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Original Research

Mining Management in Afghanistan: Opportunities, Challenges, Constraints and Strategies for Correct Use of the Mineral Resources of the Country

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Abstract

Despite the superiority of widespread mineral resources located throughout Afghanistan, minimal large-scale development of these resources has taken place during the 20th and 21st centuries. The main reason has been a number of important constraints and Challenges that have not yet been removed.

Considering that mines as national property belong to all citizens of the country and every person has equal rights in it. Mines play an important role in the self-sufficiency and economic development of countries. Therefore, researching and examining the challenges and problems that the country's mines face is of special importance and urgency and needs to be researched. In writing this article, an analytical-descriptive method has been used, which is supplemented by authoritative books on mining management, reports of the Ministries of Mines and Petroleum, tax, economy and media on the state of the country's mines, news, magazines and reviews of articles related to this topic from Nationally and internationally valid journals. As a result of major challenges and constraints facing the country's mines such as weakness and lack of expertise in various management sectors including planning, leadership, organization and supervision at the Ministry of Mines and Petroleum and related mining institutions, there was still no soft infrastructure (security, rule of law, corruption, environmental issues, information and human capital) and the lack of infrastructure (electricity, transport, land and water) are among the most important issues that have hindered the growth of mining processes such as: exploration, development and proper exploitation of mines and substandard and illegal extraction. Taking into account the mentioned challenges, using solutions such as: creating the necessary infrastructure and superstructure in the mining sector and observing the long-term goals of sustainable development for the proper exploitation of the country's mines has been proposed.

Keywords: Mining Management, Mining and Sustainable Development, Exploration management, Mine Planning, Infrastructure and Soft infrastructure.

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1. Introduction

Afghanistan has widespread mineral and hydrocarbon resources [1], [2]. The first systematic geological explorations of mineral deposits were initiated by the government in the 1960s and 1970s with technical and financial assistance from the Soviet Union [3], [4]. Detailed geological maps and reports listed more than 1,400 mineral outcroppings, along with about 70 commercially viable deposits[5], [6]. Since 2002, the government has received substantial technical assistance from the United states geological survey (USGS) and British geological survey (BGS) geological agencies and in 2009-2011, funded by the US, the government carried out a major mineral assessment, systematizing prior geological surveys and conducting new fieldwork in 24 areas of interest (Table 1; Figure 1) . Afghanistan is believed to hold more than $1 trillion worth of mineral resources and metals but faces many challenges in untapped. According to Scott Montgomery, a geologist who has studied the extent of Afghanistan's resources, the country requires a minimum of seven to 10 years to develop large-scale mining to become a major source of revenue [7], [8]. Strategy, Planning, leadership, supervision, human capital, electricity, transport, water, Land, community engagement, environmental issues, Poor security, weak legislation and corruption have prevented the development of the mining sector. Afghanistan has been at war for more than four decades. During this period, on the one hand, the academic institutions have been severely damaged, which has led to a decrease in practical capacities, and on the other hand, the economic situation has been severely damaged [9]. Therefore, key issues have not been studied or researched or less important research has been done. Mine management is also one of the basic and important topics that is less studied and researched by domestic scientific and research centers. Therefore, the need to study the issue of mining management and how to observe it in Afghanistan with a scientific and impartial perspective has always been felt; For this purpose, the present study has been undertaken to take a small step towards improving the condition of mines and economic development, taking into account the findings of this study.

The specific objectives of the study were:

1) Currently, the use of mines is associated with many problems. Extraction and exploitation of minerals is not an easy task and has special complexities. Therefore, the purpose of this article is to study the challenges and problems facing the country's mines management and its appropriate solutions. Another main purpose of this article is to investigate the existing challenges and the effects of illegal and non-standard extraction on the quality and waste of mineral reserves in the country.
2) The results of this study should be made available to educational institutions and other influential groups on issues related to Afghanistan's mining management so that they can at least contribute to practical guidance in the subsequent policy and policy-making process. The activities of responsible

individuals and institutions should be more effective in improving the condition of mines and its proper use.

In this research, several questions have been raised, each of which has addressed the management of mines from different dimensions. The questions that arise are as follows:

1) One of the important sectors in the field of economic development is mines, which have a very high production capacity to invest in the country. Therefore, the question raised in this study is why the Government of Afghanistan has not been able to properly use this great economic capacity in the field of investment, which has provided the ground for illegal mining and exploitation?
2) What are the main challenges facing the country's mines?
3) What are the effects and consequences of not managing the country's mining sector properly?
4) To what extent have the sustainable development goals (SDG$_S$) objectives been met in Afghanistan's mining contracts?
5) This research raises two other fundamental questions: how substandard and illegal mining affects the quality and waste of mineral resources and on the other hand, what are their consequences.

Some limitations and perspectives in this research field are also identified throughout the text This study positively formulates a number of recommendations as a strategic step in eradicating corruption in that sector.

2. Methodology

To achieve the objectives, In this study, the literature mostly focused on the sustainable mineral resource management in a general context and within the Afghanistan for over the last 15 years were reviewed. Considering the review policy, authorized database search engines were used to filter the related scientific articles, conference proceedings, books, reports from the peer reviewed and high indexed journals. Moreover, the local databased e.g. integrity Watch in Afghanistan Portal, UNDP, Global Witness, integrity Watch in Afghanistan, Special Inspector General For Afghanistan Reconstruction (SIGAR) BBC, DW for Afghanistan's mining sectors were investigated. The filtered literature was reviewed in full text mode as most of them were out of the scope of this work resulted to exclude them. Moreover, some other literature focused on overview of the potential of mineral resources in Afghanistan, their mining process and impacts were considered vital for this work and further research. In recent years, not only have we not managed our mines properly, but illegal mining has shown unprecedented growth in the present history of Afghanistan.

3. Result

3.1 Overview of the potential of mineral resources in Afghanistan

Afghanistan has multipart geology due to the junction position between the Indo-Australasian and Eurasian plates [10]. Its geology is composed of a series of small terranes that broke away from the main Gondwana supercontinent before colliding, with each other or, with the Eurasian plate. Ultimately, all terranes accreted onto the southern margin of the Eurasian plate. The final closure of the Neo-Tethys ocean between the Indo-Australasian and Eurasian plates produced the Himalayan orogeny. During this oblique collision, NW-directed subduction occurred beneath the Tirin- Argandab zone, and calc-alkaline granite bodies were intruded, accompanied by porphyry copper mineralization. The exotic terrane of the Kabul Block brought with it sedimentary copper deposits like Aynak - similar in age and style to those of the Zambian Copper Belt. There are currently more than 1,400 mineral deposits that have been identified including energy minerals such as oil, gas, and coal and other metallic and non-precious minerals such as lead, cement-grade limestone, gemstones, copper, iron, gold, and salt [11] .The iron and copper deposits of Afghanistan can generate a bigger amount in the economy of the country if these mines are extracted in a proper and standard way with transparency[12]. Mining developments can be a pillar of future economic growth in Afghanistan creating employment and income; developing transport and other infrastructure which will help open up areas for overall economic development, and generating not only considerable domestic revenue but also trade and balance of payments benefits. Simply put, if managed properly, mining in Afghanistan has the potential to be a driver of poverty reduction and sustained economic growth.

The USGS has recognized 24 Area of Interests (AOIs) which require further study; many areas have the potential for artisan mining. This joint study was conducted from 2009-2011 by the U.S. Geological Survey (USGS), the U.S. Department of Defense Task Force for Business and Stability Processes (TFBSO), and the Ministry of Mines and petroleum (MOMP) Afghanistan Geological Survey (AGS). Areas of Interest (AOIs) as shown in Table 1. Another 2010 study shows that the country has significant mineral resources including copper, iron ore, marble, lapis lazuli, emeralds, rubies, oil, natural gas, and the number of rare earth minerals. Mossotti identified 11 Areas of Interest (AOI) for industrial minerals including cement; Baghlan Clay-Gypsum; Bakhud Fluorite; Dudkash industrial minerals; Ghunday-Achin Magnesite-Talc; Khanneshin Carbonatite; Kunduz Celestine; North Herat, Barium-Limestone; Nuristan Pegmatite; South Helmand Travertine; and Takhar Evaporate.

