



**Botswana  
Geoscience  
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# THE 2018/19 BOTSWANA MINERAL ACCOUNTS TECHNICAL REPORT

**2021**

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**Stakeholders:**

Ministry of Finance and Economic Development  
Statistics Botswana  
Diamond Hub  
Department of Energy and Center of Applied Research

**Mining Companies:**

Morupule Mining Company | Botswana Ash Pty. Ltd | Mupane Gold Mine |  
Khoemacau Copper Mining Pty. Ltd | Minergy Coal Mining Company |  
Debswana Diamond Mining Company



## EXECUTIVE SUMMARY

Mineral accounts updating for 2018/19 follows up on previous reports to update Botswana's major mined commodities. The accounts findings are intended to highlight on the mining sector performance and competitiveness to deduce relevant policy messages for the mineral sector development.

- Botswana's mining sector is dominated by the diamond mining contributing largely from its export earnings.
- From all other major mined commodities soda ash and salt performs better after diamond mining, followed by gold and coal.
- Base metal mining was significantly high after diamonds until 2016. Thereafter there had not been any mining activity for the base metals industry until 2019.
- Mining contribution to total GDP has been surpassed by other industries from 2011 and growth of the non-mining sector has grown in Botswana.
- In 2019, the diamond sales decreased by about 49% from 2018.
- Mining growth in Botswana will be justified by success of the underground mining transitioning for most major mined commodities that were proposed by many large operating mines from 2019 that include Debswana diamond mine, Lucara Diamond mine, Mupane Gold Mine and Morupule coal mine.
- The economic valuations have revealed that generally, the Botswana major mined commodities mineral rents measured at constant prices have been quite volatile. Major declines are observed in 2009, 2012, 2015 and 2019.
- Industrial mining categorised as other mining exceeded other major mined commodities except for diamonds in terms of contribution to total GDP from 2004 until 2019.
- From all the mined mineral commodities in Botswana, diamonds, gold, and soda ash & salt are exported.
- Since 2016, there has been a 30% reduction in total rents until 2019 from all major mined commodities.
- Diamonds rents contribute largely constituting about 97% of the total rents, followed by soda ash mining taking about 3%.
- Gold mining rents started being negative from 2014 until 2019.
- The coal sector also observed negative rents in the period between 1994 until 2019, except for the years 2013 and 2018.
- However, coal and gold mining has made recognisable royalty payments to the government of Botswana.
- The negative rents of the two commodities makes it complex to estimate the commodities economic values in the future.

- There are two types of coal (thermal and washed) sold to local and export markets. All the thermal coal goes to Botswana power cooperation (BPC), mining companies (e.g BOTASH) and other consumers locally, while 79% of the washed coal is being exported. The remaining 21% of the washed coal is used by the government, parastatals, food and beverage industry and others locally.
- Botswana Power Corporation consumes 89% of the thermal coal, 10% goes to BOTASH and other consumers.
- As of the 2019 datasets acquired from the Department of Energy Affairs, 85% of the export goes to South Africa, followed by Zimbabwe consuming 10%, then Zambia taking about 0.44% while 4% goes to other countries.
- The thermal and washed coal sales have been increasing over the years indicating that the demand for Botswana coal is increasing
- Gold mining production in Botswana recorded its highest output in 2005 when it stated mining recording 3234.9kg of gold mined. Since then, gold production has been declining.
- Botswana major operating mines have a longer life of mine led by soda ash mining at 61 years, followed by coal 43 years, then diamonds 38 years and finally gold that reports 6 years remaining life of mine with the available datasets.

## TABLE OF CONTENTS

<b>Executive Summary</b>	<b>2</b>
<b>Chapter One: Introduction</b>	<b>7</b>
<b>Mining Sector Performance in the Economy of Botswana</b>	<b>8</b>
<b>Chapter Two: Major Mined Minerals Physical Accounts Update</b>	<b>12</b>
<b>Resources and Reserves updates for Botswana Major Mined Commodities</b>	<b>12</b>
<b>Diamonds Physical Stock Updates</b>	<b>13</b>
<b>Botswana Diamond Reserve Update</b>	<b>13</b>
<b>Diamonds Producing Mines in Botswana</b>	<b>16</b>
<b>Botswana Diamond Life of Mine Estimates</b>	<b>17</b>
<b>Botswana Coal Resource Updates</b>	<b>18</b>
<b>Botswana Coal Reserve Update</b>	<b>18</b>
<b>Coal Production in Botswana</b>	<b>21</b>
<b>Overview of Botswana Coal Sales and Exports</b>	<b>22</b>
<b>Botswana Soda Ash and Salt Resource Update</b>	<b>22</b>
<b>Botswana Soda Ash and Salt Reserves</b>	<b>23</b>
<b>Soda Ash and Salt Production in Botswana</b>	<b>24</b>
<b>Botswana Gold Resource Update</b>	<b>25</b>
<b>Botswana Gold Reserves and Life of Mine Estimates</b>	<b>25</b>
<b>Chapter Three: Major Mined Mineral Economic Valuations</b>	<b>27</b>
<b>Botswana Mineral Rents</b>	<b>27</b>
<b>The Impact of the Rate of Return on Capital (RoRC) on Resource Rents</b>	<b>29</b>
<b>Botswana Mining Revenue versus Mineral Rents</b>	<b>31</b>
<b>The Botswana Mineral Economic Value</b>	<b>32</b>
<b>Mining Sector Export Earnings</b>	<b>33</b>
<b>Depletion Component of Rent</b>	<b>34</b>
<b>Chapter 4.0 Conclusions</b>	<b>34</b>
<b>Chapter 5: Policy Messages</b>	<b>36</b>
<b>References</b>	<b>37</b>

## LIST OF FIGURES

<b>Figure 1:</b> Value Added of the Mining Sector compared to different sectors of the economy. Source: Ministry of Finance and economic Development	<b>8</b>
<b>Figure 2:</b> Disaggregated Mining Sector Contribution to total Gross Domestic Product	<b>9</b>
<b>Figure 4:</b> Botswana Diamond Sales Source: Diamond Hub	<b>11</b>
<b>Figure 5:</b> 2018 Botswana Diamond Production	<b>16</b>
<b>Figure 6:</b> 2019 Botswana Diamond production	<b>16</b>
<b>Figure 7:</b> Botswana Diamonds Reserve size versus Life of mine estimates	<b>18</b>
<b>Figure 8:</b> Morupule Coal Mine Production (2009-2019)	<b>21</b>
<b>Figure 9:</b> Botswana thermal and washed coal sales (2010-2019). Source Ministry of Energy.	<b>22</b>
<b>Figure 10:</b> BOTASH Soda Ash and Salt production (2009 -2019). Source: Department of Mines Production Statistics	<b>24</b>
<b>Figure 11:</b> 2019 Mupane Gold Reserve and Life on Minie Estimates	<b>26</b>
<b>Figure 12:</b> Mining and Non mining revenue for Botswana in total revenue and grants (2005/06 -2018/19)	<b>31</b>
<b>Figure 13:</b> Mineral Rents versus Mineral Revenues (2006-2019).	<b>32</b>
<b>Figure 14:</b> Botswana Mineral Economic Values.	<b>32</b>

## LIST OF TABLES

<b>Table 1:</b> The 2019 Botswana Principal Export Commodity Groups in Millions of Pula	<b>10</b>
<b>Table 2:</b> Botswana Diamonds exported countries in 2019	<b>10</b>
<b>Table 4:</b> 2018 Debswana Resource Update. Source: (Anglo American , 2019).	<b>13</b>
<b>Table 5:</b> 2018 Debswana Resource Update. Source: (Anglo American , 2019).	<b>13</b>
<b>Table 6:</b> 2019 Debswana Resource Update. Source (Anglo American , 2019).	<b>14</b>
<b>Table 7:</b> Diamond Production from Botswana in carats	<b>17</b>
<b>Table 9:</b> Masama Coal Reserve Statement , October 2019.	<b>19</b>
<b>Table 10:</b> Morupule Mine Coal Reserve Statement Source: Morupule Mine (as at December 2018)	<b>19</b>
<b>Table 11:</b> Botswana Coal Resource Update, BGI ongoing work, unpublished.	<b>20</b>
<b>Table 12:</b> Mupane mine 2010 reserve updates. Source (MSA Group, 2011).	<b>25</b>
<b>Table 14:</b> Coal Mineral Rent Estimations at 0% RoRC	<b>30</b>
<b>Table 15:</b> Mineral Rent Valuations at 5% RoRC	<b>30</b>
<b>Table 16:</b> Mineral Rent Valuations at 10% RoRC	<b>30</b>
<b>Table 17:</b> Botswana Mining export Value (2005-2019), excluding coal. (Statistics Botswana, 2020).	<b>33</b>

## ABBREVIATIONS AND ACRONYMS

<b>BGI</b>	<b>Botswana Geoscience Institute</b>
<b>DoM</b>	<b>Department of Mines</b>
<b>GDP</b>	<b>Gross Domestic Product</b>
<b>ROM</b>	<b>Rate of Mine</b>
<b>RoRc</b>	<b>Rate of Return on Capital</b>
<b>NCA</b>	<b>Natural Capital Accounts</b>
<b>CRIRSCO</b>	<b>Committee for Mineral Reserves International Reporting Standards</b>
<b>UNFC</b>	<b>United Nation Framework Classification for Fossil Fuel Energy and Mineral Reserves and Resources</b>
<b>SEEA</b>	<b>System of Environmental Economic Accounting</b>
<b>SB</b>	<b>Statistics Botswana</b>
<b>MoFED</b>	<b>Ministry of Finance and Economic Development</b>
<b>GPS</b>	<b>Global Programme for Sustainability</b>
<b>Mcts</b>	<b>Million Carats</b>
<b>Mtpa</b>	<b>Million Tonnes per annum</b>
<b>LOM</b>	<b>Life of Mine</b>
<b>MMGE</b>	<b>Ministry of Mineral Resources Green Technology and Energy Security</b>
<b>WAVES</b>	<b>Wealth Accounting and Valuation of the Ecosystem</b>

## ACKNOWLEDGEMENTS TO THE MINERAL ACCOUNTS STAKEHOLDERS:

The Mineral Accounts desk officers - BGI technical team, acknowledges all those who directly and indirectly contributed to the production of this report and previous ones. The main key players with their valued contribution to the Accounts compilation are Statistics Botswana (SB) who provide capital stock data to estimate the Minerals Economic Accounts, the Ministry of Finance (MoFED) team who are the secretariats to Natural Capital Accounts and play a critical role to review the Mineral Accounts updates before engaging with stakeholders (mining companies). We furthermore thank SB who carry this task with MoFED. We acknowledge mining companies in Botswana participation particularly Morupule Coal Mine, Botswana Ash and others who constantly provide the physical stock datasets that communicates the resource base and the exploitation trend. We furthermore acknowledge Department of Mines who authenticate the mining company's production trends as the regulator of the minerals sector in Botswana, the Diamond Hub who provides the diamond downstream datasets and the BGI & WAVES World Bank Marketing and Communications team who make final editing of the completed annual reports.

## CHAPTER ONE: INTRODUCTION

This report is the 2018/19 Mineral Accounts annual update for Botswana's major mined minerals. The accounts provide a platform to analyse the mining sector performance and competitiveness to deduce relevant policy messages for the mineral sector development. The major mined commodities include Diamonds, Coal, Gold, Soda Ash and Salt. Industrial minerals are also mined but are not yet included in this publication series.

Minerals in Botswana are of critical importance to the economy. They have provided the financial base for Botswana's economic development and growth over the years. The country had strong macroeconomic policies that managed its mineral revenues. Reinvesting them into education, health care and other forms of produced capital/ assets e.g construction of roads and buildings.

Although Botswana is praised among many Sub-Saharan countries for using its mineral resource to develop the nation, a number of **"Resource Curse"** characteristics are being observed. These "Resource Curse" characteristics are **high unemployment, high income inequality** (African Natural Resource Centre , 2016), **slow growth of non-mining exports** (Statistics Botswana, Interational Merchandise Trade Statistics, 2019). There is need to monitor the sustainable development key performance indicators through Natural Capital Accounts (NCA).

