

Data Analysis, Tools, and Visualization for Mining Data

Objective: By the end of this session, participants are able to access and use online mining data tools, and apply basic techniques to interpret and visualize the data following best practices



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Agenda

- Data driven decision making
- Steps in data analysis
- Accessing data using various online portals and tools
- Basic exploratory data analysis techniques
- Best practices data visualization



Why data-driven decision making in mining governance?

- Helps us track social, environmental, and economic impacts of mining on communities;
- Enhances compliance and monitoring of mining company's performance and adherence to the law;
- Informs government policies, program and project design of development projects, and public debate;
- Builds trust among stakeholders and reduces misunderstanding.



How to use and analyze data in mining governance?

1. Step 1: Ask a question
2. Step 2: Collect data
3. Step 3: Examine the data
4. Step 4: Share data



Step 1: Ask a question?

1. How much was the mineral sales and excise tax on minerals in 2022?
2. How much is the budget for education and health under the SDMP for 2019-2023?
3. How much is the allocation and actual spending on EPEP?
4. Did the LGU receive their shares from the national wealth from mining?



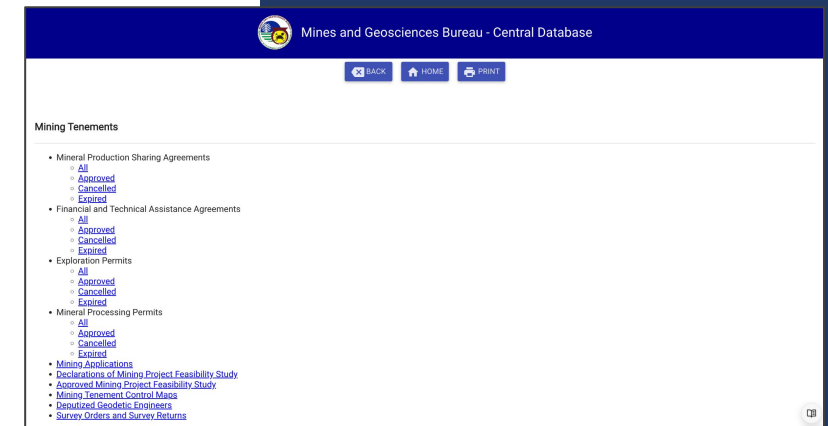
Step 2: Where to access data on mining?

1. MGB website and Database Portal
2. Philippine EITI EDGE and Contracts Portal
3. BLGF dataset
4. DILG Full Disclosure Policy Portal
5. DBM ENR Portal
6. DISCLOSE and PREDIC Tool