These AOI include minerals like barite, bauxite, and carbonatite as well as industrial metallic minerals like titanium and aluminum. Khan-e-shin carbonatite contains different metals including phosphate, barite, nepheline, rare-earth elements, zirconium, copper, niobium, fluorspar, and other minerals. But this area has been poorly explored since it is located in Southern Afghanistan. The entire Khan-e-shin carbonatite contains a variety of minerals including thorium, uranium, and lithium, but it has been estimated that it contains 6.2 million tones of phosphate; 1.4 million tones of rare-earth elements, and 3.5 million tones of niobium. Other than non-

fueled minerals, Afghanistan also has fueled minerals including hydrocarbons like oil and gas. There are four proven basins in Afghanistan that contain oil and gas (1) Amu Darya; (2) Afghan-Tajik; (3) Tirpul; and (4) Kushka. It has been estimated that this area contains 1.6-3.4 billion barrels of petroleum liquids, 16 trillion cubic feet of natural gas, and 0.50 billion barrels of natural liquid gas. Most of the unexplored oil and natural gas occurs in the Afghan-Tajik basin and Amu Darya basin. These two basins have a total covered area of about 515,000 square kilometers. The third area, the Tirpul basin has a total covered area of approximately 26,000 square kilometers; this oil basin is located to the west in Herat province[13].

According to the New York Times, the total value of iron ore is $420 billion; and copper, niobium is valued at $274 billion and $81 billion each [13]. Other minerals have a value between $0.1 billion to 50.8 billion, but the most important mineral resources which have been discovered are the Rare Earth Elements (REE) worth nearly $7.4 billion[2]. These are the most important elements used in making high-tech products like superconductor alloys, superconductor magnets, lasers, TV picture tubes, and batteries for mobile phones, laptops, and desktop computers. Some of these minerals are even found in other mines, like gold, silver, copper, lead, and iron; similarly, uranium was discovered in the Badakhshan gold mine, Haji-Gak, Daykundi mines, Dusar-Shaida mines, and also in Khan-e-shin carbonatite. Barium, thorium, rare earth elements, tin, lithium, tantalum, and niobium are found in mines of Nuristan. These minerals are very important for advanced nations like the United States, Britain, and France. According to the U.S. Geological Survey's estimate, nearly one million tons of rare earth elements have been discovered in Khan-e-shin carbonatites in the southern Helmand province of Afghanistan. These mines are highly important for the development of Afghanistan, but it might be years before they become operational and bring economic prosperity to the Afghan nation [3].

The USGS participated in the planning and execution of USGS-TFBSO scoping missions to the AOIs during 2009, 2010, and 2011. The AOIs visited were the Khanneshin Carbonatite, Chaigai Hills Travertine, Balkhab Copper, Haji-Gak Iron, Northern Aynak Copper-Cobalt, Kundalan Copper-Gold, Zarkashan Copper-Gold, and Dusar-Shaida Copper-Tin AOIs (fig. 10). Data and information gathered on these scoping missions are incorporated in the summaries of each AOI or are part of the data or information packages. In each case, new and unique geologic observations were acquired that allowed evaluation and interpretation of the previous Soviet studies, which in many cases were confirmed.

Previous USGS work on nonfuel minerals was conducted jointly by the USGS and the AGS from October 1, 2007, to the present. The main AGS focus in Afghanistan during 2009 and 2010 was in the Badakhshan Gold, Balkhab Copper, and Panjsher Valley Emerald-Iron-Silver AOIs (Figure. 1). Separate reports of this work by the AGS are included within the information packages for each AOI and are also available through the AGS. All the AOIs were selected as areas that could potentially support mineral production in the near future. As part of the project prioritization process, several AOIs or subareas were identified as more important because new information gathered and compiled in 2009 and 2011 confirmed and augmented the geologic concepts or mineral potential resulting from previous Soviet

fieldwork and USGS assessments. These important, higher priority AOIs are Badakhshan Gold, Balkhab Copper, Haji-Gak Iron, Aynak Copper-Cobalt, Zarkashan Copper-Gold, Kundalan Copper-Gold, Khanneshin Carbonatite, and Dusar-Shaida Copper-Tin. These Area of interested display outcropping mineralization with favorable geometries and simple metallurgical ore types; these characteristics may translate into lower capital costs, shorter lead times, and shorter payback periods. Many of the AOIs may contain ore deposits that could be medium to world-class in size and tenor.

Table 1. *U.S. Geological Survey and TFBSO project areas in Afghanistan – 2010–2011*[8], [1].

1.	Khanneshin carbonatite	2.	Chagai Hills travertine, copper, and gold
3.	Balkhab copper	4.	Baghlan clay and gypsum
5.	Hajigak iron	6.	Zarkashan gold and copper
7.	Takhar placer gold	8.	Dudkash industrial minerals
9.	Anyak copper	10.	Kunduz celestite
11.	Badakshan load gold	12.	Herat barite and limestone
13.	Takhar evaporite	14.	Bakhud fluorite
15.	Kundalyan gold and copper	16.	Uruzgan tin and tungsten
17.	Dusar-Shaida copper and tin	18.	Ghunday Achin magnesite and talc
19.	Tourmaline tin	20.	Nuristan pegmatites
21.	Karnak-Kanjar mercury		
22.	Nalbandon lead and zinc		
23.	Panshir Valley emerald		
24.	Katawaz gold		

Information are typed to Figure 1.

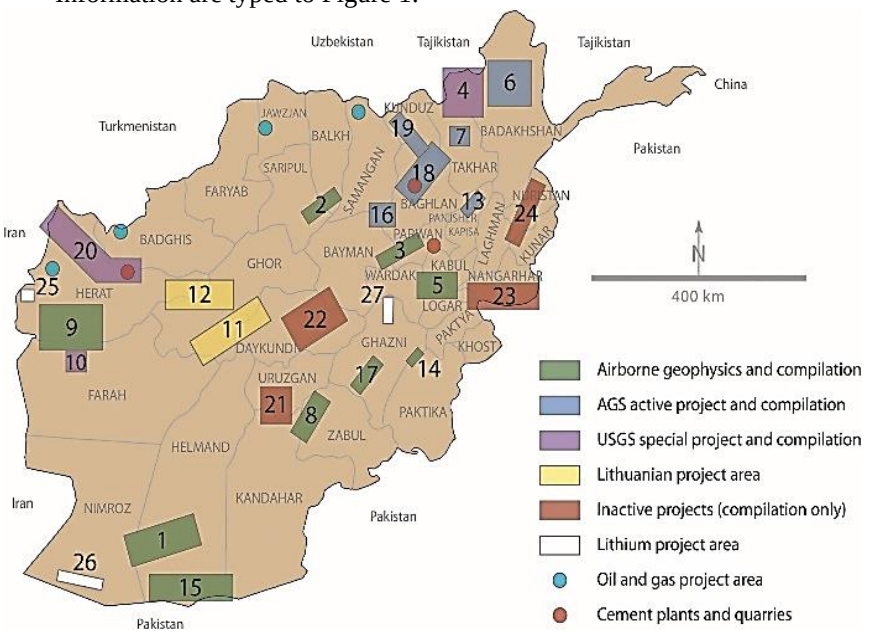


Figure 1. Map of Afghanistan displaying the 24 zones of importance areas of interest (AOIs) recognized by the U.S. Geological Survey's (USGS) and the Department of Defense Task Force for Business and Stability Processes (TFBSO) and the places where the mineral data and their associated information were compiled and activities were planned and implemented with the Afghanistan Geological Survey and the Ministry of Mines [10], [8]. Compare with Table 4 for complete names of the areas of interest.

Given, this overview of Afghanistan's extensive mineral resources and areas of interest, let us now turn to the management, constraints and challenges that have thus far limited the extraction of these natural resources. By identifying the key constraints, we will be able to develop strategies to overcome the constraints and challenges, and by doing so, will be able to leverage our natural resources endowment into sustainable resources for our citizens.

3.2 Mining Management in Afghanistan

Management is the establishment of proper proportion and coordination between different organizational resources, including material, spiritual and human. Planning, leading, organizing and monitoring are important tasks for management [12]. According to Marius Brinkman, mining management is also a part of management science. It specifically discusses the principles of exploration, exploitation, marketing of minerals, and revenue management of the extractive industries. In all the steps mentioned in the definition of mine management, all major management tasks are included. If any of these tasks is difficult, it will affect the other part and make it more difficult to achieve the goal or not at all [14] .

In the current situation of the country, a large number of mines are being explored and extracted non-professionally and technically. The only problem in the proper exploration and exploitation of mines for the growth of the country's economic strength is the proper management of this sector. In addition to the political and economic disasters of the country in various sectors of mine management such as planning, organizing, leading and monitoring are the most important issues that have prevented the proper exploitation of mines and illegal mining .

Over the past decade and a half, Afghanistan has experienced new market economy systems in a variety of sectors. Undoubtedly, in some cases the free market economic system has yielded good results, but in some sectors, such as the mining sector, in addition to the lack of favorable infrastructure and superstructures, lack of trained and professional staff, lack of policies and procedures are some of the challenges. It is another thing that the Afghan government has not been able to make comprehensive investments in recent years.

