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# ESTIMATING THE REVENUE POTENTIAL OF THE QUARRY SUBSECTOR IN GHANA



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## ABBREVIATIONS

ACEP	Africa Centre for Energy Policy
AMV	Africa Mining Vision
CSO	Civil Society Organisation
DA	Districts Assemblies
ECOWAS	Economic Community of West African States
EITI	Extractive Industry Transparency Initiative
EMMMDA	ECOWAS Model Mining and Minerals Development Act
EPA	Environmental Protection Agency
GRA	Ghana Revenue Authority
MA	Municipal Assemblies
MC	Minerals Commission
MLNR	Ministry of Lands and Natural Resources
MoF	Ministry of Finance
OASL	Office of the Administration of Stool Lands
PAYE	Pay-as-you-earn
VAT	Value Added Tax
WRC	Water Resources Commission

## EXECUTIVE SUMMARY

The quarrying industry is essential for the provision of raw materials for infrastructural development, employment, livelihood sustainment and government revenues. The contribution of the industry to revenue generation of the mining and quarry sector is however insignificant. A preliminary interrogation to determine the reason for minimal government revenues shows potential underreporting of production statistics. Further, efforts at the efficient administration of mining taxation and mineral production monitoring are generally skewed towards traditional minerals. These also have implications for governments to track production by companies engaged in the extraction of industrial minerals.

The quarry industry is insulated from the persistent risk of commodity price shocks on the global market. Optimising the industry has the potential to generate more stable revenue to support government budget implementation, which requires government action to both artisanal and commercial levels. This has triggered the need to examine the potential of the quarry industry in contributing to domestic revenue mobilisation, which is the focus of this study.

A sample of quarrying companies across five regions of Ghana was selected from a database of quarries operating in Ghana. To independently verify the production volumes of quarry aggregates from quarrying companies, truckloads of quarry aggregates directly sourced from the sampled quarries were used as proxies for production. The study also involved interviews with officials from the Ghana Revenue Authority to assess the challenges with revenue collection from the quarry industry.

The analysis showed that the potential of quarry companies for revenue generation far outweighs actual receipts reported by the revenue generation institutions and regulators. The difficulties in tracking production and revenues generated by quarries contribute to the potential understatement of production volumes which impact government revenues. The quarry industry remains a promising area for revenue mobilisation, where government's increased efforts at monitoring and regulation of activities in the industry could translate into positive outcomes for host mining communities and the country at large. Based on the findings of the study, the following recommendations are made:

1. GRA and Minerals Commission must improve oversight of the quarries and develop tools that ensure accountability and transparency in reporting actual production and revenues from quarrying companies. This can be done through remote monitoring technology solutions. The most advanced technologies are satellite imagery technologies to monitor reserve to depletion ratios of quarry concessions. A cheaper option will be the use of real time video surveillance tools that capture export volumes from the production sites. Advancement in camera technologies allow capture and identification of specific images such as trucks that leave the production sites.
2. GRA should immediately implement the issuance of the Commissioner General's invoices and receipts for transaction on all aggregates procured from the quarries.
3. GRA should work with local authorities who are already on some of the sites collecting tolls from truck drivers. Local authorities must share data with GRA to serve as a basis for estimating production volumes from quarry sites.

4. Minerals Commission should produce annual reports on the quarry industry which captures information on reserves and production and activities in the industry.
5. GHEITI should generate periodic special reports on the quarry sector to ascertain whether the quarry companies are genuinely out-of-scope in accordance with its materiality criteria. Further, the accessibility of these reports will engender active citizenship participation and promote knowledge of the state of the quarrying industry. Such detailed reports will expose the sector's specific challenges to enable government and stakeholders to find relevant solutions to the challenges.

## BACKGROUND

Quarry aggregates are essential raw materials for the development of physical infrastructure. Aggregates such as granite, limestone, sand and gravels form the bedrock of materials used for road, rail, and housing infrastructure. Commitments by government, organisations and individuals to meet infrastructure needs in Ghana create an opportunity for increasing demand and supply of quarry aggregates. For example, the housing deficit alone in Ghana is projected to be over about 1.7 million units.<sup>1</sup> Similarly, there are deficits in road and other socio-economic infrastructure. The demand for these industrial minerals therefore creates a revenue potential for government in the form of royalties and corporate taxes.

