GSF is intended to provide consistent government spending in the event that petroleum prices decline [17, 30, 41]. For

upcoming generations, the GHF leaves a legacy [16, 20]. However, the detailed analysis on the petroleum revenue distribution is reserved for the next study.

4.1 An evaluation of the main sources of petroleum revenues in Ghana.

The analysis of the PIAC reports revealed that CAPI has been the major contributor to the oil revenues in Ghana representing 53% followed by royalty (26%), CIT (21%), Surface rentals fees (0.1%) and the PHF revenue and Oher sources (7.1%) (PIAC, 2011, 2022). This substantiates PIAC's (2022) assertion that CAPI is the primary contributor, accounting for 53% or US$3.9 billion, with royalties coming in second at 26% or US$1.9 billion, and CIT at 21% or US$1.5 billion, other marginal contributions are made up of surface rental fees and other incomes earned.

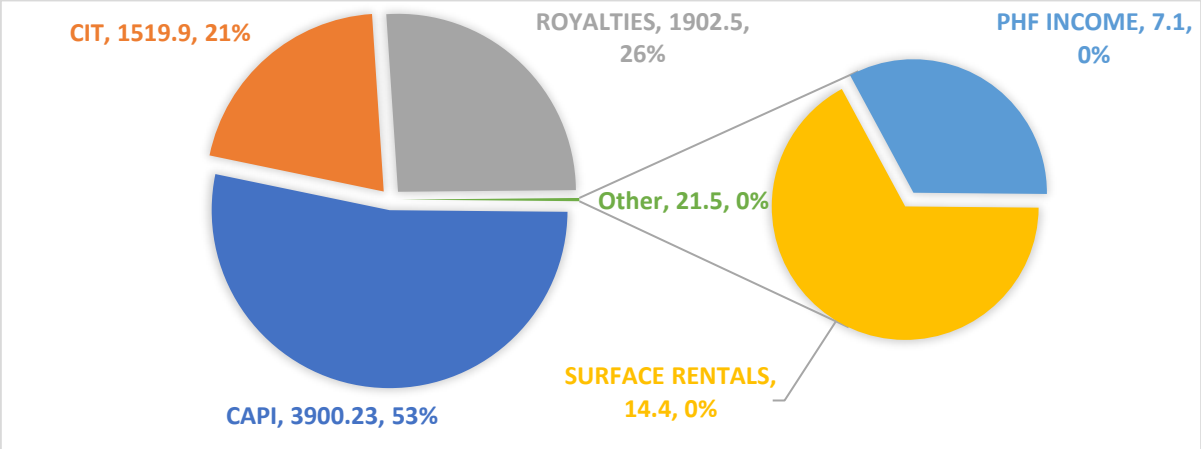

Chart 4: Petroleum revenues from the various revenue streams from 2011 to 2022 in percentages. Source: Authors' Construct with data from PIAC (2011-2022).

The review further revealed that the years 2022 and 2016 recorded the highest and the lowest oil revenue paid into the PHF respectively. It is important to note that the 2018 petroleum revenues were approximately a quarter of all oil and gas revenues from 2011 to 2017 (PIAC, 2018). This quantum leap in the 2018 petroleum revenue was attributed to increases in TEN and SGN production volumes. However, there were no revenues from gas within the same period, further indicated by PIAC.

For the study period, there were several variations in the amount of petroleum revenues received, some of which were related to shifts in the global price of crude oil. Nonetheless, as scholar-practitioners [17, 41] asserted, fiscal policy had to shield the economy from the volatility of oil revenue because it is costly to make regular adjustments to fiscal expenditure. A decline in oil prices impacts government revenue predictions for petroleum and, by extension, its ability to carry out its development agenda. The government would be obliged to borrow money and the costs of borrowing would have the same impact on crude oil prices if it is unable to reduce its spending due to negative adjustments in oil income [42] Despite these variations in oil revenue streams, it is clear from PIAC reports that CAPI generates more revenue for the government than the other revenue sources year after year.