Planning is the formulation of a strategy to achieve a goal or set a course for action; You can't do well without planning. Each government has its own strategy for using its mines. Therefore, the government's strategy in using the mines must be based on a precise and comprehensive plan. Careful planning should take into account all aspects of achieving goals. For example, in planning for the exploitation

of mines in the current situation of the country, there should be convincing answers to the following important questions.
Should mines be exploited in such circumstances or not?, If mined, which mines, how much, when and how?, Should the exploited materials be exported or turned into cooked materials? Whether the conditions for the operation of mines is available or not? And other such questions. If yes, there should be enough detailed information about all Afghanistan's mines first, This information is shown in (Figure 1).

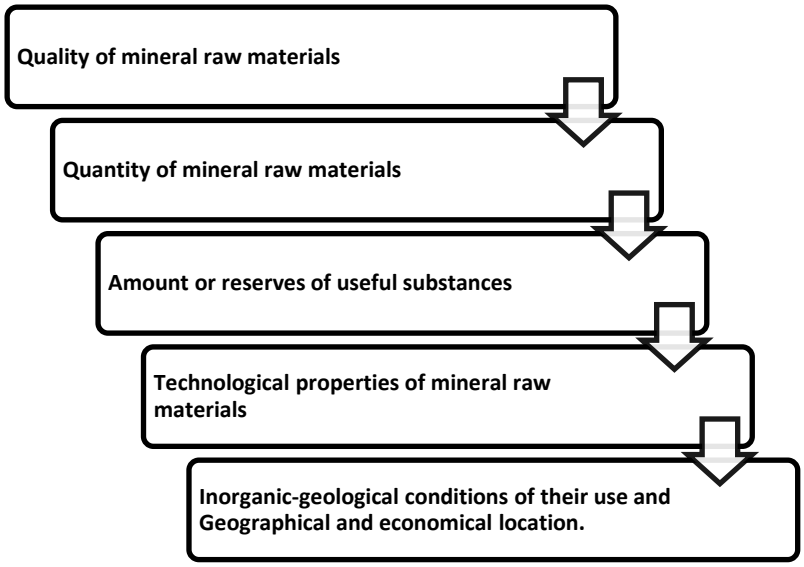


Figure 2. Factors that play a valuable role in the mining of mineral deposits adapted after [15], [16], [17] .

If it is not to be exploited due to political problems and mining insecurity, So how long to wait? Opportunities for the mafia, warlords, smugglers and other abuses prepare participants Until the mines are exploited illegally. Because in this situation, There is no security and there are many political problems And mines are not secured, Monitoring is not done properly, There are no necessary capacities for exploitation and if yes, This question must be answered. What, how much, when and how? All these questions will be answered when there is enough information about all the mines in the country in detail [18]. The issue of lack of sufficient information regarding the status of mines is one of the problems that hinders complete and comprehensive planning. In complete and comprehensive planning, there should be feasibility studies on mines in advance (Figure 3) is expressed feasibility studies to detail [16]. Operation and planning of mines in fields such as security, availability of infrastructure and superstructure and the absence of corruption, comprehensive and decisive policy is necessary. Until now the main obstacles to the exploitation of mines insecurity, poor management, lack of capacity and resources, distrust of investors to the state, need time and opportunity to create a

secure platform, provision of equipment, instruments and training human resources specialist Are considered committed. Therefore, whenever the government decides to exploit the mines, the government's decisions must be very precise and comprehensive. During the presidency of Hamid Karzai, a plan was put into operation for the large Aynak copper and Haji-Gak iron mines, and these mines were contracted with Chinese and Indian companies, But due to other problems in the challenges and constraints of the country's mining sector, they have not been exploited so far. These issues are mentioned in detail in the Mining Challenges section of the country. The monitoring process is also one of the important management tasks. This is one of the most important tasks in the Ministry of Mines and Petroleum. The biggest problem in this area is related to security. The process of monitoring the area of operation is directly related to security, The greater the security, the greater the possibility of the monitoring process. The monitoring process does not take place in areas outside the control of the government, Therefore, the mines in these areas are being illegally exploited and smuggled. In addition, the development of professional capacities and supervisory skills of employees and also equipping this department with modern technology and technical equipment, for good management of the mining sector is considered necessary. Since today all the processes of exploration, exploration of mines, observance of environmental issues and rehabilitation of areas after mining are the responsibility of the contracted company, the supervisory units of this sector must have the necessary capabilities, because supervision requires professional and well-equipped professional and managerial capacity. Being with technical equipment and machinery. The stronger the management of the mining sector, the greater the effectiveness of the use of mineral resources and the more investors are interested in investing [19]. Observance to the principle of expertise and competence and attention to the commitment and capacity of employees in different parts of the mining sector for satisfactory achievements in the field is considered necessary. Observing the principle of competence in all management levels, taking into account indicators such as professionalism, ability to manage and organize, commitment and honesty, professional-technical skills and having experience will increase the effectiveness of work in the mining sector. In the field of good management of Afghanistan's mining sector, attention to the improvement and growth of the following is considered necessary.

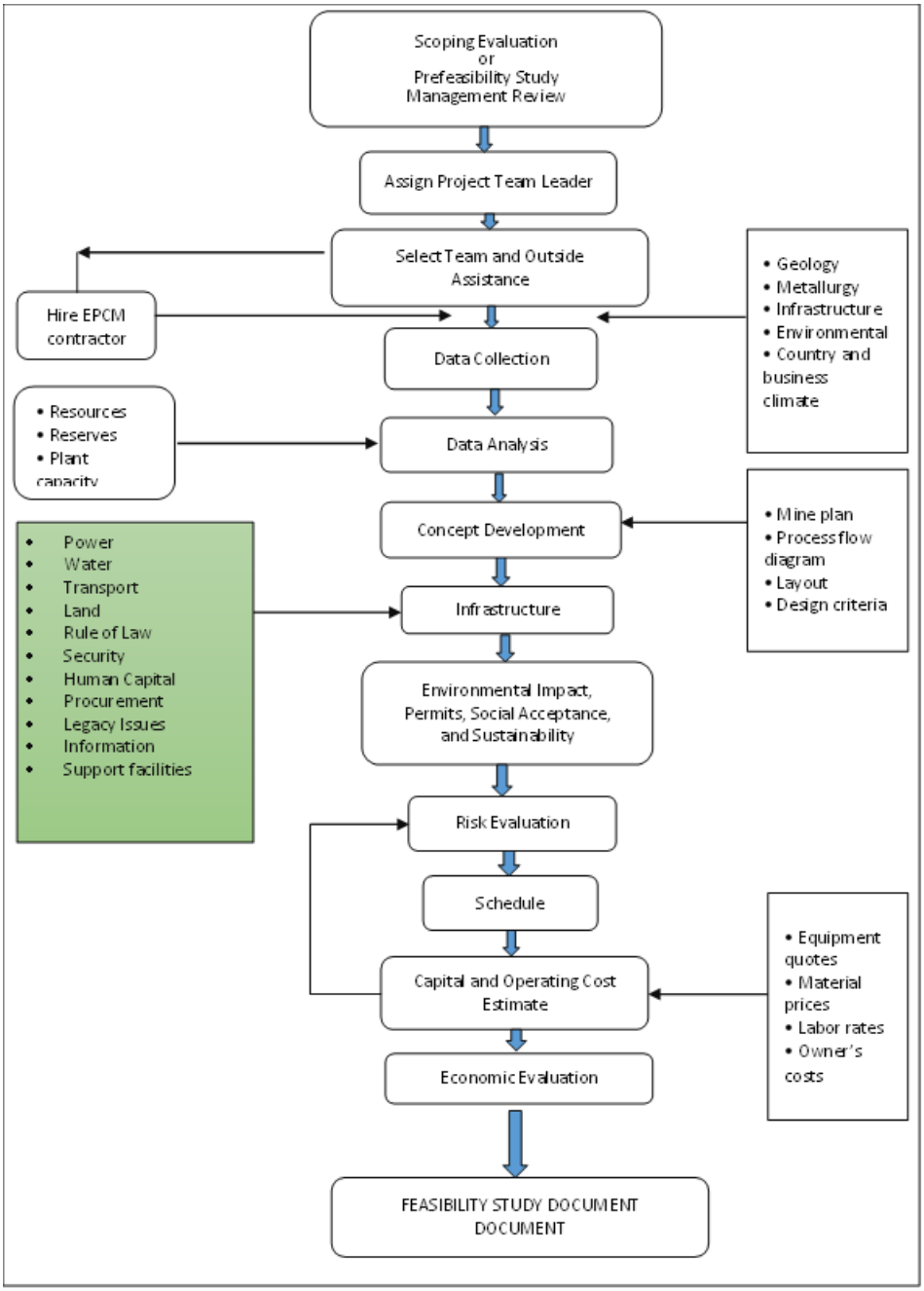


Figure 3. Feasibility study of mining process adapted after [20], [21].

