DELVE COUNTRY PROFILE

Afghanistan

ARTISANAL AND SMALL-SCALE MINING SECTOR

DELVE

A GLOBAL PLATFORM FOR ARTISANAL & SMALL-SCALE MINING DATA

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Delve is an initiative to build a global platform for artisanal and small-scale mining (ASM) data. Its vision is a world in which ASM is recognized as an important contributor to global development.

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Cover Photo: Artisanal and small-scale mining of coal at the Kalēch mine, Bamyan Province, looking west. Each adjacent canyon has several mine shafts where coal is extracted primarily using hand tools. The coal is transported from the mines by donkey (rear cover photo) before it is bagged and loaded on trucks for transport. Photo credit: John SanFilipo, USGS 2006.

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Definitions & Acronyms

AEITI	Afghanistan Extractive Industry Transparency Initiative
AGS	Afghanistan Geological Survey
ASM	Artisanal and Small-scale Mining
AISA	Afghanistan Investment Support Agency
EITI	Extractive Industries Transparency Initiative
GoIRA	Government of the Islamic Republic of Afghanistan
GDP	Gross Domestic Product
GNI	Gross National Income
HEC	High Economic Council
HDI	Human Development Index
IRA	Islamic Republic of Afghanistan
IS	Islamic State
ISKP	Islamic State – Khorasan Province
kg	kilogram
km	kilometer
LSM	Large-scale mining
m	meter
MCAS	Mining Cadastre Administration System
MoCI	Ministry of Industry and Commerce
MoEc	Ministry of Economy
MoF	Ministry of Finance
MoLSAMD	Ministry of Labour and Social Affairs, Martyrs and Disabled
MoM	Ministry of Mines
MoMI	Ministry of Mines and Industries
MoMP	Ministry of Mines and Petroleum
MRA	Mineral resource area
NEPA	National Environmental Protection Agency
SDG	Sustainable Development Goal
SOE	State-owned enterprise
UNDP	United Nations Development Programme
UNODC	United Nations Office on Drugs and Crime
USAID	United States Agency for International Development
USGS	United States Geological Survey

Country Profile Snapshot: Afghanistan

MATERIALS MINED BY ASM
(in order of individuals employed per mineral from largest to smallest)

Clay
Other Industrial Minerals
Pegmatites, Gemstones, and Semi-Precious Stones

No Employment Data Available:
Marble
Talc
Lapis Lazuli
Gold
Coal
Chromite

MINERAL GOVERNANCE FRAMEWORK

Government priorities

Decision Rights: Addressing the imbalance of decision rights for mining contracts.

Tendering Process: Improve transparency of the approval process for all types of contracts.

Classification of Mining Assets: Modify the licensing structure and mineral asset categorization to focus more on the type of mineral and required investment level rather than the 'maximum mining area'.

Royalty Rates: Standardize contractual terms in the Mining Law.

Reform the Role of the MoMP: Focus on policymaking and relinquish the tasks of regulation and operation.

Mineral Prioritization: Sequence mineral extractions based on the capabilities of the country's current infrastructure (transportation, electric grid, etc.).

Laws and policy

Minerals Law 2019 (link to a draft version – final version not available online)

National Mining Policy 2019

Artisanal and Small-scale Mining Policy 2012

Government institutions

Ministry of Mines (MoM), Ministry of Mines and Industries (MoMI), or Ministry of Mines and Petroleum (MoMP)

Afghanistan Geological Survey (AGS)

Ministry of Industry and Commerce (MoCI)

Ministry of Economy (MoEc)

Ministry of Finance (MoF)

National Environmental Protection Agency (NEPA)

Ministry of Labor and Social Affairs, Martyrs and Disabled (MoLSAMD)

Inter-Ministerial Committee (IMC)

Independent Directorate of Local Governments (IDLG)

Associations, member organizations and NGOs

Afghanistan Investment Support Agency (AISA)

Extractive Industries Transparency Initiative (EITI)

International Council on Mining and Metals (ICMM)

Northern Coal Enterprise (NCE)

ECONOMIC AND DEVELOPMENT DATA[i]

2019 Population

Total: 38,041,754 (2019)

Labor force: 10,657,679 (2020)

Women: 48.7% (2019)

Men: 51.3% (2019)

2019 Classification (GNI per capita)

Low Income (World Bank Group n.d.)