Introduction to the MGB Website and Database Portal

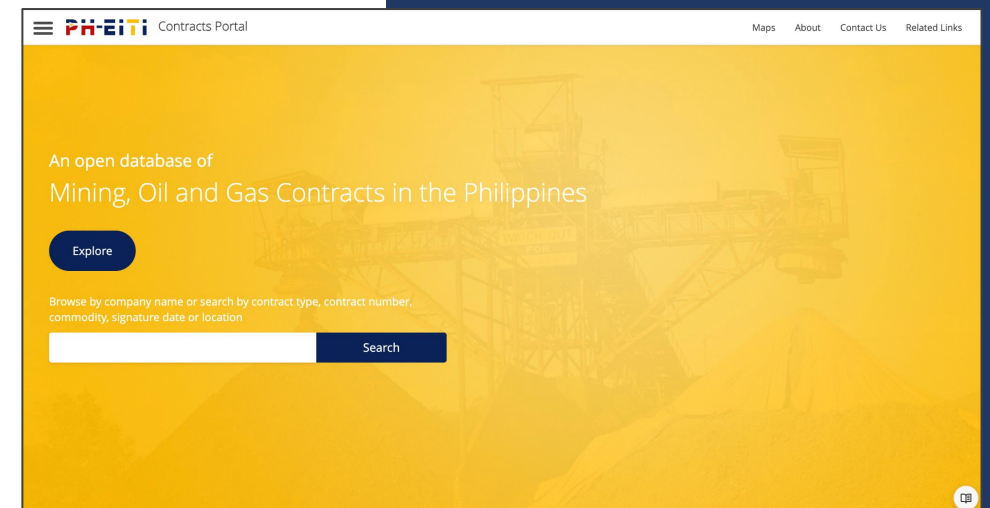
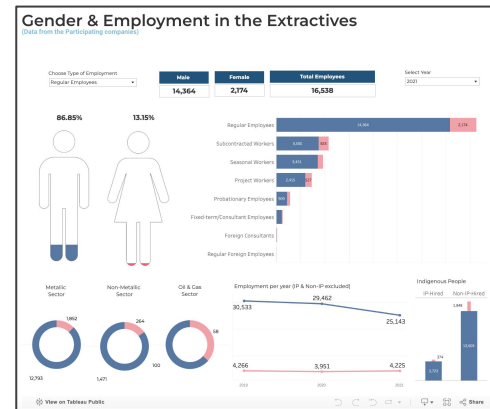
- **MGB Mineral Statistics:** Production, sales, employment, payments to government and more. Link: <https://mgb.gov.ph/2015-05-13-01-44-56/2015-05-13-01-47-51>
- **MGB Database Portal:** Data from various divisions including Mining Tenements Division, Mine, Safety, Health and Environment Division and more. Link <http://databaseportal.mgb.gov.ph/#/public>



Introduction to the PH-EITI EDGE and Contracts Portal



- **PH-EITI EDGE:** Data on payments, social and environmental expenditures, employment and more. Link to the portal: <https://pheiti.dof.gov.ph/edge/>
- **PH-EITI Contracts Portal:** Contracts of mining companies and other documents. Link to the portal: <https://contractspheiti.dof.gov.ph/>



Introduction to the BLGF Statistics and ENR dataset

- **BLGF Statistics Page:** data on shares from national wealth, grants and donations, utilization of collection and shares, and more.

Link to the webpage:

<https://blgf.gov.ph/lgu-fiscal-data/>



A screenshot of the BLGF Statistics Page. The page has a blue header with the BLGF logo, the text "REPUBLIC OF THE PHILIPPINES DEPARTMENT OF FINANCE BUREAU OF LOCAL GOVERNMENT FINANCE", and the date "Wednesday, October 16, 2024 5:58:29 AM" and source "PAGASA". Below the header is a navigation bar with "HOME / STATISTICS". The main content area is titled "Statistics" and contains a list of links under the heading "I. Latest Annual Local Finance Data". The links are: "A. Statement of Receipts and Expenditures (SRE)", "B. Annual Regular Income (ARI) and Dependencies", "C. Environment and Natural Resources (ENR) Data", and "D. Real Property Assessment Reports (RPAR)". Under "C. Environment and Natural Resources (ENR) Data", there are five sub-links: "a. FY 2022 – ENR Data by LGU – General Collections", "b. FY 2022 – ENR Data by LGU – Shares from National Wealth", "c. FY 2022 – ENR Data by LGU – Grants and Donations", "d. FY 2022 – ENR Data by LGU – Corporate Programs and Projects", and "e. FY 2022 – ENR Data by LGU – Utilization of Collections and Shares". On the right side of the page is a sidebar titled "ANNOUNCEMENTS" with a list of news items, including "BLGF Indicators for the 2024 Seal of Good Local Governance (SGLG) Assessment of th...", "BLGF Indicators for the 2023 Seal of Good Local Governance (SGLG) Assessment of th...", "BLGF reminds local treasurers on assessment of local taxes, fees and charges", "BLGF sets FY2020 collection target of local treasurers at Php307.08B", "Conduct of Continuing Professional Development (CPD) Courses: Skills...", "Conduct of Continuing Professional Development (CPD) Courses: Skills...", and "School Assignment and Important Reminders for BCLTE and ICLTE on October 14, 2018".