Reform of legal frameworks and operating systems, including laws, policies and regulations in the field of mining in accordance with international standards and standards in order to ensure transparency in contracts and prevent tampering and corruption in mining contracts is considered important. This is because, on the one hand, it prevents the loss of government revenues and illegal profiteering, and on the other hand, it assures foreign investors of the transparency and standardization of mining sector transactions. Figure 4 shows the model of sustainable management of mining activities.

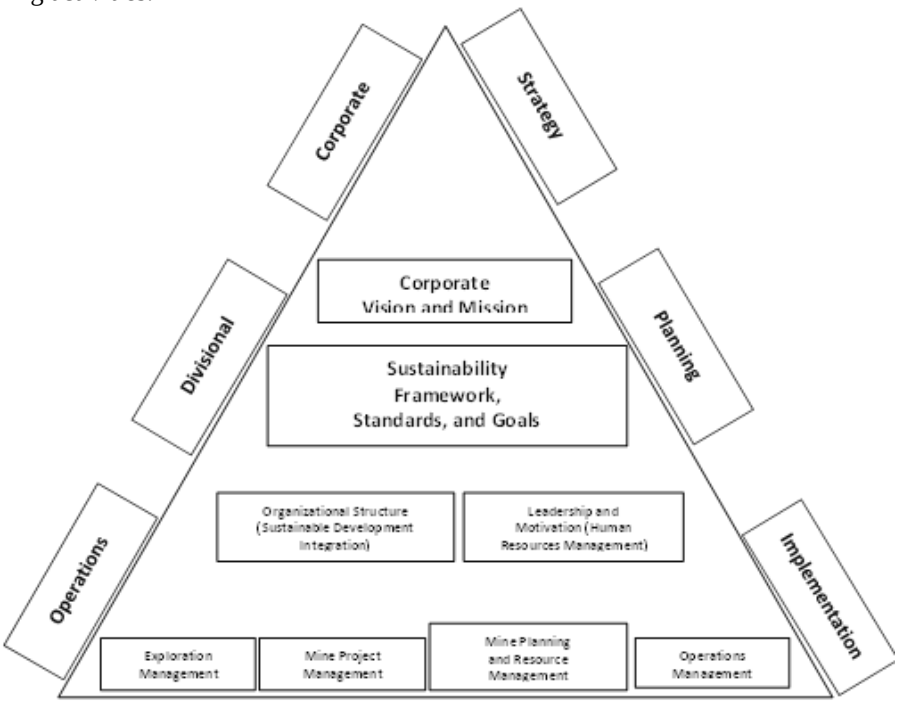


Figure 4. Sustainable management of mining operations—an integrated model adapted after [19], [22].

In addition, so far we have not been able to design and implement a proper small mines management system Up to problems; For example, we have solved the non-presentation of the real amount of mineral extraction by the contractor, the existence of corruption, and the prevention of illegal extraction of small mines. Large mining contracts; For example, we started the Aynak copper mine, the Haji-Gak iron mine and the oil and gas mine in northern Afghanistan.

At the same time, we were experiencing a new free market system, and on the other hand, we did not have the necessary infrastructure to extract and process ore; For example, energy and transportation routes and the lack of legal, tax, and technical-technological frameworks not only prevented us from making a profit from large-scale mining contracts. Rather, we are currently facing many legal and technical challenges. As, in the triangle diagram, such as sustainable management of mining activities can be seen. Develop a codified strategy, planning, leadership and coordination. In order to achieve long-term goals, sustainable development and optimal use of mines are considered necessary.

The idea of political reflection of the fact that Afghanistan is a country that is almost worth billions of dollars of mineral reserves. It has created a mentality among the masses that by selling these mines as soon as possible, we can achieve self-sufficiency. We are witnessing, even the idea among policy makers and managers Afghan government also has similar reflection. Undoubtedly, we have huge mineral reserves in the country, but how we can build this precious natural wealth within the wheel of the country's economy must be done within a regular framework through a strategic plan. If we have created all the technical, legal and policy issues, we still need at least 10 to 30 years to be able to get the least effective national budget revenue from the mining sector. Figure 5 shows that all mining processes are based on a regular rule and period of mineral resource development. This means that we can not proceed without considering the perspective, exploration and feasibility studies, which are among the most vital parts of mining activities.

Figure 4 shows that all mining processes are based on a regular rule and period of mineral resource development. This means that we can not do without the exploration and exploration work, which is one of the most vital parts of mining activities. to extract and exploit mines. The following steps are: project design before starting work, preparation and arrangement of geological maps, exploratory excavations and exploration wells in Burma, geophysical operations, geodysical operations, geochemical operations, hydrogeological operations and engineering geology, samples, different samples according to necessity Testing and analysis of excavations, arrangement of sections for more and better perception, modeling, calculation of reserves, conclusion and report arrangement that these issues play a major role in the mining of mineral deposits. If one of the following factors shown in Figure 2 has defects and problems, we can not perform the next mining activities well. The monitoring process is also one of the important management tasks.

This department is one of the most important tasks in the Ministry of Mines. The biggest problem in this sector is related to providing security and professional capacity of employees in this sector. In the monitoring process, the following activities are performed and all the steps required in a standard exploration are performed.

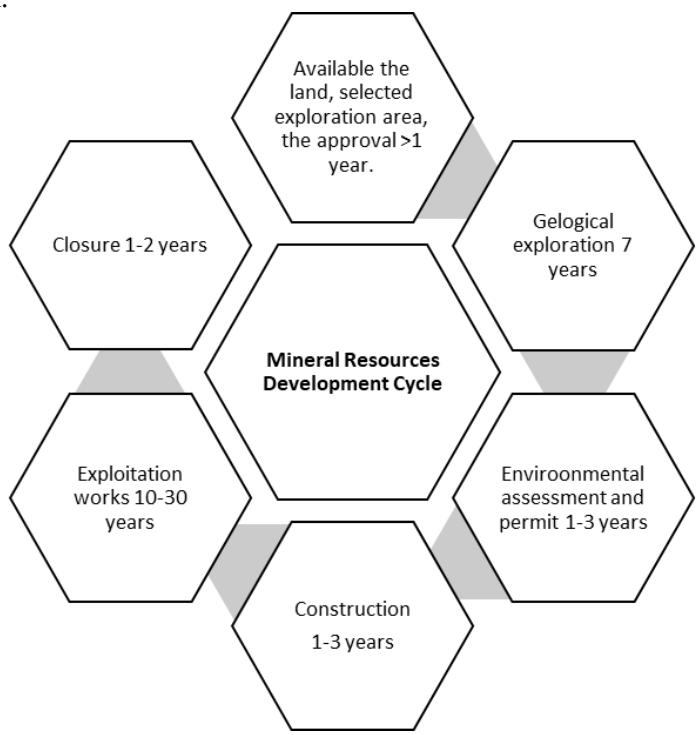


Figure 5. Life cycle of the mineral resources adapted after [23], [24].

Some of the mines that have been exploited through legal contracts, due to the lack of security in the area, the opportunity to monitor and inspect their mining activities was not possible to the officials of the Ministry of Mines, and thus the grounds for violation and violation of the terms of contracts are favorable. The monitoring process does not take place in areas outside the control of the government. Therefore, the mines in these areas are being mined and smuggled illegally.