The Gross Domestic Product is still being used globally as a measure of economic performance to observe the various economic sectors value added. However, it has its limitations to the measurement of wealth. For instance, Botswana's mining sector performance to total GDP has declined. It has been surpassed by total wholesale and retail trading from 2011, total finance and business services and general Government from 2015 measured at constant prices (Figure1). This measurement is more of an income statement rather than the country's wealth.

Mineral Accounts just like other Natural Capital accounts emerged as a tool to measure the country's wealth and advise on the economic extractability of the remaining resources. The accounts findings are used in development planning, and promote the sustainable development goals that includes social, economic and environmental issues. The forward- backward linkages of mining sector to the rest of the economy can be analysed.

Since 2017, a series of annual publications are released by the Botswana Geoscience Institute as mandated by the Government of Botswana. All the reports produced including this one has resulted on what is termed the **"ACCOUNTING PUSH"** where physical stock and economic accounts flows for the major mined mineral are updated to see whether the country is living off its natural capital or not. These reports adopt the System of Environmental and Economic accounting (SEEA) classification concepts which are consistent with the classification and definition of the System of National Accounts. This updates the National Balance sheet used in updating the Macroeconomic Indicators of Sustainable Development. The way natural resources are valued in society is changing hence the **"POLICY PUSH"** has now become pressing where governments need to deduce policy messages at different levels in decision-making. Through Mineral Accounts reports, policy briefs or studies are conducted to address gaps in the economy.

## MINING SECTOR PERFORMANCE IN THE ECONOMY OF BOTSWANA

Mining has been the dominant sector in terms of value added to gross domestic product (GDP) until 2011. Since then its contribution declined at which in 2019 its contribution was at levels observed in 2009 during the global financial crisis. Growth of the non-mining sector is attributed to the total wholesale and retail trading performing remarkably well from 2011 until 2019 with 59.8% growth (Figure 1). Total finance & business services and the general government also surpassed mining contribution to GDP from 2015 until 2019.

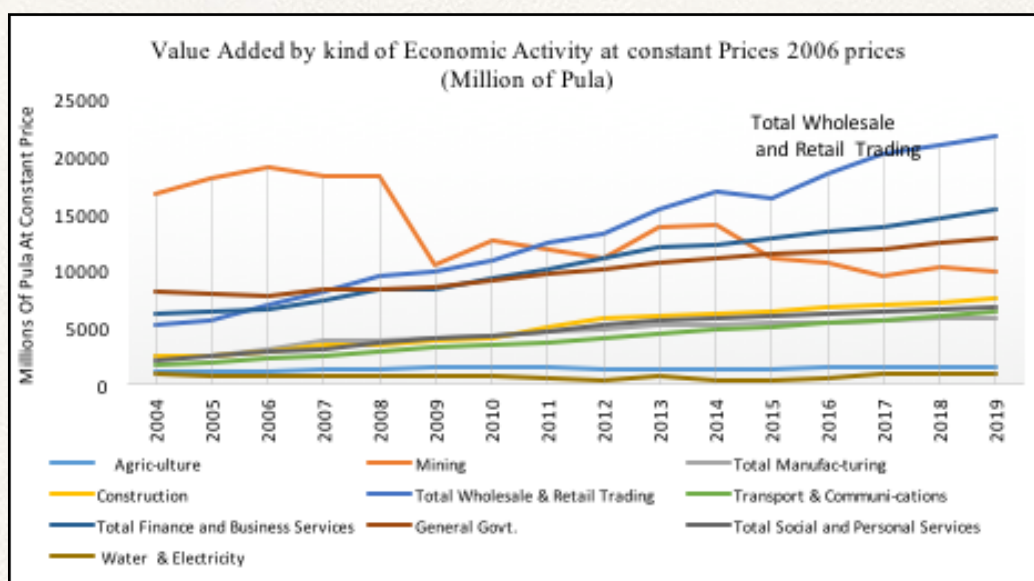


Figure 1: Value Added of the Mining Sector compared to different sectors of the economy.

Source: Ministry of Finance and economic Development

Botswana's mining sector is generally dominated by diamonds which contributes majority of mining GDP (Figure 2). The copper mining or base metal industry made significant contributions after diamond mining until 2016 when the major operating mine (BCL Mine) got liquidated. Since then, there has been no production of the base metals until 2019. However, the government of Botswana has issued companies like Khoemacau and Tshukudu Metals Motheo T3 mining licences which are now operational and most likely to revive the base metal industry. The production figures and trends of this commodity will be included in the next report. At this reporting period, soda ash mining is the second best performing after diamonds, followed by gold (although not presented in Figure 2) and lastly coal. Other mining activities such as quarries, industrial minerals and prospecting activities which are not yet part of the mineral accounts computations, do have significant contributions to total GDP (Figure 2). Industrial mining categorised as other mining exceeded other major mined commodities except for diamonds in terms of contribution to total GDP from 2004 until 2019 (Figure 2).



Prospecting activities in Botswana has also had positive growth over the years. Its contribution to total GDP in 2009 was 406.1 million of pula and increased to 785.6 million Pula in 2019 (Figure 2). Advanced exploration activities include Iron ore by Vision Ridge Investments on the Ikongwe iron ore project.

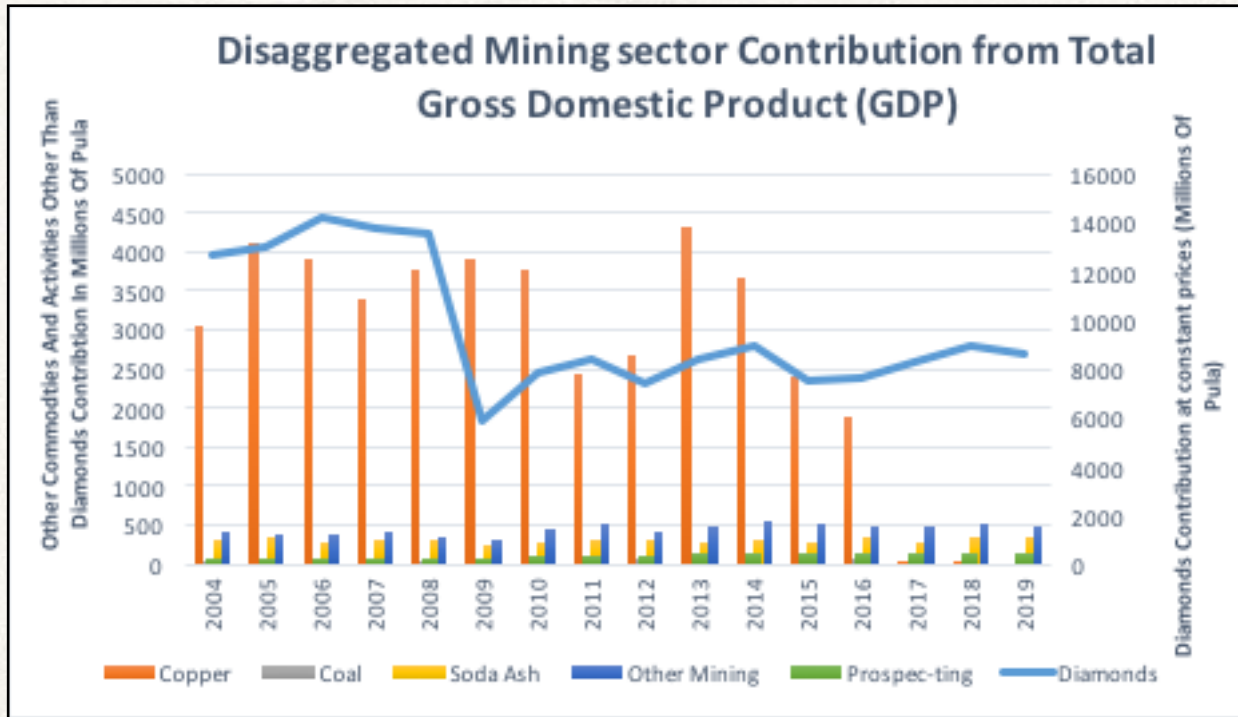


Figure 2: Disaggregated Mining Sector Contribution to total Gross Domestic Product

From all the mined mineral commodities in Botswana, diamonds, gold, and soda ash & salt are exported. Diamonds are the largest export earning commodity (Table 1 & 2). Majority of the diamond exports goes to Asia, then the United Arab Emirates (UAE), European Union, South African Custom Union countries in Africa, United States, Switzerland, Canada, and the rest of the world (2019 export statistics). Industrial minerals (aggregates) are used locally mainly in the construction sector.

Table 1: The 2019 Botswana Principal Export Commodity Groups in Millions of Pula

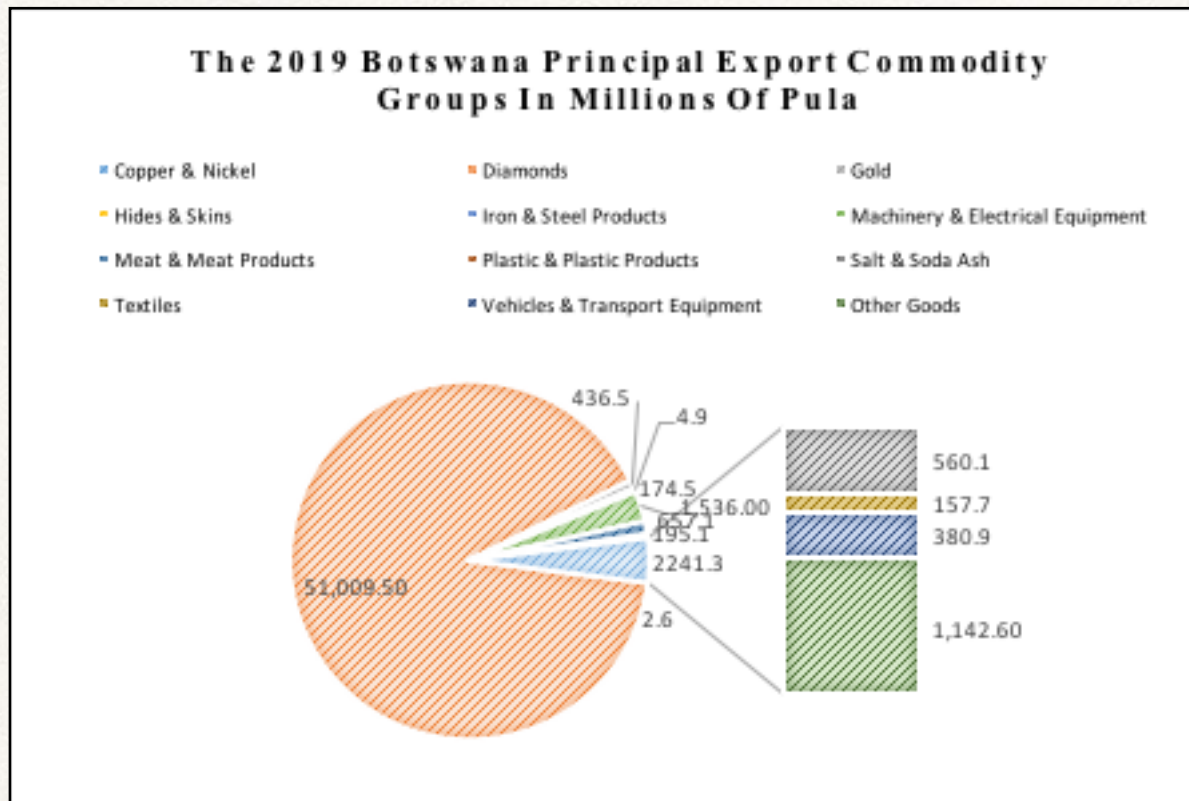


Table 2: Botswana Diamonds exported countries in 2019

Area	Individual Countries	Diamond Export Value Contribution (Millions of Pula)
<b>Asia</b>	India	1,780.40
	UAE	977.1
	Israel	364.3
	Hong Kong	265.7
	Singapore	163.9
	Japan	21.9
	other Asia	61.2
<b>European Union</b>	Belgium	1,54.0
<b>Africa</b>	South Africa	190.3
	Namibia	231.4
<b>United States of America</b>		137.1
<b>Switzerland</b>		41.3
<b>Canada</b>		18.2
<b>Rest of the World.</b>		0.1

Due to the overreliance of diamond export earning revenue, Botswana is highly posed to external shocks as diamonds are subject to movements in the world demand. This was observed in 2009, 2012, 2015 and 2019 at periods of weaker diamond demand at the international markets.