Introduction to the DILG Full Disclosure Policy Portal

- **DILG FDPP:** disaggregated data receipts and expenditures, utilization of 20% development fund, and more. Link to the portal: <https://fdppv2.dilg.gov.ph/document>
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FULL DISCLOSURE POLICY PORTAL v.2

Advancing Transparency. Promoting Accountability.

UPLOADED DOCUMENTS

SEARCH

[Click here for advanced search](#)

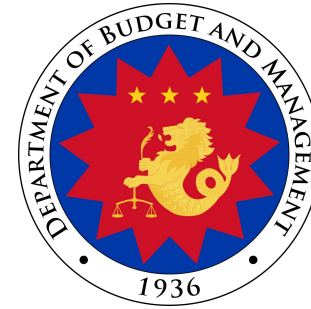
Show 10 entries

LGU	DOCUMENT TYPE	PERIOD	STATUS	DESCRIPTION
REGION VII CEBU TOLEDO CITY	STATEMENT OF RECEIPTS AND EXPENDITURES	YEAR 2023	REQUIRED • SUBMITTED	1> Toledo City Sports Center Full Disclosure Bulletin 2> Toledo City Public Market Full Disclosure Bulletin 3> City Hall Full Disclosure Bulletin
REGION VII CEBU TOLEDO CITY	ANNUAL GENDER AND DEVELOPMENT ACCOMPLISHMENT REPORT	YEAR 2023	REQUIRED • SUBMITTED	1> Toledo City Sports Center Full Disclosure Bulletin 2> Toledo City Public Market Full Disclosure Bulletin 3> City Hall Full Disclosure Bulletin
REGION VII CEBU TOLEDO CITY	SUPPLEMENTAL PROCUREMENT PLAN	YEAR 2023	REQUIRED • SUBMITTED	1> Toledo City Sports Center Full Disclosure Bulletin 2> Toledo City Public Market Full Disclosure Bulletin 3> City Hall Full Disclosure Bulletin
REGION VII CEBU TOLEDO CITY	ANNUAL PROCUREMENT PLAN OR PROCUREMENT LIST	YEAR 2023	REQUIRED • SUBMITTED	1> Toledo City Sports Center Full Disclosure Bulletin 2> Toledo City Public Market Full Disclosure Bulletin 3> City Hall Full Disclosure Bulletin

Introduction to the DBM National Wealth Portal

- **DBM National Wealth Release Portal:** data on payments collected by company, computation of shares from national wealth, year released, and more. Link to the portal:

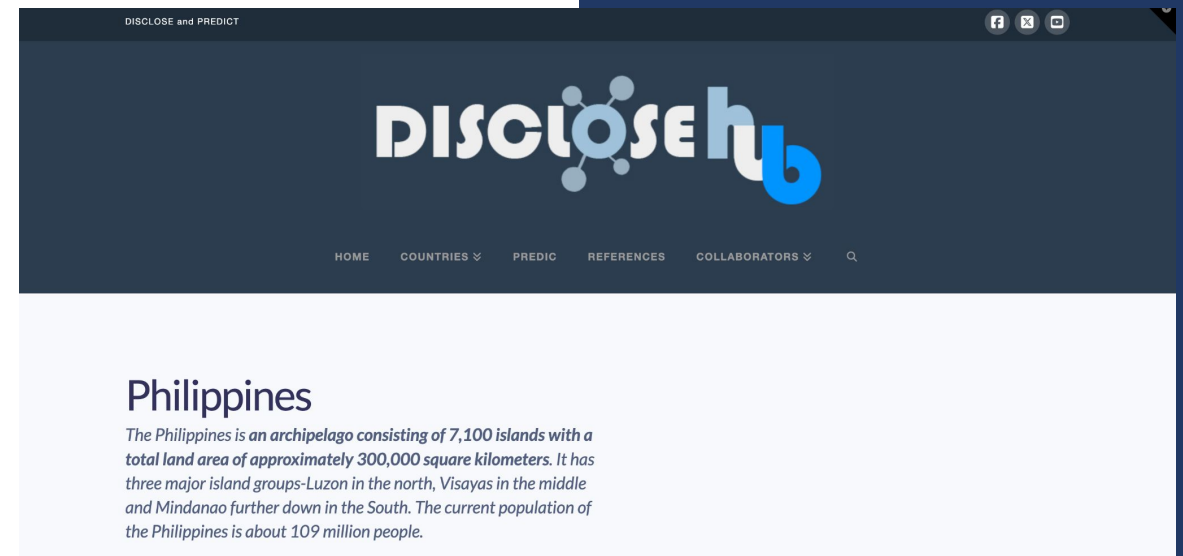
<https://reports.dbm.gov.ph/national-wealth/pages/wealth-type>



