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Abbreviations and Acronyms

Acronym	Description
CADETAF	Central Buying and Development of the mining region of Tafilalet and Figuig
CTT	Compagnie de Tifnout Tighanimine
DBA	Disc-based association
ECRM	Extended Critical Raw Materials
EIA	Environmental Impact Assessment
EITI	Extractive Industries Transparency Initiative
ESG	Environmental, social and governance
GDP	Gross domestic product
ILO	International Labour Organisation
IMACID	Indo Maroc Phosphore S.A
MEM	Ministry of Energy, Mines and Sustainable Development
MPM	Mineral Predictivity Mapping
NWP	National Water Plan
OCP	Office chérifien des phosphates
ONA	Omnium nord-africain
ONHYM	Office national des hydrocarbures et des mines / National Office of Hydrocarbons and Mines
RF	Random Forest
SEIAs	Social and Environmental Impact Assessments
WP	Work Package

Executive Summary

This report provides the reader with an overview of the key aspects regarding mineral resources, supporting regulations and institutions, as well as any related provisions in the prospecting of Critical Raw Materials (CRMs) in Morocco. The report is an integral part of the larger AfricaMaVal project and, in that context, provides this country overview specifically aimed at European Union (EU) investors and decision-makers.

AfricaMaVal is focusing on the minerals and metals present in the fourth list of CRMs for the EU as well as on Copper (Cu), Nickel (Ni), Tin (Sn) and Manganese (Mn) that are particularly pertinent considering Africa's geological potential and their critical status in the digital and energy transitions. Morocco hosts some of the ECRM such as Phosphate and Phosphate rocks, Cobalt, Fluorspar, Barite, Tin, Antimony, REE and Copper and in this case study report it was explained the availability of these raw materials and the market possibilities ensuring the European market in various strategic and critical minerals from Morocco resources.

The report will also include value chain of the ECRM, therefore activities such as exploration, extraction, processing, and recycling will be evaluated. Fiscal regulation as well as the macroeconomic and political context will be scanned to give an overview of the country regime. Environmental, social and governance (ESG) regulations and challenges will be depicted for the investors to better understand the background and questions to address when it comes to launch activities on the ground. A list of downstream to upstream actors related to the mining sector will assist deciders to build their Business to Business network. This country profile will try to address the needs of the EU green deal according to the country strategies and planification.

Eventually, this report will underline some project opportunities or recommendations.

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- Ernst and Young Morocco for providing the overview on the fiscal, legislative and regulatory context.
- MiningFile for their assistance regarding the actors of the ECRMs whole chain and institutions dedicated to the mining sector.
- Control Risk for providing the overview on the political context.



Keywords

ECRM, Mineral potential, Ore processing, Refining capacities, Recycling units, Value chain, Primary raw material, Secondary raw material, Bottlenecks, Finance, Investment, Sustainability, ESG, Land-use, Taxation, Mining regulation, Mining policies, Child labour, Responsible extraction, Morocco, Pan-African

Wording

Mineral prospectivity: “Mineral potential mapping is concerned with quantifying and mapping the likelihood that mineral deposits are present in a study area. It is synonymous to mineral prospectivity mapping, which is concerned with quantifying and mapping the likelihood that mineral deposits may be found by exploration in a study area.”



1. Extended Critical Raw Materials (ECRM) supply potential of Morocco

1.1. Inventory of the ECRM

1.1.1 Geological setting

Morocco is located at a triple junction between a continent (Africa), an ocean (the Atlantic) and an active plate collision zone (the Alpine belt system). This results in a rugged topography with a wide range of outcropping terranes spanning from Archean to Cenozoic in age, as well as diverse tectonic systems from sedimentary basins to metamorphic fold belts. It is characterised by three geological domains: The Rif Domain, The Atlas Domain and the Meseta and The Shara and Anti-Atlas Domain. The Rif domain is dominated by Alpine belt, the Atlas and Meseta consists of the epi-Variscan platform and the Mesozoic and Cenozoic cover, the Sahara and Anti-Atlas domain is where the Archean terrains occur in the south and SE and in the north is where the Proterozoic and Paleozoic formations occur.

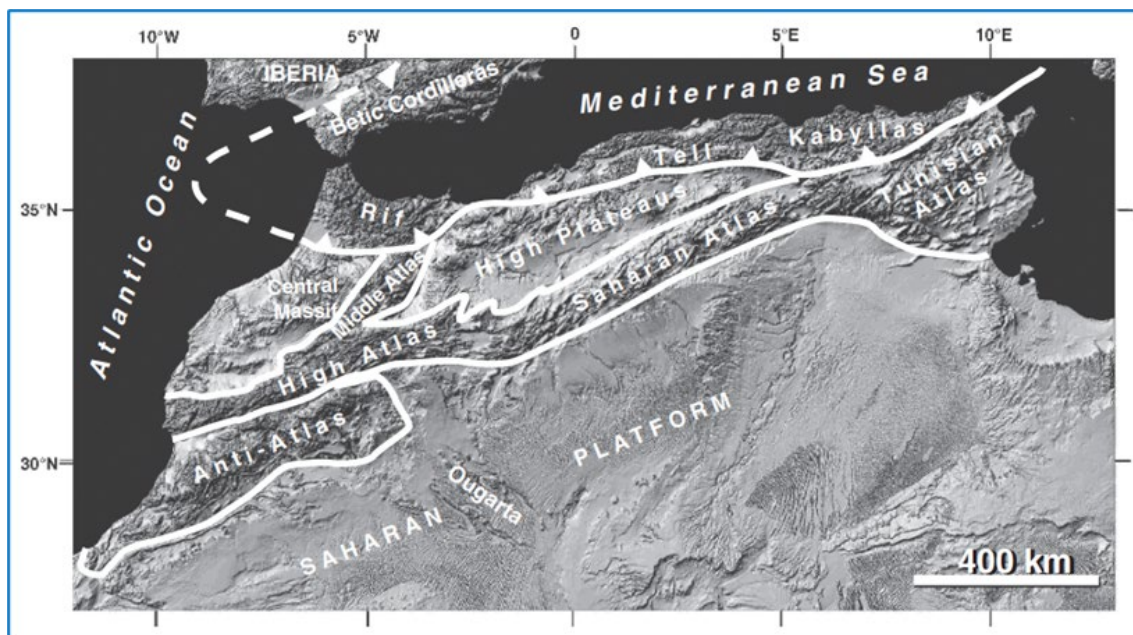


Figure-1: Physiography of northwestern Africa with limits of the main natural regions and young mountain belts²

At first sight, the topography of Morocco is comparable with that of the neighboring countries of North Africa. To the north (Figure 1), the Rif Range extends along the Mediterranean coast (Alboran Sea), ensuring the continuity of the Kabylia-Tellian belts (Maghrebides) up to the Gibraltar strait. South of these coastal ranges, a domain of elevated plateaux or mesetas occur (Algerian High Plateaux and Oran Meseta, Moroccan Meseta), including intramontane basins. Then the Atlas system rises, providing a northern boundary to the extended, and generally low elevation Sub-Saharan and Saharan domains. However, Morocco differs from Algeria and Tunisia in several ways. On the one hand, the elevation of

²

most of the country (except the Rif and Atlantic areas) is particularly high [Frizon de Lamotte et al., 2008]. The High Atlas displays several massifs close to 4000 m high, including the highest peak of northern Africa (Jebel Toubkal). A branch of the Atlas system extends obliquely across the Mesetan domain, namely the Middle Atlas, which exceeds 3000 m in elevation. The northern border of the Sub-Saharan domain also rises and forms a massive mountain belt, the Anti-Atlas, up to 2700 m high in J. Saghro, and even higher in the case of the J. Sirwa volcano (3300 m). The elevation decreases westward away from the Middle Atlas Mountains to the Central Massif of the Moroccan Meseta, towards the Atlantic coastal basins, and eventually to the Atlantic abyssal plains. South of Anti-Atlas and Saghro mountains, the plateaux (hamadas) elevation decreases southward from c. 1000 m to less than 400 m (Tindouf basin), and westward to less than 200 m, close to the Atlantic (Tarfaya basin) [Michard et al., 2008].

Neogene basins are shown along the High Atlas borders (Haouz-Tadla and Bahira Basins to the north, Souss and Ouarzazate Basins to the south) or north and east of the Middle Atlas (Guercif and Missour Basins), whereas a large foredeep basin (Gharb) extends southwest of the Rif belt. In contrast with Algeria and Tunisia, the continental basement of North Africa is more uplifted in Morocco than in the countries further east, causing Paleozoic and Precambrian rocks to outcrop extensively (Figure 2). Paleozoic rocks form large culminations within the Mesozoic Atlas domain, whereas Precambrian rocks form similar culminations (“boutonnieres”) in the middle of the Anti-Atlas Paleozoic terranes. Paleozoic units also occur in the Maghrebide internal zones, similarly, developed in Morocco (Alboran domain) and Algeria (Kabylias), but they belong to a disrupted allochthonous terrane (“AlKaPeCa”) and not to the African basement itself [Michard et al., 2008].

In Morocco, exploitation of mineral resources is done everywhere, especially in the High Atlas and the Anti-Atlas. It is of precious metals (Au, Ag), base metals (Cu, Zn, Pb, Ni), and industrial minerals (barite, fluorspar, phosphate).

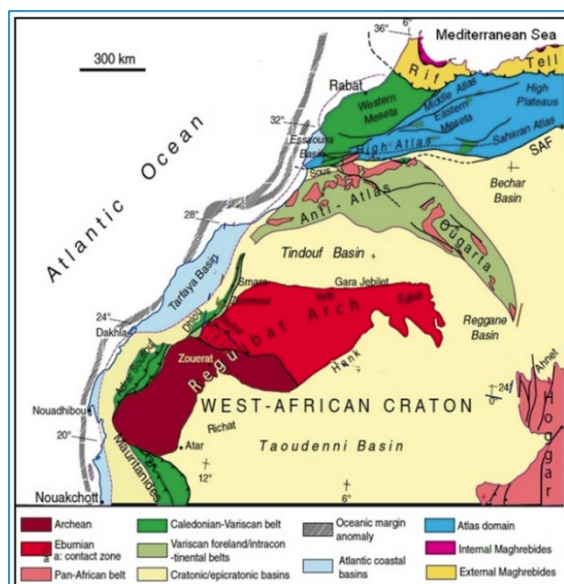


Figure-2: Tectonic map showing the northern part of the West African Craton (WAC) and the adjoining fold belts.³

³ Michard et al. 2008

The geology of southern Morocco is extremely varied and complex (figure 3). The region is home to a wide range of geological formations, from ancient Precambrian rocks to young Quaternary sediments. The main geological units in southern Morocco can be divided into three broad categories⁴:

- The Precambrian basement: This consists of ancient igneous and metamorphic rocks that date back to the Precambrian era, which began about 4.6 billion years ago and ended about 541 million years ago. The Precambrian basement in southern Morocco is made up of two main formations: the Reguibat Shield and the Anti-Atlas Inliers. The Reguibat Shield is a large, coherent block of Precambrian rocks that covers much of the western Sahara Desert. The Anti-Atlas Inliers are smaller blocks of Precambrian rocks that are found scattered within the Anti-Atlas Mountains.
- The Paleozoic and Mesozoic sedimentary rocks: These rocks were deposited during the Paleozoic and Mesozoic eras, which spanned about 541 million to 66 million years ago. The Paleozoic and Mesozoic sedimentary rocks in southern Morocco are mainly made up of limestones, sandstones, and shales. These rocks are found in a variety of tectonic settings, including basins, platforms, and orogenic belts.

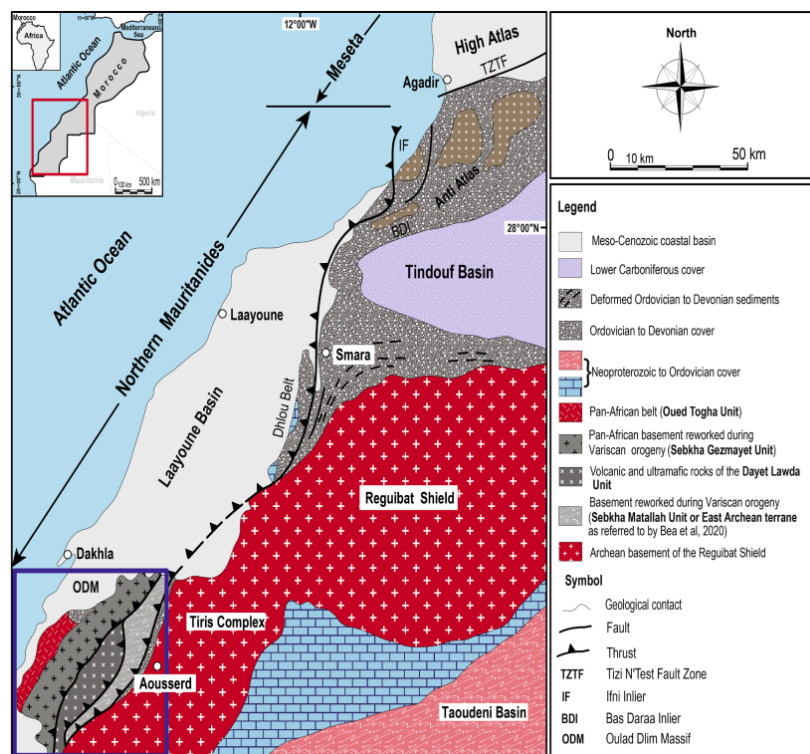


Figure-3: Geological map of southern Morocco showing the main structural domains and lithological units along with location of Oulad Dlim massif (ODM) within the Souttoufide belt (i.e., Northern Mauritanides) and western Reguibat shield⁵

⁴ Bea et al., 2020; Benaouda et al., 2022, Bouabdellah et al., 2022

⁵ Bouabdellah et al., 2022

- The Quaternary sediments: These are the most recent rocks in southern Morocco, dating back to the past 2.6 million years. The Quaternary sediments in the region are mainly made up of alluvial deposits, fluvial deposits, and aeolian deposits. These deposits are found in a variety of environments, including valleys, plains, and deserts.

The Oulad Dlim Massif is a prominent geological feature in southern Morocco. It is a large, isolated block of Precambrian rocks that is in the western part of the Souttoufide belt. The massif is composed of Mesoproterozoic and Neoproterozoic gneisses and granites. The Oulad Dlim Massif is surrounded by younger Paleozoic and Mesozoic sedimentary rocks.

The Oulad Dlim Massif is a significant geological feature because it provides insights into the geological history of southern Morocco. The rocks in the massif have been subjected to a long and complex history of deformation and metamorphism. The massif also provides most of the world's strategic metals production such as niobium (Nb), rare earth elements (REE), tantalum (Ta), phosphorus (Phos), copper (Cu), iron (Fe) and fluorine (F)⁶.

The complexity of Morocco's structural domains is thus the basis of the richness and diversity of its mineral and mainly mining resources, located in different mineralized zones, although Phosphates dominate the country's mining production both in terms of tonnage and value. Apart from Phosphates, several REE-Nb-Ta-F prospects hosted by carbonatites have been identified, and roughly evaluated by the ONHYM. Morocco has great mining potential and ranks first in Africa in terms of attractiveness of mining investments (according to the Fraser Institute's Political Perception Index).

1.1.2 Known Ore deposits and occurrences

Among the 34 raw materials assessed as ECRM by the EU in the new list of 2023, **22** ECRMs have been identified to varying degrees in Morocco (Figure 4) and, except Phos and Ti commodities, they are all located in the northeast part of Morocco in the Paleoproterozoic basement.