As chart 2 illustrates, revenue inflows from diverse sources peaked annually in 2022. In contrast to US$783.3 million in 2021, the PHF received US$1,428.8 million in total from CAPI, Royalties, CIT, surface rental fees, and income earned on the PHFs in 2022. This represents an 82.4% increase over the 2021 estimate. In its 2022 report, PIAC explains why, as a result, the average price that GNPC secured on behalf of the Ghana Group jumped by 52.9% from US$69.180/bbl in 2021 to US$105.746/bbl in 2022 for

the three producing areas: TEN, Jubilee, and SGN. Even though there was a decrease in the volume of extraction, petroleum earnings climbed by 82.4% in 2022.

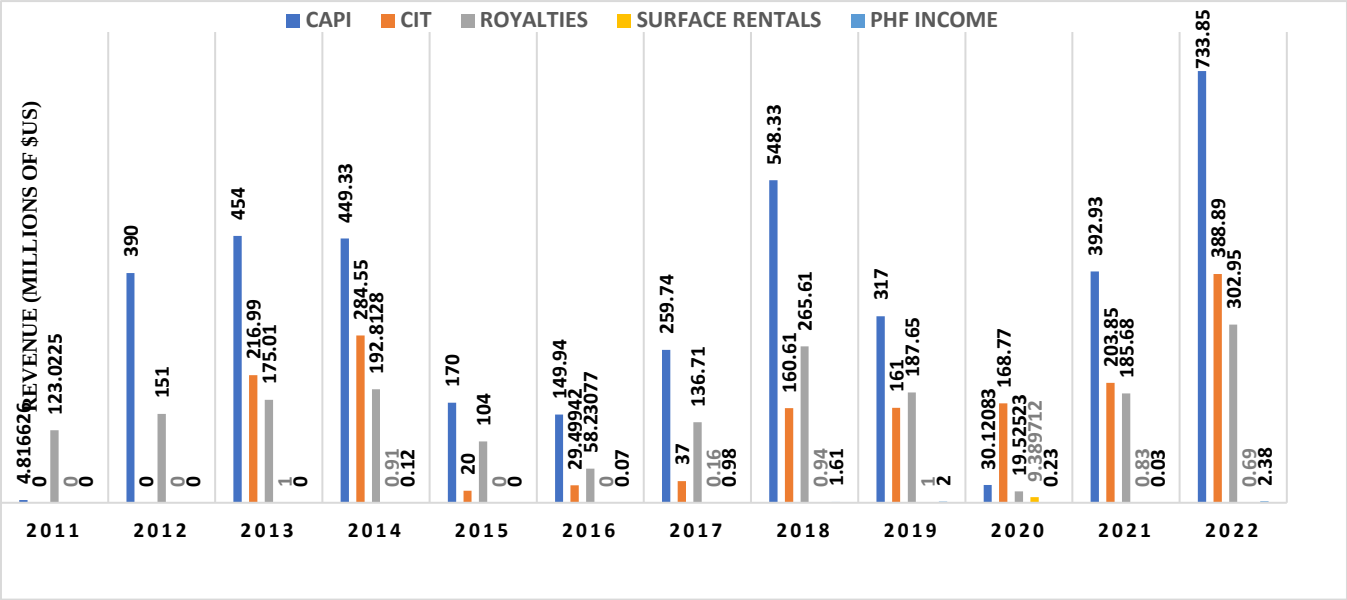

Chart 2: Authors' Construct with data from PIAC (2011-2022).

Source: *Annual Petroleum revenues from the various streams between 2011 to 2022.*

The analysis also revealed a reduction in oil production volumes in 2016. The reduction is partly attributable to the Jubilee Field's activities shutdown to aid maintenance work [16], thus resulting in a 13.7% fall in petroleum output over the previous year. For this reason, the petroleum revenue in 2016 had the lowest contributions from CAPI (US$149.9 million), Royalties (US$58.23 million), and CIT (US$20.41 million). As per the PRMA, 2011 (Act, 815), the PHF receives the oil revenues arising from Ghana's direct or indirect participation in petroleum operations, which includes the CAPI.