GNI per capita (Atlas method) (current USD): 530 (2019)

GNI per capita (constant 2010 USD): 544.26 (2010)

2019 Gross Domestic Product

USD 19.291 billion

Poverty headcount ratio (2011 purchasing power parity)[ii]

Population on/below national poverty line: 47.3% (2020)

Proportion of Employed Population living on < USD 1.90 per day: 34.3% (2019)

LIVELIHOODS

Employment

Artisanal and Small-scale Mining (ASM): In 2012, the Afghan government estimated that 50,000 people were engaged directly in ASM and 450,000 were indirectly dependent on the ASM sector (Hart Group 2016). Many of those directly employed work in informal operations, whether licensed or unlicensed (Hart Group 2016). Employment opportunities include mining, licensing, site management, security, road construction, and transportation (Lakhani and Corboz 2017; O'Donnell and Khan 2020).

Large-scale Mining (LSM): Afghanistan's mineral production has always occurred largely in artisanal and small-scale operations. However, there has been significant mineral research into attracting investment in large-scale mining and production (Peters et al. 2011a). The transition to LSM operations would require major improvements to the country's infrastructure, especially in power and transportation (Ministry of Mines and Petroleum 2019b).

Gender participation in ASM

With rare exceptions, ASM in Afghanistan is almost entirely the domain of male adults and children. Women typically support the sector indirectly through household maintenance, farming duties, or water collection (The Guardian 2009; United States Agency for International Development 2018).

MINING SECTOR SUMMARY

General Mining Context

For millennia, extractive activity in Afghanistan (officially the Islamic Republic of Afghanistan, or IRA) has been entirely artisanal or small-scale in scope. Various international governments, organizations, and companies have supported the growth of the sector, and the Government of the Islamic Republic of Afghanistan (GoIRA) views its mineral wealth as vital to the country's stability and prosperity moving forward (Ministry of Mines and Petroleum 2019a). The development of the sector has been prioritized in multiple national plans, strategies, and roadmaps. Of particular importance to the GoIRA is the formalization of the artisanal and small-scale mining (ASM) sector to improve working conditions and enable the government to earn royalties from mineral production.

Afghanistan's geographic location in the middle of Eurasia once placed it at the center of historic trade routes. Lapis lazuli found its way to Mesopotamian jewelry around 2600 BCE, and by 400 CE, Buddhist monks had already mined copper at Aynak for centuries (McIntosh and Benham 2007; Omrani 2010). The Western world became interested in Afghanistan's mineral wealth in the mid-19th century, when the British sought to locate exploitable resources and to counter Russia's growing influence in Central Asia with geological exploration and surveys of Afghanistan (Shroder 2014). By the time Afghanistan became independent in 1921, it was known to have coal, oil, and iron ore deposits (Nathan Associates Inc. and Louis Berger International, Inc. 1992). Over the next 70 years, various attempts were made, in partnership with the British, French, Germans, Swedish, Russians, Czech, United States, and Soviet Union, to exploit Afghan gold, oil, natural gas, copper, coal, and uranium, with additional plans to mine beryl, chromite, talc, slate, and salt in large-scale operations (Nathan Associates Inc. and Louis Berger International, Inc. 1992; Shroder 2014). Thus, mineral exploration and exploitation in Afghanistan has always been conducted in partnership with foreign governments, firms, and experts.

Following its independence, Afghanistan began including the development of an extractive sector as a goal in its national plans starting in the early 1960s. In 1976, after transitioning from monarchy to republic, the government acknowledged the paltry extent of previous efforts at industrial mining, noting that only natural gas, lapis lazuli, and coal had thus far been mined at a scale greater than artisanal (Ministry of Planning 1976). The next 14 years were no easier on the country's production: in 1990, following the withdrawal of Soviet forces, the Afghan government reported declines in the production of natural gas and coal from a 1978 baseline. Insufficient financial resources and a lack of trained professionals were identified as the two greatest barriers to extractive sector development (Ministry of Planning 1976; Nathan Associates Inc. and Louis Berger International, Inc. 1992). Though the Afghan government, aware since before the 1920s of this critical lack of expertise and investment, had set aside its aversion to survey and technical support from foreign governments and petitioned the United Nations for aid in 1949, sufficient and sufficiently apolitical assistance never arrived (Nathan Associates Inc. and Louis Berger International, Inc. 1992; Shroder 2014).