Morocco is a significant producer of various critical raw materials, playing a crucial role in global supply chains. Among the numerous minerals extracted in Morocco, three stand out as the most critical and economically important due to their wide-ranging applications and substantial production. The identified ECRMs are briefly described below, in order of importance:

The currently most important two ECRMs, with active mines:

- **Phosphate rock / phosphorus – P:** Fifteen (**15**) phosphates deposits and one (**1**) phosphate district are identified within different regions:
 - **Region Laayoune-Sakia el Hamra:** has **1** Large deposit, operating Continuously, named **Oued Eddahab** or **Bou Craa** (is an important phosphate mine managed by the OCP Group (Office Chérifien des Phosphates). In this region there is another deposit (**1** Medium deposit) with little information associated, named Had Labadila.
 - **Region Marrakesch-Safi:** has **3** Large deposits named respectively, Imi N'Tanout (Phos), Chichaoua or Bou Sbaa and Nzalet-El-Harrach (Gantour district). Their deposit Type are: sedimentary Phosphorite and sandstone Hosted. Also, in this region is known **1** district,

⁶ Bouabdellah et al., 2022

- named Gantour District or Gantour, operating Continuously in sedimentary Phosphorite deposit type. In this region 3 more deposits are known with few information available.
- **Region Casablanca-Settat:** has 1 occurrence named Morocco (Phos. du Plateau continental), in sedimentary Phosphorite and alluvial Placer deposit type. The Mining status of this occurrence is unknown.
 - **Region Béni Mellal-Khénifra:** has 6 deposits with few information available. Only one deposit, the Khouribga or Oulad Abddun, is operating Continuously. The **Khouribga phosphate mine**, located in this region, is the largest phosphate mine in Morocco and one of the largest in the world. The mine is operated by the Moroccan company OCP. Also, there is 1 Large deposit, the Tessaout (Phos) or Tessaout I, with barite and talc as secondaries commodities.
 - **Boucraa mine (Laayoune)** - Bou Craa is the site of a phosphate deposit of over 1.7 billion tons. Mining operations by Phosboucraa started in 1972. The mine produces around 3 million tonnes annually, which represents 10% of Morocco's total production. The mine is also operated by OCP.
- **Barite – Brt:** Sixty-six (66) Barite deposits, 3 Brt districts, 8 Brt occurrences and 1 Brt province are identified within different regions:
 - **Region Oriental:** has 1 Very Large deposit, operating Continuously, named **Zelmou or Djebel Zarouk**, with vein Polymetallic and carbonate Hosted deposit type. In this region there are more 6 deposits and 2 occurrences with polymetallic substances (Pb, Zn, Cu) and Ag, Cd associated.
 - **Region Fès-Meknès:** has 6 deposits and 1 province with no information available about their deposit size or mine status, with polymetallic substances (Pb, Zn, Cu) associated.
 - **Region Drâa-Tafilalet:** has 24 deposits, 2 occurrences and 2 districts (with large deposit size). The Zeïda (district) is operating Intermittently and the Aouli - Mibladen (district) or Haute Moulouya (district) is not Operating.
 - **Region Béni Mellal-Khénifra:** has 12 deposits, 1 occurrence. The **Bou Ousel deposit** has a Large size with Fe, Hg and Pb as secondaries substances associated. The **Zrahina Djebel deposit** has a medium size and vein Polymetallic deposit type with Fl, Ag, Pb, Zn as secondaries substances associated.
 - **Region Casablanca-Settat:** has 1 deposit named Sidi Ghanem with few information available.
 - **Region Marrakesch-Safi:** has 3 Large deposits named respectively, Seksaoua or Seksawa (operating Continuously), Matate (under Development) and Jebilet district (operating Intermittently). Although, in this region there are 10 more deposits and 2 occurrences with no information available.
 - **Region Souss-Massa:** has 2 deposits and 1 occurrence with few information available.

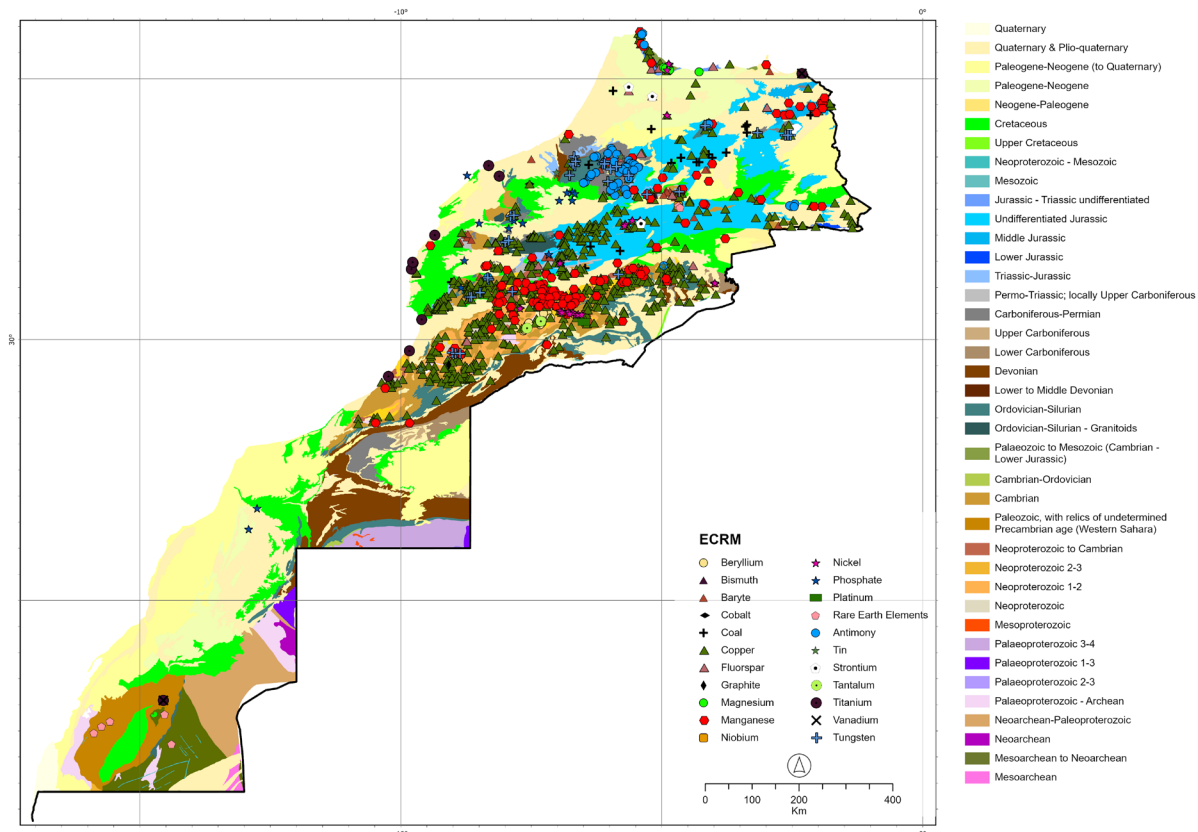


Figure--4: Mineral occurrences in Morocco overlaying simplified map of geological ages (source SIGAfrique).

Others ECRMs, with active mines:

- **Copper – Cu:** Six hundred and forty-five (**645**) Copper deposits (6 Medium deposits and 17 Small deposits), **2** Cu districts, **154** Cu occurrences, **1** project, **4** prospects and **4** provinces are identified within different regions, but only very few are operating or under development.
- **Manganese – Mn:** One hundred and five (**105**) manganese deposits (3 Large deposits in Oriental region, Drâa-Tafilalet and Souss-Massa); **1** Mn district and **25** Mn occurrences. Only 2 are operating Intermittently and 1 operating Continuously.
- **Fluorspar – Fl:** Eighteen (**18**) fluorspar deposits and **1** fluorspar province are known. There is a large deposit operating Continuously in Rabat-Salé-Kénitra region named Achmmach (El Hammam, Fl) and one medium deposit in Béni Mellal-Khénifra region and other Medium deposit in Oriental region, with several associated secondary substances.
- **Cobalt – Co:** Twenty-three (**23**) Cobalt deposits and **1** Cobalt occurrence are known. Only 3 deposits are operating Continuously in Drâa-Tafilalet region: 2 Large deposits and 1 with no information available, but all deposits with several associated secondary substances (Ag, As, Au, Bi, Cr, Cu, Mo, Ni).
- **Antimony – Sb:** Forty-seven (**47**) Antimony deposits (3 Medium deposits in Béni Mellal-Khénifra region and 1 Medium deposit in Tanger-Tetouan-Al Hoceima region), **1** Sb field and **2** Sb occurrences. All deposits are identified within different regions and within orogenic Gold or vein Polymetallic deposit type.

- **Tungsten – W:** Thirty-one (31) Tungsten deposits (3 Small deposits in Marrakesch-Safi and Rabat-Salé-Kénitra region) and 3 W occurrences. All deposits and occurrences known has few information available or unknown about their mining activities.
- **Southern Provinces: cobalt-nickel -gold** deposits of Bou Azzer are associated with the Elgraara Panafrican greenstone belt extending over 30 Km. The main orebodies consist of elongated lenses of massive Ni-Co-Fe arsenide minerals. These lenses occur in a core of carbonate or siliceous gangue and are almost exclusively located along the contact between serpentinite and a quartz diorite intrusion (Tourneur et al., 2021), . Mining was initiated in 1934 by SMAG (Société Minière de Bou Gaffer) on the central deposits in Bou Azzer and on the Ightem deposit to the east of the district. From 1969 to 1971, the Russian group Technoexport conducted a comprehensive research program that led to the discovery of the Taghouni, Bou Azzer East, and Tamdrost deposits, the mine was put back into production and closed again in 1983 due to depletion of mineral reserves. In 1987, the geological team of CTT resumed work and discovered the Méchoui deposit. Production thus recommenced after an ambitious research and development program, resulting in two beneficiation processes enabling the production of cobalt cathodes, cobalt derivatives, nickel, and gold ingots.

Table 1 includes the main active mines.

LONG	LAT	Occurrence	ECRM	OtherSubst
-1.8100	34.4730	Beddiane	Cu	Ag, Brt, Pb, Zn
-8.3667	30.0833	Talaat N'Ouamane	Cu	Ag, Mo, Pb
-8.7333	29.7500	Tazalaght (Ait Abdellah)	Cu	Ag, Pb
-1.7833	34.5000	Touissit District	Cu	Ag, Pb, Zn
-4.9167	32.8667	Zeïda (district)	Brt	Pb
-2.7667	32.2000	Zelmou	Brt	
-8.7330	30.9500	Seksaoua	Brt	Ag, Au, Cu
-12.9167	26.3667	Oued Eddahab	Phos	U
-5.7833	33.5000	Achmmach	Sn	Au
-7.9667	31.1500	Matate	Brt	
-5.8333	33.5333	El Hammam (MAR, FI)	FI	
-6.8000	30.5333	Aghbar (Bou Azzer)	Co	Au, Ni, U
-6.9106	30.5208	Bou Azzer	Co	Ag, As, Au, Bi, Cr, Cu, Mo, Ni, U
-6.9106	30.5208	Bou Azzer	Ni	Co, Ag, As, Au, Bi, Cr, Cu, Mo, U
-7.2667	31.0667	Imini (distr.)	Mn	Pb
-8.1800	31.8500	Jebilet district	Brt	Zn, Ag, Cu, Pb, Py
-8.1800	31.8500	Jebilet district	Cu	Ag, Brt, Zn, Pb, Py
-8.2000	31.3800	Guemassa district	Cu	Ag, Zn, Pb

Table 1: List of the main active mines.

1.2. Prospectivity and mineral high potential mapping

1.2.1 Selection of the ECRM for mineral prospectivity

Among the ECRMs present in Morocco, **8 ECRMs** were selected for mineral prospectivity mapping (MPM): **Phosphate, Copper, Barite, Manganese, Antimony, Cobalt, Tungsten, and Fluospar**. The choice of those commodities was constrained by the dataset used, as it needs at the very least more than 10 occurrences for a given ECRM to perform a correct prediction. The Mineral Predictivity Mapping (MPM) was performed

using the Disc-based association (DBA) grid method coupled to Random Forest (RF) method (see Vella, 2022). This method focusses on the local spatial associations of geological variables and features of various natures to describe the relationships between the predictors and the mineralization. This allows the identification of geological environments in the study area around each node of the DBA grid, and the integration of both quantitative and non-quantitative spatial data, such as geophysical anomaly maps and location of geological map units, respectively. Then, RF classification is used here to perform a generalization of complex geological environments and features and evaluate their likelihood to host potential mineralization occurrences by giving a score comprised between 0 (low potential) and 1 (high potential). In Morocco, the data used for MPM are:

- SIGAfrique Geological maps at 1:2,000,000 scale
- SIGAfrique mining database

The DBA grid for predictive modelling is mainly defined by **five parameters**:

- Size of cell – d.
- Search radius for lithologies – R.
- R/d ratio,
- Search radius for mineral occurrences – R_1 . It can be null, in this case the search radius will be restricted to the cell size (d)
- Search radius for faults – R_2 . It can be null; in this case the search radius will be restricted to the cell size (d) or it can take into account the cumulative length of faults present in the cell size (d).

To maximize the grid resolution while minimizing overlaps and cells with only on lithology, the parameters of DBA grid for all the commodities used in this study are as follows: d = 3000 m, R = 9000 m, R/d = 3, R_1 = 5000 m, R_2 = 5000.

1.2.2 Mineral high potential areas

Mineral high potential areas were highlighted for the eight studied ECRMs in Morocco. The criteria allowing the assessment of DBA-RF modelling can be found in the table below. All the favorability maps can be found in the **Appendix_1.2.2_MPM_MOROCCO**.

Morocco	TN	FN	FP	TP	TPR	FPR	PPA (%)	Precision (%)	Accuracy (%)	J-score	Threshold
Phosphate	90121	3	10156	125	0.9765625	0.1012795	10.2395	1.2	89.9	0.88	0.358
Copper	78005	546	17811	4043	0.8810198	0.1858875	21.7658	18.5	81.7	0.695	0.459
Barite	90140	40	9670	555	0.9327731	0.0968841	10.1838	5.4	90.3	0.836	0.491
Manganese	89936	80	9437	952	0.9224806	0.0949654	10.3471	9.2	90.5	0.828	0.401
Antimony	96174	2	3878	351	0.9943343	0.0387598	4.21194	8.3	96.1	0.956	0.401
Cobalt	97264	4	2962	175	0.9776536	0.0295532	3.12435	5.6	97	0.963	0.412
Tungsten	96496	1	3644	264	0.9962264	0.0363891	3.89224	6.8	96.4	0.962	0.53
Fluorspar	97070	5	3191	139	0.9652778	0.0318269	3.31657	4.2	96.8	0.943	0.457

Notes: True Positive (TP) and True Negative (TN) correspond to the number of grid cells which are correctly predicted by the RF model (i.e. mineralized and non-mineralized cells, respectively). Inversely, False Positive (FP) and False Negative (FN) correspond to the number of grid cells which are incorrectly predicted by the RF model (i.e. mineralized instead of non-mineralized cells and non-mineralized instead of mineralized cells, respectively). **FP could correspond to mineral high potential areas.** True positive

rate (TPR), also called “Recall”, correspond to $TP/(TP+FN)$, False positive rate (FPR) corresponds to $FP/(FP+TN)$, Percentage of prospective area (PPA) correspond to $(TP+FP)/All$, Precision correspond to $TP/(TP+FP)$, Accuracy correspond to $(TP+TN)/All$ and J-score correspond to $TPR - FPR$.

Phosphate rock / phosphorus – P: Morocco is a major global producer of phosphate rock, a critical raw material used primarily in fertilizer production. Large-scale mining operations dominate the phosphate industry, but there may be smaller-scale, artisanal activities in some regions. The favorability map of P (Appendix 1.2.2a) produced by the DBA-RF model display **two large mineral high potential areas**, mainly (1) Gantour Basin (Region Marrakesch-Safi) and the (2) Southern Provinces region:

- **Khouribga Mines:** The Khouribga region in central Morocco is home to some of the most significant phosphate deposits globally. Mines in this region are operated by the OCP Group (Office Chérifien des Phosphates), a state-owned company and one of the leading phosphate producers in the world.
- **Bou Craa Mine:** Located in the Southern Provinces region, the Bou Craa mine is another important phosphate operation managed by the OCP Group.