4.1.1 *Carried and Participation Interest (CAPI) Component of the Petroleum Revenues*

The first CAPI is at least 15% for exploration and development, per the Petroleum Act, of 2016 (Act 919). Furthermore, in every petroleum agreement, GNPC is entitled to purchase an extra participating interest within a given time frame once commercial find is announced. The revenues from CAPI realized in 2014 amounted to US$499.33 million (see chart 3), as opposed to US$453.57 million in 2013. While the 10.1% annual growth in CAPI revenues in 2014 is noteworthy, it also underscores the consistent decrease in CAPI's share of total petroleum receipts from 72% in 2011 and 2012 to roughly 54% in 2013 and ultimately 51% during the reviewed period. The CAPI saw a significant 51.4% (US$733.85) growth in revenue in 2022. Compared to US$392.93 million in 2021, the revenue from CAPI accounted for 51.4% representing US$733.85 million of the total revenue generated from the TEN, Jubilee, and SGN Fields. This is an 86.8% increase in the CAPI compared to 2021. All things considered, this study shows that, during the examined period, CAPI revenues have shown a generally favourable linear trend (PIAC, 2022). The pictorial presentations from charts 2 and 3 confirm the assertions made by PIAC (2021) and the BoG (2021); that CAPI has been the lead revenue contributor to the PHF.

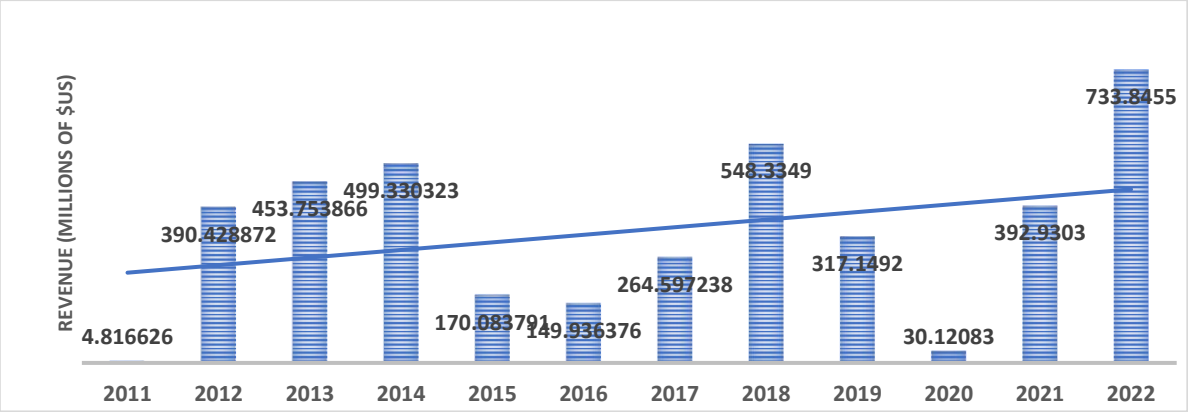

Chart 3: *Trend of CAPI's share of Petroleum revenues to the PHF (2011 to 2022).*
Source: *Authors' Construct with data from PIAC (2011-2022.*

4.1.2 *Oil and Gas Revenues from Royalties Payments*

Royalty is another major source of revenue for Ghana since 2011. Analysis of data from the GNPC shows that Ghana is entitled to a royalty rate of 5% from the Jubilee and TEN fields each and 7.5% from the SGN on its gross production. Thus, confirming what is stipulated in the PRMA. Chat 4 shows the marginal contributions of the royalty component to the PHF between 2011 to 2022. From 2011 to 2014, the share of royalty contribution to the total oil earnings in Ghana has been consistent. Compared to US$104.21 million received during the same period in 2015, US$58.23 million in royalties were obtained in 2016 from the production of oil and gas on Jubilee Field indicating a 44% decrease over the previous year (PIAC, 2016). The total revenue generated by royalties for the Jubilee, SGN, and TEN Fields increased by 63.2% to US$302.95 million in 2022 from US$185.68 million in 2021. Results from the data revealed that 52% of the overall royalties for the period came from the Jubilee Field, with SGN and TEN coming in second and third respectively. Over the course of the 12-year crude production era, royalties had their lowest and maximum revenue points in 2016 and 2022 respectively.