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Introduction to the MO and SDSG DISCLOSE Hub

- **DISCLOSE Hub:** legal frameworks, community development agreements, and research materials related to mining governance around the world. Link to the Hub: <https://disclosehub.net/>



Introduction to the GDI PREDIC Tool

- **PREDIC Tool:** visualized data on company profile, economic, social, and environmental impacts and expenditures. Link to the tool: <https://www.govdatainitiative.org/localizingenergytransition>



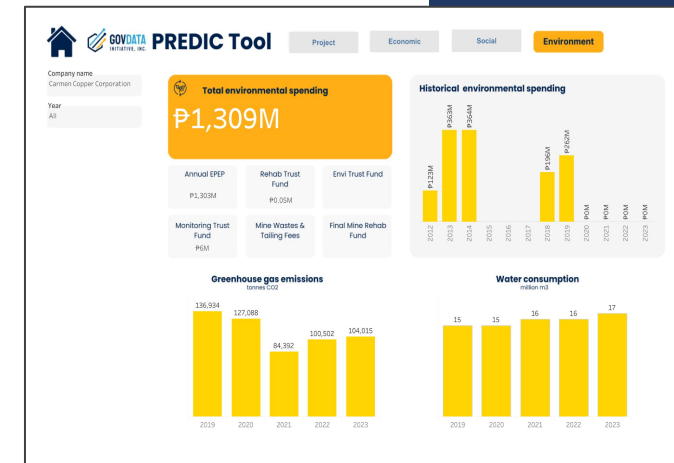
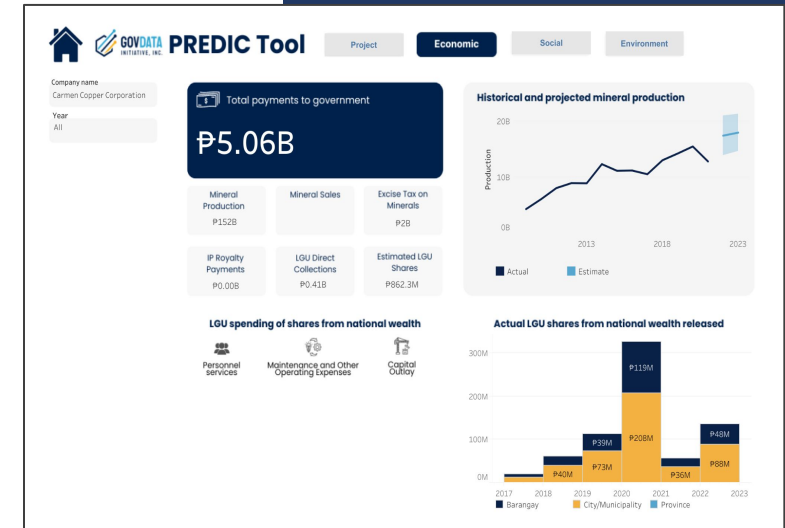


Step 3: How to analyze data?