Morocco's phosphate rock deposits are of high quality and are relatively easy to mine. The country also has a strong infrastructure in place for transporting and processing phosphate rock. As a result, Morocco is well-positioned to continue to be a major player in the global phosphate rock market.

Barite – Brt: Morocco is one of the largest producers of barite in northwestern Africa, with a long history of mining that dates back to 1949 when production was only 600 tons (Eyssautier, 1952; Azza, 1998). Today, the country produces 1,100,000 tons per year, making it the third-largest producer worldwide after China and India [Samaoui et al., 2023]. Barite deposits are found in various regions, including the Atlas Mountains, where the mineral is extracted and processed for various industrial applications. The favorability map of Barite (Appendix 1.2.2b) produced by the DBA-RF model display **three mineral high potential areas**, mainly:

- **The Drâa-Tafilalet region** - Is the most important barite production area in Morocco. It is home to the Tafraoute and Ijoukak mines, which are the two largest barite mines in the country. Other major barite mines in the Drâa-Tafilalet region include the Assa mine and the Tizi mine.
- **The Central Atlas region** - Is also a significant producer of Barite. It is home to the El Jadida and Moulay Bouselham mines, which are two of the largest barite mines in the country. Other major barite mines in the Central Atlas region include the Guercif mine and the Jbel Ayachi mine.
- **The Anti-Atlas region** - Is the smallest producer of barite in Morocco. However, it is home to the Tissint and Ait Oualili mines, which are two of the largest barite mines in the country. Other major barite mines in the Anti-Atlas region include the Ouarzazate mine and the Kelaat Mgouna mine.

Copper – Cu: The favorability map of Copper (Appendix 1.2.2c) produced by the DBA-RF model display **four mineral high potential areas** along the axe SW-NE Atlas Mountain (High, Central and Middle Atlas) in the following regions:

- **Souss-Massa region** – In this region there is a Bou Azzer mine, who is the second largest copper mine in Morocco. This mine produces about 50,000 tonnes of copper per year.
- **Drâa-Tafilalet region** - Where is the largest copper mine in Morocco: The Oumjrane mine is a large, open-pit copper mine that covers an area of approximately 10 square kilometers (4 square miles).

It is one of the largest and most productive copper mine in Morocco, producing approximately 150,000 tons of copper per year. The mine is operated by the Canadian company Kinross Gold Corporation.

- **Marrakech-Safi region** - The Sidi Rahal mine in the Marrakech-Safi region is a smaller copper mine. This mine produces about 5,000 tonnes of copper per year.
- **Fès-Meknès region** - The Sefrou mine in the Fès-Meknès region is a smaller copper mine. This mine produces about 10,000 tonnes of copper per year.

Manganese – Mn: The favorability map of Manganese (Appendix 1.2.2d) produced by the DBA-RF model display **three mineral high potential areas** along the axe SW-NE Atlas Mountain in the following regions:

- **Souss-Massa-Draâ region** – In this region, specifically in the province of Zagora there is the Aït Benhaddou Manganese Mine (it's a sedimentary deposit), who is the largest manganese mine in Morocco, producing approximately 200,000 tons of manganese per year. In this region there are also another important mines: The Oued Souss Manganese Mine, located in the province of Agadir, is the fourth largest manganese mine in Morocco, producing approximately 40,000 tons of manganese per year; and Bou Azzer Manganese Mine, a sedimentary deposit located in the province of Ouarzazate. This mine is the fifth largest manganese mine in Morocco, producing approximately 30,000 tons of manganese per year.
- **Drâa-Tafilalet region** - The Imini mine is located in the Drâa-Tafilalet region in southern Morocco. More specifically, the mine is located in the Ouarzazate Province, Amerzgane Caïdat, Amerzgane Cercle. The mine is located about 50 kilometers southeast of the city of Ouarzazate. The mine's manganese deposit is Cretaceous in age and has an estimated reserve of 100 million tons of manganese. The mine is operated by the Moroccan state-owned company Managem.
- **Marrakech-Safi region** - A sedimentary deposit located in this region, specifically in the province of Marrakech, named Sidi Rahal Manganese Mine, is the second largest manganese mine in Morocco, producing approximately 150,000 tons of manganese per year.
- **Tanger-Tetouan-Al Hoceima region** – The Mâ'der Manganese Mine is a sedimentary deposit situated in the foothills of the Rif Mountains. This mine is the third largest manganese mine in Morocco, producing approximately 50,000 tons of manganese per year. The mine is operated by the Moroccan company Managem.

These five mines together produce approximately 470,000 tons of manganese per year, making Morocco one of the leading producers of manganese in the world. Manganese is a critical mineral that is used in a wide variety of industries, including the production of steel, batteries, and fertilizers.

Fluorspar – Fl: The favorability map of Fluorspar (Appendix 1.2.2e) produced by the DBA-RF model display **three mineral high-medium potential areas** along the axe SW-NE Atlas Mountain in the following regions:

- **Draâ-Tafilalet to Béni Mellal-Khénifra region** – Here is located the Zelmou Mine, specifically in the province of Drâa-Tafilalet. It is situated in the Anti-Atlas Mountains, approximately 75 kilometers (47 miles) south of the city of Ouarzazate. The Zelmou mine is a large, open pit mine that covers an area of approximately 5 square kilometers (2 square miles). It is one of the largest and most productive fluorspar mines in Morocco, producing approximately 800,000 tons of fluorspar per year. The mine is operated by the Moroccan company Managem. The Boumalne Dadès Mine, located specifically in the province of Tinghir (High Atlas Mountains) is a smaller, open pit mine

that covers an area of approximately 2 square kilometers (0.8 square miles). It is one of the more productive fluorspar mines in Morocco, producing approximately 300,000 tons of fluorspar per year. The mine is operated by the Moroccan company Managem.

- [Tanger-Tetouan-Al Hoceima region](#) - Rif Domain - Internal zone (district)
- [Oriental region](#) – The Taourit Mine is located specifically in the province of Nador. It is situated in the Rif Mountains, approximately 180 kilometers (112 miles) east of the city of Oujda and 50 kilometers (31 miles) south of the town of Nador. The Taourit mine is a smaller, open-pit mine that covers an area of approximately 1 square kilometer (0.4 square miles). It is one of the less productive fluorspar mines in Morocco, producing approximately 100,000 tons of fluorspar per year. The mine is operated by the Moroccan company Managem.

These mines represent approximately 85% of the total fluorspar production in Morocco. Fluorspar is an important mineral that is used in a variety of industries, including the production of aluminum, steel, and glass. It is also used in the manufacturing of paint, plastics, and pharmaceuticals.

Cobalt– Co: The favorability map of Cobalt (Appendix 1.2.2f) produced by the DBA-RF model display **three mineral high-medium potential areas** along the axe SW-NE Atlas Mountain in the following regions:

- [Souss-Massa to Draâ-Tafilalet region](#) – The Oumjrane Mine, is the largest cobalt mine in Morocco, producing approximately 150,000 tonnes of cobalt per year. It is a skarn deposit located in the Oriental region, specifically in the province of Drâa-Tafilalet, approximately 120 kilometers east of the city of Ouarzazate and 30 kilometers south of the town of Boumalne Dadès. The Bou Azzer Mine is the third largest cobalt mine in Morocco, producing approximately 30,000 tonnes of cobalt per year. It is a porphyry deposit located in this region, specifically in the province of Ouarzazate. The Ben Haddou Mine is the fourth largest cobalt mine in Morocco, producing approximately 25,000 tonnes of cobalt per year. It is a porphyry deposit located in the Souss-Massa-Draâ region, specifically in the province of Zagora.
- [Fès-Meknès region](#) – Located in this region is the second largest cobalt mine in Morocco - Sefrou Mine, producing approximately 50,000 tonnes of cobalt per year. It is a porphyry deposit located specifically in the province of Sefrou, approximately 80 kilometers east of the city of Fès.
- [Tanger-Tetouan-Al Hoceima region](#) - The Mâ’der Manganese/Cobalt Mine is a sedimentary deposit located in the foothills of the Rif Mountains. The mine also contains cobalt, with an estimated reserve of approximately 25,000 tonnes. The Mâ’der Manganese Mine is an example of the diversity of mineral deposits in Morocco. While it is primarily a manganese mine, it also contains cobalt, making it a valuable source of both minerals. The mine is an important part of Morocco's mining industry and contributes to the country's economic development.

These mines together make Morocco one of the leading producers of cobalt in Africa. Cobalt is a critical mineral that is used in a wide variety of industries, including the production of rechargeable batteries for electric vehicles and electronic devices.

Antimony – Sb: The favorability map of Antimony (Appendix 1.2.2g) produced by the DBA-RF model display **three mineral high-medium potential areas** along the following regions:

- [Fès-Meknès region](#) – The Sidi Slimane is the largest antimony mine in Morocco, producing approximately 200,000 tonnes of antimony per year. It is a vein deposit located in the Fès-Meknès



region, specifically in the province of Moulay Yacoub, approximately 80 kilometers (50 miles) east of the city of Meknes.

- **Tanger-Tetouan-Al Hoceima to Rabat-Salé-Kénitra region** – there is the second largest antimony mine in Morocco - Oulad Abdoun mine, producing approximately 100,000 tonnes of antimony per year. It is a smaller, open-pit mine that covers an area of approximately 1 square kilometer (0.4 square miles).
- **Souss-Massa region** – The Tizi Ougoula located in this region, is a small and open-pit mine that covers an area of approximately 1 square kilometer (0.4 square miles) and is the third largest antimony mine in Morocco, producing approximately 50,000 tonnes of antimony per year.

These three mines together produce approximately 350,000 tonnes of antimony per year, making Morocco one of the leading producers of antimony in the world. Antimony is a critical mineral that is used in a wide variety of industries, including the production of batteries, flame retardants, and pigments.

Tungsten – W: The favorability map of Tungsten (Appendix 1.2.2h) produced by the DBA-RF model display **three mineral high-medium potential areas** along the following regions:

- **Béni Mellal-Khénifra region** – Has the Oued Zem Mine, the largest tungsten mine in Morocco, producing approximately 60,000 tonnes of tungsten per year. It is a skarn deposit located in this region, specifically in the province of Khouribga. It is a large, open pit mine that covers an area of approximately 5 square kilometers (2 square miles).
- **Souss-Massa region** – The Oued Eddahab Mine is the second largest tungsten mine in Morocco, producing approximately 40,000 tonnes of tungsten per year. It is a skarn deposit located in the province of Zagora.
- **Draâ-Tafilalet region** – The large, open-pit mine that covers an area of approximately 2 square kilometers (0.8 square miles), Zaouit Sidi el Mekki Mine is the third largest tungsten mine in Morocco, producing approximately 30,000 tonnes of tungsten per year.

These three mines together produce approximately 130,000 tonnes of tungsten per year, making Morocco one of the leading producers of tungsten in the world. Tungsten is a critical mineral that is used in a wide variety of industries, including the production of steel alloys, tools, and electrical contacts.

1.3. Ore processing and refining capacities

Morocco was the world's leading exporter of phosphate rock, phosphoric acid, and phosphate fertilizers [S&Q, 2023]; it was the world's second-ranked producer of phosphate rock after China and accounted for about 11.2% of the world's phosphate rock output in 2017. The country also was the world's third-ranked producer of barite after China and India and accounted for 11.0% of world output. Morocco was the world's seventh-ranked producer (excluding United States production) of acid-grade fluorspar, accounting for 1.3% of world output. The country was the 11th-ranked and 17th-ranked producer of cobalt and silver, respectively, and accounted for 1.8% and 1.4% of world output, respectively. Morocco also accounted for 1.4% of the world's copper production. Other mineral commodities produced in Morocco included arsenic trioxide, cement, clays (bentonite, fuller's earth, and montmorillonite), feldspar, gold, iron ore, lead, manganese, mercury, natural gas, nickel, petroleum condensate, salt, and zinc.⁷

⁷ table 2; OCP Group, 2018, p. 20–21; Silver Institute, The, 2018, p. 26; Jasinski, 2019; McRae, 2019a, b) [Taib, 2018]

Morocco has a well-established and modern mining industry, with a range of processing and refining facilities for a variety of minerals.

The types of processing facilities in all Africa (AfricaMaVal Database Processing Plants) are divided into 4 main types:

- 6 Concentrators,
- 117 Plants,
- 45 Refineries, and
- 47 Smelters.

The main differences between these processing facilities lie in their specific functions and industries of application. A "plant" is a general term for various industrial facilities, while a "smelter" focuses on extracting metals, a "concentrator" enhances the concentration of valuable minerals within raw ore and a "refinery" mostly deals with refining petroleum or chemicals. However, the term refinery is the location where the concentration of metal/s and purity is increased.

And Morocco has in terms of ECRM processed elements⁸:

- 14 Plants (5 for Barite, 1 for Cobalt (Co), 1 for Nickel (Ni), 1 for Phosphate rock)
- 1 Refineries (1 for Cobalt (Co))

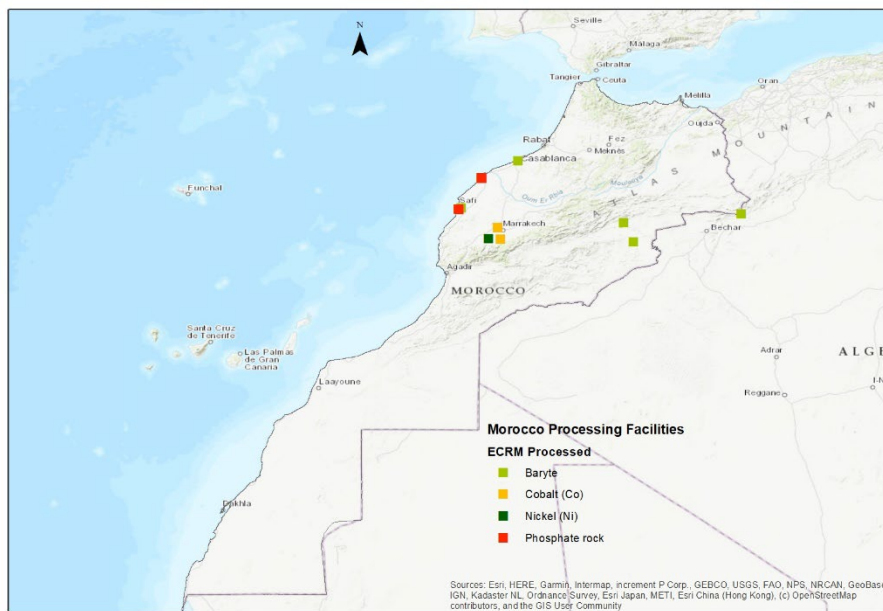


Figure-5: Main processing units.