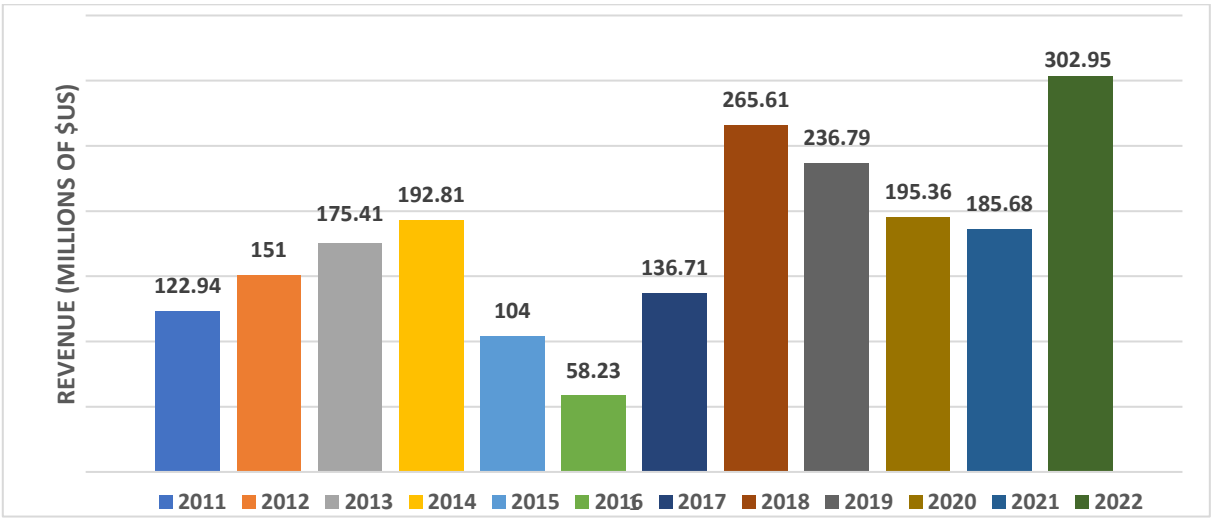

Chart 4: Annual Contributions of Royalties to the PHF (2011-2022).
Source: *Authors' Construct with data from PIAC (2011-2022).*

In 2021, the total royalties from the Jubilee, TEN, and SGN Fields were US$185.68 million, a 5% reduction from US$195.36 million in 2020. The Jubilee field's royalties accounted for 47% of the total royalties during that time, with SGN and TEN following closely behind. Because royalties are based on gross production, they are a reliable source of revenue for countries that produce oil and gas, thus confirming the earlier argument that royalties are appealing to the HC because revenues are earned as soon as production begins irrespective of the IOC profits status (Duval et al, 2009). This study, therefore, recommends that Ghana government should in future petroleum agreements negotiate for better royalty rates as opposed to the current 5% for Jubilee and TEN and 7.5% for SGN fields respectively.

4.1.3 *Oil and Gas Revenues from Corporate Income Tax (CIT) Payment.*

CIT has been another major source of revenue for the government of Ghana. It involves taxing the operations of the IOC at the upstream level. Despite 35% of CIT, which is a tax on profits, typically generates less revenue than CAPI and royalties as shown in chart 5. In comparison to 2020, a total of US$168.77 million was received as CIT from the three producing fields and US$203.85 million in 2021, thus, a 20.79% increase. During the 2013 period's review, Jubilee Partners paid in CIT of about US$216.99 million (25.63%), as compared to the budget expectations of US$55.9 million. Since oil production started in 2011, the GoG has not received CIT portion of petroleum revenue until 2013 (GRA, 2014; MoF, 2014).