The Botswana diamond sales are made from the De Beers Global Sight holder sales (DBGSS), Okavango Diamond Company (ODC), Lucara Mining (Boteti), Gem Diamonds and Lerala mining. DBGSS sells 85% of Debswana production while ODC sells 15%. Including other diamond mining companies, DBGSS on a 5-year average contributed 85% of the diamonds sales followed by ODC at 9.99%, then Boteti at 4.4% (Table 3). Lerala and Gem Diamonds sales contributed less than 1% up until 2017 when the two went on care and maintenance.

In the past five years, diamond sales recorded their lowest sales in 2015. They increased into 2016 then dropped slightly in 2017 and 2018. In 2019, the diamond sales decreased by about 49% from 2018 (Figure 4). Covid 19 pandemic amongst other causes resulted in reduced demand for the luxurious commodity. Another possibility might be the quality of the stones.

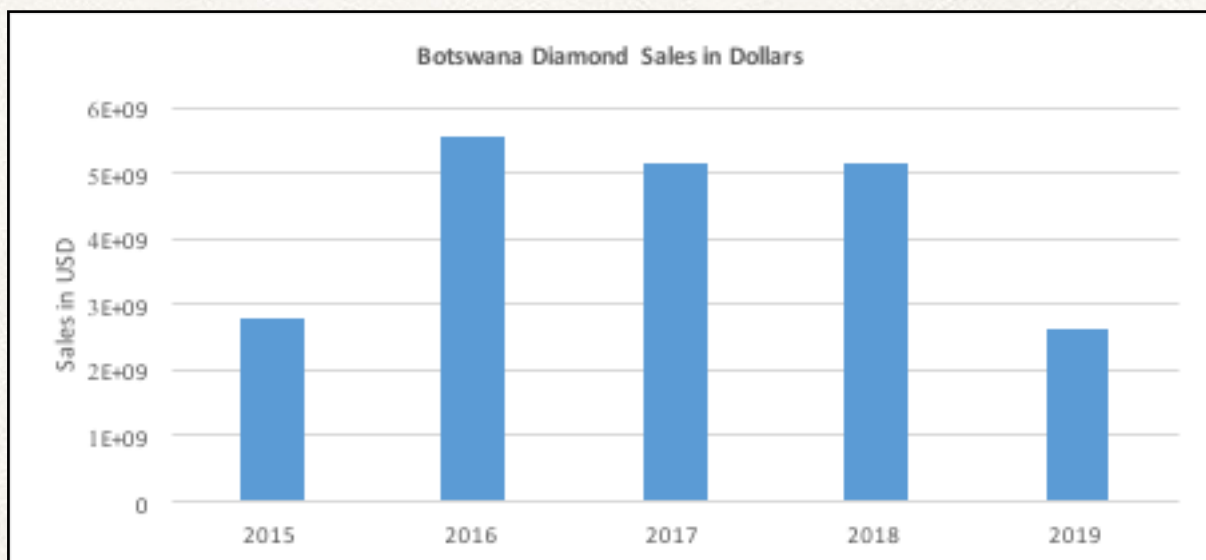


Figure 4: Botswana Diamond Sales Source: Diamond Hub

The Botswana mining industry need to diversify to other minerals that are not highly affected by global shocks and improve local usage of mined minerals. In addition, the government need to intensify the coal development strategies from energy to other uses observing their environmental impacts.

## **CHAPTER TWO: MAJOR MINED MINERALS PHYSICAL ACCOUNTS UPDATE**

Mining companies use different reporting standards in justifying their resource and reserve classifications according to international reporting standards under the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) (ORAMA, 2017). CRIRSCO are representative bodies are responsible for developing mineral reporting codes. For instance, different countries that have adopted the reporting codes for mineral resources and reserves under CRIRSCO template include but not limited to:

- Joint Ore Reserves Committee (JORC) Code – Australia
- Canadian Institute of Mining (CIM) Code – Canada
- Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC) code- South Africa (Commonly adopted in Botswana)
- Society for Mining Metallurgy and Exploration (SME) Guide –United States (ORAMA, 2017).

Botswana follows the SAMREC, JORC and CIM which are explained for each commodity or mining company adopted reporting standard in the subsequent chapters. Although different countries have their own reporting standards, the SEEA recommends the United Nation Framework Classification for Fossil Fuel Energy and Mineral Reserves and Resources (UNFC) -2009 that classifies resources based on the maturity of the projects. The classification evaluates fossil fuel energies and mineral based on whether resources for extraction have been confirmed, developed, or planned and if so to what extent (Bersales, 2017). The quantities of resources are classified based on the three fundamental criteria of **Economic and Social viability (E), field project status and feasibility (F), and geological knowledge (G)** using a numerical coding system.

### **RESOURCES AND RESERVES UPDATES FOR BOTSWANA MAJOR MINED COMMODITIES**

The starting point of the physical stock accounts is the classification of the minerals on the ground. As has been with the 2015/16 and 2017/18 report produced by BGI for major mined commodities, all are reported on the “Reserves Category” with an exception for diamonds. Information on the commodities reserves is sourced from published audited reports, mining companies and Department of Mines reports.

## DIAMONDS PHYSICAL STOCK UPDATES

### BOTSWANA DIAMOND RESERVE UPDATE

The Diamond reserve update for this reporting period is from Debswana operations, Karowe and Lerala mines.

### DEBSWANA MINES RESERVE UPDATES

Debswana mining company diamond reserve and resource estimates adopt the Australian Code for Reporting of Resources and Reserves (JORC code – 2012) and the South African Code for the Reporting Exploration Results, Mineral Resources and Mineral Reserves (The SAMREC Code- 2016). The definitions of the reserves used to report the Debswana operations under these codes have the same meaning as the Canadian Institute of Mining and Metallurgy (CIM) (Anglo American , ORE RESERVES AND MINERAL RESOURCES REPORT , 2019).

The two resource types are reported, the kimberlite material which is mined from in situ and the tailings mineral resource (TMR), (Anglo American , ORE RESERVES AND MINERAL RESOURCES REPORT , 2019). The company include the inferred resource in life of mine plan as the additional reserve.

The four operating mines for Debswana in Botswana include Orapa, Letlhakane, Damtshaa & Jwaneng mines. The updates for these mines are sourced from Anglo American publicly listed reports that include Debswana operations (Anglo American, 2019). The total Debswana resource estimate for 2018 & 2019 stood at 838,7 million carats (mcts) and 816 mcts respectively (table 4 and 5).

Table 4: 2018 Debswana Resource Update. Source: (Anglo American , 2019).

mcts	Reserves			Resources		Total
	Proved	Probable	Measured	Indicated	Inferred in LoM Plan	
Damtshaa		4.7		0.9	2	7.6
Jwaneng		166.6		57.8		224.4
Letlhakane				7.1	5.2	12.3
Orapa		131.2		297		428.2
<b>Total</b>		<b>302.5</b>	<b>0</b>	<b>362.8</b>	<b>7.2</b>	<b>672.5</b>
<b>TMR</b>		<b>Probable</b>	<b>Measured</b>	<b>Indicated</b>	<b>Inferred</b>	<b>Total</b>
Damtshaa						0
Jwaneng					14.7	14.7
Letlhakane		7.6			14.1	21.7
Orapa				129.8		129.8
<b>Total</b>		<b>7.6</b>	<b>0</b>	<b>129.8</b>	<b>28.8</b>	<b>166.2</b>

mcts	Reserves			Resources		
	Proved	Probable	Measured	Indicated	Inferred	Total
Kimberlite and TMR						
Damtshaa	0	4.7	0	0.9	2	7.6
Jwaneng	0	166.6	0	57.8	14.7	239.1
Letlhakane	0	7.6	0	7.1	19.3	34
Orapa	0	131.2	0	426.8	0	558
<b>Total</b>	<b>0</b>	<b>310.1</b>	<b>0</b>	<b>492.6</b>	<b>36</b>	<b>838.7</b>

Table 5: 2019 Debswana Resource Update. Source (Anglo American , ORE RESERVES AND MINERAL RESOURCES REPORT , 2019).

mcts	Reserves		Resources			
	Proved	Probable	Measured	Indicated	Inferred	Total
Kimberlite						
Damtshaa		4.2		0.8	1.9	6.9
Jwaneng		152.4		57.8		210.2
Letlhakane				7.1	5.2	12.3
Orapa		136.8		286.7		423.5
<b>Total</b>		<b>293.4</b>	<b>0</b>	<b>352.4</b>	<b>7.1</b>	<b>652.9</b>
TMR			Measured	Indicated	Inferred	Total
Damtshaa						0
Jwaneng					13.6	13.6
Letlhakane		6.6		1	13.1	20.7
Orapa				128.8		128.8
<b>Total</b>		<b>6.6</b>	<b>0</b>	<b>129.8</b>	<b>26.7</b>	<b>163.1</b>
Total	Proved	Probable	Measured	Indicated	Inferred	Total
Damtshaa	0	4.2	0	0.8	1.9	6.9
Jwaneng	0	152.4	0	57.8	13.6	223.8
Letlhakane	0	6.6	0	8.1	18.3	33
Orapa	0	136.8	0	415.5	0	552.3
<b>Total</b>	<b>0</b>	<b>300</b>	<b>0</b>	<b>482.2</b>	<b>33.8</b>	<b>816</b>

## **KAROWE MINE (LUCARA DIAMOND) RESERVE UPDATES**

Karowe Diamond Mine (KDM) resources are defined under the CIM definition Standards for Mineral Resources and Reserves (CIM 2014). The company reported about 8.32 mcts as indicated resource and 1.01 mcts as inferred resource (JDS Energy & Mining Incorporation , 2019).

According to this report, a mine plan has been developed to extract the economic portions of the indicated Mineral Resource through a combination of open pit and underground mining methods.

The mineral resource has been estimated with no allowance for mining dilution and recovery whilst the inferred resources are estimated on the basis of limited geological knowledge. This means they have a lower level of confidence on the inferred resource than that applied to an indicated mineral resource and cannot be directly converted into a mineral reserve.

## **LERALA MINE RESERVE UPDATES**

Lerala mine was placed on care and maintenance in 2015 According to the previous report (Tshoso & Sefemo, BOTSWANA MINERAL ACCOUNTS REPORT 2017/18, 2019), Lerala reserve and resource size stood at 3,253 kilocarats (kcts) of the KDL resource with 454 kcts as inferred and 2,799 kcts as indicated resource.

The total resource size for Botswana diamond mines with the available information remains at 830.60 mcts in 2019.

## DIAMONDS PRODUCING MINES IN BOTSWANA

### DIAMOND PRODUCTION STATISTICS FOR 2018 & 2019

In 2018 and 2019, diamond production was from Debswana and Karowe/Lucara mines which are currently the only diamond producing mines. Majority of production continue to be from Debswana operations. Summary of the 2018 and 2019 diamond production statistics from these two are summarised in figure 5 & 6 below.