⁸ AfricaMaVal, Deliverable 1.3, 2023

Name processing entity	Processing Facility	Status	ECRM	Owner	Operator	Products	Capacity
Facility at Errachidia	Plant	Assumed Active	Barite	Broychim S.A.R.L. [100%]	CADETAF- ASM	Chemical grade, Barite	6000 mt/y, 500000 mt/y
Facility at Figuig	Plant	Assumed Active	Barite	Broychim S.A.R.L. [100%]	CADETAF- ASM	Chemical grade, Barite	6000 mt/y, 500000 mt/y
Facility at Tafilate	Plant	Assumed Active	Barite		ASM	Chemical grade	6000 mt/y
Plant at Casablanca	Plant	Assumed Active	Barite	Broychim S.A.R.L. [100%]	CADETAF- ASM	Barite	120000 mt/y
Plant at Safi	Plant	Assumed Active	Barite	Broychim S.A.R.L. [100%]	CADETAF- ASM	Barite	30000 mt/y
Guemassa Polymetallic Plant	Plant	Assumed Active	Cobalt (Co)	Managem Group [100%]	CTT	Metal	2500 mt/y
Marrakesh Refinery	Refinery	Active	Cobalt (Co)	Managem S.A. [99,77%], Unnamed Owner [0,23%]	CTT		
Guemassa Metal Complex	Plant	Assumed Active	Nickel (Ni)	Managem Group [100%]	CTT	Metal	250 mt/y
Maroc Chimie I and Maroc Chimie II	Plant	Assumed Active	Phosphate rock	Government [100%]	OCP	Phosphoric acid, P2O5	500000 mt/y
Maroc Phosphore I and Maroc Phosphore II	Plant	Assumed Active	Phosphate rock	Government [100%]	OCP	Phosphoric acid, P2O5	1150000 mt/y
Maroc Phosphore III and Maroc Phosphore IV	Plant	Assumed Active	Phosphate rock	Government [100%]	OCP	Phosphoric acid, P2O5	1500000 mt/y
Plant at Jorf Lasfar I	Plant	Assumed Active	Phosphate rock	Office Chérifien des Phosphates (OCP) [100%]	Jorf Fertilizer Co. V	Phosphoric acid, P2O5	375000 mt/y
Plant at Jorf Lasfar II	Plant	Assumed Active	Phosphate rock	Office Chérifien des Phosphates (OCP) [33.33%]	IMACID	Phosphoric acid, P2O5	430000 mt/y
Plant at Jorf Lasfar III	Plant	Assumed Active	Phosphate rock	Office Chérifien des Phosphates (OCP) [50%]	Bunge Maroc Phosphore S.A. Or Pakistan Maroc Phosphore	Phosphoric acid, P2O5	375000 mt/y
Plant at Jorf Lasfar IV	Plant	Assumed Active	Phosphate rock	Office Chérifien des Phosphates (OCP) [33%]	Euro-Maroc Phosphore Co.	Phosphoric acid, P2O5	150000 mt/y

Table 2: List of the main processing units.



2. Assessment of the ECRM value chain

2.1. Characterization of the value chain for primary and secondary raw materials

2.1.1 List of the mining and recycling projects

The Moroccan mining sector is dominated by a handful of large companies which hold around 60% of the national mining assets compared to 40% for hundreds of small, under-equipped and poorly supervised companies.

If the management of the sector does not present any particular difficulties for large Companies, having regard to the provisions of the Mining Law, it is not the same for small entities which take advantage of a historical heritage (customary law or advantages economic measures decreed since Independence), which seriously slowed down the development of the Sector.

Thus, the geological constitution of the surrounding lands often allows us to suspect the presence of deposits that are significantly larger and richer than the preliminary superficial reconnaissance allows. In this case, the mineralized showings held by many artisanal miners may only be the tip of the “iceberg”, which encourages them to be taken in hand by competent professionals for their development.

By way of illustration, let us note that the almost fortuitous discovery of the current large mine of Hajjar (Guemassa), held by the ONA group (Omnium nord-africain), was made following an airborne reconnaissance, which made it possible to detect an unsuspected mineralized mass not detected at the surface.

The task facing us will therefore be to identify these promising potentials held by companies who are technically and financially deprived, to identify the business opportunities available to EU investors for ensure the European market in various strategic minerals from Morocco. This can thus be done, through partnerships with stakeholders in the Sector, in a socio-economic environment beneficial to both Moroccan and European companies working in the field. Table 3 represents the most important projects ongoing and whereas some also have investments ongoing, such as expanding facilities.

PROPERTY	OWNER(S)	DEVELOPMENT STAGE	ACTIVITY STATUS	COMMODITY(S)	PRIMARY COMMODITY	PRIMARY RESERVES AND RESOURCES tonnes
Khouribga	OCP S.A.	Operating	Active	Phosphate	Phosphate	26,800,000,000
Youssoufia	OCP S.A.	Operating	Active	Phosphate	Phosphate	8,020,000,000
Tizert	Managem S.A., Unnamed Owner	Construction Started	Active	Copper, Silver	Copper	1,184,000
Achmmach	Atlantic Tin Ltd, Toyota Tsusho	Construction Planned	Active	Tin, Gold	Tin	156,000



	Corp., Nittetsu Mining Co. Ltd.					
Bouskour	Managem S.A.	Construction Started	Active	Copper, Silver	Copper	327,000
Akka	Managem S.A., Unnamed Owner	Operating	Active	Copper, Gold, Silver	Copper	161,000
Bou-Azzer	Managem S.A., Unnamed Owner	Operating	Active	Cobalt, Nickel, Copper, Arsenic	Cobalt	24,000
Jbel Laassal	Managem S.A., Unnamed Owner	Operating	Active	Copper, Gold	Copper	107,000
Oumjrane	Managem S.A.	Operating	Active	Copper	Copper	92,000
SOP Plant	Emmerson PLC	Prefeas/Scoping	Active	Potash, Potassium Sulfate	Potash	
Guemssa Marrakesh	Glencore/Managem S.A.	Recycling		Cobalt, Nickel Lithium	Cobalt	

Table 3 : List of the main ECRM mining units

2.1.2 Existing ESG indicators

Within the framework of this study, we manage to identify only one company certified for ESG indicators. A range of ESG rating agencies are scoring OCP environmental, social and governance practices each year. OCP Group recognizes the importance of ESG metrics performance as equal to financial performance. Our best-in-class ESG practices shape our resilience to short, medium and long-term risks. In 2021, OCP had achieved results reflecting its ability to manage ESG risks and be transparent on its sustainability performances and impacts (OCP Sustainability Integrated Report, 2021).

2.1.3 Status of economic links between the formal and informal sectors

The ASM sector in Morocco contributed to 90% of barite production. Barite is one of the minerals which the ASM sector is allowed to produce based on Law no. 74-15, together with zinc and lead. The ASM production of barite, lead and zinc take place in a designated region of 58,799.41 km², which until recently was reserved only for ASM production. The ASM sector is regulated, supervised and supported by the CADETAF. Based on available information and stakeholders' interviews, the ASM sector is largely formalised and barite production is sold in the form of unprocessed ore to enterprises who perform beneficiation before export. However more forward linkages would be desirable to increase value capture by ASM producers.

Informal mining occurs in coal mining, especially in Jarada region. Although the mining sector is important for the national economy (26% of national exports in 2022 according to official figures provided by the Ministry of Energy Transition and Sustainable Development), Morocco's positioning towards new energies (notably solar) and the predominance of phosphate in the mining sector does not place coal as a priority in production, even though its consumption has grown with the establishment of several coal-fired power plants in Morocco over the past six years, including one in Jerada in 2017 (Dessertine, 2023).



A comprehensive overview on the ore deposits and production parameters of ECRMS currently recovered by artisanal and small-scale mining in Africa is already available as part of the deliverable 1.4. While a more detailed analysis of the ASM sector role in the production of ECRMs in Morocco, including major challenges and investment opportunities on production, social, governance and environmental impacts and value chain, will be available as part of deliverable 7.2.

2.2. Identification of the bottlenecks along the value chain

The identified bottlenecks during this project have been compiled from data from the World Bank through several pertinent and scored indicators, as following:

- Two criteria from “**Worldwide Governance Indicators (WGI)**”: the government effectiveness and the control of corruption (Figure 6). Concerning these, Morocco did not increase its Government Effectiveness and the control of corruption from 1996-2022, although is above the average from North Africa countries.

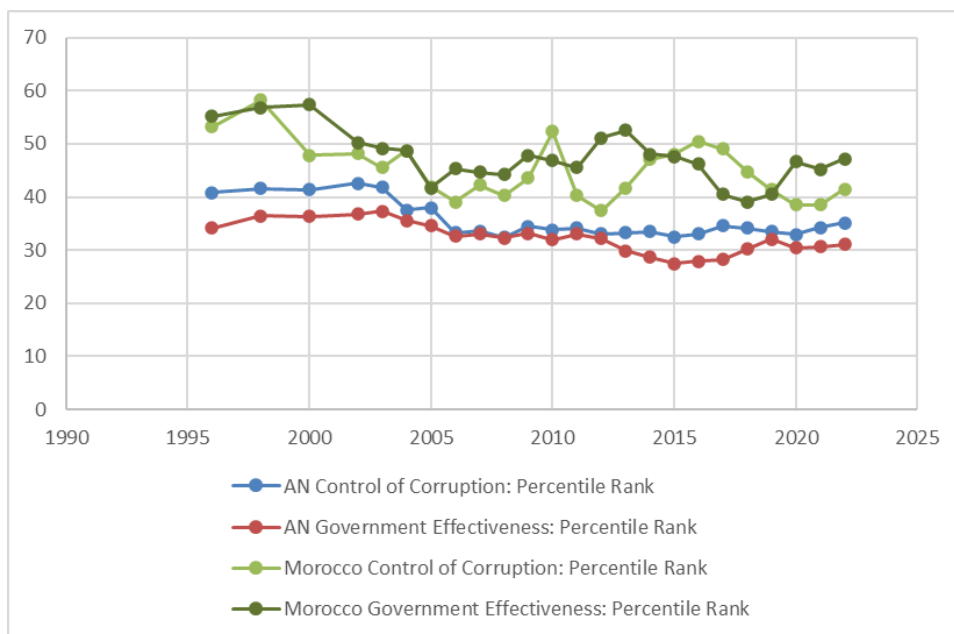


Figure 6: Government Effectiveness and the Control of Corruption

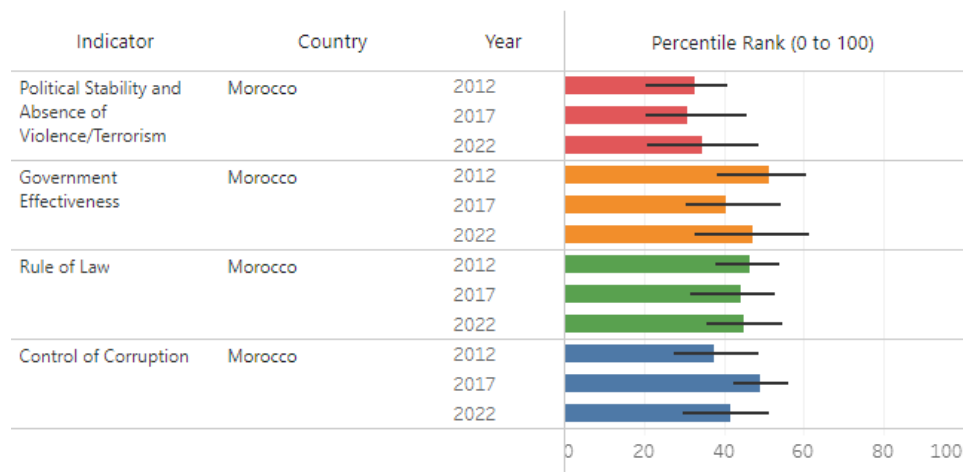


Figure -7: Government Effectiveness, political stability rule of law and the Control of Corruption ranks

Morocco performs below 50% rank in terms of political stability, absence of violence and terrorism, although a small increase was verified in 2022. Government effectiveness decreased in 2017 although it increased again in 2022. The Control of corruption rank decreased in 2022. In general, a lot still needs to improve in terms of governance indicators in terms of world ranks.

Logistics performance index: Overall (1=low to 5=high) in Morocco was reported at 2.54 1=low to 5=high in 2018, according to the World Bank collection of development indicators, compiled from officially recognized sources. Morocco - Logistics performance index: Overall (1=low to 5=high) - actual values, historical data, forecasts and projections were sourced from the World Bank on December of 2023. The international score uses six key dimensions to benchmark countries' performance and also displays the derived overall LPI index. The scorecard allows comparisons with the world (with the option to display world's best performer) and with the region or income group (with the option to display the region's or income group's best performer) on the six indicators and the overall LPI index.

The logistics performance (LPI) is the weighted average of the country scores on the six key dimensions:

- Efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs;
- 2) Quality of trade and transport related infrastructure (e.g., ports, railroads, roads, information technology);
- 3) Ease of arranging competitively priced shipments;
- 4) Competence and quality of logistics services (e.g., transport operators, customs brokers);
- 5) Ability to track and trace consignments;
- 6) Timeliness of shipments in reaching destination within the scheduled or expected delivery time.

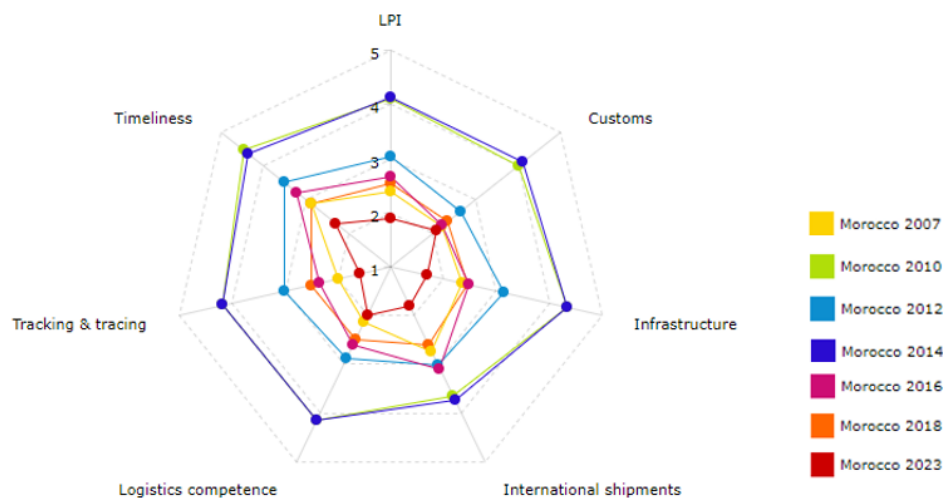


Figure 8: Logistics performance index⁹

Morocco with investment supported by the Bank implemented of its Transport and Logistics Infrastructure Investment Plan, notably through the National Rural Roads Program - Phase II (NNRP II), the Marrakech-Agadir Highway Construction and the 3rd Airport Project of Morocco. The Marrakesh-Agadir Highway Construction Project offers a double opportunity for tourism and agro-industrial potential, from the center of the country up to the North (Tangier) and to the Atlantic (Agadir), and has enabled more than 1.4 million Moroccans to have improved access to road transport (African Development Bank Group, 2019).

Road: Over the past 20 years, the government has built approximately 1100 miles (about 1770.28 km) of modern roads, connecting most major cities via toll expressways. The Moroccan Ministry of Transport and Logistics aims to build an additional 2,100 miles (about 3379.62 km) of expressways and 1,300 miles of highway by 2030 (<https://www.trade.gov/country-commercial-guides/morocco-infrastructure>).

Rail: Morocco’s railway network includes 800 miles of track, with 120 stations serving passengers, and 15 serving freight. The government currently has plans to extend the 225-mile Tanger-Casablanca high-speed rail line, inaugurated in 2019, by 140 miles to connect Casablanca with Marrakesh. The extension will require the creation of new maintenance centers dedicated to high-speed rail activity.

Morocco’s 2040 Rail Strategy (“Plan Rail Maroc 2040”) is a long-term strategy for the development of the national rail network and its various components by 2040 and require \$37 billion. (<https://www.trade.gov/country-commercial-guides/morocco-infrastructure>).

Port capacities: Morocco, occupied the 96th position in the 2016 Logistics Performance Index, is now 109th, putting it far behind many MENA countries: Egypt and Tunisia both outperformed their North African neighbor in the index.

⁹ The International Bank for Reconstruction and Development/The World Bank 2023

Morocco's current position is near the bottom, among the region's worst performers, whereas United Arab Emirates (11th), Qatar (30th), Oman (43rd), Saudi Arabia (55th), Bahrain (59th), and Kuwait (63rd) are the region's top performers, and Egypt (67th), Iran (67th), Lebanon (76th), and Jordan (84th) fared relatively well at the global level.

Morocco's regression in this year's index is partly due to the decreasing quality of delivery speed and tracking. Although Moroccan shipments are reported to meet quality criteria by 82 percent, the report notes that airport and port supply chains take more time than is usually necessary when exporting or importing goods.