The quarrying industry is insulated from the persistent risks of commodity price shocks on the global market. This is because the market for the quarrying industry is much more stable and tends to trade more within the economy which reduces exposure to global market dynamics.<sup>2</sup> This is contrary to the market conditions for traditional mineral resources such as gold, bauxite, manganese and diamond which are more susceptible to global market dynamics. Industrial minerals, if optimised have the potential to generate more stable revenue to support government budget implementation.

The Africa Mining Vision (AMV) recognizes industrial minerals as important sources for domestic revenue mobilisation for resource-rich African countries. This requires actions to optimise these minerals at both commercial and artisanal levels. This should be considered in Ghana's efforts at maximizing revenues from the mining sector. Consequently, a concerted effort by all stakeholders including companies, state agencies and Civil Society Organisations (CSO) is necessary to increase transparency, accountability and monitoring of production outputs and associated revenues. The evidence in this report suggests that the quarrying industry has far more potential for revenue generation than it currently contributes to the state.

<sup>1</sup> Africa Housing Finance Yearbook (2019). Available at <http://housingfinanceafrica.org/app/uploads/V14-GHANA-PROFILEKF-2.pdf>

<sup>2</sup> Managing Commodity Lifecycles, Mining. Available at <https://www.extractiveshub.org/servefile/getFile/id/4210>

## THE QUARRY INDUSTRY IN GHANA

Quarrying operations in Ghana include the production of granite, limestone, and sandstone for use mainly in building and road construction. Generally, industrial mining activities are significantly reserved for Ghanaian citizens whilst exceptions are made for foreign investors a minimum investment of \$10 million. This provision is stated in the Minerals and Mining Act 2006, Act 703 (as amended by the Minerals and Mining (Amendment) Act 2015, Act 900) which is the main legislation for the mining sector in Ghana.

This Act is supported by other legislations which provide legal, fiscal and institutional frameworks that govern the sector. These include the Minerals Commission Act, 1993 (Act 450), Minerals and Mining (General) Regulations, 2012 (L.I 2173), Minerals & Mining Licences Regulations 2012, (LI 2176); Environmental Protection Agency Act, 1994 (Act 490), Income Tax Act, 2015 (Act 592) etc. These laws governing the sector support important policy frameworks which outline the principles and plans the country has for the mining and quarrying sector. Examples of such policies include the Minerals and Mining Policy of Ghana, 2014; National Environmental Policy, 2010; and National Land Policy, 1999 etc.

### Institutional Framework And Fiscal Regime

The quarrying industry is broadly classified under the “Mining and Quarrying” Sector in Ghana. The sector is governed by several institutions that play respective roles in policy formulation, regulation and revenue collection within the sector. Box 1 presents the functions of certain key institutions within the Mining and Quarrying sector.

Institution	Functions
Ministry of Lands and Natural Resources	Formulate policies to ensure the sustainable management and utilisation of the country’s natural mineral resources.
Minerals Commission	The Minerals Commission is responsible for the regulation and the management of the utilisation of mineral resources. They also recommend actions on the negotiation, granting or suspension of mineral rights to the Minister responsible for mines.
Forestry Commission	Responsible for the regulation, management and conservation of Ghana’s forest and wildlife resources.
Environmental Protection Agency (EPA)	The EPA is responsible for the management and the protection of the country’s environment.
Ghana Revenue Authority	Ghana Revenue Authority (GRA) is responsible for revenue assessment and collection.
Ghana Geological Survey Authority	It is charged to provide relevant and up-to-date geological information on natural resources, land and environment.
Ministry of Finance	Responsible for the effective and efficient macroeconomic and financial management of the economy of Ghana.
Water Resources Commission	Responsible for overseeing the sustainable use of Ghana’s water resources.
Lands Commission	They are responsible for land use management through demarcations, mapping, reregistrations and compensation for displacement.

The fiscal regime of the mining sector applies to both industrial and non-industrial minerals. It uses the tax and royalty system where government receives direct revenues from the industry in the form of royalties, corporate income taxes and other rents paid by the companies. In Ghana, a mineral royalty constitute a share of gross production of mineral output. Corporate income taxes are paid based on the net income of the companies, with a capital allowance of 20 per cent straight-line depreciation. Other revenue sources include environmental permit fees, dividends, ground rents and property rates. Table 1 describes the government’s main revenue sources directly received from the industry.