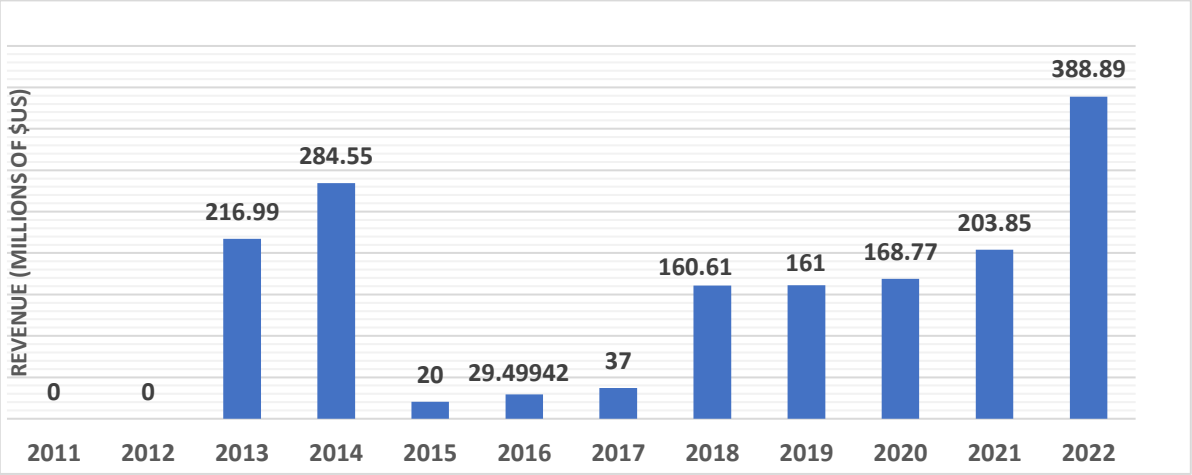

Chart 5: Annual Contributions of CIT to the PHF (2011-2022).
Source: *Authors' Construct with data from PIAC (2011-2022).*

Apart from the CIT revenue stream which could not achieve its revenue targets, all other sources of petroleum receipts to the PHF exceeded their targets for the year under review. Nonetheless, the corporation tax assessment that Jubilee Partners faced in 2012 was resolved, resulting in a payment of US$40.2 million. This payment was made in the first quarter of 2013, and it was included in the 2013 report (PIAC, 2013; MoF, 2013). Even though the price of crude oil steadily dropped in the second half of 2014, this had no negative impact on the economy or the anticipated profits from the petroleum industry. The CIT rate went up to 25.3% in 2020 from 20.39% in 2019. After significant drops in revenue streams from CIT in 2013 and 2014, the trajectory in terms of the marginal increment has been consistent from 2018 through to 2022.

Kosmos Energy paid US$22.1 million in additional assessments in the first half of 2017 as a result of a GRA tax audit that covered the years 2011 through 2015. An additional US$12.043 million was paid into the PHF as CIT for the assessment arising from the 2011 to 2015 after the GRA audit during the second half of the year. In October, a payment of US$2.84 million was made as its CIT for the third quarter. Thus, in 2016, a total of US$36.96 million was contributed as CIT to the PHF. A further tax examination conducted by the GRA from 2011 to 2015 on Anadarko led to the transfer of US$12.73 million into the GRA's coffers. PetroSA deposited US$0.76 million into the GRA's accounts as corporate tax assessment during the third quarter (PIAC, 2016).

4.1.4 *Annual Surface Rental Fees or Payments*

Although surface rental fees and other AOE were collected in 2011, the results, on the contrary, showed that the funds were deposited into Ghana's non-taxable revenue account rather than the PHF. Even though the GNPC sent the IOC an invoice, the bill was sent before the PRMA was established and was not in the name of the Ghanaian government (PIAC, 2011). According to PIAC, these acts are against the terms and principles of the PRMA (Act, 815) of 2011. The estimated amount of taxes unaccounted for over this time frame is GH¢603.7 million. IOCs' carrying over of losses may have played a role in the non-compliance, according to the Ministry of Finance (2013). To what extent subsequent funds were withheld from the PHF, however, PIAC was unable to ascertain.

While it was anticipated that the upstream petroleum sector would provide US$348.42 million, the actual amount received was US$101.24 million less than initially projected. The oil market's lower-than-anticipated price for crude oil and the extended production disruption on Jubilee Field were the reasons given by the Ministry of Finance for the underperformance of petroleum receipts in 2016. It is important to note that, notwithstanding the persuasiveness and plausibility of both arguments, if all of the gas export bills to the Ghana National Gas Company (GNGC) during the period under consideration had been paid, the 2016 revenue shortfall would have been 46% less than disclosed. Indeed, there would have been no shortage if GNGC had paid off all of its outstanding debt to GNPC in 2016 (PIAC, 2022).