The kingdom ranks 115th in terms of customs, 103rd in international shipments, 101st in logistics quality and competitiveness, 112th in tracing and tracking, and 114th in timeliness—suggesting sluggish delivery systems despite efforts to boost connectivity both domestically and internationally. https://www.moroccoworldnews.com/2018/07/251429/global-logistics-performance-index-morocco-ranks-109th-algeria-117th

Energy: The Government of Morocco seeks to increase security of supply by reducing dependence on energy imports, including increasing use of renewable sources for electricity production. Nevertheless, the country imports approximately 90 percent of its energy needs. Total primary energy consumption has increased by about 5 percent per year since 2004, but Morocco plans to decrease energy consumption by 15 percent from 2016 levels by 2030 through energy efficiency measures.



3. Investment/financing prospects for ECRM projects in Morocco

3.1. Fiscal, legislative and regulatory context for in-country financings

Mining sector in Morocco requires obtaining prior authorizations from the relevant administrative body, namely the Ministry of Energy, Mines, Water and Environment granted by:

- Law no. 33-13 relating to mining (hereinafter the “Mining Law”); and
- Decree no. 2-15-807 enacted for the application of the Mining Law.

The Mining Law provides that any exploration, prospecting or mining activity is subject to the prior granting of mining titles, which are requested from the Administration by submitting files attesting "technical and financial capacities". Article 3 of the Mining Law provides that mines are part of the State's public domain.

Mining Law provides for 3 categories of mining titles namely:

- Exploration authorization – The mining exploration is defined by the Mining Law as geological, geochemical and geophysical work, evaluation by excavation, probing and exploration drilling, carried out on the ground and/or in water, or by aerial methods, with the aim of identifying sites or areas with mining potential that may give rise to a prospecting permit;
- Prospecting permits – The mining research is defined by the Mining Law as studies and work relating to geology, geochemistry, geophysics and prospecting, as well as extraction and processing tests aimed at delimiting deposits of mineral resources considered as "mines" and their reconnaissance, determination of their morphology, reserves, nature and the possibility of their exploitation and processing; and
- Mining license – The mining exploitation is defined by the Mining Law as studies and work concerning the extraction, processing, recovery and marketing of mining products.

Tax regulations

The main fiscal regulation is part of the Moroccan Tax Code (“MTC”) and Law No. 47-06 relating to local taxes. In addition, as Morocco has signed several Double Tax Treaties (“DTT”) with other countries, their provisions override domestic law (Ernest & Young, December 2023).

Under the Moroccan Constitutional system, neither the Government nor any other State body is entitled to grant specific tax exemptions or regimes to local or foreign investors that are not provided by the law.

The tax regulations in Morocco do not provide for major tax incentives applicable to mining activities.

Consequently, mining operators are subject to general regulations while benefiting from the tax incentives and exemptions outlined herein regardless of the chosen legal structure. In Annex 3.1 tax regulation related to mining activities are explained in detail. Moroccan companies including mining operators are subject to CIT according to the following rules.



Legal environment

Morocco does not impose general restrictions on foreign investments. Nevertheless, the mining sector falls under a specific regulatory framework. Foreigners intending to proceed with the incorporation of an entity in Morocco may choose to operate through a branch or a subsidiary.

From a legal perspective, a branch is an affiliated entity that does not have its own legal personality and is under the management of its head office. The advantages of operating through a branch stem from its relative ease of establishment and management when compared to a subsidiary. The legal perspective that views the branch as an extension of its foreign parent company without independent legal personality, there exists joint and several liability between the branch and the parent company. Consequently, the foreign company assumes responsibility for all obligations of the branch, in contrast to a subsidiary.

Investment Charter

Law no. 03-22 establishing the Investment Charter (hereinafter referred to as "Law no. 03-22" or the "Investment Charter") was introduced to maximize the impact of investment, particularly in terms of creation of stable employment, equitable regional development, prioritization of growth sectors for the national economy and sustainable development. Table 4 shows the common incentives and criteria to be granted.

Common Investment Incentives			
Criteria			Rate
1	Creation of stable employment*	Employment ratio between 1 and 1,5	5% of eligible investment amount
		Employment ratio between 1,5 and 3	7% of eligible investment amount
		Employment ratio >3	10% of eligible investment amount
2	Gender ratio** (>=30%)		3% of eligible investment amount
3	Future-oriented sectors or upgrading of sectors		3% of eligible investment amount
4	Sustainable investment projects		3% of eligible investment amount
5	Local integration projects		3% of eligible investment amount

Table 4: Common Investment Incentives (Ernest & Young, December 2023)

Immigration and visa procedures for foreign employees

The recruitment of foreign employees in Morocco is subject to specific rules. Article 507 of the Labor Code provides that employers may recruit employees when necessary, taking into consideration the professional experience, education and the professional recommendations. As a principle, the priority is given to Moroccan nationals whereas foreigners may be recruited in Morocco in the absence of Moroccan nationals with the requisite professional skills. As per article 516 of the Labor Code, Moroccan employers may freely hire foreigners provided that they do not find Moroccan nationals with equivalent professional skills. For that, Moroccan employers should obtain an authorization from the Ministry of Employment. This authorization is issued in the form of a visa on the employment contract.



Visa prerequisite - there are certain nationalities who are required to obtain a prior consular visa before entering Morocco. As such, they will be required to apply for a consular visa to enter the Moroccan territory and be able to start their immigration procedure, which will enable them to obtain a work permit and a resident permit.

The recruitment of foreigners in Morocco can be done in two ways:

- (i) Either through a local entity (company or branch) by the conclusion of a local employment contract;
- (ii) By the conclusion of a secondment agreement to the benefit of a local entity. In this regard, if a foreigner is seconded to a Moroccan entity, the authorization from ANAPEC is not required (Ernest & Young, December 2023).

3.2. Macroeconomic context for in-country financings

Gross domestic product (GDP) analysis

The GDP growth is projected to accelerate to 3 percent in 2023, mainly due to in agricultural output and its positive spillovers to the rest of the economy. Inflation is forecast to gradually decline to about 4 percent in 2023, as the commodity price shock gradually dissipates, and the monetary stance becomes less accommodative. Remittances and tourism flows are projected to moderate somewhat owing to the deterioration in euro area growth, and investment is expected to remain subdued, but lower inflation and measures to support demand from the 2023 Budget are expected to sustain private consumption. Over the medium term, GDP growth is projected to stabilize at around 3½ percent, as the initial positive effects of the structural reforms help offset the scarring effects from the pandemic and Russia’s war in Ukraine.

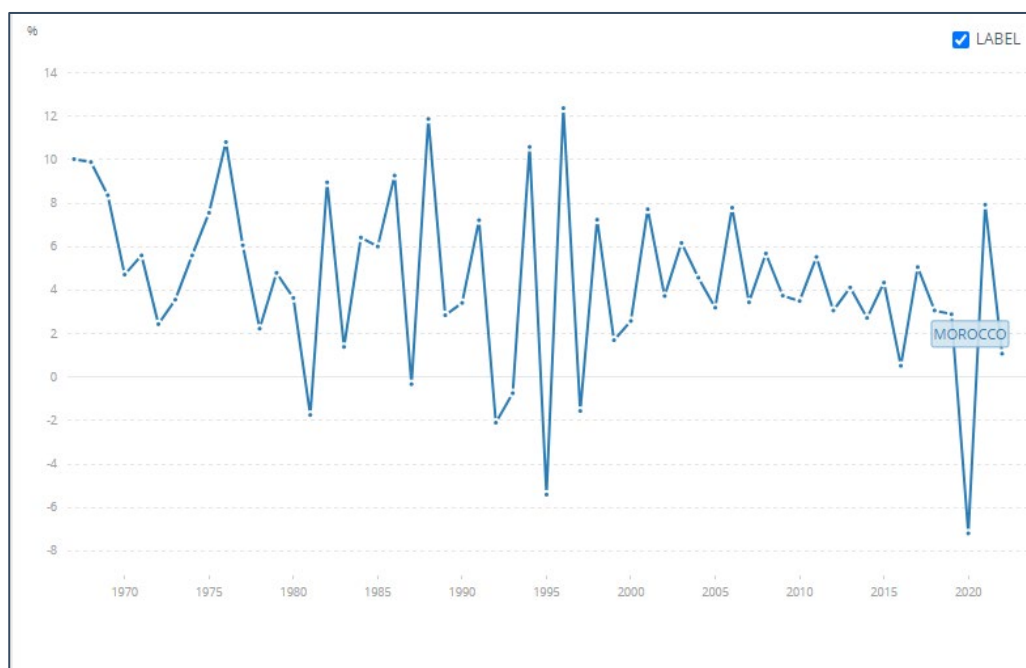


Figure -8: Historical GDP

It is estimated grow of GDP, which is 2 points higher than in 2021 but 3-5 points lower than the prevailing level in 2010 and the years that followed, when Brent prices also exceeded USD 100. Although a drop cannot be ruled out depending on the scale of the crisis in Europe, these two major sources of currency should remain at high levels. At 3.9% of GDP in 2023, the current account deficit would remain high, but should be covered without difficulty. The Moroccan economy continues to attract significant capital flows, mainly in the form of foreign direct investment (approximately 2% of GDP), of which more than a third is now directed towards the development of industry (Table 5).

Macroeconomic Stability	2020	2021	2022	2023	2024
Consumer Price Inflation (%)	0.4	1.34	6.66	6.07	3.65
Consumer Price Index Avg	100.4	101.75	108.52	115.11	119.31
Producer Price Inflation (%)	-1.8	5.02	12.74	1.74	-1.75
Producer Price Index Avg (%)	98.2	103.13	116.27	118.29	116.22
GDP Deflator	122.98	126.8	132	133.92	137.76
Domestic Credit Growth (%)	4.48	4.21	7.38	7.06	7.52
Money Market Interest Rate (%)	2.87	2.6	2.48	2.81	3.12
Bond Yield (%)	2.78	2.53	2.75	4.67	4.76
Budget Balance/GDP (%)	-7.14	-5.51	-5.22	-4.06	-5.11
Budget Expenditure/GDP (%)	29.66	28.07	31.17	28.9	29.9
Public Debt/GDP (%)	74.44	71.31	72.86	76.04	79.42
Debt Int Payment GDP (%)	2.58	2.33	2.24	2.23	3.59
Public Debt, LCU (\$B)	96.31	98.28	92.75	104.1	114.32
Budget Revenue, LCU (\$B)	27.38	31.99	34.04	34.06	35.68
Interest Payments (\$B)	29.68	29.64	29.73	31	52.48
Interest Payment Growth Rate (%)	-2.4	-0.13	0.3	4.27	69.29
Gold Reserves (\$B)	1.35	1.29	1.29	NA	NA
Gross Domestic Savings (\$B)	256.12	281.04	261.08	245.12	273.87
Stock Market Index	11,287.38	NA	NA	NA	NA

Table 5: Projected economic growth

Morocco has repeatedly demonstrated a strong capacity to respond effectively to setbacks in recent years. The September 8 earthquake in Al Haouz is the last of a series of shocks that have struck Morocco since the COVID-19 pandemic. The quake had devastating human and material consequences localized primarily in remote mountain communities but is unlikely to have significant macroeconomic impacts.

Morocco's external resilience is also evidenced by a solid external demand for the country's goods and services, despite the international economic slowdown. Equally, Foreign direct investment inflows remain strong and increasingly directed towards the manufacturing sector. Various modern industrial niches well connected to global value chains have emerged and the country maintained access to international capital markets despite the ongoing tightening of global financial conditions.



Morocco has launched ambitious reforms to improve human capital and encourage private investment. These reforms will achieve the desired economic and social development impact only if, though, combined with other critical initiatives, including the removal of regulatory and institutional barriers that limit competition and slow the reallocation of factors of production to more productive firms and sectors.

Moreover, a paradigm shift is still needed to empower Moroccan women economically which will be necessary to meet the high ambitions of the country as expressed in the NDM. Beyond its importance in promoting gender equality, increasing Female Labor Force Participation (FLFP) would also have a significant economic impact and be a powerful driver of socioeconomic development. The report shows that meeting the NDM objectives of a 45 % FLFP could boost growth by almost one percentage point a year (<https://www.worldbank.org/en/country/morocco/publication/morocco-economic-monitor-fall-2023-from-resilience-to-shared-prosperity>).

Morocco Public debt

In 2021 Morocco public debt was 98,493 million dollars, has increased 10,821 million since 2020. This amount means that the debt in 2021 reached 68.94% of Morocco GDP, a 3.31 percentage point fall from 2020, when it was 72.25% of GDP. If we check the tables we can see the evolution of Morocco debt. It has risen since 2011 in global debt terms, when it was 53,267 million dollars and also in terms of GDP percentage, when it amounted to 48.56%. According to the last data point published, Morocco per capita debt in 2021 was 2,712 dollars per inhabitant. In 2020 it was 2,439 dollars, afterwards rising by 273 dollars, and if we again check 2011 we can see that then the debt per person was 1,635 dollars .

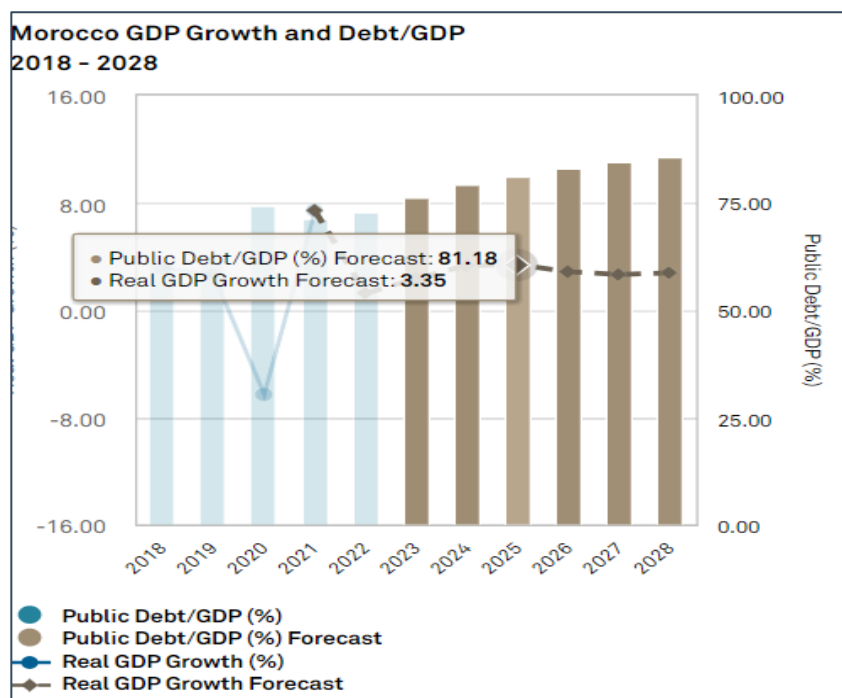


Figure -9: Morocco GDP and Debt

Restrictions on imports/exports and overview of time and costs relating to customs clearance

Overview

In Morocco except for a limited number of branches regarded for example: phosphates, international road transport and basic telecommunications services, the various economic activities are open to both nationals and foreigners. Most quantitative restrictions on trade have been lifted. Those still in force relate to basic agricultural products: oils, sugar, cereals and their derivatives. Morocco is waiting until the accompanying measures are in place before replacing these restrictions with their tariff equivalents. The authorities have confirmed that all basic agricultural products will be subject to tariff equivalents in accordance with Morocco's commitments under the WTO Agreement on Agriculture. Customs duty rates have been significantly reduced across the board. Because of the various tariff exemptions and reductions, the nominal rates do not truly reflect the level of effective protection. The application of tariff equivalents should lead to relatively high rates on the agricultural products in question. 4. Morocco's trade policy strongly emphasizes export. Thus, most taxes on exports have already been abolished.

Measures directly affecting exports/imports

Since the starting of the pandemic, Morocco has established a total of 9 circulars concerning both the export and the import of covid-related products, concerning mainly masks, protective plastic face visors and medicines for human use.