The value of Afghanistan's mineral resources has been estimated at between USD 1 trillion and 3 trillion (Reuters 2010). With the rise of the Mujahideen, the Taliban, and other armed groups between the 1980s and the present, some of this wealth has supported insurgent activity: in 2015, the GoIRA earned approximately USD 42 million, whereas in 2020, the Taliban earned between USD 200 and 400 million from mining (BDO LLP 2019; Byrd and Noorani 2017; Lakhani and Corboz 2017; O'Donnell and Khan 2020). Afghanistan's extractive activity is supervised by multiple governing bodies working in tandem, including

the Cabinet (composed of the President, Vice-Presidents, all Ministers, and the Supreme Court) and the High Economic Council (HEC) (composed of the President, a Vice President, select Ministers, and select advisors from the private sector). Since 2016, the licensing and approval of large-scale mines like the 2007 Mes Aynak copper lease and the 2011 Hajigak iron ore leases have been under the jurisdiction of the Cabinet and HEC (Ministry of Mines and Petroleum 2019a; Renaud 2020). The task of licensing and approving ASM sites falls to the Ministry of Mines and Petroleum (MoMP) [sometimes referred to as the Ministry of Mines (MoM) or the Ministry of Mines and Industries (MoMI)].The Parliament, a bicameral body, approves all mining laws and updates thereof.

As the Afghan Constitution specifies that the State owns all mineral resources (Islamic Republic of Afghanistan 2004, Chapter 1, Article 9), all mining without a GoIRA-issued license is considered illegal (Ministry of Mines Directorate of Policy 2012a). In 2018, as part of its ongoing efforts to curb unlawful mining and increase the State's revenue flows from ASM, the MoMP drafted an ASM Formalization Strategy (Ministry of Mines and Petroleum 2018) to allow unlicensed miners to gain entry into the legal mining sector (Ministry of Mines and Petroleum 2019a). Because informal mining is driven by a variety of social and economic factors, formalization of the artisanal mining sector has been a challenging process, requiring significant cooperation between national and local governments and a reduction in the influence of non-state actors, among other things (Lakhani and Corboz 2017).