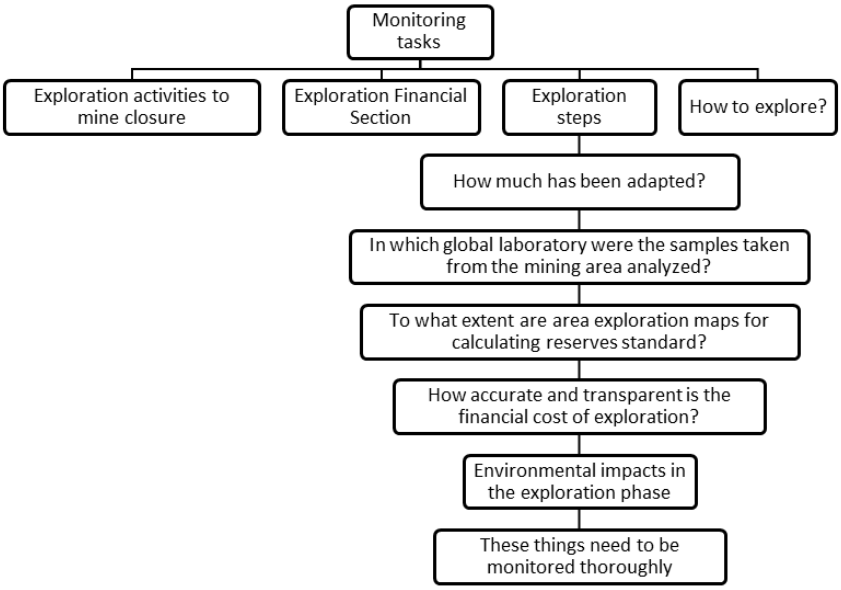


Figure 6. Major tasks and indicators that can be performed and monitored at different stages of exploration modified by authors.

Despite the preponderance of extensive mineral resources placed all through Afghanistan, minimal large-scale development of these resources has taken place during the 20_{th} and 21_{st} centuries the primary reason has been a number of important constraints that have not yet been removed.
This section will provide an overview an main constraints.

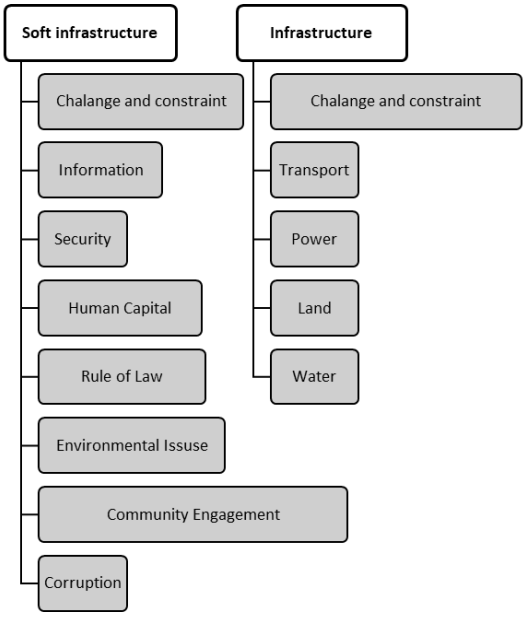


Figure 7. Constraints and challenges in the mining sector identified by the Authors.

In order to expose the illegal mining with the insecurity and weakness of governance that the government has not been able to monitor and take care of in recent years, we are examining the Global Witness report on the illegal mining in Badakhshan. Research in 2014 and 2015. Global Witness indicates that the spread of insecurity in Badakhshan province has been linked to the illegal extraction of lapis lazuli and tourmaline mines in kuran wa munjan which are being ransacked and smuggled by local militias backed by some political figures and armed groups. The perpetrators of illegal mining in Badakhshan in 2014. They have earned about $ 20 million, which is equal to the revenue that the government in 2013. Obtained from the mining sector. According to a report published by the Global Witness Foundation, in 2015. As a result of the government's efforts to curb the lapis lazuli mines illegally, the revenue from its illegal mining for smugglers was reduced to $ 12 million by mid-2016 as illustrated in Figure 8. About 50 percent of it went to the opposition. According to the agency, illegal mining is the second largest source of funding for war, and Afghanistan's mines are also called Conflict Minerals.

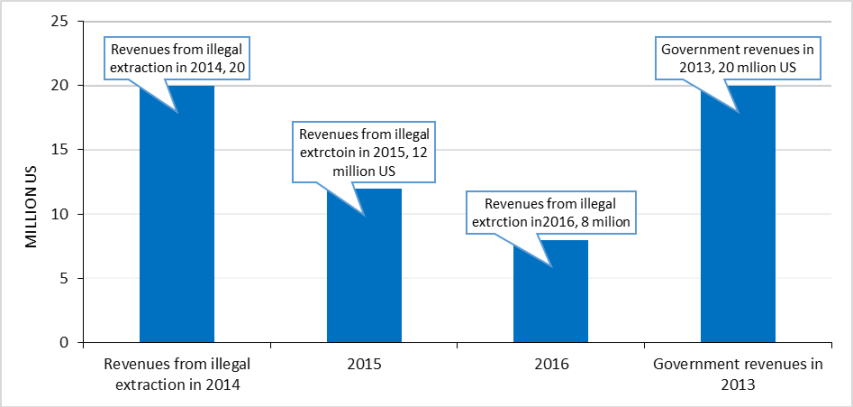


Figure 8. Total government revenues in 2013 compared with income of illegal mining of lapis Badakhshan in 2014 adapted after [25].

Also here is an example of a number of provinces of the country where mining activities are formally and informally, illegally and arbitrarily specified in Figure 9-10.

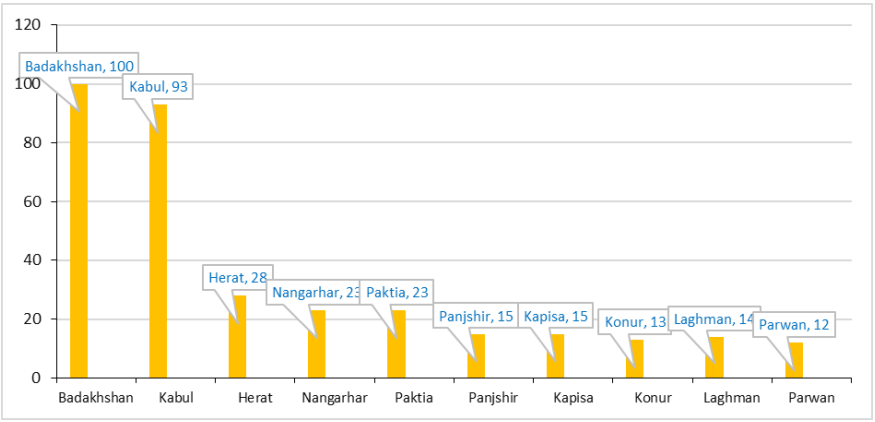


Figure 9. Numbers of illegal mining sites by the provinces according to ministry of mines and petroleum [26].

On the other hand, some of the mines that have been exploited through legal contracts, due to lack of security in the area, the opportunity to monitor and inspect their mining activities to the officials of the Ministry of Mines and Petroleum, and thus the grounds for violations and violations of the conditions. Contracts in it are favorable.

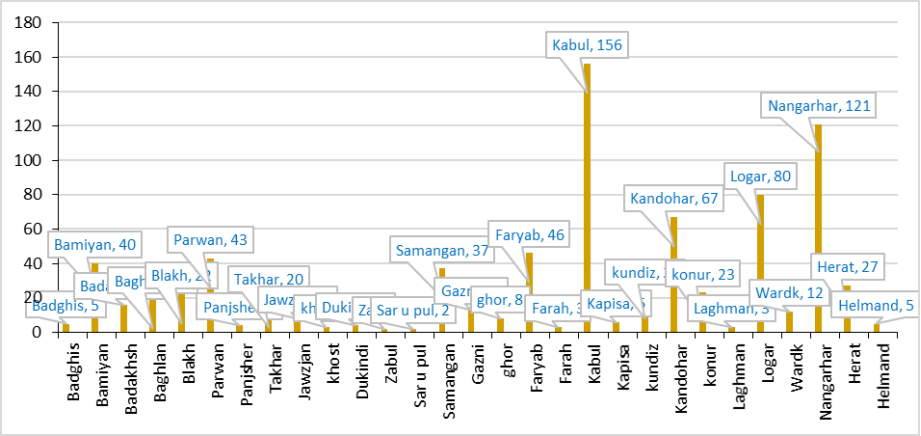


Figure 10. Province based number of active contracts between 2011 – 2016 based on [26].

This is one of the cases of unauthorized exploitation of the country's mines, which has been caused by the lack of security. As can be seen in Figure 9, more of the mines contracted are located in unsafe areas and it is not conducive to monitoring their exploitation. The above findings reflect the government's lack of oversight and neglect of mines, which is considered national capital.

Mining sector has a great potential for corruption. This potential is due to several things, including: first, weak supervision on the process of obtaining permit, second, overlapping regulations on mining. Weak supervision from the central government and/or provincial government on the mechanism of mining permit issue frequently happens [27].

Even where mining companies operate legally, under contracts, there is evidence of corruption in the process of contracting. In-depth case studies of five mines conducted in 2015 highlight multiple irregularities and violations in bidding processes for mining contracts and subsequent contract enforcement.

Table 2. *Basic Information on Five Mining Projects adapted after UNITED STATES INSTITUTE OF PEACE* [28].