Measures on exports:

- Fully lifted (as of June 2022)

- Customs circular n°6021/311 of 03/03/2020 - licencing system for the export of surgical masks.
- Customs circular n°6041/311 of 22/04/2020 - licencing system for the export of protective plastic face visors
- DMP circular n°91DMP/00 of 31/03/2020 - specific authorisation issued by the DMP (Ministry of Health) to industrial pharmaceutical establishments for the export of medicines for human use.
- Customs circular n°6064/311 of 25/06/2020 - licencing system for the export of nonwoven fabrics

- Partially lifted (as of June 2022)

- Customs circular n°6024/311 of 13/03/2020 - licencing system for the export of antiseptic preparations and protective masks (the part lifted is on the export of protective masks). There is still a licencing system for the export of antiseptic preparations.

Measures on imports (all in place):

- customs circular n°6058/311 of 05/06/2020 - licencing system for the import of protective masks
- customs circular n°6054/311 of 28/05/2020 - compliance check for the import of non-woven fabric protective masks for non-medical use



- Customs circular n° 6088/311 of 16/09/2020 - compliance check for the import of fabric protective masks for non-medical use
- Customs circular n° 6096/311 of 21/10/2020 - licensing system for the import of ethyl alcohol

3.3. Political context for in-country financings

Political environment and background

The monarchy of King Mohammed VI is the highest political authority in the country, and has been at the centre of political power for centuries. It is largely perceived by Moroccans as essential to stability, even more so since the wave of uprisings in the Arab world in 2011. Since the beginning of the rule of King Hassan II, Morocco has maintained a pro-Western stance aligned with French and US foreign policies, and since the 1980s the kingdom has adopted liberal economic policies. This has allowed Morocco to develop strong relations with several European countries, which have been strong supporters of the monarchy, helping to sustain its rule.

During the Arab Spring the 20 February Movement arose to demand democratic reforms and the end of political corruption and nepotism. The state has engaged in widespread repression of members of this movement using threats, harassment, and arrests, effectively suppressing any threat of major civil unrest. Although the movement has been unable to expand due to state repression parts of civil society continue to sympathise with its ideals. The movement remains present through the engagement of its activists in a number of social issues.

Human rights organisations continue to criticise the crackdown on liberties in the kingdom. Hundreds of activists, journalists and citizens who have denounced political corruption or publicly criticized the political establishment are in prison.

Morocco has a history of civil unrest linked to the mining sector. In December 2017, two men died in the rural north-eastern city of Jerada (Oriental province) while working in an illegal coal mine. The incident prompted several weeks of sustained unrest, with thousands of protesters calling for an end to illegal mines and demanding improved economic prospects and an end to their marginalisation. Although the protests did not significantly spread outside of Jerada, they demonstrate the higher potential for sustained mass unrest in rural and impoverished areas.

The state has also faced recurrent episodes of labour-related unrest. Protests are mainly driven by local labour unions protesting changes to their administrative or financial status due to changes to their professions imposed by the authorities. Those protests have mainly occurred in main urban centres. However, the continued expansion of the mining industry will drive a threat that miners in rural areas will attempt to unionise and stage similar protests. There are currently no major unions for mining workers in Morocco and attempts to form an active union in the aforementioned Jerada mine for instance were repressed by the state.

Attitudes towards foreign investment

Morocco remains a business-friendly destination, and the government has succeeded in positioning the kingdom as a major destination for foreign direct investment (FDI) in North Africa. The government is keen



to attract foreign investors and seeks to facilitate investments through favourable regulations, economic reforms and other incentives. Enforcement of regulation varies depending on the sector and state institution responsible. However, there is no clear pattern of discrimination against foreign investors, including in the mining sector. Morocco is struggling to address the gap between the often-inadequate skills of its unemployed population and the requirements of the modern jobs market, and it is common for companies to hire foreigners or Moroccans educated abroad for positions that require advanced technical skills. The local market favours candidates with a foreign education, particularly degrees from France, Canada and other countries where French is an official language, due to the overwhelming use of French in the Moroccan business sector.

Contract risk and expropriation

Contract risk in Morocco remains low and nationalizations are unlikely. The most recent round of nationalization occurred in the 1970s. The current political establishment is highly unlikely to conduct any nationalizations as it seeks to project an image of a secure business environment to attract foreign investors.

Foreign companies have periodically faced contract frustration when dealing with the government given endemic corruption and occasional conflicting interests with the local economic elite. However, the government is wary of undermining foreign interest in the non-phosphate mining sector, limiting the threat of similar contract risks for foreign companies. Contract risk to foreign companies occur when companies – or the governments of the countries in which they are based – have expressed support for Western Saharan independence.

External environment

War

Although the security environment in Morocco remains broadly benign, the kingdom has been engaged in a decades-long, low-intensity conflict with Sahrawi independence movement the Polisario Front over sovereignty of the disputed territory of Western Sahara. In recent years, Morocco has explicitly designated the recognition of its sovereignty over Western Sahara by the international community as its priority in its foreign policy. This has undermined some of its diplomatic relationships, including with neighbours such as Algeria. Morocco considers Western Sahara to be its “southern provinces” and fully part of the kingdom, despite the fact that its sovereignty over the territory is not recognised by the majority of the international community.

International regulations

Morocco is yet to join the International Extractives Transparency Initiative (EITI). The state-owned OCP – the country’s largest mining company – nonetheless joined the Extractive Industries Transparency Initiative (EITI) as a supporting company in September 2022. As its status as a supporting company is relatively recent, reports on its compliance with the EITI are yet to be collected and published.

Morocco has been a member of the International Labour Organisation (ILO) since 1956. Morocco has ratified ILO’s eight fundamental conventions and all four governance conventions. Local laws largely adopt



the content of the conventions, and guarantee the right to unionise and strike. In practice over the past few years however, representative figures of powerful unions or labour movements have been the target of state repression.

Human rights and mining in Morocco

Morocco is demographically split into three main ethno-cultural groups: the Arabs, Amazighs (commonly referred to as Berbers) and the Sahrawis. The Amazighs are the indigenous people of North Africa and the biggest ethnic minority in Morocco. The community consists of around 15 million people, amounting to roughly 40% of Morocco's total population, and is divided into three groups: the Riffis in the northern Rif region, the Amazighs of the plains and northern part of the Atlas mountains, and the biggest sub-group, the Chleuhs, located in the southern range of the Atlas mountains which is also referred to as the Anti-Atlas. The overwhelming majority of areas where the Moroccan state seeks to develop mining activities in the coming years are located in predominantly Amazigh land.



4. Assessment of social, environmental, and governance challenges¹⁰

4.1. Country-level assessment and context

4.1.1. Overview of the mining sector

The mining sector plays a vital role in the country's socio-economic development, contributing close to 10% to its GDP and providing employment opportunities with 49,572 people directly employed in the sector. The country is known for its vast mineral deposits, including phosphates, zinc, copper, lead, silver, and gold. Morocco is major producer of phosphates (Pistilli, 2021)³², and in 2021, the country was ranked as the world's second-largest producer of this mineral.

Phosphate mining accounts for a significant portion of the country's export revenue and employs thousands of people across the country.

In 2021, the total volume of mining production amounted to 41 million tonnes, of which, 38 million tonnes was from phosphates. Total turnover for the year was approximately 100 billion MAD (\$9.57 billion). The total contribution to Morocco's exports was 26% of which 19.3% was phosphate in 2021.

The Moroccan Government has set out a national strategy for the development of its mining sector (excluding phosphates) with the goal of tripling the mining sector's turnover to more than MAD15 billion by 2025. This would involve multiplying the volume of investment in mining exploration and research tenfold to nearly 4 billion Moroccan dirham (MAD), and doubling the jobs generated by the sector.

Mines form part of the state's public domain under Article 3 of the Mining Law. The initial duration of an exploration authorisation is two years, renewable once for a one-year period if additional exploration is required based on the results of the exploration and the contemplated investment. Exploration work must begin within three months of the date of issuance of the authorisation and be continued regularly in accordance with the work programme agreed between the MEM and the investor. An exploration authorisation provides its holder with exclusive rights to explore the area described in the authorisation. The award of research permits in the exploration area, provided that the application for a research permit is submitted while the exploration authorisation is still in force. The initial duration of a research permit is three years, renewable once for a four-year period. Renewal is subject to the completion of the applicable minimum work programme and related expenditures and must be requested at least three months before the expiry of the three-year initial period. An mining license is granted for a period of ten years and can be renewed for successive periods of ten years until available reserves are exhausted (<http://uk.practicallaw.tr.com/w-018-4123>).

¹⁰ Most of the information of this section is from AfricaMaVal, deliverable 4.1 by AWIMA



4.1.2. Mineral and Mining Policies

Mining resources belong to the Moroccan state (Article 3). Mining is categorised into Mining resources and Quarries (Article 2). Exploration, Prospecting and production should all be done within the confines of the law.

The regulatory framework for the Moroccan mining sector is mainly based on the following laws and regulations:

Law No 33-13 Related to Mines (The Mining Law and Mining Decree), which set out the:

- administrative regime applicable to the award of mining titles;
- main rights and obligations of mining title holders in the context of exploration, research or exploitation activities;
- rules governing relations between mining title holders and landowners;
- rules applicable to the supervision of mining activities by the competent authorities; and
- administrative and criminal sanctions applicable to mining operators for violation of their statutory obligations.

The Mining Law and Mining Decree replaced old legislation dating back to the 1950s and adapt the regulatory framework to new market trends at an international level.

The reform had the following main impacts:

- Extending the application of mining legislation to all mineral substances used in industry, other than construction and civil engineering materials.
- Establishing the new mining title of exploration authorisation, allowing investors to develop exploration programmes over a wider area.
- Introducing an operating licence for tailings and slag heaps that are planned for enrichment and/or for recovery of masses consisting of waste and residues from mining products.
- Provisions relating to natural or artificial cavities for the underground storage of liquefied or gaseous natural gas and liquid hydrocarbons, or chemicals for industrial use.
- Introducing express provisions relating to environmental impact assessments and the requirement to implement a closure plan dealing with post-exploitation phases.

In addition to the abovementioned mining related regulations, Morocco has implemented a range of policies to regulate and promote sustainable development in its mineral and mining sector. These policies include the National Strategy for Mining Sector Development, the National Charter for the Environment and Sustainable Development, the National Water Plan, the Renewable Energy Policy, and Social and Environmental Impact Assessments (SEIAs).

4.1.3. Mining Regulations

The main law regulating the exploration and extraction of mineral resources in Morocco is the Mining Law, which requires the obtaining of a mining title before commencing mining activities. It distinguishes between exploration, research and exploitation activities as follows:

For each of these activities, Article 4 of the Mining Law sets out an administrative regime that describes the process for obtaining the relevant mining title and the rights and obligations associated with each mining title. The application for exploration authorisation, research permit or mine operating licence must be filed with the administration responsible for mines.



Licence Type or Authorisation	Description	Duration	Renewable	Restriction
Exploration Permit	Legal Person, Exclusive rights (article 22) Area btwn 100sqkm and 600sqkm.	2 years (Art 26)	Renewal once for one year (article 26)	A holder cannot have more than 4 exploration licences
Research Permit (Article 31)	Legal Person, Exclusive rights. Area for this permit cannot be more than for exploration but it is determined by the Holder. It should cover at least 4 km in length.	Valid for 3 years (Article 37)	Renewal once for a 4-year period	This is dependent on field work, reporting and financial expenditure for the planned field work (article 37)
Mining Licence	Legal Moroccan Entity (Art 46)	10 years	Renewable for 10 years till exhaustion of resource	You can only have a mining licence if you had the Exploration & Research permit

Table 6: The various licence / permit types / authorisations available for the mining sector of Morocco.

Each licence type attracts different permitting fee as detailed below:

Licence Type	Amount	Details
Exploration	MAD2,000	Exploration authorisations are subject to the performance of a minimum amount of work per square kilometre ranging between MAD10,000 and MAD66,000
Research	MAD50 per square kilometre	Research permits are subject to the performance of a minimum amount of work per square kilometre ranging between MAD10,000 and MAD66,000
Mining	MAD 18,000	A local annual tax applicable to mining exploitation activities is payable to the relevant region under Article 4 of Law No 47-06 related to local taxes, promulgated by Dahir No 1-07-195 dated 30 November 2007

Table 7: Permit fees per licence type

4.1.4. Taxation and Royalties

Mining companies are subject to a corporate income tax rate of 17.5%, which is the standard rate for all companies in the country. Additionally, mining companies are subject to a resource tax, which is calculated based on the quantity and value of the minerals extracted. The resource tax rate varies depending on the type of mineral, and ranges from 2.5% to 10% of the value of the extracted minerals (Mining Code, 2015).

The granting and renewal of mining permits are subject to the payment of certain application fees, which have been revised by the New Mining Code and the Decree. In addition to the taxes stipulated by the Tax Code that are applicable to all economic activities in Morocco, a local annual tax applicable to mining

exploitation activities is payable to the relevant region (under Article 4 of Law No 47-06 related to Local Taxes, promulgated by Dahir No 1-07-195 dated 30 November 2007).

The amount of this tax is based on the quantity of mining products extracted during mining exploitation. The rate varies depending on the extraction region between MAD1 and MAD3 per ton extracted. The taxpayer is either the concessionaire or the owner of the mining activity.

Royalties

The Mining Law does not stipulate any further taxes or royalties. Royalties are only applicable in the ASM sector, if and when, production happens.

Foreign Direct Investment

There is no restriction on the nationality of shareholders of a company engaging in mining activities. In December 2022, Morocco adopted an Investment Charter that repealed the Investment Charter No. 1-95-213 of 8 November 1995. This charter is the principal regulatory document for foreign and domestic investments with an exception to investment in agriculture, as well as the exclusion of real estate and commercial sector investors from some provisions of the charter.

The Moroccan government can sign specific agreements and contracts with investors, providing subsidies for certain expenses, custom duty and Value Added Tax (VAT) exemptions when the agreed criteria are met. Morocco has ratified 72 investment treaties for the promotion and protection of investments and 62 economic agreements, including with the United States and most EU nations, that aim to eliminate the double taxation of income or gains.

4.1.5. Land-use and Mineral Rights

Land Use and Mineral Rights are governed by a legal framework that includes the Mining Code and several other laws and regulations. The Mining Code provides for the exploration, exploitation, and processing of mineral resources, while also setting out the rights and obligations of mining companies.

Under the Mining Code, mineral rights are owned by the state, and mining companies must obtain exploration and mining licences in order to carry out mining activities. The licence application process includes a review of the mining company's technical and financial capabilities, as well as an assessment of the potential environmental and social impacts of the proposed mining activities.

Once a mining licence is granted, the mining company has the right to explore and extract minerals within the designated area, subject to compliance with all applicable laws and regulations. However, the government retains the right to terminate the licence if the mining company is found to be in violation of any of its obligations.

In addition to the Mining Code, land use is governed by several other laws and regulations, including the Land Use Planning Law and the Environmental Protection Law. These laws are designed to ensure that land use and mining activities are carried out in a sustainable manner, with due regard for environmental protection, social responsibility, and the rights of local communities.

Generally, the legal framework governing land use and mineral rights is designed to promote sustainable mining practices and protect the rights and interests of all stakeholders. However, there are ongoing



debates over the allocation of mineral rights and the potential impact of mining activities on local communities and the environment, which continue to be the subject of research and policy discussions (El-Baraka and Kasmi, 2016; Bechri et al., 2018).

4.1.6. Environment

Dahir no. 1-03-59 promulgating Law no. 11-03 relating to the protection and enhancement of the environment lays out basic rules and general principles of national policy on protection and development of the environment. Within this law is the establishment of a specific requirement, guaranteeing the repair of damage to the environment and the compensation of victims.

A very important policy is the requirement of an Environmental Impact Assessment (EIA). Under Law No 12-03 Relating to Environmental Impact Assessment (Law 12-03), mining activities are subject to a prior authorisation granted based on both, an:

- Environmental impact study prepared by the promoter of the project, which is reviewed by the national or regional committee on environmental impact studies.
- Environmental acceptability decision (décision d'acceptabilité environnementale) granted by the governmental authority in charge of the environment (autorité gouvernementale en charge de l'environnement).