**Table 1: Government’s Revenue Main Sources from the Quarrying Sector**

Revenue source	Description	Receiving Government Agency
Mineral Right or Lease Fees	Licenses, rents and permits on mining/ quarrying concessions	Minerals Commission (MC)
Mineral Royalties	5 per cent on gross revenue. In some cases, companies with development or stability agreements pay between three to five per cent on royalties.	Ghana Revenue Authority (GRA)
Corporate Income Tax (CIT)	Generally, CIT is 35 per cent on net income, with a capital allowance of 20%. <sup>3</sup>	Ghana Revenue Authority (GRA)

**Source:** Ghana Extractive Industries Transparency Initiative (2019)

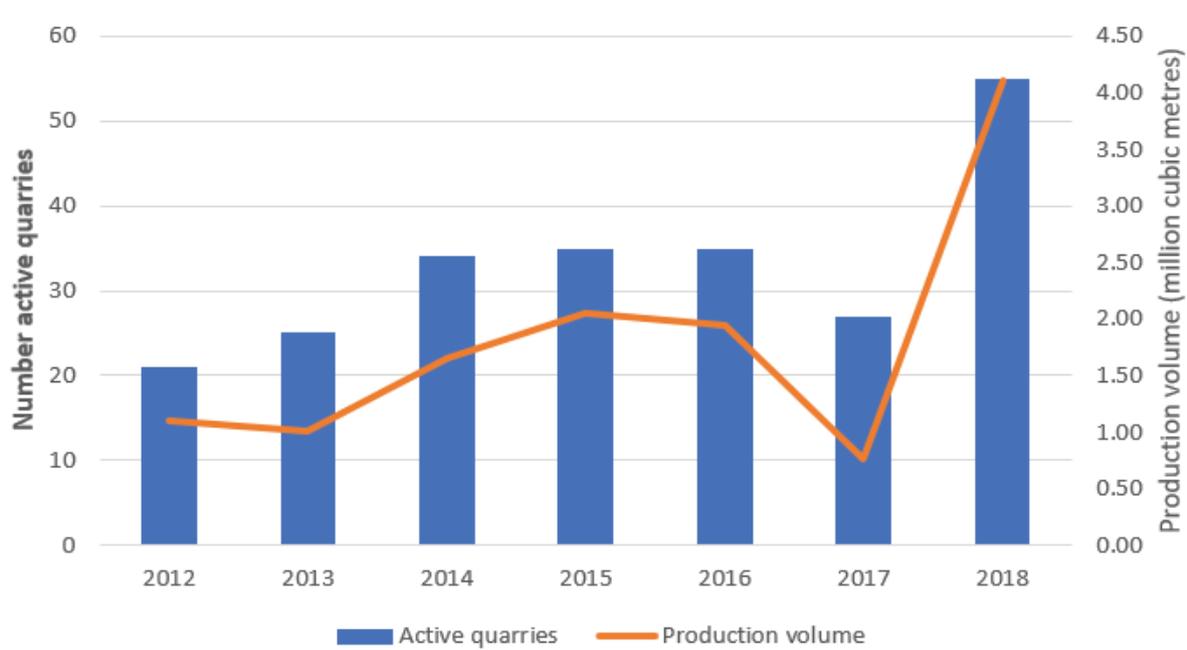
### Quarry Production Statistics

Data was sourced from the Minerals Commission covering the period between 2012 to 2018. The number of quarries whose production data had been provided between the period under review has more than doubled, from 21 in 2012 to 55 in 2018 (See Figure 1). Majority of these quarry companies located in the middle and southern parts of Ghana.

According to the data, the total production of quarry aggregates increased steadily from 1.09 million cubic metres in 2012 to about 2.05 million cubic metres in 2015. However, by 2017, production had declined to about 759 thousand cubic metres and subsequently increased to about 4.1 million cubic metres in 2018. Thus, within the seven-year period, the total production of quarry aggregates amounted to about 12.64 million cubic metres, representing an average production of about 1.8 million cubic metres per year.

<sup>3</sup>By policy, companies investing more than \$500 million are given a tax concession of 2.5 percentage points less than 35 percent.