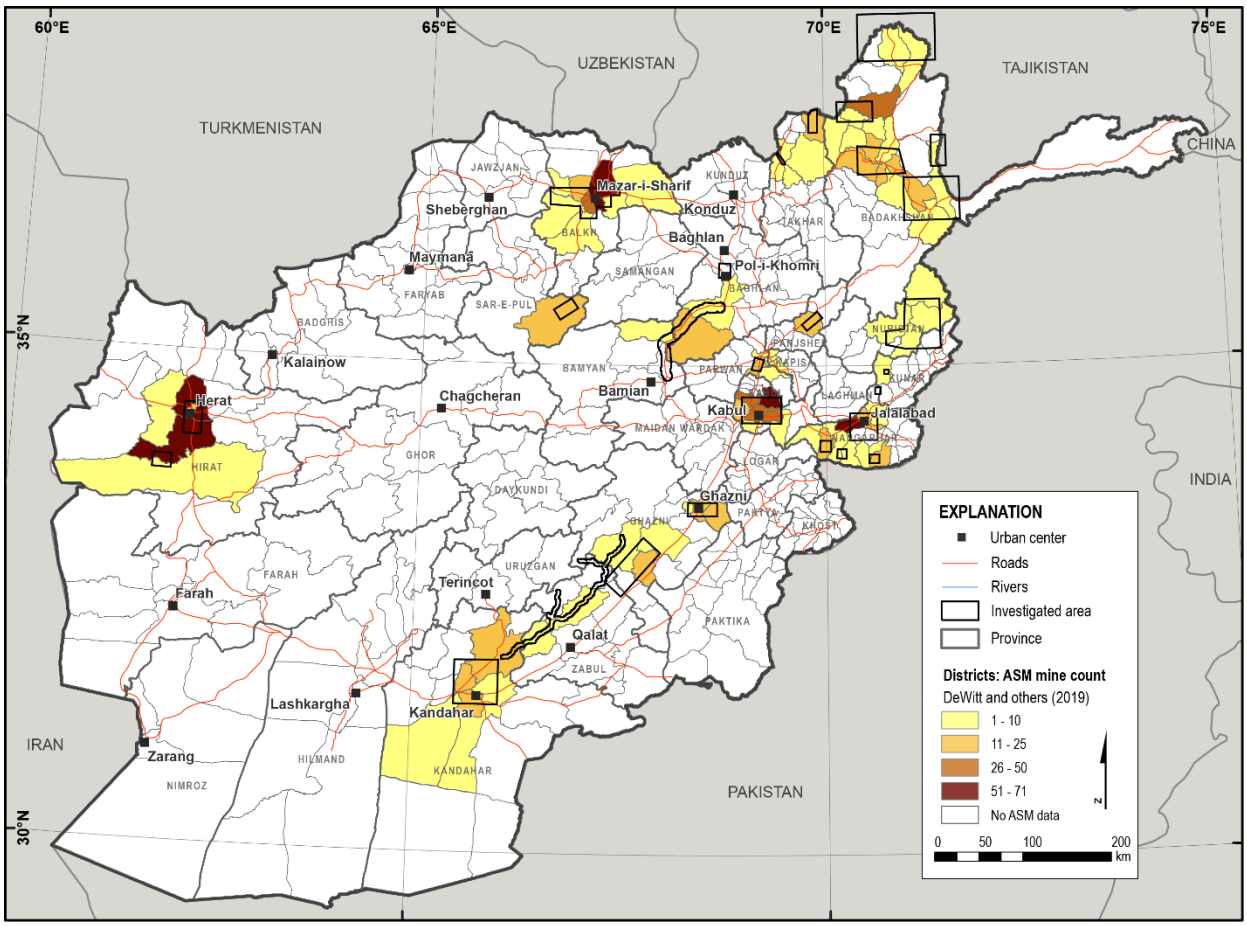
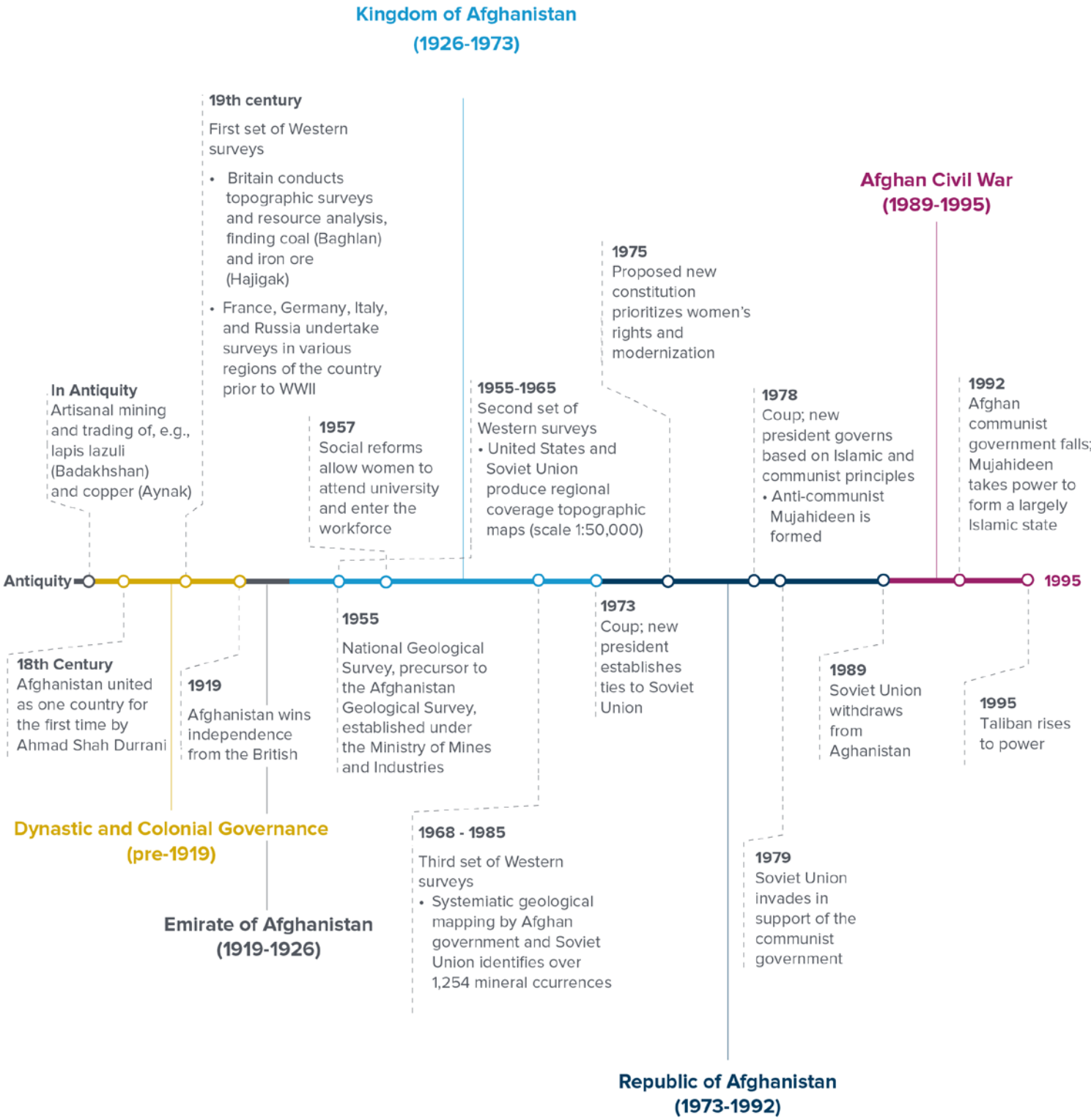