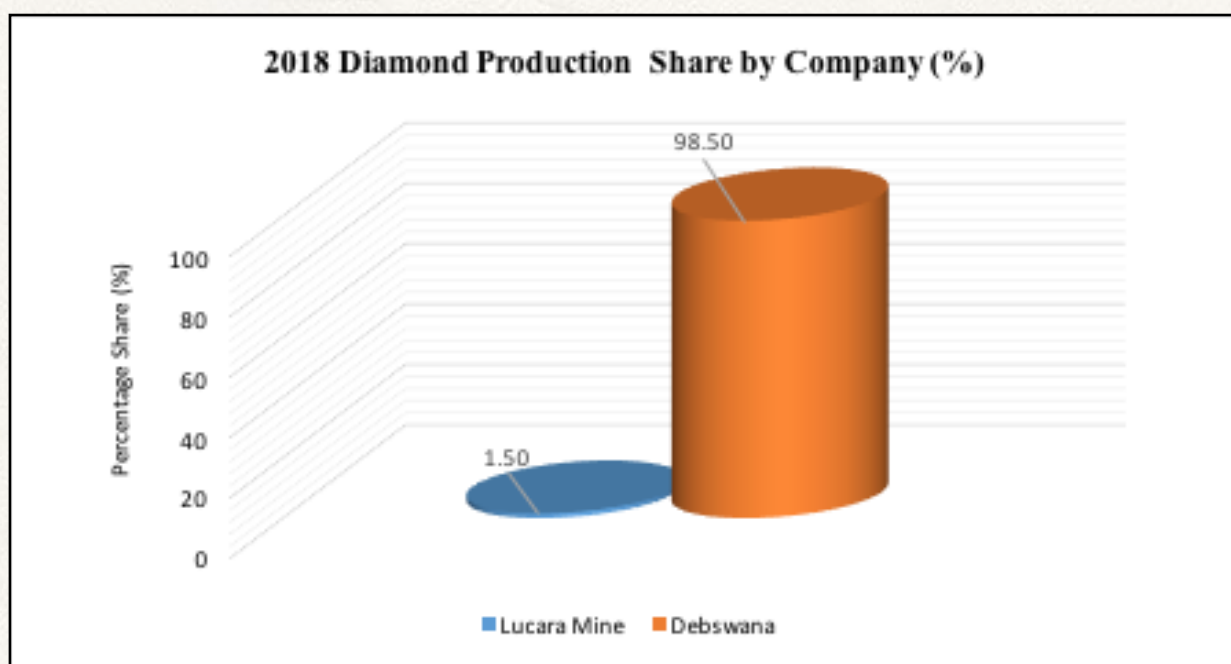


Figure 5: 2018 Botswana Diamond Production

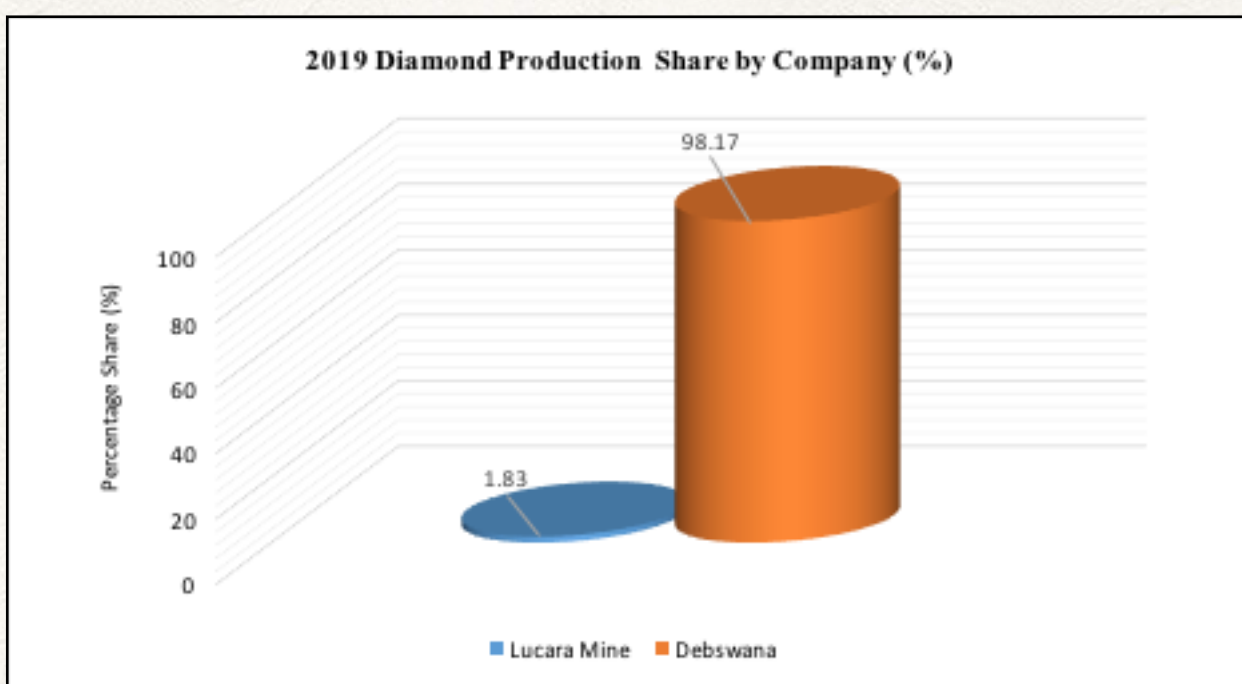


Figure 6: 2019 Botswana Diamond production



Table 6 below shares statistical datasets on diamond production for the past 7 years. The diamond production for the two other mines placed on care and maintenance in 2017 has their production profile reflected for the period of operation between 2015 and 2017.

Table 6: Diamond Production from Botswana in carats

	<b>Lucara Mine</b>	<b>Debswana Mine</b>	<b>Gem Diamonds</b>	<b>Lerala</b>
<b>2013</b>	<b>440,960</b>	<b>22,693,000</b>	-	-
<b>2014</b>	<b>420,995</b>	<b>24,237,000</b>	-	-
<b>2015</b>	<b>364,313</b>	<b>20,368,000</b>	<b>91,330</b>	
<b>2016</b>	<b>342,046</b>	<b>20,434,000</b>	<b>40,975</b>	<b>62,520</b>
<b>2017</b>	<b>249,808</b>	<b>22,663,000</b>	<b>5,420</b>	-
<b>2018</b>	<b>364,529</b>	<b>24,013,000</b>	-	-
<b>2019</b>	<b>433,014</b>	<b>23,254,000</b>	-	-

## **BOTSWANA DIAMOND LIFE OF MINE ESTIMATES**

The life of mine estimates is determined by the reserve size estimates and production profile generally on a five-year moving average. The life of mine estimate is a changing variable for mine operations determined by a number of factors like the economic conditions. The main contributing factor is the commodity price trends that affect the demand and supply of minerals which ultimately affect the company's decision to expand, invest money to justify reserves or not invest although they may be geological occurrences that can create a longer mining period.

On a long-term trend the Botswana diamond reserve sizes has generally been decreasing from 1979 until 2005. In 1979 reserves stood at 1053.1 mcts and reduced to 626.4 mcts in 2005. Thereafter the reserves gradually increased to 830.6 mcts in 2019 (Figure 7).

Botswana diamond mines currently have 38 years life of mine operations estimated using the current reserve size and the 5yma production profile.

The diamonds lifespan is most likely to increase as both Debswana and Lucara are planning to extend their operations with underground developments.

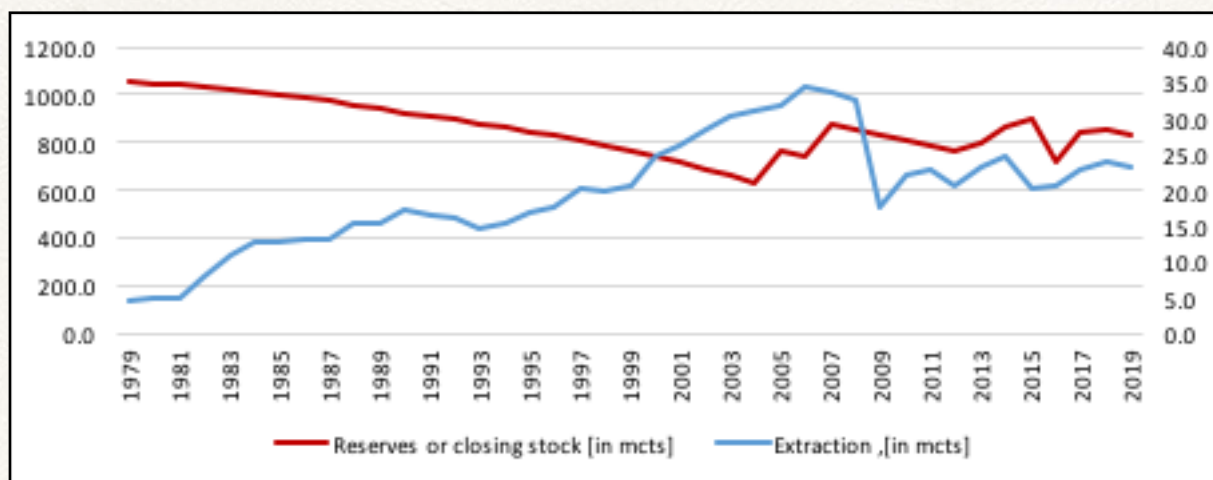


Figure 7: Botswana Diamonds Reserve size versus Life of mine estimates

## BOTSWANA COAL RESOURCE UPDATES

### BOTSWANA COAL RESERVE UPDATE

The Botswana coal resource updates are from Morupule and Minergy Coal mining companies.

Morupule Coal has a long history as the only coal mining company in Botswana dating as far back as 1979, while Minergy Coal development project was granted a mining licence in 2019.

The Minergy Coal reserve update were sourced from online published reports and the company website summarised in Table 7.

According to the company reports, the Minergy Coal resource estimate is in accordance with the SAMREC reporting code of 2016, with consideration of the South African guide to the systematic evaluation of coal resources and coal reserves (SANS10320:2004). The available geological and geophysical data were reviewed in consistency of the coal seam thicknesses and coal quality over the West Block as well as the larger Masama Coal Project Prospecting Licence area (Minergy Coal, <https://www.minergycoal.com/why-coal/>, 2021).

The coal reserve update for the two mining companies is 74.18 MT for Minergy Coal while Morupule estimated 77 MT from their 2018 report summarised in Table 8.

Table 7: Masama Coal Reserve Statement, October 2019.

Mining	Seam	Reserve Category	ROM Tonnage (Reserve (Mt))	Practical yield (%)	Saleable tonne (Mt)
Section A	A	Proved	10.842	54.40%	5.898
<b>Section A total proved</b>			10.842	54.40%	5.898
Section A	A	Probable	15.697	54.00%	8.481
	E	Probable	8.037	74.30%	5.973
Section A total probable			23.733	60.90%	14.455
<b>Section A total proved and probable</b>			34.575	58.90%	20.353
Section B	A	Proved	-	-	
Section B total proved			-	-	
	A	Probable	31.327	59.30%	18.562
	E	Probable	8.281	56.70%	4.694
Section B total probable			39.608	58.72%	23.257
<b>Section B total proved and probable</b>			39.608	58.72%	23.257
<b>TOTAL PROVED AND PROBABLE</b>			<b>74.183</b>	<b>59.37%</b>	<b>43.609</b>

Online Source: <https://www.minergycoal.com/wp-content/uploads/2020/09/Minergy-Coal-Resource-Reserves.pdf>

Table 8: Morupule Mine Coal Reserve Statement Source: Morupule Mine (as at December 2018)

Reserve Block	Proven (Mt)	Probable (Mt)	Derived from Inferred resources (Mt)	RoM Scheduled production (Mt)	Competent Person
MCM1	40	30	7	77	Mindset2014

The non-producing coal companies are not included in mineral account compilation. These await approval from the Department of mines to be granted mining licences to justify that their operations are economically mineable considering all other modifying factors.

Botswana's large coal resource base has made coal an attractive commodity for development in Botswana. Other coal resources in Botswana reported to a total of 28,180.83 Mt from 17 identified coal basins around the country are summarised in Table 9.

Table 9: Botswana Coal Resource Update, BGI ongoing work, unpublished.