The EIA process includes public consultations to ensure that stakeholders are informed and involved in the decision-making process. For example, the Environmental Impact Assessment Law No. 01-09 of 2010 requires an EIA for all mining projects, including exploration, exploitation, and mine closure plans.

Environmental Regulations

Moroccan environmental regulations provide for specific further rules:

- waste management is regulated by Law No 28-00 dated 22 November 2006 Relating to Waste Management and Disposal.
- sewage water use or discharge is regulated by Law No 36-15 Related to Water, promulgated by Dahir No 1-16-113 dated 10 August 2016.
- air pollution is regulated by Law No 13-03 Related to Air Pollution Control promulgated by Dahir No 1-03-61 dated 12 May 2003. This forbids discharges, emissions and release into the air of pollutants that do not comply with the quantities and concentration limits set out in Decree No 2-09-631 dated 6 July 2010.

Mine Closure

The Mining Law also requires the holder of an operating licence to prepare a Mine Closure Plan. Mining companies must develop a plan to manage the environmental impacts of mine closure, including the reclamation and rehabilitation of the land.

The mine closure plan must be submitted to the Ministry of Energy, Mines and Sustainable Development for approval. The Environmental and Social Impact Assessment Guidelines for Mining Projects, published in 2018, require mining companies to develop a mine closure plan that includes measures to minimise soil erosion and water pollution.



Water

Morocco is among the world's most water-stressed countries (World Bank, 2022). At 600 cubic metres of water annually per capita per year, the country is already well below the water scarcity threshold of 1,700 cubic metres, according to the World Health Organization.

The National Water Plan (NWP), adopted in 2009, is a policy initiative aimed at promoting sustainable water management practices in the mining industry. The plan recognises the importance of water as a critical resource for the mining sector and the need for efficient and sustainable use of it.

The NWP in the mining sector aims to improve water resource management by promoting the use of advanced technologies and techniques to minimise water consumption and reduce water pollution. The plan also emphasises the importance of stakeholder engagement and public participation in decision-making processes related to water management in the mining sector.

The successful implementation of the NWP will require active participation from stakeholders, effective management of potential social and environmental risks, and adequate financial resources to support the implementation of sustainable water management practices.

4.1.7. Societal and Community Aspects, Cultural Heritage

Morocco has a legal framework for Social and Environmental Impact Assessments (SEIAs) in the minerals and mining industry. The SEIA process is intended to ensure that mining projects are carried out in a socially and environmentally responsible manner, and to minimise any negative impacts of mining activities on local communities and the environment.

The SEIA process in Morocco involves the identification and assessment of potential impacts of mining activities, as well as the development and implementation of measures to mitigate any negative impacts. The SEIA process also involves the consultation and participation of local communities and other stakeholders in the decision-making process.

The Kingdom of Morocco has a rich cultural heritage, both tangible and intangible. Law 22-80, promulgated in 1981 and supplemented by law 19-05 is the primary framework that regulates the conservation of the country's cultural heritage (Royaume de Maroc, 2021). In 2021, the Ministry of Culture, Youth and Sports in partnership with the Foundation for the Safeguarding of Heritage Culture of Rabat organised a roundtable alongside international and local cultural experts to deliberate on ways to strengthen the national legislation in accordance with global standards. Recommendations at the end of the discussion included the creation of a single national code including all cultural heritage and accompanying regulations, updates introducing new concepts and universal terminology as well as the introduction of mechanisms supporting the inclusion of civil society in the management and protection of its heritage (ibid.).

4.1.8. Public Health and Safety

Public health and safety in the Moroccan mining sector is a top priority for the government and stakeholders involved (Mining Technology, 2021). The sector poses significant risks to workers and local communities due to exposure to harmful chemicals and physical hazards. Therefore, regulatory policies have been implemented to mitigate these risks and ensure the safety of everyone involved.



Operational Health and Safety (OHS) and Labour Regulations

The holder of a mining title must operate mining activities in compliance with laws and regulations related to health, hygiene and environmental protection (Article 56, Mining Law). Vizirial Order dated 18 February 1938 Forming Internal Rules for the Exploitation of Mining Products Other Than Combustibles Mining Products (as amended by Vizirial Order dated 9 September 1953) sets out detailed health and safety requirements for carrying out exploitation activities, including obligations to:

- Maintain work areas in a constant state of cleanliness and to respect the hygiene and sanitary conditions necessary to preserve employees' health.
- Make devices such as telephones or acoustic pipes available in underground circulating areas to enable communication between employees, supervisors and extraction technicians.
- Take measures to prevent water stagnation and the accumulation of mud in the working area and galleries.

Labour Practices

Labour unions represent the interests of workers in the mining sector and advocate for their rights and welfare. The General Confederation of Moroccan Workers (CGTM) is the largest labour union in the country and represents workers in the mining sector, among others.

It is stated in the Regulatory, status of personnel of mining companies (Article 21) that women may not go underground and secondly that in the small-scale sector the socio-cultural view is that women should only undertake work relating to catering, sorting and cleaning minerals. However, the mining sector in Morocco especially the formal sector has very skilled and high-profile women involved. There is currently an upward trend in the number of women in the mining industry. Under the supervision of the Ministry of Mines and the Academic level. In the "Ecole Nationale Supérieure" des Mines de Rabat, for the 2020-2021 academic year, out of a total of 825 future engineers, there were 415 female and 410 male engineering students.

4.2. Mining practices vs. Environmental, Social and Governance (ESG) goals

4.2.1 Environmental challenges

The key issues in the environmental management of the mining sector in Morocco are related to water, air and biodiversity as well as how to implement and monitor the various activities to deliver the desired results for relevant stakeholders. Mining operations can be water-intensive, and in Morocco, water resources are already under pressure due to a combination of factors including climate change, population growth, and agricultural demands. Mining companies operating need to pay attention to the National Water Plan and to implementing water conservation and management practices to reduce their impact on the local water supply. Companies should consider implementing measures to reduce dust emissions and monitor air quality to ensure that emissions remain within acceptable levels. Companies should implement measures to minimize their impact on local flora and fauna. The regulations and various strategic plans already make these recommendations and companies need to implement and adhere to them. Activities and actions around these issues implemented need to be communicated to communities affected by mining.



4.2.2 Socio-economic issues

Social issues

Social issues in Morocco include unemployment, poor education, and regional disparities (Kabis-Kechrid, 2015). With more than 50% of its population made up of youth, this demographic is disproportionately affected by these issues, resulting in youth marginalization (USAID, 2012).

A National Framework Law NO: 09.21⁵³ on social protection was adopted in March 2021. The scope of the framework includes:

- The generalisation of the compulsory health insurance (AMO) by the end of 2022, by broadening the base of beneficiaries of this insurance to include vulnerable categories benefiting from the Medical Assistance Scheme (RAMED) and the category of self-employed and non-salaried professionals, so that an additional 22 million people benefit from AMO, which covers the costs of treatment, medicines and hospitalisation.
- The generalisation of family allowances by 2023/2024, enabling households not receiving these allowances to receive benefits covering child-related risks, or lump-sum benefits for protection against child-related dangers (school drop-out) for 7 million school-age children.
- Broadening the pension schemes coverage in 2025 to include around 5 million people who are employed and not receiving a pension, through the inclusion of self-employed professionals and informal economy workers.
- The generalisation of the unemployment benefit scheme (Indemnité pour perte d'emploi - IPE) in 2025 to cover all persons in stable employment through the simplification of the eligibility conditions and the extension of beneficiaries.

4.2.3 What would be the best practices for a responsible mining?

In 2012, Morocco launched the Moroccan Code for Good Governance Practices in public enterprises and institutions, with the aim of ensuring the transparent and accountable management of public institutions and enterprises (MEF, 2020). This Code was created by a working group from the National Governance Commission, led by the Ministry of Economy and Finance through the Department of Public Enterprises and Privatisation, and involved many institutional actors and public enterprises

Morocco is signatory to and has ratified the New York Convention on the Recognition and Enforcement of Foreign Arbitral Award. This establishes a framework for enforcement of foreign arbitral awards, although the enforcement process is submitted to local law.

Morocco has put in place all the necessary laws and regulations for the management of their mining sector. However, the implementation and monitoring of the various regulations and their impact is key to achieving maximum benefit for the industry and communities.

Governance

Governance plays a crucial role in natural resource management. Organisations such as Transparency International include Morocco in their work, which gives an opportunity to have an external opinion on corruption and governance.



Morocco is a politically stable constitutional monarchy and this stability helps in the promotion of investment and business in this North African country. According to the Ministry of Energy, Mines and Sustainable Development, their strategic plan is to closely look at the issues of mining and energy transition, strategic and critical minerals, local content, and reclamation and rehabilitation of old mines.

In order to enhance on the governance of the natural resources of Morocco, the mining companies must comply with local laws and regulations. Moreover, Morocco should be encouraged to sign up with the EITI and follow the international standards for governance of natural resources.



5. Business network between the European Union and Morocco

5.1. Assessment of the upstream and downstream business ecosystem

5.1.1 Context, formal and informal players

The key institution governing the mining sector of Morocco is the Ministry of Energy, Mines and Sustainable Development (MEM).

The MEM has delegated authority to:

- the Walis (representative of the central government in the local region) for the award of exploitation authorisations for projects of a value less than MAD200 million; and
- Regional Directors of the Energy and Mines Department of the MEM for the award of research permits. (Order of the MEM No 2360-16 dated 9 December 2016.)

In addition to the MEM, other key stakeholders in the mining sector of Morocco are:

- The National Office of Hydrocarbons and Mines (ONHYM). The ONHYM is subject to the state supervision and financial controls applicable to Moroccan public establishments. ONHYM's mission is to:
 - carry out in the authorised zones, all studies, research and prospecting activities for the discovery of hydrocarbons deposits or any other fuel, mining deposits or any mineral substance, with the exception of phosphates;
 - undertake in the authorised areas, the development and exploitation of hydrocarbon or mining deposits or mineral substances, and to carry out all related activities, in particular ensuring the transport and upgrading of hydrocarbons and mining products in accordance with the regulations in force; and
 - promote any action likely to contribute to the development of hydrocarbon, mining and mineral products' exploration and exploitation.
- Land Registry. The Land Registry (ANCFCC: Agence Nationale de la Conservation Foncière du Cadastre et de la Cartographie) is a public establishment (établissement public) regulated by Law No 58-00, promulgated by Dahir No 1-02-125 dated 13 June 2002. It is subject to the state supervision and financial controls applicable to Moroccan public establishments. The Land Registry is in charge of the issuance of special titles (titres spéciaux) relating to each mining title registered with it.

Current aim of mining legislation in Morocco is to improve the appeal of the mining sector for national and international private investment, as evidenced by the new mining law 33-13 of 2015, following the reform of the last mining code of 1951. This law governs all mineral substances, with the exception of phosphates (reserved for the State) and construction materials. The political choice of an industrial orientation for the mining sector is all the more visible in that nowhere in this new law is artisanal mining stipulated. Artisanal mining is only officially allowed in the mining region of Tafilalet and Figuig, under a law created by the dahir (royal decree) of 1960, extended in 1975 and currently governed by the new law 74-15 enacted in 2016. The regulation of artisanal mining in Morocco is therefore above all a regional exception and falls into a certain political pragmatism (Dessertine, 2023).



5.1.2 Relationships at local or regional levels

To ensure that the people of Morocco benefit from mining revenues, mining companies pay annual mining taxes to the state. The applicable tax rates range from one to three dirhams per ton of mineral extracted. Currently tax amounts are fixed by the regional authorities of areas in which mining activities take place. There is no provision for state development projects for the benefit of local communities, to be specifically funded by mining tax in terms of 2015 Mining Code.

The 2015 Moroccan Mining Code and its implementation decree provide for mining companies to contribute towards local development in terms of corporate social responsibility (CSR). The current Mining Code provides for mining companies to contribute to rural development and poverty alleviation in areas where mining takes place. After paying mining tax, mining companies are therefore required under CSR to contribute to the best of their abilities towards the building of schools, hospitals, roads etc. in and around areas where mining activities take place.

Following mining communities' complaints, the Moroccan government has observed, however, that lack of infrastructure suggests that local mining communities still do not benefit from mining, despite the 2015 legal reform. The Minister of Energy, Mines and Sustainable Development admits that the current distribution of tax revenues by the 2015 Mining Code between the national and regional government is inappropriate. Currently, a portion of mining taxes is paid by mining companies directly to the national government and a portion to the regional government. No taxes are allocated to local government in the areas where mining takes place. Communities still lack basic infrastructure, as all revenues from mining end up at national and regional level.

To aggravate the situation, it also appears that locals are not employed in the mining sector. Local communities, therefore, believe that they are left in poverty by mining companies, in spite thereof that the mineral resources supposedly belong to them as the original inhabitants of the areas where the resources were discovered. They feel strongly that mining companies cannot be the only parties that benefit from the profits created by mineral extraction.

Conflicts in mining areas prompted the Minister to initiate the revision and reform of the current system of mining tax distribution under the 2015 Mining Code. The aim of this process is to ensure that the sharing of mining revenues becomes more beneficial to local communities. The image of mining communities lacking basic infrastructure, in spite of the mineral riches extracted around them, is far too prevalent in mining areas in Africa. It seems as if mining areas in Morocco provide no exception. The situation of these communities and their relationship with mining companies can be ameliorated if the proposed tax reform is implemented (Bernard Kengni, 2018).

Despite all of the local problems associated with poor revenue of mining taxes to the local population, Morocco kips trying to do business with neighboring countries and in that sense applied in 2017 to be a member of the Economic Community of West African States (ECOWAS), which includes 15 countries in West Africa. However, Morocco's bid for membership was stalled as West African economic actors feared that goods imported through Morocco's free trade agreements would flood the market of states within ECOWAS. During COP27 a MoU on Critical Raw Materials was signed with Namibia and is also expected to be signed with Morocco, Uganda, South Africa, Rwanda, Senegal, DRC, Zambia, Burundi and Algeria.

Morocco expected to remain the world's leading supplier of phosphate rock and phosphate-based fertilizers for the next 5 years as OCP continues to invest in expanding capacity at existing mines.



Managem is increasing its output of cobalt cathode, copper concentrate, and silver by developing its mineral resources in Morocco through exploration studies in partnership with ONHYM.

Cobalt cathode output by Managem at the Guemassa complex is expected to increase in the next 5 years with the beginning of the supply of cobalt from the company's share at the Pumpi Mine in Congo (Kinshasa) in 2020.

Silver production by Maya is expected to increase. Morocco's standing as a significant world supplier of fluorspar was further solidified with the entry of GFL into Morocco's fluorite production in Taourirt Province and exports by way of Nador Port.

5.2. Building new B2B relations

Morocco is linked to the European Union by an association agreement with full tariff removal of industrial products since 2012. After having obtained "most favoured nation status" with the EU, Morocco is now negotiating a comprehensive free trade agreement.

In 2021, the United Kingdom and Morocco signed an agreement that aims to ensure the continuity of bilateral relations following the U.K.'s exit from the EU.

Morocco is a member of the Agadir Agreement, the free-trade area that also includes Egypt, Jordan and Tunisia, and a signatory to bilateral free trade agreements with the United Arab Emirates, Turkey and the United States, Canada and Morocco are discussing an exploratory foreign investment promotion and protection agreement.

5.2.1 Promoting local content and enabling mining cluster actors

Relevant institutions for the development of a Morocco-focused critical minerals network

State institutions:

- **Ministry of Energy, Mines and Sustainable Development (MEM).** Under Decree No 2-20-413 Establishing Attributions and Organisation Rules of the Mining and Energy Department of the MEM dated 3 July 2020.
- **National Office of Hydrocarbons and Mines (ONHYM).** ONHYM is a public establishment regulated by Law No 33-01 promulgated by Dahir No 1-03-203 dated 11 November 2003 and its Decree No 2-04-372 dated 29 December 2004.
- **Land Registry.** The Land Registry (Agence Nationale de la Conservation Foncière du Cadastre et de la Cartographie) is a public establishment (établissement public) regulated by Law No 58-00, promulgated by Dahir No 1-02-125 dated 13 June 2002.