**Figure 1: Active quarries production volumes between 2012 and 2018**



**Source: Minerals Commission (2020)**

The foregoing indicate that the number of quarry companies have increased significantly between 2012 and 2018. Ordinarily, this increase in activity should have an impact on direct revenue to government from the industry. At the barest minimum, royalty which represents a share of total production should increase. However, the EITI report which presents the most available revenue data from the mining sector does not show any significant contribution from the quarry industry to government revenue. In 2017, the Ghana EITI report shows that total government revenue from 26 quarry companies amounted to about GHS 6 million out of a total of GHS 1.4 billion generated from the Mining and Quarrying sector. This represents about 0.4 per cent of total revenues from the sector. Similarly, in 2018, Government of Ghana received about GHS 6.8 million from 47 quarries out of total mining sector revenue of GHS 1.58 billion, also representing 0.4 per cent of total government revenue obtained from the Mining and Quarrying sector.<sup>4</sup>

Data from the Commission further shows inconsistencies in revenue generation and production volumes of quarry aggregates. In 2018, total production increased to about 4.1 million cubic metres from the 2017 production output of 759 thousand cubic metres, representing an increase of about 440 per cent. However, total government revenue from quarrying increased by 13 per cent.

It is also noted from the GHEITI report that quarry companies are often out of the scope of its assessment, largely influenced by the materiality threshold<sup>5</sup> of GHS 2 million it has established. The trend in the growth of the quarry industry and the limited contribution it makes to government revenue requires a thorough assessment of the impediments or hindrances to revenue optimisation from the industry.

<sup>4</sup>Ghana Extractive Industries Transparency Initiative (GHEITI) (2019). Ghana mining sector report – 2017 and 2018

<sup>5</sup>The materiality threshold represents the minimum payments by a company that qualifies it to be assessed by GHEITI.

As part of ACEP's work to ensure that extractive resources contribute optimally to revenue to the state, the low revenue from the quarrying industry triggered the interest in examining the variables that account for this. ACEP's preliminary interrogation of government data on monitoring by agencies of state pointed to potential underreporting of production and revenues by companies to the state. This observation of potential underreporting reiterates the position of regional and global extractive sector frameworks and standards such as the Africa Mining Vision (AMV), the Extractive Industry Transparency Initiative (EITI), and the ECOWAS Model Mining and Minerals Development Act (EMMMDA). A study of these governance frameworks confirms that optimizing the fiscal contribution of all minerals, including industrial minerals, to government revenues are hampered by, inter alia, lack of transparency and ineffective audits of production, and financial reporting.

This study, therefore, assesses the potential of the quarry industry in contributing to domestic revenue mobilisation. The analysis provides an estimation of the revenues using primary and secondary data obtained from selected quarries and regulatory institutions.

## ANALYSIS OF REVENUES FROM THE QUARRYING INDUSTRY

We selected a sample of 15 quarries based on their production volumes from the database of quarry companies obtained from the Minerals Commission. These selected quarries recorded about 41 per cent of total production in 2018. They are located in the Central, Greater Accra, Western, Ashanti and Bono regions of Ghana. These regions generally host the major quarry companies in Ghana. We observed daily truckloads of quarry aggregates that left each site within an 11-hour time interval (from 7am to 6pm) for a period of five days. Research assistants were placed at the exit points of the sampled quarry companies and observed truck loads of quarry aggregates on a daily basis. Each truckload was captured with the aid of a digital camera and the image was sent remotely to a central server. To ensure the integrity of the data, the images contained the exact geographical coordinates of the site and the exact time the image was captured.

We also discovered that in some of the quarries, operations begin as early as 4am in order to help truck drivers avoid road traffic situations. This early operation makes the data collected between 7am and 6pm conservative estimates for the total daily production. The sum of the daily truckloads we obtained for the period was used to estimate the daily production of quarry aggregates. One month after the first visit, we made a second visit to the quarry sites to examine whether significant variations existed in production data obtained from the first visit.

The estimation of annual production from the sampled quarries was based on the sample of truckloads obtained from the field for both visits. To account for potential variations in production output and to reduce the likelihood of overestimating production volumes, we based our estimation of annual production on the following assumptions:

- a. We used truckloads of quarry aggregates directly sourced from the mines as a proxy for production. This approach was adopted to independently verify the production volume of quarry aggregates. The research assistants were placed at the exit points of the quarry sites to identify truck loads of quarry aggregates leaving the site.
- b. A shutdown and maintenance period of one month was assumed for the estimation of the annual production volumes for each quarry site. The study assumed that there will be periods of temporal shutdowns to allow for machine maintenance and public holidays. Thus, 48 weeks was used to estimate annual production instead of 52 weeks.
- c. Annual production for the sampled sites was determined using a confidence interval estimate. This accounted for potential variations in annual production. A 95 percent confidence interval was assumed to account for the extent to which the estimated annual production deviated from its actual value. The confidence interval provided lower and upper limits within which the actual production value would fall. We generated three production scenarios using the upper and lower limits, as well as the point estimate of the production volume. These are referred to as the lower production, base production and the upper production scenarios. Box 1 provides detailed descriptions of the scenarios.