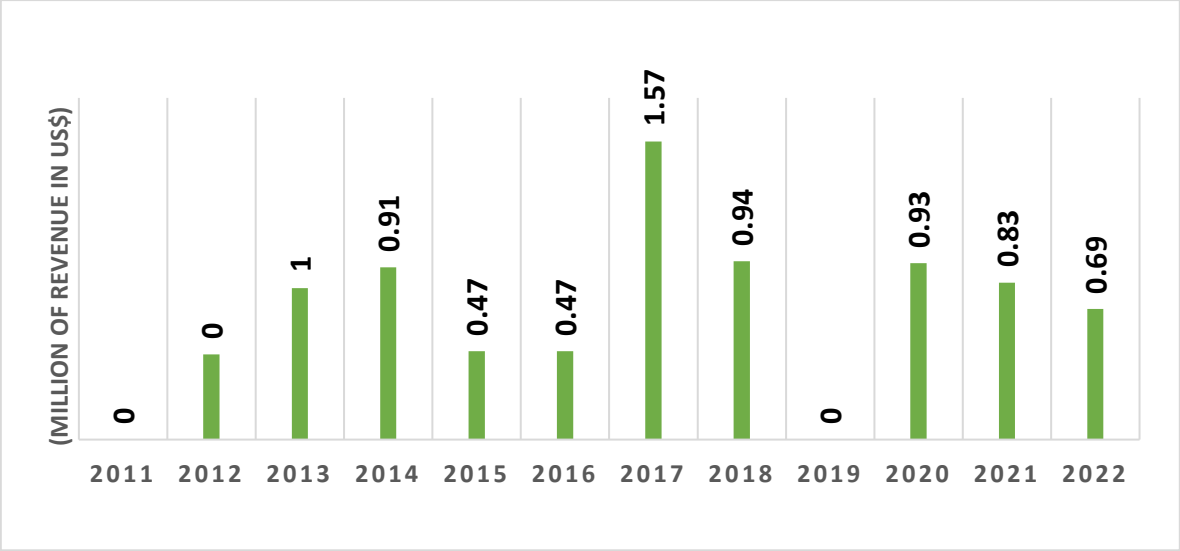

Chart 10: Annual Contributions of Surface Rental Fees (2011-2022).

Source: *Authors' Construct with data from PIAC (2011-2022).*

The surface rental rates paid by the licensed upstream firms in 2014 totaled US$0.91 million; in 2015, US$0.47 million was paid to the government, which is 49% less than in 2014. The Surface Rental fees did not include the amount of US$0.869 million that was collected subsequent to the 22nd Lifting. A 2011 receipt that was recovered from a government account in 2014 amounted to US$0.802 million of the undistributed Surface Rental charge receivable of US$0.869 million, which was not included in the 2014 revenues. Given that it was received after the revenues from the 22nd lifting were distributed, this sum was not included.

GRA and BoG (2016) state that surface rentals owed by upstream petroleum firms as of the end of 2015 were US$0.72 million whereas surface rentals paid by these companies in 2015 totaled US$0.47 million (GRA, 2016). Therefore, in 2015, nine additional upstream oil firms failed to pay their surface rental assessment. Furthermore, the PHF was paid a total of US$1.57 million in surface rentals in 2017. This included US$0.82 million in arrears and US$0.71 million in assessments from 2017. US$0.61 million and US$962,746 were paid in the first and second halves of the year, respectively. The surface rental was estimated to cost US$1.22 million in 2017. As a result, the total sum paid for the evaluations carried out in 2017 was equal to 63.8% of the accomplishment. However, US$30,884.25 of the 2016 arrears owed by Springfield Field to Exploration Production Ltd were incorrectly paid into the GRA's accounts. As at the conclusion of this study, this sum is yet to be included the PHF (PIAC, 2017; BoG, 2017). The unpaid surface rental fees for 14 of the 17 petroleum agreements that were in place prior to 2017 had been settled. Thirteen of the companies had made payments for the 2017 assessments.