Figure 1. ASM mine count by district based on data published by DeWitt et al. (2021a). ASM was observed using very high-resolution satellite imagery within specific investigation areas, which correspond to the mineral resource areas published by the USGS (Peters et al. 2011a).

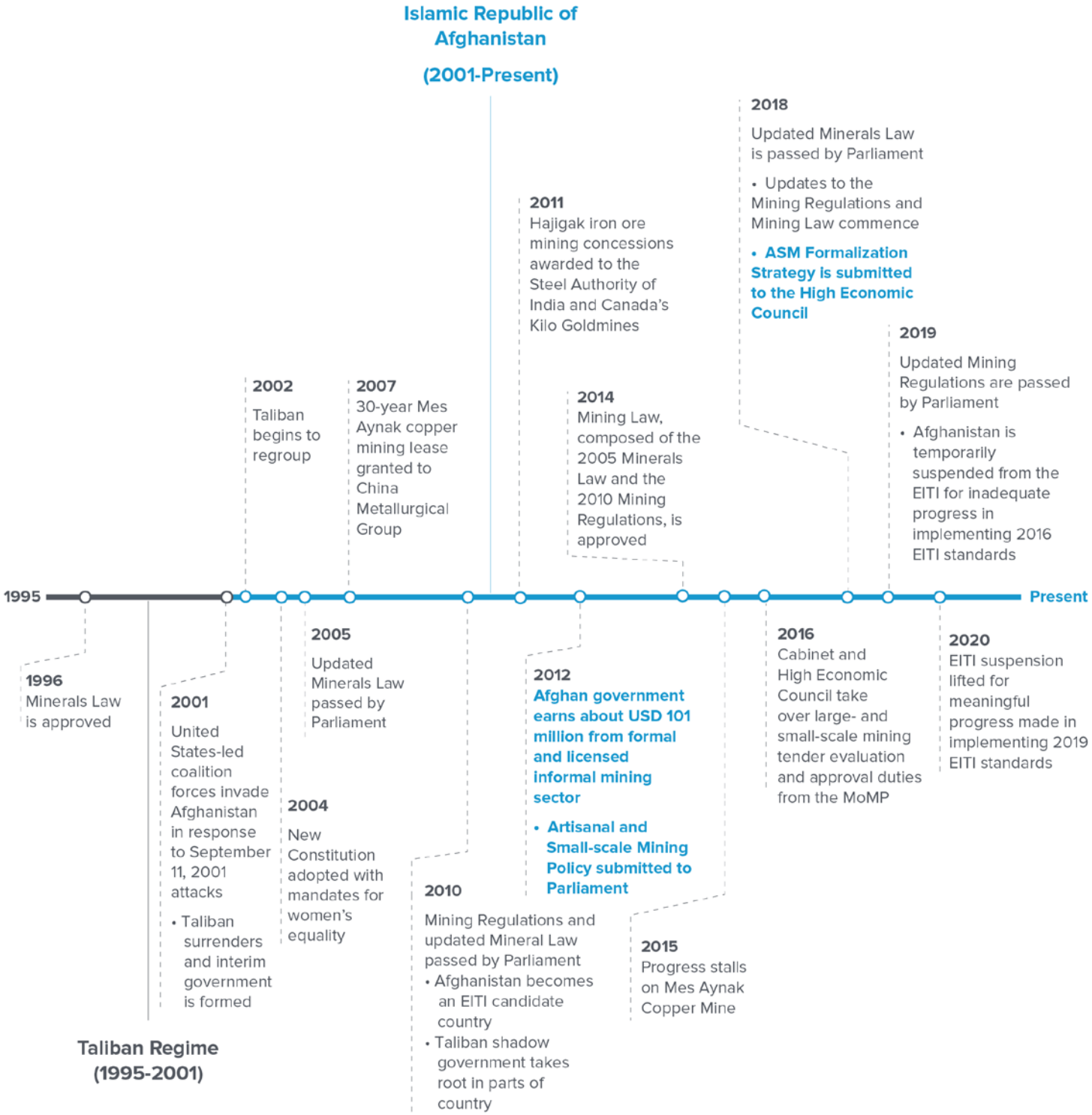
There is very little reliable information regarding the scale and scope of ASM activity in Afghanistan (BDO LLP 2019; Renaud 2020). The MoMP has reported a need for documentation of all informal mining