Coal Fields	Botswana Geoscience Institute Coal Resource Update		
	Identified (Mt)		
	Demonstrated		Inferred
	Measured	Indicated	
Mmamabula East	2,589.90	24.2	33.9
Mmamabula East_2		243	2,119.00
Mmamabula West		892	1,541.00
Mmamabula South	2421.27		
Mmamabula Central	549.5		
Dukwi		508	414
Foley/ Sese	651	1714	2653
Serule			
Tshimoyapula			1175
Lechana		103	727
Morupule	492.13	591.25	2001.17
Morupule South	2026.08		
Mmamantswe	978	265	
Ncojane			
Bobonong			
Masama	13.12	73.21	304.01
Dutlwe/ Takatokwane		424.5	2,654.00
Sub-Total	9,721.00	<b>4,838.16</b>	<b>13622.08</b>
Total		14,558.55	<b>13622.08</b>
<b>Grand total</b>			<b>28,180.52</b>

## COAL PRODUCTION IN BOTSWANA

Morupule Coal mine production profile has increasing over the years. Production slightly reduced in 2019 from 2.4 Mt to 2.1 Mt (Figure 8).

On a five-year moving average, the company has been operating at an annual output of 2.0 Mt. Minergy coal production statistics still have to be quality checked from the year of production and will be reported into the next update.

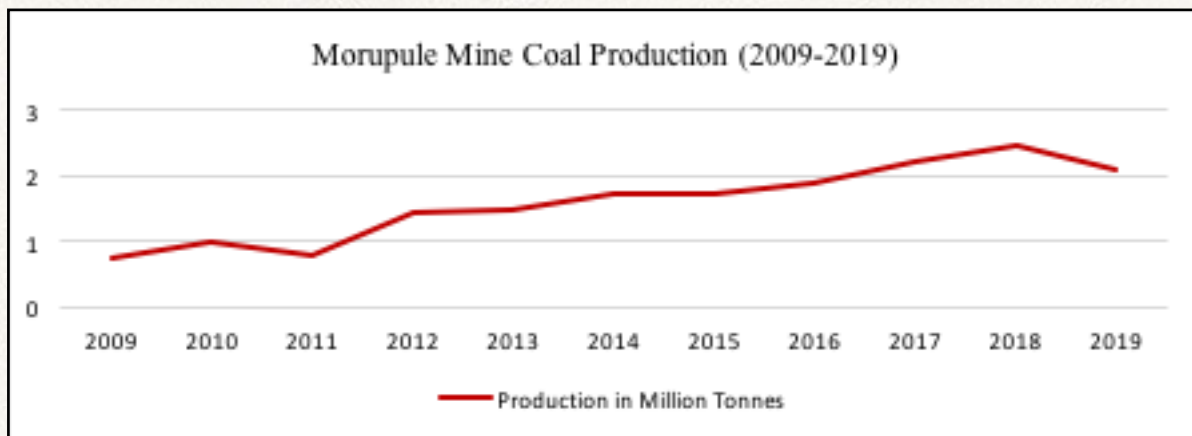


Figure 8: Morupule Coal Mine Production (2009-2019)

## OVERVIEW OF BOTSWANA COAL SALES AND EXPORTS

There are two types of coal (thermal and washed) sold to local and export markets. All of the thermal coal goes to Botswana power cooperation (BPC), mining companies (e.g BOTASH) and other consumers locally, while 79% of the washed coal is being exported. The remaining 21% of the washed coal is used by the government, parastatals, food and beverage industry and others locally.

Botswana Power Corporation consumes 89% of the thermal coal, 10% goes to BOTASH and other consumers.

As of the 2019 datasets acquired from the Department of Energy Affairs, 85% of the export goes to South Africa, followed by Zimbabwe consuming 10%, then Zambia taking about 0.44% while 4% goes to other countries.

The thermal and washed coal sales have been increasing over the years indicating that the demand for Botswana coal is increasing (Figure 9).

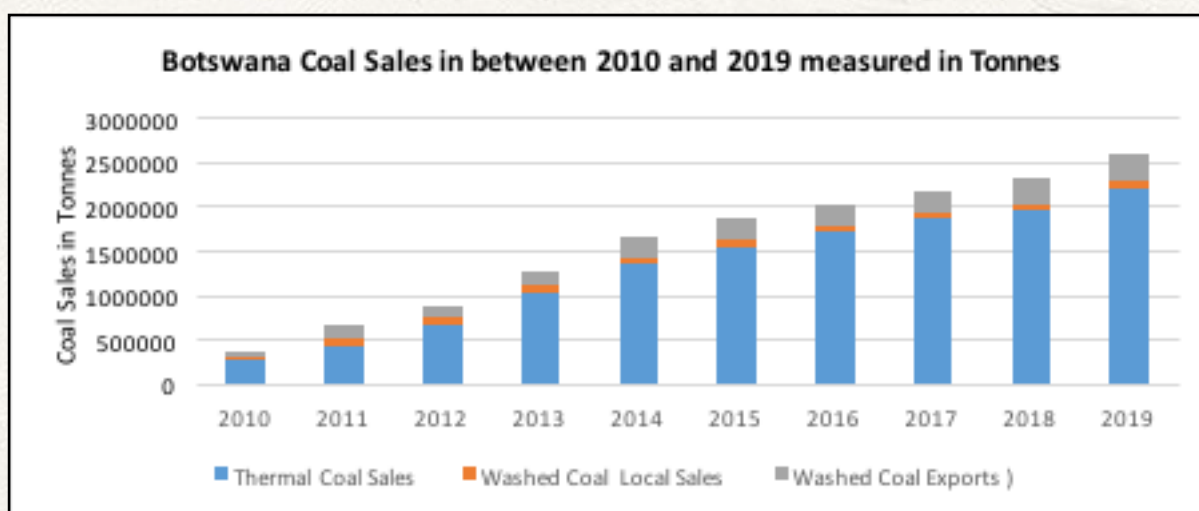


Figure 9: Botswana thermal and washed coal sales (2010-2019). Source Ministry of Energy.

The Botswana coal development is ripe for development particularly for exports as most of South African mines have reached life of mine with no significant brownfield expansion or Greenfield projects under way.

Coal still makes up 41% of global electricity generation and 29% of primary energy demand. Minergy mining company (Minergy Coal, <https://www.minergycoal.com/sales-strategy/>, 2021) argues that coal will continue to play a major role in delivering energy access and security into the future through its detailed statements as follows.

- According to The Integrated Resource Plan (2019), by 2030, almost 60% of electricity in South Africa will still be generated from coal. This will have reduced from the current level of 77%. Given that no new power stations are being built and that South Africa continues to face a very real coal-cliff, Minergy remains poised and capable of supplying coal to the southern African power generation market.
- Coal is foreseeable to stay in the near future with claims that renewable energy has been proven unreliable for base load electricity supply.
- The coal fired power generation stand above others as hydro is hamstrung by the global water shortage while nuclear is capital intensive.
- Additionally, large volume of coal is used in many industrial processes with no other practical substitutes other than being used for power generation.
- Cut back in production of coal in China will lead to increased demand of seaborne thermal coal.

So, Botswana coal has a significant role going forward to utilise the South African handling facilities presumed to be the best in Africa.

## **BOTSWANA SODA ASH AND SALT RESOURCE UPDATE**

### **BOTSWANA SODA ASH AND SALT RESERVES**

Soda ash and salt continues to be mined by Botswana Ash Limited (BOTASH Ltd) as the only producer of the commodity in Botswana. Soda ash occurs with salt in the brine. The salt is sold as a by-product although mined in large quantities than soda ash. It is unclear if the brines are replenishing or not. BOTASH Ltd confirmed a ratio of 1: 5 attributed to soda ash to salt content in the brines. The company made efforts to provide estimate for their saleable soda ash and salt reserves. In 2018, an estimate of 16.6 Mt was reported for the year-end 2017. According to this estimate, with an assumption that the reserves are depleting, the remaining soda ash reserve is 16 Mt at end of 2019. The salt volume thus remains at 80 Mt according to the soda ash and salt ratio in the brines.

## SODA ASH AND SALT PRODUCTION IN BOTSWANA

Soda ash and salt production for the period 2009 until 2019 is summarised in Figure 10. The production of soda ash on a 5-year moving average is 262,370 tonnes per annum, while salt annual production is 385,102 tonnes. The year 2018 recorded the highest for the soda ash production which recorded 297,237 tonnes. The highest salt production was observed in 2013 and 2014.

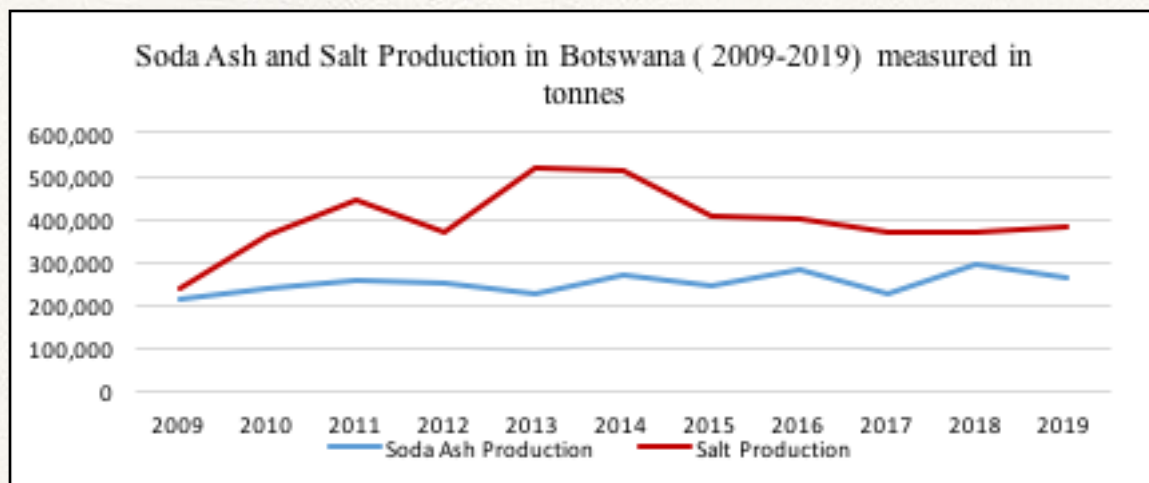


Figure 10: BOTASH Soda Ash and Salt production (2009 -2019). Source: Department of Mines Production Statistics

BOTASH exports 90% of its products to South Africa, Zambia, Zimbabwe, Malawi, Democratic Republic of Congo and Namibia (Botswana Investment and Trade Centre, 2021). BOTASH have made initiatives on beneficiating their products for value addition. The company confirmed the expansion and beneficiation plan to manufacture bicarbonate of soda, and the recommissioning of the liquid carbon dioxide plant.



## BOTSWANA GOLD RESOURCE UPDATE

### BOTSWANA GOLD RESERVES AND LIFE OF MINE ESTIMATES

Gold Resources in Botswana are found within the Tati Greenstone Belt in a north-north-west NNW striking belt of the Archean meta volcanic metasedimentary and intrusive rocks in north-western side of Botswana. The mineable gold occurrences in this area are owned by Mupane Gold mine, which has been the only gold mining company in Botswana since 2005. The mine has been an open pit operation exploiting their mining tenements namely Tau, Kwena and Tholo deposits and the remote Signal Hill, Molomolo and Golden Eagle gold deposits (MSA Group, 2011).

In 2011, Mupane mine resources were reported by MSA Geoservices which is a South African Consultancy company with competent persons using the NI 43-101 Canadian Reporting and has been the only readily available report about the mine's operations and resources. Mupane resource updates are summarised in Figure 8

Table 10: Mupane mine 2010 reserve updates. Source (MSA Group, 2011).