### Box 1: Annual production scenarios

1. **Lower production scenario:** This scenario accounts for the least value of attainable production volume. It was estimated using the lower limit of the confidence interval.
2. **Base production scenario:** This scenario is estimated using the point estimate of the annual production volumes.
3. **Upper production scenario:** This scenario accounts for the maximum value of attainable production volumes. It was estimated using the upper limit of the confidence interval.

### Estimation of Production Volumes from the Quarrying Industry

From the sample, weekly volumes of quarry aggregates ranged from 79 to 689 truckloads per site with an average weekly volume of 237 truckloads. The total weekly volume recorded from the sample was 3,315 truckloads. Central Region recorded the highest weekly production of 1108 truckloads, followed by Greater Accra and Western regions with respective production volumes of 860 and 689 truckloads. Table 2 presents the truckloads obtained from the sampled quarries.

**Table 2: Average Production of Quarry Aggregates in the Sample for first and second visits**

Region	Total trucks
Ashanti Region	265
Bono Region	162
Central Region	1108
Greater Accra Region	860
Western Region	689
Eastern Region	231
<b>Total</b>	<b>3315</b>

The average weekly volume of 3,315 truckloads translates to 59,670 cubic meters of aggregates using a conservative conversion rate of one truckload to 18 cubic meters, ignoring the observation from the field, that most of the trucks had capacities of 20 and 22 cubic metres. Based on the field data, an annual production estimate of about 2.8 million cubic metres was obtained for the base production scenario from the sampled quarries. For the lower production and upper production scenarios, production volumes of 2.06 million and 3.6 million cubic metres, respectively were obtained. Given that the sampled volumes represented about 41 percent of the total production of quarry aggregates for 2018, total estimated production volumes from all active quarries, is estimated to be about 5.02 million cubic metres at the lower production scenario, 6.98 million cubic metres at the base production scenario, and 8.95 cubic metres at the upper production scenario (**See Table 3**).

**Table 3:** Production estimates for sampled quarry sites

	Production volumes (million m3)		
	Lower case	Base case	Upper case
<b>Estimates for 15 sampled quarries</b>			
Estimated weekly production	0.043	0.059	0.076
Estimated annual production	2.06	2.86	3.67
<b>Estimates for all active quarries</b>			
Estimated annual production (national)	5.02	6.98	8.95

### Estimation of Potential Revenues from the Quarrying Industry

The ex-factory prices of quarry aggregates range from GHS 75 to GHS 85 per cubic metre depending on the type of material. However, the most demanded aggregates (0.5 inch, ¾ inch and 1-inch aggregates) are between GHS 80 and GHS 85. A conservative estimate of GHS 80 is used as the price for quarry aggregates per cubic metre for the entire estimation. The total annual revenue for the sampled quarries is therefore estimated to be GHS 401.94 million for the lower production scenario, GHS 558.86 million for the base production scenario and GHS 715.78 million for the upper production scenario.

The two main sources of government revenue from the extractive sector are royalties and corporate income taxes. Government's take in the form of royalty is 5 per cent of gross production. Royalties are therefore estimated to be GHS 20.10 million, GHS 27.94 million and GHS 35.79 million for the lower production, base production and upper production scenarios respectively. The companies are also required to pay 35 per cent of their net profits as corporate income tax. The net profit is estimated as the difference between the revenues after royalties and total cost of operation and maintenance, and capital allowance for the amortisation of debts:

$$NP = Rv - R - C - A$$

#### Where:

NP = net profits

Rv = revenues

R = Royalties

C = cost of operation and maintenance

A = Capital allowance for debt amortisation

Generally, operation and maintenance costs of quarries include costs incurred for blasting, drilling and stripping activities, as well as mucking and hauling activities. Other costs are incurred for power consumption and staff remuneration. The costs incurred for operations and maintenance form about a third of the total revenues.<sup>6</sup> Capital allowance for the investment is estimated as 20 percent of the total revenue.<sup>7</sup> This is also conservative, recognising that some companies would have paid off all debts.