- Exploratory Data Analysis (EDA) is an approach used in data analysis to **summarize and visualize** the key characteristics of a dataset. It is often the first step in the data analysis process, helping to **uncover patterns, spot anomalies, and check assumptions** with the help of statistical graphics and other data visualization methods.

Exploratory data analysis using PREDIC Tool

- Interpret trends in data on production over time using line and bar charts.
- Disaggregating the share from the national wealth released per local government unit through the years
- Using historical data to identify **trends in social development spending and environmental protection spending**





Step 4: How to share data?

- **Data visualization** is a powerful tool that transforms raw data into **meaningful and actionable insights**.
 - **Enhances understanding, improves communication, and supports storytelling:** Data visualizations provide a clear and concise way to communicate patterns, trends, and insights within the data. They can convey a message, provide context, and engage the audience, making the information more memorable and impactful. Facilitates
 - **Decision-Making:** Data visualizations highlight key data points, patterns and trends, relationships, and outliers, aiding in the identification of opportunities and challenges.
 - **Enhances Data Exploration:** Interactive data visualizations allow users to **explore and interact** with the data dynamically.



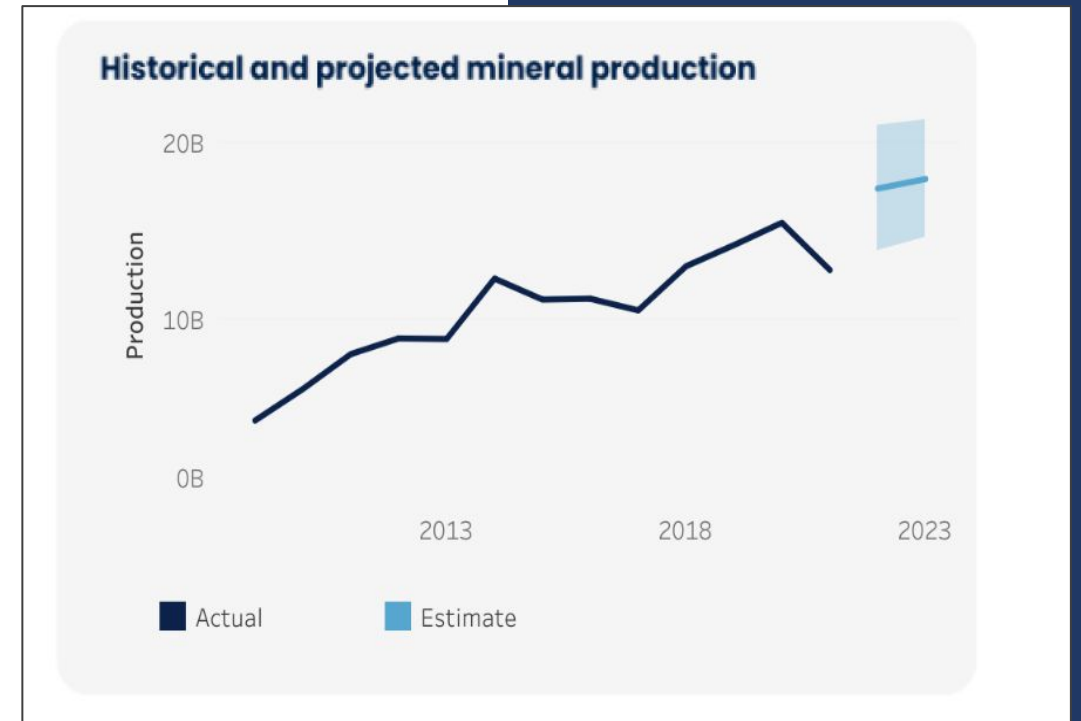
Introduction to basic charts

- Each chart has its strengths and works best for specific types of data. In choosing a chart, consider two things: the type of data we are visualizing and the purpose of our data viz.
- Basic charts:
 - Line chart
 - Bar/column chart
 - Pie/doughnut chart
 - Heatmaps

Line charts

Line charts are useful in emphasizing changing trends in our data and compare several data sets.