*MINERAL RESOURCES													
Deposit	Cut off Grade Au g/t	Measured			Indicated			Measured +Indicated			Inferred		
		Tonnes (000)	Au (g/t)	Au (000 oz)	Tonnes (000)	Au (g/t)	Au (000 oz)	Tonnes (000)	Au (g/t)	Au (000 oz)	Tonnes (000)	Au (g/t)	Au (000 oz)
Kwena	0.8	97	1.41	4	254	1.58	13	351	1.51	17	47	2	3
Golden Eagle	0.9				1805	1.98	115	1805	1.98	115	68	3.21	7
Molomolo	0.9	8	2.52	1	113	1.83	7	121	2.06	8	7	1.89	
Signal Hill	0.9	521	2.21	37	549	2.1	37	1070	2.15	74	173	2.27	13
Tau	0.8	579	3.22	60	810	2.98	78	1389	3.09	138	47	2.93	4
Tawana					122	1.8	7	122	1.78	7			
Tholo	0.8				161	2.03	11	161	2.13	11	584	2.72	51
Stockpiles		745	1.2	29				745	1.21	29			
<b>Total</b>		<b>1950</b>	<b>2.09</b>	<b>131</b>	<b>3814</b>	<b>2.19</b>	<b>268</b>	<b>5764</b>	<b>2.15</b>	<b>399</b>	<b>926</b>	<b>2.62</b>	<b>78</b>

The mine reported expansions to underground operations in 2019 and has since partnered with B2 Gold to expand gold exploration prospects targeting about one million ounces (oz) of gold resource. The company has reported over 120 exploration targets generated from soil geochemistry and aeromagnetic work (Galane Gold, 2021) .

Estimating the gold reserves for Mupane Gold using the previous reserve update by Jefferis (2016), the company remaining reserves stand at 5,275 kg of gold at the end of 2019. This estimates 6 years remaining mining life with the current production rate (Figure 11).

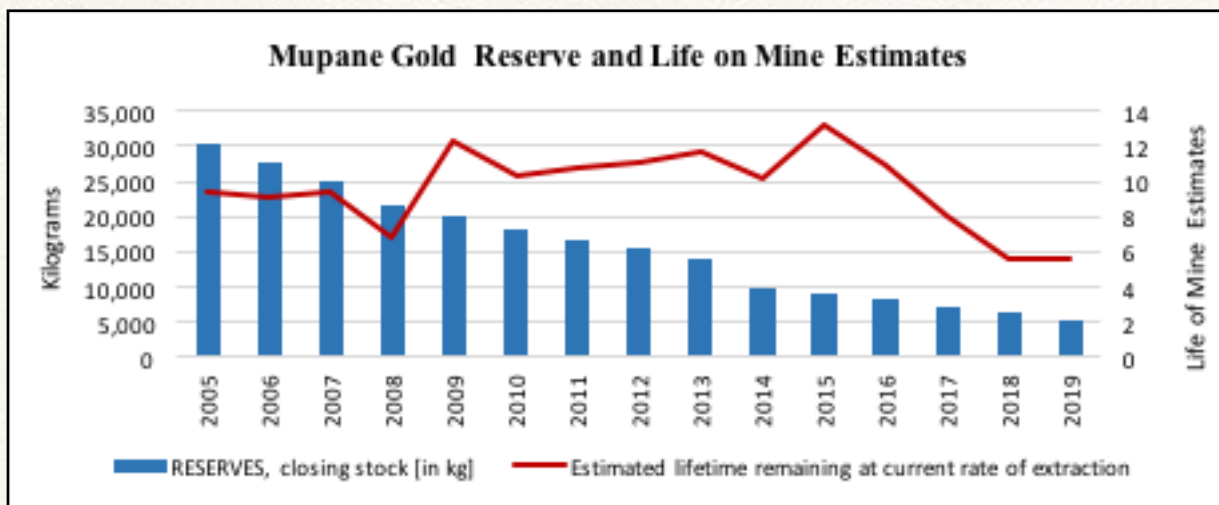


Figure 11: 2019 Mupane Gold Reserve and Life on Mine Estimates

## BOTSWANA GOLD PRODUCTION

Gold mining in Botswana started in 2005. On a five year average the gold production in Botswana has been around 880.9 kg annually, where in 2019 the saleable gold was 942.9 kg. Like other major mined commodities, gold production slightly increased in 2018. Gold mining production in Botswana recorded its highest output in 2005 when it started mining recording 3234.9kg of gold mined. Since then, gold production has been declining.

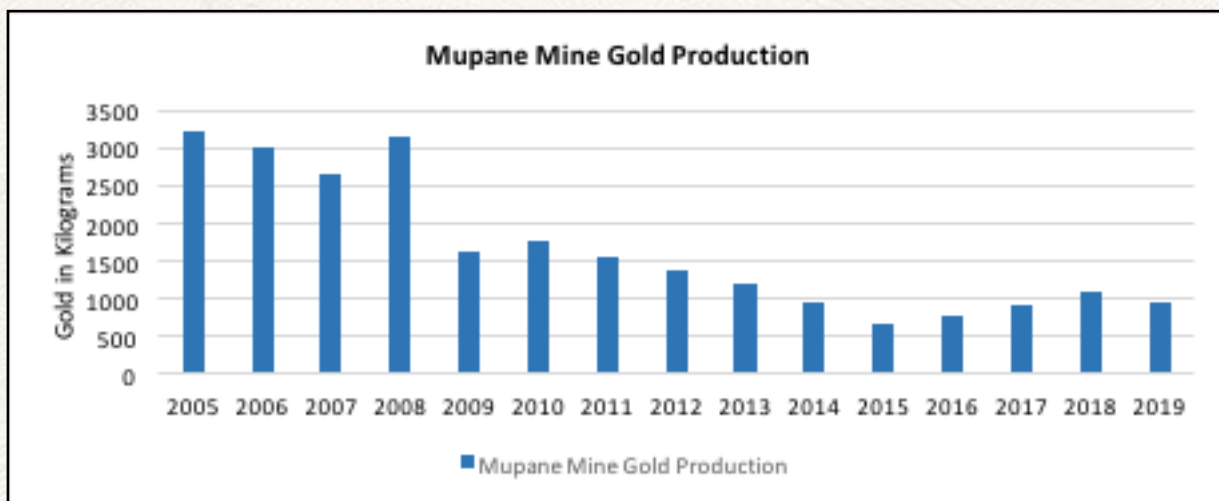


Figure 4: Mupane Gold mine production (2005-2019)

## CHAPTER THREE: MAJOR MINED MINERAL ECONOMIC VALUATIONS

The economic valuation of minerals is focused on calculating:

- The Rent generated from minerals,
- The Depletion component of rent and
- The estimated Mineral Value of the remaining mineable reserves.

The above three are critical for mineral policy recommendations and decision making in mineral development. There is an analysis of whether the mined mineral commodities are mined economically and whether the government is getting enough rents from the depletion of non-renewable resources. Jefferis (2016) argues that unless there are specific policies to recover the resource rents from mining companies, they will accrue as “Windfall Profits” or super-normal profits to mining companies with minimal benefit to the government. Windfall profits mean that mining companies are getting profits that are over and above what would normally be required to reward a mining company for the capital employed in the mining operation and the risks incurred in mining investment and operation.

In many countries including Botswana, the law states that the minerals belong to the state. Mining companies are given licenses entitling them to explore and mine for minerals, however the Government as the owner of the resource, is entitled to a return on it (Jefferis, Public Finance and Mineral Revenues in Botswana, 2016).

Other economic evaluations are made that make necessary policy recommendations. In this report, we have included the mineral rent accrual versus mineral revenue to assess the mineral tax structure in Botswana and review of royalties paid by mining companies to the government of Botswana.

### BOTSWANA MINERAL RENTS

Rent is collected as the profit above normal return on an investment due to the scarcity of minerals. This is the economic return that comes from the sale of a mineral over and above the cost of extracting the mineral, including the risk adjusted opportunity cost of capital. The formula adopted for the computation of mineral rents follow the United Nations System of Environmental Economic Accounting (SEEA) methodology. The formula is as follows:

$$\text{Resource Rent} = \text{OP} - \text{RC} - \text{FC} - \text{PT} \text{ ----- (1)}$$

Where: OP= Operating surplus, RC =Return on capital, FC= Consumption of fixed capital and PT = other taxes on production (adopted from Jefferis, 2016).

The rents are acquired from various taxes that include royalty payments, profit taxes and withholding tax on remitted dividends. In this report, the mineral rents are calculated until 2019. The mineral rent calculations are determined by parameters from equation 1 which are actual values provided by mining companies except for the internal Rate of Return on Capital (RoRC) which is estimated. This parameter has a greater effect on the rent value estimations if understated or overstated. This rate is perceived by the level of risk for operating mines.

The mineral accounts valuations are not made at company operational level, hence the report adopts the globally accepted rate of return on invested capital for mining companies. The report has used 15% on all commodities except for coal that has adopted 10% RoRC due to its low perceived level of risk in Botswana. Majority of Botswana coal has a guaranteed demand on electricity usage locally leading to a low demand-supply risk.

The capital stock datasets collected from the Statistics Botswana slightly changed in 2019. The GDP was rebased using the latest International Standard Industrial Classification of All Economic activities (ISIC Rev 4). Due to this effect, rent estimates for the major mined commodities may differ from previous reports.

The mineral rent estimations are done at both current and constant prices. The constant prices are most preferred, as the values have been adjusted for inflation. The major mined mineral rents for the past 10 years for all major mined resources is summarised in Figure 11.

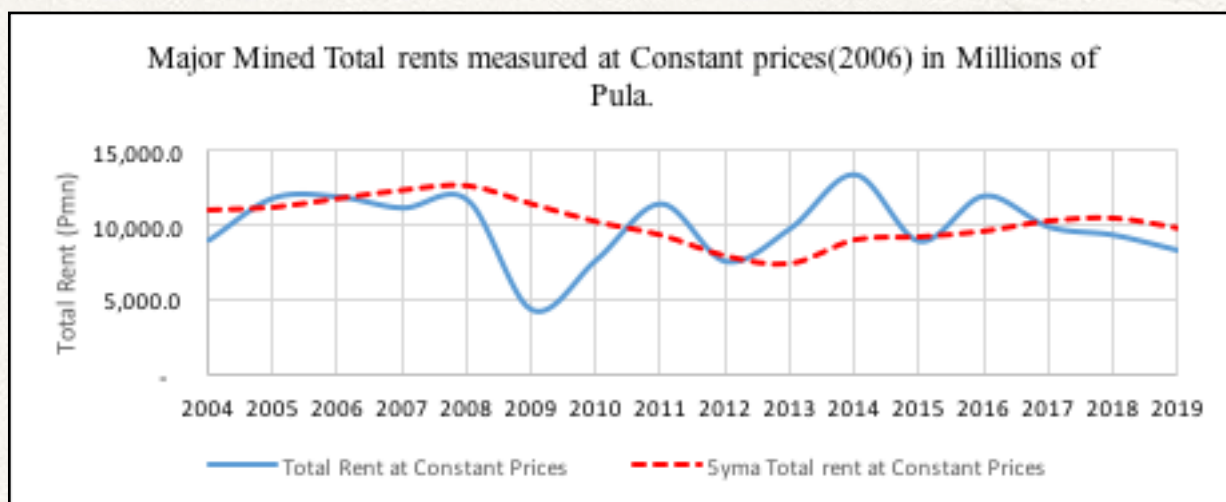


Figure 11: Total mineral rent and Syma total rent measured at constant prices (2006), for Diamonds, Coal, Gold and Soda Ash & salt. Authors Calculations .

The total mineral rents averaged on a 5-year moving trend measured at constant prices show that Botswana mineral rents have been quite volatile. Major declines are observed in 2009, 2012, 2015 and 2019. As Botswana is highly reliant on diamond export revenues, these declines are mostly contributed to the changing demand of both rough and polished diamonds internationally. Since 2016, there has been a 30% reduction in total rents until 2019. This implies mineral revenues has been declining.