Company	Mine	Product	Province	Year	Area	Deposit	Royalty rate
Afghan Investment Company	Ghori Cement (Karkar-Dodkash)	cement and coal	Baghlan	2007	216 hectares	unknown	$1.04 / ton of cement; $8 / ton of coal
Westland General Trading	Nuraba and Samti	gold	Takhar	2008, 2012	1,400 hectares	Nuraba: 800 kilograms; Samti: 31 tons (impure)	20 percent of London Metal Exchange Price (LME)
Afghan Krystal Natural Resources	Qara Zaghan	gold	Baghlan	2011	1,257 hectares	unknown	26 percent of LME
Hewad Brothers	Kohi Safi	chromite	Parwan	2011	5,400 hectares	unknown	26 percent based on $210 per ton
Khoshak Brothers	Western Garmak	coal	Samangan	2012	650 hectares	unknown	$21/ton

Examining the mining process and the contract papers of the above mines, it has been reported that the money that is lost from the understanding of surface rent and royalties reaches $ 50 million annually, so the money of other mines certainly reaches hundreds of millions of dollars. Also, the bidding process, licensing and licensing of the above mines shows political interference and favoring companies that have no previous experience at all. Another problem reported in the report is the non-payment of royalties and taxes by contractors. The companies have started to extract in the early stages and have not prepared the necessary documents for the government. Most importantly, their activities were not properly monitored.

Preparation of bidding documents for contracts was manipulated to give an edge to chosen companies who were also given undue benefits. The process of contract issuance was also influenced by politicians. In all five instances, the contracts benefited politicians or their close relatives and the stipulated royalty payments were not collected. Contracts have also been repeatedly amended or cancelled, again to the advantage of the mining companies. Analysis of the small mines' contracts database showed that there is a large variation in the duration of contracts and in the royalties imposed, indicating that officials have discretion in making contracts – with corresponding opportunities for corruption [9].

Also, do not consider the work already done in the mines, because most of these mines have been explored, explored and mined. In this case, there are many facilities for contracts without paying any points. Previously mined mines should have paid more royalties and newly discovered mines should have paid less royalties. For example, the fluorite mine in Kandahar province itself, where there is

clearly corruption at the time of the contract, and the following questions are also included. This mine was discovered in 1975. Its report is available in the Geological Survey Archive, whose reserves have been fixed at 8791.9 million tons under the B + C1 category. In 2012, he was awarded a ten-year contract with Amaniyeh Mining. It has considered the first 3 years for its exploration stages and has determined 7 years in its exploitation stage. What is questionable; Is there transparency in the way of contract, determination of royalty and other parts of it and is the area of Nish district of Kandahar province one of the insecure areas?

And the second question is when the government can not monitor the exploration, the amount of extraction, its environmental and social impact due to lack of security. So why are these kinds of contracts done, why are they not suspended or terminated? The third question is that fluorite is exported in the country in the form of raw materials and does not bring any job opportunities and significant income to the country; So in your opinion, such contracts are not against the national interest? The fourth question is, if the mine has been explored and stabilized, then what is the need for rediscovery? Isn't its exploitation useless and why has it been rediscovered and the explored mine called the unexplored mine given to the contract is not this embezzlement? In my opinion, the contract of this type of mines is considered a national betrayal and has no logical justification, because the mines of national capital and are the lifeblood of us and our future generations. Non-compliance with the provisions of the law, the first persons of the government (President, Vice Presidents, members of the National Assembly, Attorney General, Chief Justice and Cabinet Ministers) be. A clear example of the non-transparency of the contract process of the Aynak Logar copper mine, dated November 20, 2007. MCC Company was announced as the winner in the bid to obtain the Aynak Copper Mining License by the Ministry of Mines. Advantages and disadvantages in the presented text The suggestions require further in-depth studies of scientific-research and financial institutions to clarify the advantages and disadvantages of technical and economic contracts and in the next bidding for granting mining licenses to other mines in the country as A comparative basis should be studied.

Table 3. *Submission of proposals of MCC Chennai and Kazakhstan Consortium published by the representative of Kazakhstan Consortium* [29], [30].

No	Specifications	Kazakhstan Consortium (Kazakh)	Chinese Company (MCC)	Difference
1	Volume of investment in Aynak copper project, including electricity projects	US $ 4.054 billion	US $ 3.4 billion	US $ 0.654 billion
2	Start of extraction	2years after the signing of the contract	5years after the signing of the contract	3 years
3	Extraction volume (tons)	290000	200000	90000
4	Volume of additional investment in Aynak copper project with additional projects	$5.64 billion	it is not clear	-
5	Money that Afghanistan's budget earns from royalties (royalties) means Afghanistan's budget revenues from royalties	Annually $ 383 million or 54,490 tons of pure copper (if the price per ton of copper is $ 7,300) the size of the royalty is fixed at 18.1 percent and is not related to changes in copper prices in the world.	Size Royalty of 19.2 percent is not high and is linked to the world price of copper in the world, for example: the price of copper 7300 US Dollar 19.2% Royalty used, but if the price of copper in the world down, then the size of Royalty Chennai to 8 percent comes down	The Chinese royalty of 19.2 percent depends on the world price of copper and can fall to 8 percent, but the size of Kazakhstan's royalty is 18.1 percent and it is proven that this is good for Afghanistan's budget.
6	Afghanistan's budget revenue from royalties over 30 years	11.490 billion dollars	it is not clear	

Corruption, and the generally weak and inefficient administration of the mining sector, are reflected in Afghanistan's low ranking in the 2017 Resource Governance Index which assesses how resource-rich countries govern their oil, gas and mineral wealth. Afghanistan achieved a score of only 34 out of 100 points, which ranked it 71st among 89 countries Figure 11. The country's poor ranking was driven largely by low scores for governance, the extent of political conflict and insurgencies, corruption and breakdown in the rule of law; Afghanistan scored especially low on the 'enabling environment' component. Afghanistan also ranks low on the World Bank's 'Ease of Doing Business' Index – 173th out of 190 countries, though on the positive side, in 2019 Afghanistan became one of the ten countries in that index to show the most improvement [25].