<sup>6</sup>Mireku-Gyimah, D., & Ansah, N. O. (2017). An Economic Evaluation of the Loyal Quarry of Atiwa Quarries Limited. Ghana Mining Journal, 17(1), 43-53.

<sup>7</sup>In estimating the value of Loyal Quarry, Mireku-Gyimah & Ansah (2017) estimated the capital allowance to be about 15 percent of the total revenues. We adjust this value by using a conservative estimate of 20 percent of total revenue.

Government revenues accrued from corporate income tax for the lower, base and upper cases are GHS 58.62 million, GHS 81.5 million and GHS 104.38 million respectively. Therefore, total revenue due government in the form of royalties and taxes sum to about GHS 78.71 million and GHS 109.44 million for the lower and base case scenarios. For the upper-case scenario, total estimated revenue for the government is GHS 140.17 million. The build-up of government revenues is provided in Table 4.

**Table 4: Estimation of Government’s Revenues from Sampled Data**

	Amounts (GHS million)		
	Lower production scenario	Base production scenario	Upper production scenario
<b>Company costs and revenues</b>			
Total revenue	401.94	558.86	715.78
Royalty payments	20.10	27.94	35.79
Operation and maintenance costs	133.98	186.29	238.59
Capital Allowance	80.39	111.77	143.16
Total payments	234.47	326.00	417.54
Net profit	167.48	232.86	298.24
<b>Government take</b>			
Royalties	20.10	27.94	35.79
Corporate income tax	58.62	81.50	104.38
<b>Total government revenue</b>	<b>78.71</b>	<b>109.44</b>	<b>140.17</b>

## DISCUSSION OF FINDINGS AND CONCLUSIONS

Ghana's Minerals and Mining Policy highlights four approaches to efficient revenue generation and ensuring corporate accountability on the part of companies operating in the mining sector. These include; a simplification of the fiscal regime, providing safeguards against tax leakages, strengthening the financial reporting obligations of companies and developing appropriate capacity for the efficient administration of mining taxation. However, weaknesses in operationalising the fiscal regime of the quarrying industry affect the robustness of the monitoring systems to ensure that revenues that accrue to governments from the quarry industry are maximised.

The fiscal regime provides specific government take from the minerals sector as provided in the Income Tax Act and the Minerals and Mining Act. However, the study shows low efforts at optimising revenue from the quarrying sector, which skews the operationalisation of the fiscal regime to precious minerals, particularly gold. This is evident in the inadequacy of data on the quarrying industry as compared to other precious minerals. The key actors responsible for revenue generation in the quarrying industry is Ghana Revenue Authority (GRA) and Minerals Commission. However, these institutions do not have adequate data required to optimise the sector. This is admitted by GRA in their response to the research questions:

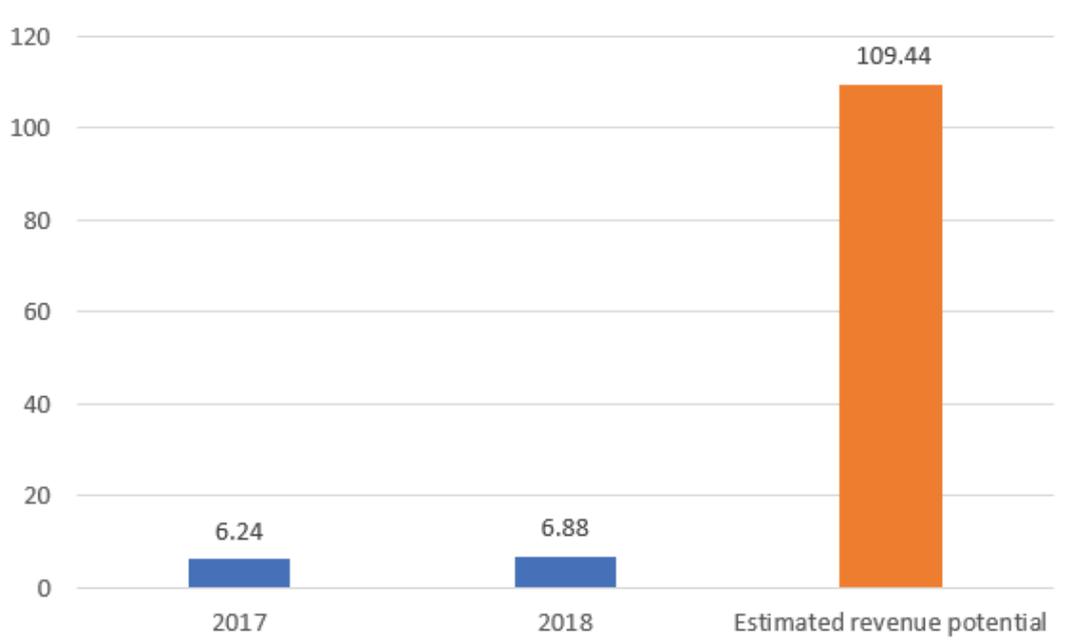
*“Inadequate quarrying records makes it difficult to determine value of royalties to be paid”*