Majority of diamond production which are principal exports for Botswana are from Debswana which is controlled by Anglo American (Anglo American, Ore Reserves and Mineral Resources Report 2019, 2019). Therefore, Debswana mine production plans is heightened in line to the changes with international market demands. According to Anglo American Reports, 2012 was a year of heightened commodity prices volatility and commodity price weakness. The slowdown in Chinese demand which was magnified by destocking activity which was a principal factor in the market's commodities including others like iron ore, copper and platinum which are part of Anglo-American assets.

According to the De Beers group Reports (De Beers Group, 2019), production of diamonds in Botswana in 2019 was 4% lower at 23.3 million carats (2018: 24.1 million carats). Production at Jwaneng increased by 5% to 12.5 million carats (2018: 11.9 million carats) as throughput rose to partly offset a 12% decrease at Orapa to 10.8 million carats (2018: 12.2 million carats), owing to a delay in an infrastructure project and expected lower grades. Globally a 13% decline in production was observed in response to weaker demand, with the business being impacted by mining cost inflation in southern Africa, unit cost increases limited to 5%.

The capital stock data show that the diamond industry in Botswana observed a 3% increase in salaries from 2014 onto 2015, a 26% decrease of total gross output and 25% decrease in total operating surplus in 2015. In 2019, salaries also increased by 4% with about 3% & 4% decrease in total gross output & total operating surplus respectively. All of these resulted in reduced mineral rents to the Government of Botswana that declined by 33% in 2012 from 2011, 31% decrease in 2015 from 2014, and 10% decrease in 2019 from 2018 estimated rent values. This was highly affected by decline in production due to slow demand of diamonds globally. In 2012, production dropped from 22.9 to 20.6 million carats while in both 2015 and 2019, production also declined from 24.7 to 20.4 mcts and 24.0 to 23.3 mcts respectively.

## **THE IMPACT OF THE RATE OF RETURN ON CAPITAL (RORC) ON RESOURCE RENTS**

RoRC is conceptually part of the costs of production but is not normally calculated and published as part of financial accounts. In choosing an appropriate RoRC, a trade-off needs to be made between simplicity and accuracy. The appropriate RoRC may vary across time and projects. A new mining projects may have a higher RoRC while a mature mining project with little geological uncertainty and stable offtake agreements may preferably have a lower RoRC. For present purposes, simplicity is favoured, a single RoRC of 15% is used for all commodities except coal, where the rate is 10%. This should not be overlooked as the rent calculation is more sensitive to the assumed RoRC. This is observed in coal valuations. Attention is paid to coal because its rent valuations have been constantly negative although significant amount of royalty payments has been made to the government of Botswana. The varied rent estimations calculated using various RoRC (0%,5% and 10%) is shown on Table 12, to 14 below to show sensitivity of this parameter.

Table 12: Coal Mineral Rent Estimations at 0% RoRC

Values in Million Pula	Gross Output	Value added at basic prices (current prices)	Compensation of employees	Operating surplus, gross	Consumption of fixed capital	Capital stock	Return on capital stock at 0%	Mineral Rent Estimations
2009	100.1	55.4	40.2	15.2	23.6	434.1	0.0	-8.5
2010	142.8	39.7	49.9	-10.2	33.3	702.4	0.0	-43.5
2011	160.4	24.9	67.1	-42.2	85.3	1390.2	0.0	-127.6
2012	321.2	245.7	86.8	158.9	215.2	1448.5	0.0	-56.3
2013	615.1	495.6	101.1	394.6	179.5	1470.9	0.0	215.1
2014	423.7	182.1	122.1	60.1	250.5	1564.4	0.0	-190.4
2015	577.3	347.2	156.3	190.9	223.5	1166.5	0.0	-32.6
2016	542.9	335.8	165.2	170.6	206.1	984.5	0.0	-35.5
2017	684.4	471.9	185.7	286.2	190.9	977.1	0.0	95.2
2018	840.6	499.5	205.3	294.2	185.0	969.8	0.0	109.2
2019	736.7	411.5	212.1	199.5	211.1	956.9	0.0	-11.7

Table 13: Mineral Rent Valuations at 5% RoRC

Values in Million Pula	Gross Output	Value added at basic prices (current prices)	Compensation of employees	Operating surplus, gross	Consumption of fixed capital	Capital stock	Return on capital stock at 5%	Mineral Rent Estimations
2009	100.1	55.4	40.2	15.2	23.6	434.1	21.7	-30.2
2010	142.8	39.7	49.9	-10.2	33.3	702.4	35.1	-78.6
2011	160.4	24.9	67.1	-42.2	85.3	1390.2	69.5	-197.1
2012	321.2	245.7	86.8	158.9	215.2	1448.5	72.4	-128.7
2013	615.1	495.6	101.1	394.6	179.5	1470.9	73.5	141.5
2014	423.7	182.1	122.1	60.1	250.5	1564.4	78.2	-268.7
2015	577.3	347.2	156.3	190.9	223.5	1166.5	58.3	-90.9
2016	542.9	335.8	165.2	170.6	206.1	984.5	49.2	-84.7
2017	684.4	471.9	185.7	286.2	190.9	977.1	48.9	46.4
2018	840.6	499.5	205.3	294.2	185.0	969.8	48.5	60.7
2019	736.7	411.5	212.1	199.5	211.1	956.9	47.8	-59.5

Table 14: Mineral Rent Valuations at 10% RoRC

Values in Million Pula	Gross Output	Value added at basic prices (current prices)	Compensation of employees	Operating surplus, gross	Consumption of fixed capital	Capital stock	Return on capital stock at the chosen 10%	Mineral Rent Estimations <sup>a</sup>
2009	100.1	55.4	40.2	15.2	23.6	434.1	43.4	-51.9
2010	142.8	39.7	49.9	-10.2	33.3	702.4	70.2	-113.8
2011	160.4	24.9	67.1	-42.2	85.3	1390.2	139.0	-266.6
2012	321.2	245.7	86.8	158.9	215.2	1448.5	144.9	-201.1
2013	615.1	495.6	101.1	394.6	179.5	1470.9	147.1	68.0
2014	423.7	182.1	122.1	60.1	250.5	1564.4	156.4	-346.9
2015	577.3	347.2	156.3	190.9	223.5	1166.5	116.6	-149.2
2016	542.9	335.8	165.2	170.6	206.1	984.5	98.4	-133.9
2017	684.4	471.9	185.7	286.2	190.9	977.1	97.7	-2.5
2018	840.6	499.5	205.3	294.2	185.0	969.8	97.0	12.2
2019	736.7	411.5	212.1	199.5	211.1	956.9	95.7	-107.3

The coal mining sector need to be thoroughly analysed and appropriate policy messages need to be drawn. This is because growth is observed, where Minergy Coal mining have started production increasing Botswana’s total output to Morupule mine company which has been the only coal mining company for so many years. Morupule mine has also declared expansion plans going into underground operations. Coal is also receiving pressure on the climate change issues being identified a polluting fossil fuel energy.

Diamonds rents contributes largely constituting about 97% of the total rents, followed by soda ash mining taking about 3%. Gold mining rents started being negative from 2014 until 2019.

## BOTSWANA MINING REVENUE VERSUS MINERAL RENTS

Mineral rents generally are a special characteristic that distinguishes minerals from most of the produced goods and services in an economic system. It represents the economic income that comes from the scarcity of minerals. Other economic commodities derive income from the productivity of either capital or labour (African Natural Resource Centre , 2016).

Mineral revenues on the contrary are accrued from dividends, royalties, and mineral taxes-taxes on profits and withholding taxes levied on mining companies. The Botswana mineral revenues generally have been declining as compared to the non-mining revenues from 2005 until 2019.

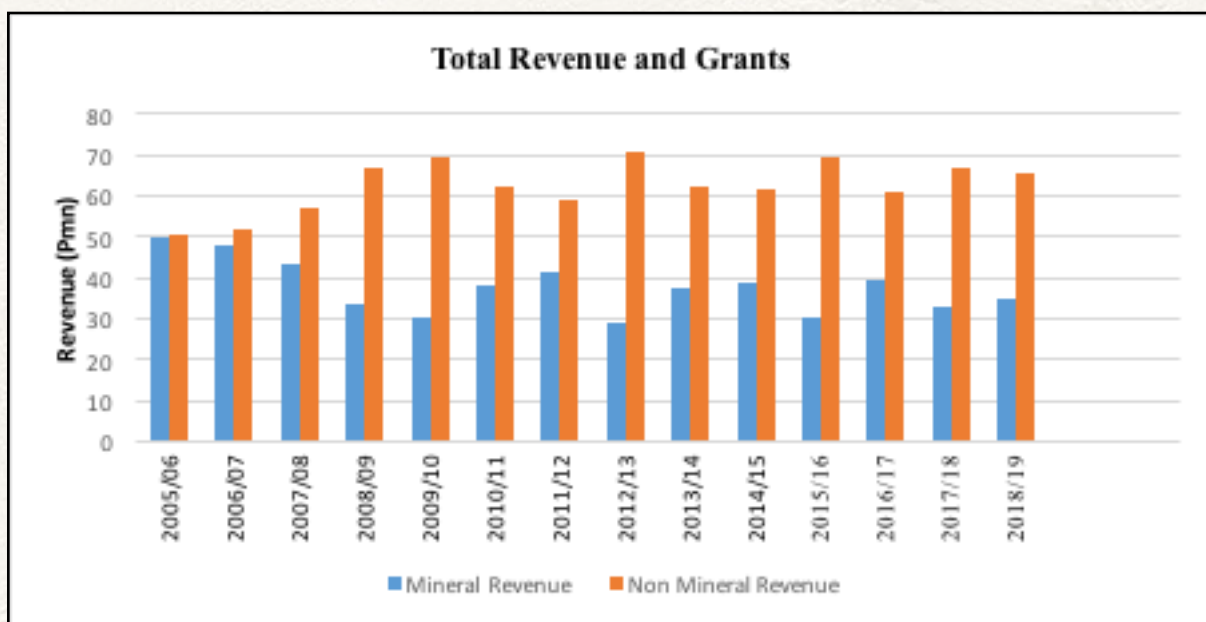


Figure 12: Mining and Non mining revenue for Botswana in total revenue and grants (2005/06 -2018/19)

The growth of the non-mining sector is a good indication of diversification efforts if not overshadowed by decline in mining sector performance. Critical questions remain for mineral policy on how mining sustainability can be achieved and secondly the public policy to identify where the majority of mineral export earnings can be appropriately invested for sustainable growth.

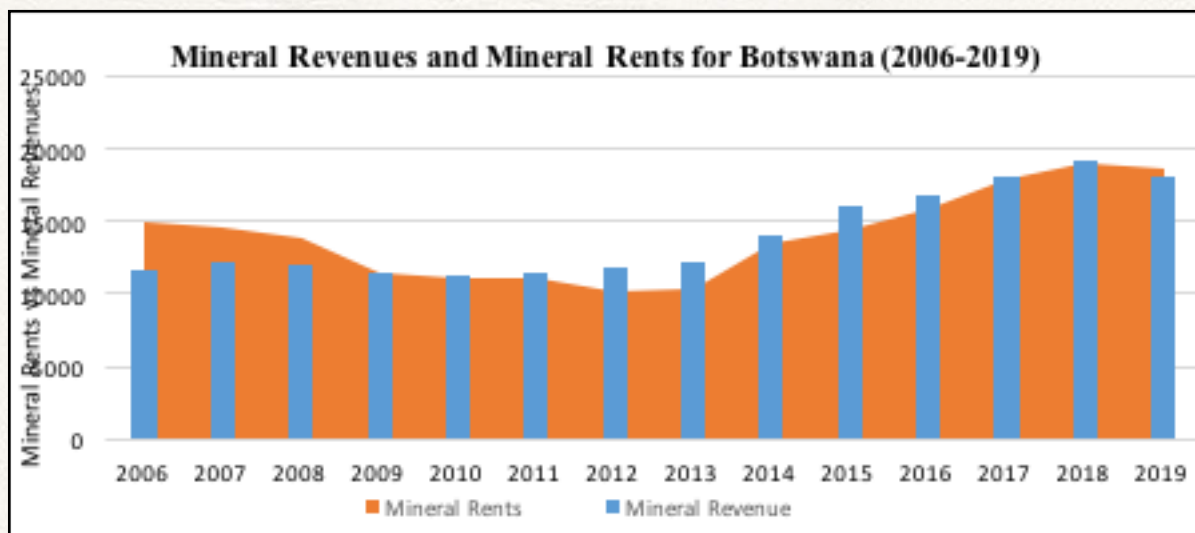


Figure 13: Mineral Rents versus Mineral Revenues (2006-2019).