occurring province by province in its ASM Formalization Strategy (Ministry of Mines and Petroleum 2018). However, a growing body of research is emerging that documents ASM in Afghanistan. Work conducted by the U.S. Geological Survey (USGS) has produced a geospatial dataset documenting ASM within the specific mineral resource areas (MRAs) described in Peters et al. (2011a) (DeWitt et al. 2021a). The scope of this dataset focuses on MRAs for which ASM is possible and probable – i.e., high-value, easily extractable mineral resources located in surface or near-surface deposits. This catalogue of ASM locations also documents the type of mineral commodity being extracted and the estimated number of mine sites per square kilometer (km^2) (Figure 1; more information at DeWitt et al. 2021a). This work is ongoing, and future additions to this database may further benefit the GoIRA in its ASM-focused policies.

Timeline


Kingdom of Afghanistan
(1926-1973)
19th century
First set of Western surveys
• Britain conducts topographic surveys and resource analysis, finding coal (Baghlan) and iron ore (Hajigak)
• France, Germany, Italy, and Russia undertake surveys in various regions of the country prior to WWII
Afghan Civil War
(1989-1995)
1975
Proposed new constitution prioritizes women's rights and modernization
In Antiquity
Artisanal mining and trading of, e.g., lapis lazuli (Badakhshan) and copper (Aynak)
1957
Social reforms allow women to attend university and enter the workforce
1955-1965
Second set of Western surveys
• United States and Soviet Union produce regional coverage topographic maps (scale 1:50,000)
1978
Coup; new president governs based on Islamic and communist principles
• Anti-communist Mujahideen is formed
1992
Afghan communist government falls; Mujahideen takes power to form a largely Islamic state
Antiquity
1995
18th Century
Afghanistan united as one country for the first time by Ahmad Shah Durrani
1919
Afghanistan wins independence from the British
1955
National Geological Survey, precursor to the Afghanistan Geological Survey, established under the Ministry of Mines and Industries
1973
Coup; new president establishes ties to Soviet Union
1989
Soviet Union withdraws from Aghanistan
1995
Taliban rises to power
Dynastic and Colonial Governance
(pre-1919)
1968 - 1985
Third set of Western surveys
• Systematic geological mapping by Afghan government and Soviet Union identifies over 1,254 mineral ccurrences
1979
Soviet Union invades in support of the communist government
Emirate of Afghanistan
(1919-1926)
Republic of Afghanistan
(1973-1992)

Timeline (continued)



ASM Context & Livelihood

Many facets of ASM in Afghanistan are under-studied, including why people engage in it, methods, materials mined, wage structure, and revenue generated. ASM practices are generally region- and commodity-specific: though some level of mechanization is used in talc-mining, for example, placer gold deposits are mined manually. Women have minimal-to-no presence at ASM sites, though child and forced labor are known problems (Central Statistics Organization and UNFPA 2017; DeWitt et al. 2021b; International Labour Organization 2012). Labor conditions can be hazardous, especially in informal ASM operations; problems range from long-term health issues like lung disease to injury and death (BDO LLP 2019; Shuja 2016; United Nations Development Programme 2020). The environmental impacts of mining (e.g., topsoil erosion, decline in water availability and quality, air pollution) are borne largely by farmers and the rural poor (Ministry of Mines and Petroleum 2018; United Nations Development Programme 2020; United States Agency for International Development 2018).