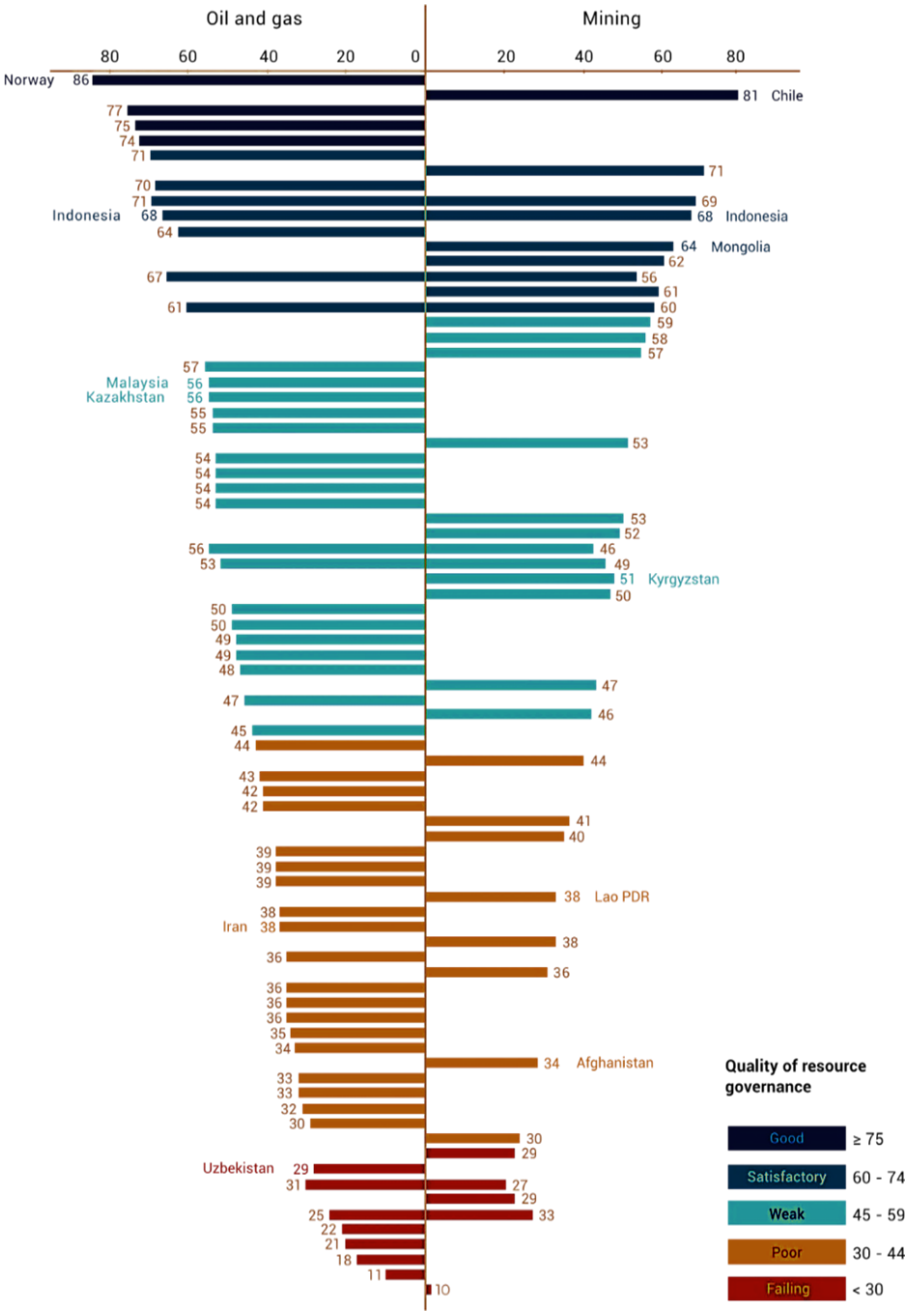


Figure 11. Resource Governance Index, country scores and rankings in sustainable management of mining operation Created on data from Natural Resource Governance Institute- 2017 [7].

In 2007. The largest contract for the Aynak copper mine was awarded to MCC for $ 3.5 billion. This mine is one of the largest copper mines in the world. China has estimated the total value of copper at the mine at $ 10 billion, but the project has not extracted a single gram from the mine in the past 13 years due to acute security issues. The Afghan government annually loses $ 808 million in royalties. Over the past 17 years, the Afghan government has signed several mining contracts with various domestic and foreign companies. However, due to the lack of transparency in concluding these contracts, the lack of proper supervision over the practical work of extraction has always been a concern. Copper Aynak was signed between the Ministry of Mines and Petroleum and MCC in 2007. Until now, practical work has not started due to the following reasons:

Prolongation of the ancient excavation process, Lack of sufficient mineral phosphite in the country to neutralize sulfuric acid to produce pure copper, Lack of economics of the railway project, MCC's request for revision and adjustment of the Aynak copper contract for changes in the reduction on the reality in order to return within the project and security challenges in and around the Aynak copper area The Aynak copper contract is currently failing for the above reason. In addition, in 2012, the contracts for the Badakhshan and Balkhab Sar e pul gold mines were put out to tender, at which time the Turkish Mining Company and the Afghan Gold Minerals won the tender, but due to legal problems, the contracts were suspended for up to six years. On October 5, 2018, two volunteer companies signed an agreement between the Ministry of Mines and Petroleum at the Afghan Embassy in Washington.

The duration of these contracts is 30 years. For the first three years, the Afghan Mining Company will invest $ 22 million in the Badakhshan Gold Mine and the Afghan Gold Minerals Company will invest $ 56 million in Balkhab Sar e pul Copper.

Unfortunately, the practical work of these mines has not started since 2018. However, it is criticized that these contracts contain ambiguities and violations of Afghanistan's mining law.

These cases can be expressed in the following points:

1. Uncertainty of the total value of each contracted mine.
2. Former Minister of Urban Development's participation in contract companies.

Because according to the Afghan Mining Law, the president and vice presidents, ministers and members of the National Assembly and other high-ranking government officials can not get a mining contract until 5 years after leaving office.

3. Reduction of royalty from 11 to 8 and from 10 to 6 According to Integrity Watch Afghanistan, the royalty rate of contracts has changed since Saadat Mansour Naderi served as Minister of Urban Development in the cabinet.
4. Lack of financial guarantees by the Company.

Other challenges facing Afghanistan's mines are the local use of minerals, the location of mines, ease of extraction, and socio-economic disadvantages, and the high quality of useful materials and parasitic elements implicitly with the main mine. The reason for its integrity and high quality such as high percentage of useful materials, price supplements, quality, purity and some other features have attracted

everyone's attention. This feature of the country's reserves has caused smugglers and traffickers to obtain mineral stones and sell them on the black markets using any illegal means. For example, according to preliminary research, Logar chromite contains a significant percentage of platinum group elements, which include elements (Pt, Ir, Os, Pd, Rh, Ru) and is one of the most valuable elements.

Therefore, it is not far-fetched that its illegal extraction and smuggling was not solely due to the extraction of chromium (Cr); Rather, it is more important to obtain platinum group elements.

Also, the illegal extraction of lapis lazuli in Badakhshan province, Sharif marble, Helmand marble, etc. is done due to their high quality.

Table 4. *Elementary and mineral association of some mines in Afghanistan 2010-2011 after* [3].

Name of mines	The main minerals	Mineral Possible
Aynak Copper	Copper, Cobalt, Silver	Marble, chromite, asbestos, talc
Badakhshan Gold	Gold, Iron	Silver, Copper, Uranium
Zarkashan Copper-Gold	Copper-Gold	Silver, lead
Haji-Gak Iron Iron	Iron	Barium, marble, sandstone, uranium, copper
Balk-hab Copper	Copper	Lead, zinc, coal

A strong legal and regulatory framework can successfully attract and retain investment. Another challenge, the negative effects of which are no less than the issues mentioned, is the early amendment of the Mineral Law by the Cabinet of the Islamic Republic of Afghanistan. Minerals Act 2005 Approved. Since then, this law has been amended four times: in the years 2009-2011 and 2019, this law has provided for various approval processes and the right to decide for each of the 5 types of contract award.

Table 5. *Types of mining licenses and associated decision rights adapted after ministry of mine and petroleum* [31] .

License	Process	Decision	Area (Maximum)	Term
Reconnaissance	Application	MoMp approval	20000 square km	2 years+no extensions
Exploration	Tender	HCI+Cabinet approval	250 square km	2 years+2 year extensions
Exploitation	Tender	HCI+Cabinet approval	50 square km	30 years+15year extensions
Small-Scale mining	Tender	MoMp approval	1 square km	10 years + 5year extensions
Artisanal	Application	MoMp approval	1 hectare	5 years + 5year extensions
Quarry and construction materials	Application	MoMp approval	1 hectare	5 years + continuous 5years terms

Classify mineral assets in the minerals legislation. The current classification methodology relies too heavily on the maximum mining area to distinguish license types. This has led to confusion and rent-seeking, as both mining companies and ministry employees simply divide a mining area to smaller blocks, thereby allowing approvals at the council or cabinet level. Instead, we seek a classification scheme that reduces the type of license and focuses classification of licenses on the type of mineral and required investment levels. For example, gemstones and construction material would be classified as small-scale mining licenses, while copper would be an exploitation licenses, irrespective of the license area. These change in the law should be made immediately.

A number of civil society organizations have objected to the law, saying it has many loopholes that not only fail to serve Afghanistan's interests, but also create a national crisis in the country. these institutions address the gaps in this law: lack of transparency in the bidding process, non-publication of contracts, uncertainty of owners and individuals who benefit from such contracts, lack of consultation with civil society representatives in drafting it and lack of dispute resolution mechanism in case of conflict Have mentioned. the law does not provide a way to punish government officials who support certain companies to win them, and to ensure transparent accountability, an oversight process is needed that includes representatives of the Afghan National Assembly.

Integrity Watch Afghanistan says the law leaves the hands of the mafia and corrupt people in the lurch. Mining is considered in this law, but Afghanistan's mining is not considered, and this process could lead to the fate of the Republic of the Congo in Africa, where 34 million people were killed in the civil war and $ 24 trillion of its capital was looted. In most countries of the world, governments never delegate the identification and exploration process to the private sector. My mission was in the Ministry of Mines. Afghanistan National Development Strategy (ANDS) mentions the potential of the mining industry to generate employment and accelerate development in rural areas. To develop the huge mineral potential, the Government of Afghanistan has adopted a new policy direction, transferring the task of exploitation of the country’s natural resources from the state to the private sector. But still there are no guarantees that the that Afghan leaders and international

community will follow best practices for natural resources exploitation on how to establish a good governance frame work. For a proper mining exploitation, there should be officials and authorities from the government, NGOs, community and civil society who monitor and evaluate the mining process. The process and revenue of the mining sector must be controlled by the specified authorities for the transparency of the mining process. the government of Afghanistan has signed up for the Extractive Industries Transparency Initiative (EITI) a global voluntary standard to ensure transparency of payments from natural resources, to implement it at the national level.