- This chart is best when we want to show:
 - Change over time
 - Category comparison
- Example dataset:
 - Mineral production from 2009-2021



Bar charts

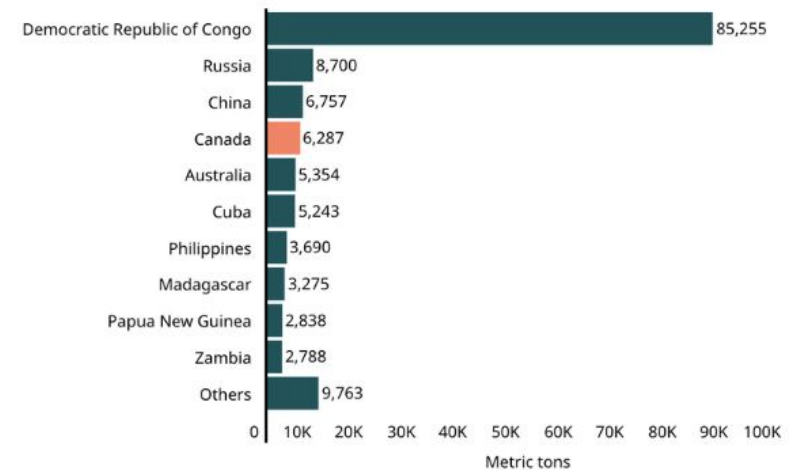
We use bar charts when comparing sizes of different categories. Bar charts are also useful when data labels have long names (e.g., tax payments by company).

- This chart is best when we want to show:
 - Category comparison
 - Ranking
- Example dataset:
 - Average cobalt production by country, 2015–2019

FIGURE 1.

Average cobalt production of top producing countries, 2015–2019

DRC produces bulk of the world's cobalt



Source: "Data Section, Chapter 6.4," World Mining Data, last accessed 19 October 2021, www.world-mining-data.info/?World_Mining_Data__Data_Section

Column charts

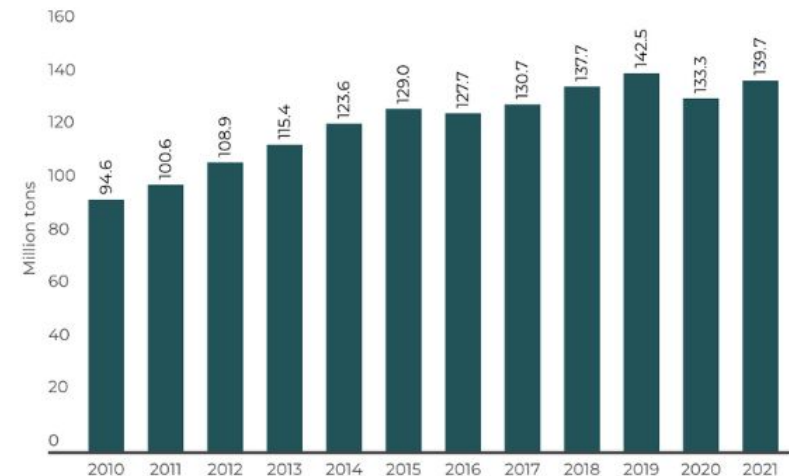
Column charts are similar to bar charts and are best used when data is a time series (e.g., oil production 2010-14).

- This chart is best when we want to show:
 - Change over time
 - Category comparison
 - Ranking
- Example dataset:
 - Carbon dioxide emissions of Algeria 2010-2021

FIGURE 1.