The mineral revenues captured are almost equal to the expected mineral rents. This is an indication of a good mineral policy tax structure. The mineral rents in this comparison are presented at current prices.

## THE BOTSWANA MINERAL ECONOMIC VALUE

The mineral economic values are estimated using mineral rents. The economic value of the resource stock is calculated as the rent per unit of the stock times size of the stock. The valuation corresponds to the Net Present Valuation method (NPV) and assumes the resource rent will rise at an equal rate of discount. The discount rate accounts for the time value of money and a 10% rate has been used for all valuations. The estimated mineral economic values for the four major mined commodities in the 2018/19 reporting period are summarised in Figure 15.

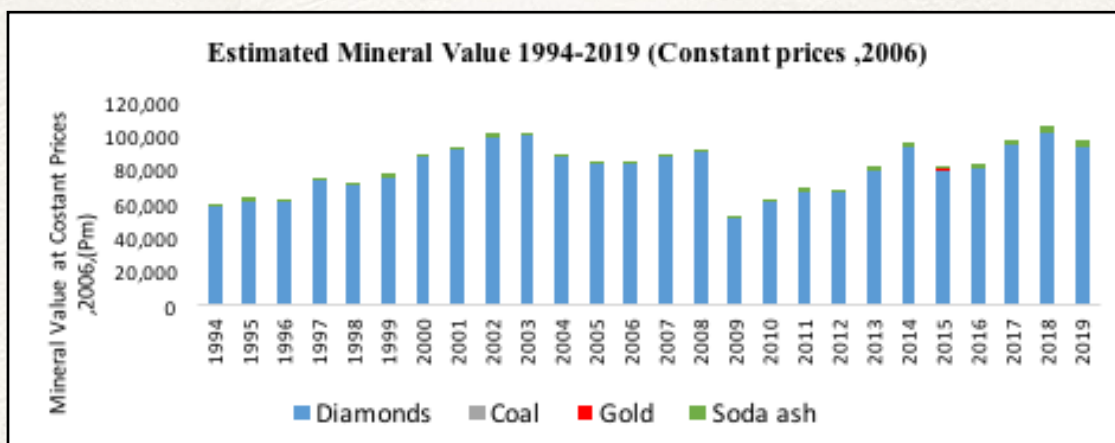


Figure 14: Botswana Mineral Economic Values.



Majority of the expected economic returns are from diamond mining, followed by soda ash and salt. The economic values of gold resources turned uneconomic due to the estimated negative rents. The same applies for coal, which has had negative rents except for 2013 and 2018 in the period between 1994 until 2019. The mineral value estimation makes use of the discounted net present value which estimate a positive value or zero if negative. In most periods coal values have been estimated to be zero.

## MINING SECTOR EXPORT EARNINGS

Diamond exports constitutes majority of the Botswana mining exports followed soda ash and salt sales. Soda Ash & salt surpassed the gold export earnings from 2012 until 2019, making gold the third mining export earner in Botswana according to the datasets provided by Statistics Botswana. Table 15 below provides a summary of the Botswana mining export earnings from 2005 until 2019.

Table 15: Botswana Mining export Value (2005-2019), excluding coal. (Statistics Botswana, 2020).

Exports (Million Pula)	Diamonds	Copper Nickel	Soda Ash and Salt	Gold	Total Mining
2005	17,450	2,487	123	138	20,198
2006	18,344	3,972	108	207	22,631
2007	18,609	6,789	473	239	26,110
2008	20,793	6,240	505	382	27,921
2009	15,234	3,735	526	270	19,764
2010	21,946	4,267	506	461	27,180
2011	33,708	2,991	522	525	37,746
2012	34,435	3,551	645	618	39,249
2013	55,367	4,747	723	451	61,289
2014	65,328	4,392	862	361	70,943
2015	52,730	3,790	924	283	57,727
2016	70,781	2,631	939	344	74,695
2017	55,904	41	970	383	57,298
2018	60,411	0	885	446	61,742
2019	51,010	0	561	437	52,007

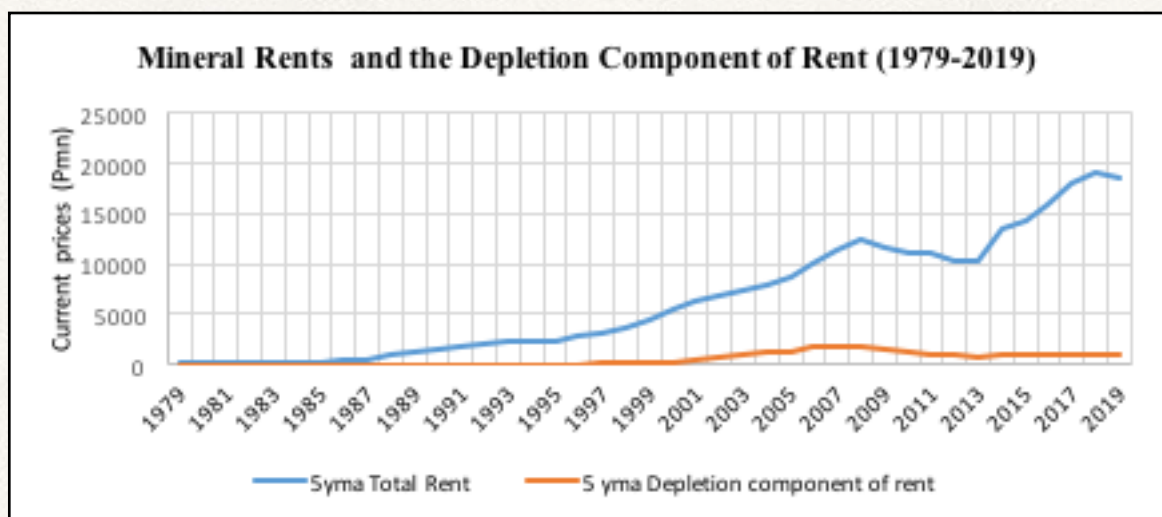
Coal has not been included on table 15, as there was no available data. Copper nickel is included until 2016 although not reported for this 2018/19 reporting period. This is simply because there was no mining from the previous copper nickel mine after being liquidated from 2016.

## DEPLETION COMPONENT OF RENT

The depletion component of rent is calculated using the resource rent and estimated life of mines of the operating mines. It is calculated using the following formula:

$$\text{Depletion Component of Rent} = \frac{\text{Resource Rent}}{(1 + \text{chosen discount rate})^{\text{lifetime of the mineral deposit}}}$$

In principle, when the depletion component of rent gets larger when the remaining lifetime of the deposit gets shorter.



The depletion component of rent for Botswana major mined minerals have been declining since 2009 until 2019. The mineral rents were quite volatile at this period where they dropped drastically in 2012 and 2015. Another effect of the decreasing depletion component of rent is that most mines have a longer mine life particularly soda ash mining (61 years), followed by coal (43 years), then diamonds (38 years) and finally gold that reports 6 years remaining life of mine.

## CHAPTER 4.0 CONCLUSIONS

The following conclusions can be drawn from the 2018/19 update.

- The mining sector that defined Botswana as a resource led economy for many years, have presented a different growth model where its contribution to total GDP has been surpassed by three other industries (Total Wholesale and Retail Trading from 2011, Total Finance and Business Services and General Government from 2015).
- The Botswana mining sector continues to be dominated by diamond export earnings constituting about 98% of total export earnings which exposes the economy to external shocks. In 2019 diamond sales decreased by 49% from 2018 in terms of value recording about 2.6 billion Pula as compared to the 2018 sales that recorded about 5.1 billion Pula. This

was attributed to the Corona virus pandemic which slowed the demand for diamonds in the international markets. Soda Ash export earnings are second best after diamond mining followed by coal and gold.

- Botswana major mined commodities Mineral Rents measured at constant prices have been quite volatile. Major declines are observed in 2009, 2012, 2015 and 2019 due to weakened demands of diamonds, operational challenges and price volatilities in the diamond sector, which contribute, largely to Botswana mineral rents. The declined performance of the year 2019 was also added to the emergence of Covid 19 pandemic leading to a slow demand of diamonds and decline in output for almost all mineral commodities.
- Coal had negative rents for a longer time, and gold also observed negative rents from 2013. Although these two had negative rents yielding the negative economic values, the two has contributed to mineral royalties earned. Coal contributed 26.6 million pula of Royalties in 2019, while gold contributed 20.15 million Pula.
- Botswana coal development is ripe for development particularly for exports as most of South African mines have reached life of mine with no significant brownfield expansion or Greenfield projects under way.
- In 2019, majority of major mined commodities transitioned to underground operations. These include Debswana diamond mine, Lucara mine, Mupane Gold Mine and Morupule Coal mine.
- Prospecting activities in Botswana is growing, in 2019 it contributed 785.6 million Pula as compared to 2009 where it stood at 406.1 million pula in terms of contribution to total GDP.
- The depletion component of rent for Botswana major mined minerals have been declining since 2009 until 2019. This depicts a longer mining life for most operations.
- Majority of the expected economic returns are from diamond mining, followed by soda ash and salt. Gold mineral rents turned negative since 2014 until 2019, and this has made the economic values of gold resources to be negative. The same applies for coal, which has had negative rents except for 2013 and 2018 in the period between 1994 until 2019.
- The growth of the non-mining sector is a good indication of diversification efforts if not overshadowed by decline in mining sector performance. Critical questions remain for mineral policy on how mining sustainability can be achieved and secondly the public policy to identify where the majority of mineral export earnings can be appropriately invested for sustainable growth.
- The Botswana mining industry need to diversify to other minerals that are not highly affected by global shocks and improve local usage of mined minerals. In addition, the government need to intensify the coal development strategies from energy to other uses observing their environmental impacts.

## CHAPTER 5: POLICY MESSAGES

The mineral accounts report is to assess the relevant policy messages that will address sustainable development issues and growth for Botswana. The policy messages for the government of Botswana drawn from this report are as follows:

- 1. Botswana need to explore diversification in twofold:**
  - a. Diversification in Mining:** Growth of the industrial minerals have proved to add significant value to the mining revenue basket. Diversifying mining from diamonds will not only add value but will cushion promote mining sustainability and cushion the nation from global external shocks.
  - b. Diversification in the whole economy:** Botswana need a diversified export base to avoid extreme global shocks affecting the economy due to reliance on diamonds export earnings. Research to promote a forward backward linkage among different sector to identify sectors that can stimulate economic performance are needed, especially with many strategies implemented by the government yet observing a slow pace of economic transformation.
- 2. The legislation or mineral policy should ensure that sustainable mining is core where the environmental issues at the rise of climate change issues and concerns on employment creation in the sector should be paid attention to.**
- 3. Research needs to be done to assess the future for diamond mining in Botswana:**
- 4. The coal mining sector need to be thoroughly analysed and appropriate policy messages need to be drawn.** This is because growth is observed, where Minergy Coal mining have started production increasing Botswana's total output to Morupule mine company which has been the only coal mining company for so many years. Morupule mine has also declared expansion plans going into underground operations. However, the coal beneficiation plans for Botswana has been motivated by the government but are being delayed. The carbon footprint issues for coal mining and usage should be assessed from current usage to other development areas of beneficiation proposed by the government.
- 5. The beneficiation strategies for mined commodities e.g coal and soda ash mining need to be enacted:** Botswana has reached a point where the need for downstream activities is critical for value addition. The government need to address the beneficiation of minerals through different lenses of policy and legislation.
- 6. The Botswana mining tax policy need to accommodate downstream beneficiation to urge companies** not to export raw materials.

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