The institutions have not paid enough attention to ensure the effectiveness of revenue administration in the quarrying industry. Observations from the field visits do not show any evidence of operational visibility of GRA and the Commission at the various quarry sites. Further, GRA does not enforce the issuance of the Commissioner General's invoice at the mine. This makes it difficult for the Authority to track production and revenues generated by the quarrying companies. This further complicates the ability of the Authority to identify possible risks of revenue under-statement which impacts profits reported for corporate income tax purposes.

However, response from GRA indicates that if it has reasonable suspicion of companies suppressing their incomes, Taxpayer Service Centres (TSCs) investigate such occurrences. The field visits also reveal that in some areas, local authorities are stationed close to the mine to toll the trucks that transport quarry aggregates from the production site. This tolling exercise does not provide oversight on the operations of the quarries, and there is no system for the local authorities to share the information on trucks they toll with GRA. In many instances, the assemblies begin operations between the hours of 6am to 6pm, whereas, as indicated above, some quarry companies begin their operations as early as 4am and continue into late hours of the day.

This study shows that the potential for revenue generation from the quarrying industry is about 18 times more than government's revenue generated in 2018. The situation of lower revenue-generation is attributable to inefficiencies in revenue collection and a lack of transparency in reporting production volumes and financial information from the quarries. Revenue generation from quarries may be lesser than that obtained from other extractive sector industries such as gold, however, field data analysis suggests that its value is not negligible. The quarry industry remains a promising industry for domestic revenue mobilisation. However, realising the fiscal benefits from the industry require increased efforts of relevant revenue institutions at monitoring and regulating activities within the industry.

**Figure 2: Revenue potential of the quarry industry compared with actual receipts for 2017 and 2018**



The analysis showed that the potential of quarry companies for revenue generation far outweighs actual receipts reported by the revenue generation institutions and regulators. This additional monetary value could be used to finance critical developmental projects in the country. It would as such benefit the country if mining sector regulators and stakeholders begin to heighten focus on the quarry industry and explore avenues for increased welfare gains to the country. It is for policy purposes as this that ACEP explored the revenue potential of the quarrying industry to influence policy action to ensure maximum revenue returns to the government. Based on the findings of the study, the following recommendations are made:

1. GRA and Minerals Commission must improve oversight of the quarries and develop tools that ensure accountability and transparency in reporting actual production and revenues from quarrying companies. This can be done through remote monitoring technology solutions. The most advanced technologies are satellite imagery technologies to monitor reserve to depletion ratios of quarry concessions. A cheaper option will be the use of real time video surveillance tools that capture export volumes from the production sites. Advancement in camera technologies allow capture and identification of specific images such as trucks that leave the production sites.
2. GRA should immediately implement the issuance of the Commissioner General's invoices and receipts for transaction on all aggregates procured from the quarries.
3. GRA should work with local authorities who are already on some of the sites collecting tolls from truck drivers. Local authorities must share data with GRA to serve as a basis for estimating production volumes from quarry sites.
4. Minerals Commission should produce annual reports on the quarry industry which captures information on reserves and production and activities in the industry.

5. GHEITI should generate periodic special reports on the quarry sector to ascertain whether the quarry companies are genuinely out-of-scope in accordance with its materiality criteria. Further, the accessibility of these reports will engender active citizenship participation and promote knowledge of the state of the quarrying industry. Such detailed reports will expose the sector's specific challenges to enable government and stakeholders to find relevant solutions to the challenges.

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