Carbon dioxide emissions of Algeria, 2010-2021

Emissions in Algeria have steadily increased



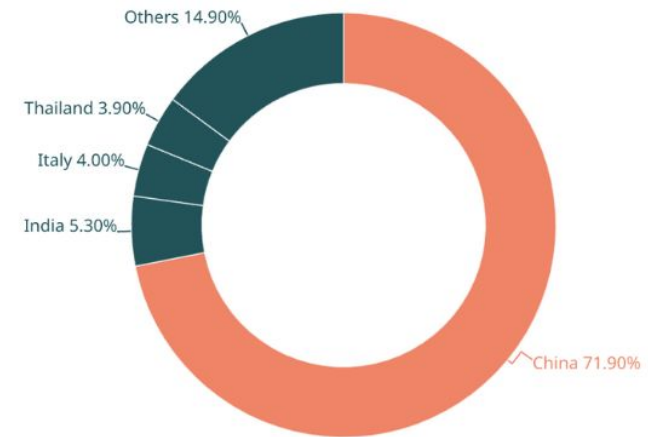
Source: BP Statistical Review of World Energy (2021), <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/oil-demand.html>

Pie/doughnut chart

Doughnut charts are useful in showing the proportions of categorical data, with the size of each piece representing the proportion of each category. Make sure to use sparingly and with up to 4-5 categories only.

- This chart is best when we want to show:
 - Part-to-whole
- Example dataset:
 - Export destination of Angola's crude oil in Q4 2020

Export destination of Angola's crude oil in Q4 2020



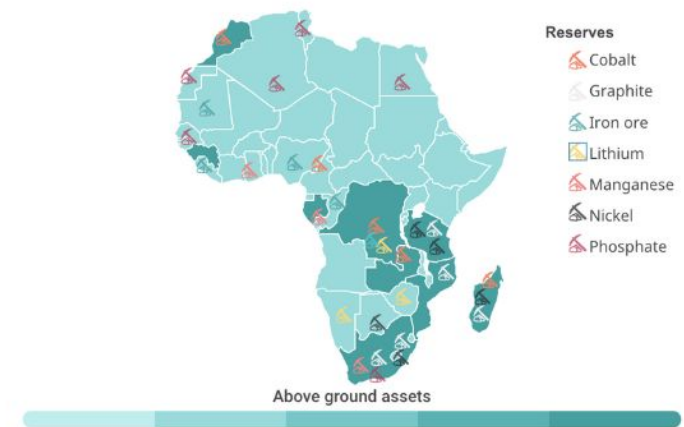
Source: Statista, Main destinations of oil crude exports from Angola 2020:
<https://www.statista.com/statistics/1137636/main-destinations-of-oil-crude-exports-from-angola/>

Heatmaps

Heatmaps are often used in spatial data analysis to represent the concentration or density of events across a geographic area.

- This chart is best when we want to show:
 - Geographic distribution
- Example dataset:
 - Location of Africa's battery mineral reserves and above ground assets needed for downstream industries

Location of Africa's battery mineral reserves and above ground assets needed for downstream industries



Source: Based on S&P Global data and U.S. Geological Survey (2022).

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Summary

- Data is crucial for tracking mining's social, economic, and environmental impacts, ensuring informed policy decisions, transparency, and stakeholder trust.
- EDA techniques, such as time-series analysis, help identify trends in mining outputs, revenues, and compliance, allowing for better forecasting and performance monitoring.
- Key portals like the MGB Database, PH-EITI EDGE, and DBM ENR Portal provide valuable datasets that inform decision-making in mining governance.
- Clear, effective visualization of data enhances understanding and communication, supporting better decision-making and stakeholder engagement.

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Sample output



HOW MUCH DID BRGY. BIGA RECEIVE FROM MINING?



Data Story

According to the Philippine mining legal framework, local government units hosting mining operations are entitled to their shares from nationally-collected taxes on minerals. From 2017 to 2022, Barangay Biga saw fluctuating shares from mining, starting at ₱7 million in 2017 and peaking at ₱119 million in 2020. After this high, the shares dropped to ₱20 million in 2021 and slightly recovered to ₱48 million in 2022. These fluctuations make it difficult for the barangay to plan long-term projects and services. To address this, Barangay Biga could set up a reserve fund and seek alternative income sources to reduce reliance on volatile mining revenues. This would help stabilize the barangay's finances and sustain development efforts.