EMPLOYMENT

In 2012, the GoIRA estimated that about 50,000 people in the country were engaged directly in ASM, with 450,000 people indirectly dependent on ASM practices (Hart Group 2016). More recent estimates of ASM employment are not available, although it is known that informal ASM is widespread throughout the country. The impetus for artisanal mining is varied and depends on several complex and interrelated factors. In many areas, seasonal ASM is tied to agricultural production and used to supplement farming income. 'Influx' or 'rush' ASM occurs when new mineral deposits conducive to small-scale extraction, particularly gemstones, are discovered. The demand for labor prompted by these discoveries is met by an influx of miners who rapidly exploit the resource, then leave the area. 'Shock' ASM occurs when a sudden change in economic circumstances pushes local people into ASM. Finally, traditional ASM occurs where many generations claim and mine the same geographic area, particularly in areas of gold and gemstone resources (Al Jazeera 2007; Ministry of Mines and Petroleum 2018; Ministry of Mines Directorate of Policy 2012a).

Many of those directly employed in the ASM sector work in private licensed or unlicensed mines or in mining operations run by armed groups or militias. In certain provinces, mining activities enrich non-state political actors like the Taliban, the Islamic State (IS), or local warlords (O'Donnell and Khan 2020; United Nations Development Programme 2020). Locals in militia-controlled regions can find work in mining, licensing, site management, security, road construction, or transportation (Lakhani and Corboz 2017; O'Donnell and Khan 2020). Daily wages vary with commodity and job description. For example, emerald miners in Panjshir Valley are not paid a daily wage but receive a percentage of the revenue from their finds (The Guardian 2009). On the other hand, in 2014, the daily wage for locals engaged in artisanal chromite mining in the Khas Kunar region along the border with Pakistan was 300 Afghanis (USD 5.30[iii]) (Shroder 2014).

Since the early 1980s, the successive efforts of various non-state actors to capitalize on mineral deposits in areas under their control has led to both cooperation and conflict between local communities and the GoIRA (Lakhani and Corboz 2017). In one formalized artisanal mining scenario, the state owns the rights to all mineral resources and approves licenses for artisanal miners to extract these resources. The artisanal

miners pay a royalty to the government on profits made from the sale of these legally mined minerals. In reality, unlicensed mining occurs in most regions without national-scale government oversight or intervention. Non-state actors or local provincial authorities (local governments) may allow mining operations and control access to lands with mineral deposits (United Nations Development Programme 2020). In general, the employment structure of ASM is varied, and depends on the unique geographic, geologic, political, and socioeconomic situation of each mining area. Relatively little is known about many of these situations. In some areas, such as the informal mining of lapis lazuli, a three-tiered employment system exists. Mine shafts and tunnels are 'rented' to miners, who in turn hire laborers to mine 'licensed' tunnels. The miners pay taxes to the 'apex' non-state actors to ensure physical and job security. Local communities provide supplies and the labor pool, and the GoIRA receives no royalties (United Nations Development Programme 2020). In the case of emerald ASM, local elites control the land in which minerals are hosted. Miners are granted access to these areas and share profits after paying a 'royalty' to the local elites (Byrd and Noorani 2017). Minerals produced in this system are transported either by highway, where they are 'taxed' at local and national checkpoints by state- and/or non-state actors, or by pack-animal along smuggling routes to Pakistan (Byrd and Noorani 2017; United Nations Development Programme 2020). Payment of royalties, fines, and bribes to employees of the GoIRA is both a result of, and a contributing factor to, the State's weakness in the extractive domain (BDO LLP 2019).

GENDER PARTICIPATION

With the rare exception of specific mine sites, ASM in Afghanistan is almost entirely the domain of male adults and children. Women's role in the sector is primarily to support mining activity through food preparation and housekeeping. For example, emerald miners in Panjshir receive food and financial support from their families over the many months they may spend digging for the stones (The Guardian 2009). Similarly, water collection in rural areas, whether for household use, farming, or possibly mining-related activities such as sluicing, is a task often left to women (United States Agency for International Development 2018). In 2017, the Afghan Socio-Demographic and Economic Survey found that female participation in mining and quarrying was 0% in Parwan and Kapisa but 9.61% in Bamyan (Central Statistics Organization and UNFPA 2017); further information on the commodities the women of Bamyan mine is unavailable. There have been efforts to increase opportunities for female participation downstream in gem processing; for example, in the early 2000s, an Italian aid group proposed a pilot initiative to educate and train Afghan women in Kabul in cutting and polishing (Bowersox et al. 2007). Afghanistan's 2018-2022 National Export Strategy similarly includes plans to improve female representation in gem polishing and jewelry design (Islamic Republic of Afghanistan et al. 2018).