4. Discussion

The first consequence of these existing problems and challenges is that selection of the priority Area of interest (AOI) tenders. For example, we will likely have to move forward with substance metal contracts such as iron ore, gold and copper only after a few years, when power and transport issues are resolved. The lack of acknowledgment of these constraints is one reason why the signed Aynak copper and Haji-Gak ore iron deposits contracts have not moved forward since the signing of these contracts. For this reason, it likely makes greater sense to begin with limitations material and aggregate contracts, as these form the bulk of contract awards and do not require extensive transport or power resources. Second, the security limitations denote that we should either sequence Area of interest (AOI) tenders in regions of the country with higher security, or upfront acknowledge that greater security must be provided for mines in less secure areas. Third, we must decide whether we want to relax these constraints one by one, or if it is possible to resolve these constraints concurrently by region. In other words, it may be difficult to quickly resolve security, power, or transport issues throughout the country, but it may be possible to resolve a bundle of these limitations in a particular region at the same time. If is true, then we must align our regional transport, power, security, and other strategies with our mining strategy. in the continuation of this research, we will briefly review the main challenges and constraints of this process.

In most of the countries that have successful experiences in the field of mining, one of the main reasons for creating sufficient knowledge in the field of management of this sector has been. For the management of mines, not only technical and engineering discussions are sufficient, but also the management of these resources requires a broader understanding in the field of economics, law and management of these resources. So far, no serious attention has been paid to these issues at the level of the Ministries of Higher Education and the Ministry of Mines of Afghanistan. Demand for mineral raw materials has been growing steadily since World War II, and this demand is directly related to factors (population growth and the non-renewability of minerals and hydrocarbons). An important example is the Aynak copper contract, which was signed in 2007. The contract was awarded for $ 7,300 per ton, which was later increased to more than $ 11,000 per ton over the next three years, indicating a lack of specialized manpower in the natural resources (mining) sector. And demand, population growth, and the non-renewability of

minerals, and ultimately national interests, meet the long-term goals of sustainable development in mining contracts. Specialized manpower is the first factor for proper mining management. We see the negative consequences of skilled manpower in all large and small scale contracts that this article does not have the capacity to address. Intrinsic characteristics (high quality, local use of minerals, location of mines and ease of extraction) and socio-economic disadvantages can also be mentioned here as a major challenge that has paved the way for illegal and substandard extraction. The first consequence of these challenges and constraints is that they affect the bidding process. For example, large mining contracts may not be possible until the problems of security, skilled manpower, instability of the mining law, electricity, transport, land and water are resolved, and domestic and foreign investors are less interested in investing. For example, several large mining contracts, such as Aynak Copper, Haji-kg Iron, and the Amu Darya Basin, have not progressed after more than 10 years. Income and employment are the two main benefits of mining activities. Due to illegal mining and the mentioned problems, the government of Afghanistan and the people of Afghanistan have benefited less through this. On the contrary, local commanders, warlords, and armed dissidents have made considerable gains in the past. Also, if not properly managed and its illegal and substandard extractions, it reduces the real value of mines and a big blow to the value of mining construction, mining industrial life, mining quality, environment, economy, revenues, equipping domestic and foreign terrorists and smuggling minerals. The countries of the region and its re-export are of greater monetary value to the country.
Finally, in view of the above issues, the following conclusion and recommendation are presented:

5. Conclusion

1. Afghanistan is a country rich in natural resources. In terms of natural resources, this wealth has created a lot of optimism about the prospects for economic development. The findings of domestic and foreign scientists and researchers based on geological structure and numerous reports show that the value of Afghanistan's natural resources in terms of potentials reaches thousands of billions of dollars. And he can afford it this way. Economists believe that this can only lead to satisfactory results in the use of mines through effective and efficient management. Many countries, such as Chile, have made good use of their mines through effective management, and others, such as the Congo and Sierra Leone, have suffered from poor governance, poor economies, and civil wars due to poor and unhealthy mineral reserves. In Afghanistan, weakness in mining management is one of the important factors in illegal and substandard mining. Which is directly related to the weakness of governance. In addition to causing the spread of substandard and illegal mining, it also causes economic damage, loss of minerals in the floors, lower quality of minerals, reduced industrial life of the mine and many environmental problems.
2. What is important in the field of mining contracts. How to contract with mining contractors, implementation of mining rules and regulations, how to monitor mining companies and how to implement contract articles and implement a

regular and coordinated policy in the mining contract, is a matter of great concern about the country's mining signs. Without considering the stages of exploration and exploration or sufficient information about its quantity and quality is given to contracting companies. This causes irreparable damage to the government and a number of minerals are exported abroad in the form of raw materials; And a clear example is chromite, which is contracted without export in terms of quantity and quality and evaluation in terms of industrial value and its potential use in the country and is exported abroad in the form of raw materials, while the chromium element is a part. It is important in the steel industry and it is of great economic importance, and there is an urgent need for steel in the country, and millions of tons of steel are imported into the country every year, and the government has not taken any practical steps to invest in this sector.

3. Lack of soft infrastructure (security, rule of law, skilled manpower, environmental and social issues, information and human rights) and infrastructure (water, electricity, transport and land) are among the major constraints facing this sector. The weakness of these foundations and the existence of shortcomings in this area cause many problems in the proper management of the country's mining sector.
4. Mines are among the non-renewable resources, considering that the principle of sustainable development belongs not only to today's generation, but also to future generations.
5. The role of mines in the economic outlook of Afghanistan is of considerable importance and this phenomenon is effective in increasing the dynamism of the economy, even in reducing the existing disorders in this country and can put an end to the existing anomalies in the country and make a bright and prosperous Afghanistan.
6. Achieving economic self-sufficiency in the country will be difficult and challenging if the Afghan government fails to properly manage its mining and natural resources sector and does not seriously fight corruption, smuggling and illegal mining. Managed and targeted mining can solve many of Afghanistan's economic problems and provide jobs and employment for its citizens, and as a result, its citizens can achieve economic prosperity.

   What can be presented as a general conclusion is that the huge reserves of mines in the country alone can not be a factor for happiness and prosperity. Rich mines can turn the misery of its people from time to time. In order to use these resources effectively, it is necessary to create superstructures and infrastructure in the mining sector. And the slightest challenge is eliminated. Effective management is the most important element for the effective use of natural resources, especially mines in the country.

6. Recommendations

1. Arrangement a committee of experts in all areas related to mining management, economics, environment, sociology and law to be able to create an effective and practical framework in the field of mining.
2. Introduce and reproduce the Mining Law before signing it for relevant institutions, private companies, civil society organizations, scientists, professors and people in the field of mines.
3. Public awareness, international cooperation, prosecution of perpetrators of illegal mining and smuggling, the growth of mining sector management, and the strengthening of governance and security can all play a valuable role in preventing the unreasonable use of mines.
4. The process of concluding mining contracts in a competitive manner as well as announcing the loss and winning of contracts should be done publicly in the presence of all contractors, so that the contractors know why they won the contract or why they lost the contract.
5. Most of Afghanistan's mines are contracted without considering feasibility studies (economic, technical, organizational and scheduling), determining the actual amount of reserves from forecast to stabilized reserves and determining the industrial life of mining, which is against all principles and norms. Mining operations are carried out in the exploration phase, which is one of the most vital parts of mining activities in the world.
6. Therefore, it is recommended to the Ministry of Mines to conduct feasibility studies when submitting contracts to avoid negative consequences in the future. A major example of the lack of feasibility studies is the contracting of Aynak Copper, which MCC considers uneconomical for the construction of the railway and the specified amount of royalties.
7. Publish all reports on the mining contracting process so that people have full access to the relevant processes.
8. Publication of all reports on the amount of revenue from mines and how it is consumed.
9. Try to make the royalty situation according to the quality and having a mineral parachute, Because the price of useful materials depends on its quality.
10. Preventing the sale of Afghan mineral raw materials and creating infrastructure for processing metallurgical industries (metal smelting network) inside the country.
11. The development of professional capacities and supervisory skills of the staff in the Ministry of Mines and Petroleum, as well as equipping this department with modern technology and technical equipment, for the good management of the mining sector is considered necessary. Because supervision requires professional and managerial capacity of personnel and being equipped with equipment and technical machinery.
12. Design a clear and effective mechanism for distributing mining revenues between local people, local governments and the central government.

13. Creating a single and transparent account for the collection of all natural resource revenues and overall strengthening of the mining monitoring system and establishing a fair mechanism to ensure the interests of local people are also considered to be effective for better management of Afghanistan's natural resources.

These are some of the most important suggestions in this study to be used by responsible institutions in the field of effective management of these resources.

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