Academic institutions and other training establishments in the field of geosciences and mining

- **Rabat National School of Mines**
Underground and open pit mining techniques;
Ore processing and valorization;
Civil engineering associated with mining (soil mechanics, geotechnics and rock mechanics);



Spatial modeling in 2D and 3D (Geomatics and geostatistical modeling);
 Quality and quality control for the control of production chains (Supply chain) and planning;
 mining digitalization through mastery of CAD techniques and instrumentation technologies;
 Innovation for research and development.

- **Institute des Mines de Marrakech**

Master the techniques related to geological investigations
 Ensure the proper conduct of a drilling site
 Use technical equipment
 Lead a team in carrying out a mission in the field or in a mine
 Manage human and material potential

- **Faculté Polydisciplinaire de Khouribga BP: 145 Khouribga principale, 25000, Maroc**

The Geo-Resources and Geo-Mining sector provides training for students in order to acquire skills to integrate into the mining sector. The training course allows the acquisition of general and professional training in the field of exploration and exploitation of mines, ore processing and ore quality control in a circular economy concept. This training is supported by soft skills lessons which will ensure the student's development on a personal, behavioral and relational level.

- **Faculté des Sciences Kénitra Campus Universitaire Kénitra BP 133 Maroc – Département de Géologie**

The basic degree in "Earth Sciences" is open to holders of a Baccalaureate in Science. This sector aims to prepare students for professional life in the private and public sectors of application of Geosciences. The proposed modules and scheduled internships aim to train specialist graduates who master, on the one hand, the main methods and techniques of applied geology and, on the other hand, the practice of IT tools and digital cartography. This training also aims to equip students with appropriate knowledge on natural resource management techniques.

Also important training and Networking are expected to Morocco in 2024:

PanAfGeo-2 training in Mineral Resources Assessment is expected to be carried out in Morocco co-organized by the Geological Survey of Morocco. It will include training in classroom approaching subjects such as: Mineral Resources of Morocco, Exploration techniques, field equipment and sampling, treatment of geological data and GIS mapping. Subjects such as: Circular Economy, ECRM and UNFC classification as well as AMREC which is based in UNFC adapted for African Countries will also be part of the theoretical classes. Field visits to important mineral projects are also expected.

Mining the Connections 2024, International Multi-Network Conference on Mining, May 21-23, 2024 - Marrakech, Morocco. Following the success of the 1st edition of the international conference Mining the Connections, held at Château Laurier in Quebec City on April 25-27, 2022, we are planning a second edition in May 2024 at the Kenzi Rose Garden Hotel in Marrakech, Morocco.



6. Energy and digital transition: develop a strategy for the EU and Africa Partnership

Existing partnerships/projects dealing with responsible sourcing, CRM, with synergies to the AfricaMaVal objectives

The Moroccan Government implemented a national strategy for the development of its mining sector modernising the legislative and regulatory framework applicable to mining activities in 2015 and 2016 through the Law No 33-13 Related to Mines (Mining Law) and Law No 74-15 Related to the Mining Regions of Tafilalet and Figuig (Tafilalet and Figuig Mining Law)¹¹. The reform of the law consisted in extending the application of mining legislation to all mineral substances used in industry other than construction and civil engineering materials. Legislative reforms include also:

- The status of mining companies' employees, which is currently regulated by Dahir No 1-60-007 Forming the Status of Mining Companies Employees;

- The definition of mining products, which would include natural hydrogen. The draft law also creates a specific process to determine whether a product is considered a mining product under the Mining Law;

- The obligation for companies applying for a mining permit to be awarded first with a categorisation certificate (attestation de categorisation) by Moroccan authorities;

- The obligation for companies applying for a mining permit;

- The mining companies will have to hire individuals located in the region where mining operations are located or use local products;

- Risk assessments and safety controls to be carried out annually by mining companies;

- The use of a competitive process for the award of slag heaps operating licences;

- The possibility for mining permits holders to subcontract mining operations, subject to the approval of Moroccan authorities.

Morocco is making a significant transformation of its economy to increase medium-high tech industries in Northern Africa. This structural transformation results from a significant acceleration in foreign and domestic investments in the automotive, aerospace, and renewable technology sectors, as well as chemicals.

Eight critical minerals account for 97% of its export value. Lithium is the first critical mineral in terms of export value and accounts for 21% of the critical mineral export basket, followed by iron ore (18%), nickel (17%), phosphate rock (15%), and PGM (15%).

¹¹ <http://uk.practicallaw.tr.com/w-018-4123>



There is no restriction on the nationality of shareholders of a company engaging in mining activities. In December 2022, Morocco adopted an Investment Charter which is the principal regulatory document for foreign and domestic investments with an exception to investment in agriculture, as well as the exclusion of real estate and commercial sector investors from some provisions of the charter.

The Moroccan government can sign specific agreements and contracts with investors, providing subsidies for certain expenses, custom duty and Value Added Tax (VAT) exemptions when the agreed criteria are met. Morocco has ratified 72 investment treaties for the promotion and protection of investments and 62 economic agreements, including with the United States and most EU nations, that aim to eliminate the double taxation of income or gains.

In 2016, the European Bank for Reconstruction and Development (EBRD) provided a EUR 28 million loan to CMT, a Moroccan listed mining company to support the upgrade of the Tighza mine located in the north-east of Morocco. The EBRD funds will support the construction of a new shaft at the mine's Ighraem Aoussar site to increase productivity. It will also improve working conditions within the mine to meet national health and safety and environmental protection regulations and also international good practice. All projects financed by the EBRD must be structured to meet the Banks Environmental and Social Policy (2014) requirements which include compliance with National laws in addition to GIIP. Also, in the Banks Environmental and Social Policy Performance Requirement 4 (Health and Safety) makes a specific requirement to projects meeting EU OSH Directives. <https://www.ebrd.com/sites/Satellite?c=Content&cid=1395271995517&d=Touch&pagename=EBRD%2FContent%2FContentLayout&rendermode=live%3Fsrch-pg>

Morocco is linked to the European Union by an association agreement with full tariff removal of industrial products since 2012. After having obtained “most favoured nation status” with the EU, Morocco is now negotiating a comprehensive free trade agreement with the bloc. In 2021, the United Kingdom and Morocco signed an agreement that aims to ensure the continuity of bilateral relations following the U.K.'s exit from the EU. Morocco is a member of the Agadir Agreement, the free-trade area that also includes Egypt, Jordan and Tunisia, and a signatory to bilateral free trade agreements with the United Arab Emirates, Turkey and the United States.



7. Opportunities for responsible investments

7.1. Identification of individual exploration, mining and refining projects

The examples, presented in the form of sheets, illustrate the approach methodology that we intend to adopt:

- Sheet 1: Barite (COMABAR);
- Sheet 2: Manganese (SACEM);
- Sheet 3: Cobalt (CTT – MANAGEM);
- Sheet 4: Antimony

The first three sheets are representative of the three mining regions present in Morocco. The operations are held by big companies with documentation provided. These examples are given in Annex 7.1 and could be a good starting point for cooperation with EU countries.

Morocco was the 11th-ranked and 17th-ranked producer of **cobalt and silver**, respectively, and accounted for 1.8% and 1.4% of world output, respectively. Managem is focusing on increasing its output of cobalt cathode, copper concentrate, and Silver, also leveraging African wide regional value chains and shares in mining sites across the continent, such as the Pumpi Mine in Congo (Kinshasa).

Located 120 km south of the town of Ouarzazate, **Bou-Azzer cobalt mine** is one of the oldest of the Managem mines. It has been operational since 1928 and is managed by Compagnie de Tifnout Tighanimine. Its activity consists of research, exploitation and processing of primary Cobalt. Although Managen is now cooperating with Glencore for recycling cobalt.

It is one of the few mines in the world producing cobalt as a mono-product. The Bou-Azzer mine supplies the hydro-metallurgy plants of Guemassa with most of their Cobalt concentrate or Cobalt spoil heaps.

The Khemisset Potash Project it is approximately 90km from the capital city, Rabat, and the planned bulk port of Kenitra Atlantique and 150km from the port of Mohammedia. It is close to the significant regional town of Khemisset and benefits from outstanding infrastructure including a network of toll roads, and electricity distribution grid and enjoys a supportive local government. Emmerson Plc has identified pre-production capital cost savings of over US\$1.2 billion relative to the average Canadian potash mine development, with cost savings of over 90% on key mine access and infrastructure. JORC compliant resources were estimated at 537 Mt @ 9.24 % K₂O (<https://www.emmersonplc.com>).

Atlantic Tin Ltd engages in the mineral exploration and development of **Achmmach Tin project** in Morocco. The company was formerly known as Kasbah Resources Limited and changed its name to Atlantic Tin Ltd on January 12, 2023. Atlantic Tin Ltd was incorporated in 2005 and is based in Perth, Australia.

The Achmmach tin deposit is hosted within a tightly folded sedimentary sequence of Visean Namurian turbidite beds locally showing shear corridors overprinted by tourmaline alteration. The area has also been intruded by magmatic sills of intermediate and mafic composition. The tin mineralisation occurs as



cassiterite (SnO₂) in disseminated form within the tourmaline, in association with sulphide veins or within quartz veins. (Kasbah PR 8/18/14) Achmmach geology is dominated by a north-east trending metamorphosed greywacke sequence crosscutted by near vertical east-west structures. These structures are usually marked by outcrops of tourmaline and silica altered breccias. Tin mineralization is commonly associated with these breccias. (Kasbah 3/08 QR). In 2018, ore reserves were estimated at 7 Mt @ 0.82 % SnO₂

Bou El Jaj prospect (Sn), located 8 km south-southeast of the Achmmach Tin Project is also hold by Atlantic Tin. The prospect is located at the southernmost extension of a mineralised corridor that is about 2.5 to 3 km wide and almost 12 km long, extending south-southwest from Achmmach through to the Oued Beht river.

Atlas Lion Deposit (V-Pb) -Vanadium District • Vanadinite deposit with desirable concentration of Vanadium and Lead • Surface deposits allow for simple, efficient and low-cost mining • Large, under-explored region in Morocco • High geological upside for other battery metals.

Three (3) main carbonatite intrusions were identified by the ONHYM during the exploration of the Southern Provinces: Lamlaga and Twinhinate located in the western part of the Oulad Dlim Massif and Glibat Lafouda located in the eastern part of the ODM. Exploration works performed by the ONHYM led to the discovery of significant resources in Nb-REE-(Ta)(Table X). The development of these prospects faces several challenges (in terms of infrastructures, energy, recovery of REE, ...) that may constitute investment opportunities.

	Tonnage	REE content (%)	Nb ₂ O ₅ grade (%)	Ta ₂ O ₅ grade (ppm)	U ₃ O ₈ grade (ppm)
Lamlaga	618 Mt	0.64	0.28		
Twihinate	597 Mt	0.90	0.32		111
G. Lafhouda	114 Mt		0.30	272	400

Table 8: Resources of the carbonatites prospects of the Southern Provinces¹²

7.2. ASM sector country profiles

Country profiles on ASM sector developments and investment

Artisanal miners had been legally mining for barite, kohl (black powder used for cosmetics), lead, and zinc at the Figuig and the Tafilalet regions near Meknes City since 1960. Dahir No. 1–60–019 of 11 Jomada II 1380 Hijri (Royal decree no. 1–60–019 of december 1,1960) created centrale d'Achat et de Développement de la Region Minière du Tafilalet et de Figuig (CADETAF) as an independent public agency with financial and legal authority. The Ministry of Energy and Mines was responsible for the technical supervision of mining operations in the Figuig and Tafilalet mining zone. Artisanal miners produced barite, lead, kohl, and zinc ores within an area of 60,000 km². Artisanal miners sold ores to collection centers, which were equipped with chemical analysis, storage, and weighing facilities. Prices were based on cost,

¹² <https://mining.onhym.com>

insurance, and freight (c.i.f.) value after subtracting taxes, which were 10 Moroccan dirham (MAD) (US\$1.00) per metric ton for barite, 300 MAD (US\$30.00) per metric ton for kohl, 10% for lead, and 15% for zinc. In 2017, 1,083 artisanal miners produced 472,102 t of barite ore, 20,778 t of zinc ore, and 5,183 t of lead ore (USGS, 2017-2018 Minerals Yearbook).

In 2021, the country produced 38.1 million tons of phosphate ore with a value of US\$ 10.5 billion. Beyond phosphate, Morocco is also recognized for its global output shares of arsenic (12%), barite (15%), cobalt (1.4 %), fluorspar (0.9 %), silver (0.75 %) and lead (0.65 %) (USGS, 2022). Of these, barite is the only mineral, which has a considerable portion derived from artisanal and small-scale producers, estimated to account for 30 – 50 % of the country's production. In the period 2016 – 2020 the ASM sector in Morocco was producing about 4.5 – 7.5 % of the global barite supply (CADETAF 2020). Traditionally, ASM activities also exploit small amounts of lead and zinc ores that usually are not associated with barite veins. However, in industrial mining in Morocco it is common to exploit vein structures that contain lead, barite and fluorspar minerals in complex ores (BGR 1975). More recently, the southern part of the country has witnessed a growth in small-scale gold mining (DELVE 2019).

ASM activities in Morocco could play a role for the European supply with barite since the Moroccan ASM share in global barite production is at least 4.5 %. However, currently the ASM production is mostly sold to the petroleum industry that use the API standard to control the quality of barite products.

The extracted barite ore at the mine site is only handpicked and at the CADETAF stockyard, the ore is not subjected to any type of processing or dressing like, for example, washing, jigging, flotation, crushing or grinding. The introduction of enhanced processing techniques could improve the grades of the barite products and reduce the number of harmful substances, opening the way to barite markets other than the petroleum industry. However, the scarcity of water needed for most processing activities would present a challenge in the CADETAF zone.



Conclusions

Morocco is expected to remain the world's leading supplier of phosphate rock and phosphate-based fertilizers expanding capacity at existing mines, adding new mines, and adding new concentrating, floating, and washing units. Managem is focusing on increasing its output of cobalt cathode, copper concentrate, and silver by developing its mineral resources in Morocco through exploration studies in partnership with ONHYM and in partnership with Glencore for recycling cobalt and also nickel and lithium. Morocco has a well-established and modern mining industry, with a range of processing and refining facilities for a variety of ECRM minerals, namely 14 Plants (5 for Barite, 1 for Cobalt (Co), 1 for Nickel (Ni), 1 for Phosphate rock) and 1 Refineries (1 for Cobalt (Co)).

Nevertheless, Morocco still has projects identified with interest for partnership with EU, complying with criteria of available information, stable prices and need to EU market which makes the country attractive for foreigner investment.

The artisanal and small-scale mining sector is regulated, supervised and supported by the CADETAF contributing 90% of barite production. The ASM sector is largely formalised and barite production is sold in the form of unprocessed ore to enterprises who perform beneficiation before export.

In relation with mining employment, Morocco is struggling to address the gap between the often-inadequate skills of local unemployed population and the requirements of the modern jobs market whereas foreigner employment is often needed. This is especially important in mining areas because people and local authorities still think that mining does not sufficiently benefit local populations where probably promotion of training is needed to locals and to governmental institutions such as the Geological Survey. EU projects such as PanAfGeo-2 offers this opportunity to countries such as Morocco, in fact, one training is planned to 2024 in mineral resources and training in field skill for geological mapping occurred in 2022.

Apart from adjustments needed, Morocco remains a business-friendly destination for foreigners, and the government has succeeded in positioning the kingdom as a major destination for foreign direct investment (FDI) in North Africa. The government is keen to attract foreign investors and seeks to facilitate investments through favorable regulations, economic reforms, and other incentives to decrease corruption and increase market confidence.

Morocco participates and complies with international agreements and regulations invests in partnerships with foreign countries such as joining the International Extractives Transparency Initiative (EITI), International Labour Organisation (ILO). Participates in international mining conferences and promotes these events in Morocco to attract foreigner investment. However, there are sectors, including mining phosphates, that are not yet open to foreigners.



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