The Ministry of Energy has been tasked with investigating Britannia-U, Sahara Energy, and Swiss African Oil Company violations of several regulatory obligations, including their failure to pay surface rentals. The Togolese government is posing some obstacles to the East Keta Ultra Deep Block, which is jointly held by GOSCO, Bluestar, and Heritage, over their maritime boundary with Ghana. Due to the difficulties, the local oil firms have been forced to halt operations. This block's 2017 surface rental is still pending payment.

In 2018, surface rentals came to a total of US$0.94 million. The amount that was realized from Surface Rentals comprises US$34,993.22 in arrears that were paid into the Petroleum PHF in 2017. These were the revenues that Springfield Exploration and Production Company Ltd had wrongly credited into the GRA's accounts. Similar to earlier reports, this stream generates much less financial contributions (MoF, 2017; PIAC, 2018). However, as of September 2019, there were no gas royalty receipts. A minor rise from 0.33% relative to 0.40% made up of the Surface Rentals (US$656,408) and PHF Interest (US$1.70 million). The entire amount of Surface Rental payments collected in 2021 was US$0.83 million, down from US$0.93 million in 2020, or an almost 11% uptick. The GRA states that this sum comprises overdue payments for previous years totaling US$0.21 million. From US$2.11 million at the end of 2020 to US$2.58 million by the end of December 2021, Surface Rental Arrears grew by 22.22% (PIAC, 2021).

The 2022 Surface Rental payments were US$0.69 million, a decline of 16.8% from the 2021 figure of US$0.82 million. According to the GRA, the sum collected can be attributed to 9 out of the 14 companies that are currently operating oil blocks. Comparing US$2.77 million (7.6%) at the end of 2022 to US$2.58 million at the end of 2021, Surface Rental Arrears was higher. One-fourth of the entire sum of Surface Rental fee arrears (US$1.80 million), is related to four contractors whose Petroleum Agreements were terminated by the Minister of Energy in 2021 (PIAC, 2021).

5. Conclusions, recommendations and future research

This section concludes the paper and proffers suggestions that can enhance adherence to the legal provisions instituted to maximize anticipated benefits from petroleum revenue and ensure its sustainability. It is clear from the empirical studies that most oil producing and exporting countries have put in place legal rules and regulations to guide how their petroleum revenues are managed, and Ghana is not an exception. In an effort to secure long-term management of its oil earnings, Ghana passed the Petroleum Revenue Management Act, 2011 (Act 815), as revised in 2015 (Act, 893) to govern the assessment, collection, and management of its petroleum revenue.

The study examined the contributions of various sources of oil revenue to Ghana's PHF since 2011. The contributions of these sources are CAPI (53%), Royalties (26%), CIT (21%), PHF revenue and other sources (7.1%), and Surface rental fees (0.1%). The deposit of oil revenue into the PHF were in accordance with the Act, though there were some ministerial discretions regarding the cap assessment of the excess revenue. The years 2022 and 2016 recorded the highest and the lowest oil revenue paid into the PHF respectively. The paper discovered that annual surface rental fees received prior to the PRMA were deposited into Ghana's non-taxable revenue account instead of the PHF. Therefore, the passage of the PRMA to appropriately guide the administration of the petroleum revenue accruing from approved sources was indeed timely.

The paper found the significance of CAPI as Ghana's primary source of petroleum revenue, noting that it has the potential to increase the nation's petroleum revenues and should be carefully considered in future petroleum agreements.

The paper calls for strict adherence to the provisions of the PRMA to help maximize the benefits of the petroleum industry and its sustainability in Ghana. Hence, the responsible institutions including the GRA, Ministry of Finance, PIAC, and BoG must take steps to fully implement the Act's provisions to guarantee compliance.

The main limitation of the study is that it only had data from the various institutions on the subject matter for the periods between 2011 and 2022. Further studies can also look at the environmental impact of oil and gas production in Ghana aside from the revenues earned for the period.

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