Of concern in certain sectors, notably clay mining and brick making, is child, bonded, and other forced labor (DeWitt et al. 2021b; International Labour Organization 2012). Child labor is also known to occur in coal, gold, and salt mining (Bureau of International Labor Affairs 2019), and the Taliban has a history of recruiting child soldiers in areas where ASM no longer occurs or has been stayed or terminated (Lakhani and Corboz 2017; U.S. Department of State 2020). Shuja (2016) found that the inter-ministerial cooperation that would be required to identify instances of forced and child labor and to take corrective action is sometimes lacking: ASM sites (which fall within the purview of the MoMP) are not necessarily open to representatives of the Ministry of Labor and Social Affairs, Martyrs and Disabled (MoLSAMD) for spot checks or other detection mechanisms.

LABOR, SAFETY, & WORKING CONDITIONS

The GoIRA applies the definition of ASM to minerals and materials that can be easily extracted by a community without significant use of, or access to, capital, machinery, or technology (Ministry of Mines and Petroleum 2018). This would seem to exclude the small-scale mining of such deposits as marble and coal, which requires some machinery and infrastructure, even though licenses for such mining have been registered with the Afghanistan Extractive Industries Transparency Initiative (AEITI) over the years (Ministry of Mines and Petroleum (MCAS) 2021). Moreover, mechanization is highly site-dependent: chromite mining can occur entirely with the use of hand tools or with some use of excavators, as can coal and gold mining (Shroder 2014). Emerald mining often involves the use of explosives and large-scale excavators to break up host rock and clear overburden (DeWitt et al. 2020), though in certain mine sites only hand tools are used (The Guardian 2009). Bulldozers are nearly always used in gravel and sand mining (Mossotti 2014).

Given the sheer number of commodities extracted by artisanal or small-scale enterprises in Afghanistan, working conditions are varied and accidents are under-reported. Though health and labor regulations exist (Ministry of Justice 2007), they are inconsistently enforced, a problem exacerbated by the informal nature of many ASM operations (United Nations Development Programme 2020). In 2013 and 2017, coal mine collapses killed 5 and 27 miners respectively, with another 14 injured in the 2017 collapse (BDO LLP 2019). Workers in talc and clay mines are exposed to dust and hazardous gases that can cause lung diseases (Shuja 2016; United Nations Development Programme 2020). Poor air quality, the danger of collapsing tunnels, and increased landslide hazards are just three of the negative impacts of the use of explosives in ASM (Ministry of Mines and Petroleum 2018). Local communities also deal with degraded water quality and infrastructure due to ASM activity (Ministry of Mines and Petroleum 2018). Additionally, in regions that see sudden influxes of (male) miners, women and children face diminished mobility and threats to their personal security (United Nations Development Programme 2020).

ENVIRONMENT

In implementing the 2007 Environment Law, Afghanistan's National Environmental Protection Agency (NEPA) is supported by the Committee for Environmental Coordination, the National Environmental Advisory Council, and 34 provincial Subnational Environmental Advisory Councils (National Environmental Protection Agency 2007). The law's primary mandates are environmental conservation, sustainability, and the improvement of human and environmental health, all while supporting nationwide economic development (National Environmental Protection Agency 2007). ASM-related environmental impacts NEPA must address include declining water table levels, deforestation (United States Agency for International Development 2018), air and water pollution (United Nations Development Programme 2020), river channel regime shifts, topsoil erosion, and unfilled shallow pits (Ministry of Mines and Petroleum 2018). Due to limitations in monitoring and enforcement capability, areas of licensed and unlicensed ASM are rarely monitored and infractions are not addressed (United States Agency for International Development 2018).

By law, mining cannot occur in the country's four nature reserves, which are set aside as Prohibited Areas (Ministry of Justice 2019; United States Agency for International Development 2018). However, the United Nations Development Programme (UNDP) identifies mining as one possible threat to Afghanistan's natural sites (United Nations Development Programme 2014). Band-e-Amir National Park, famous for its highly desirable travertine and located between an iron deposit to the south and a coal deposit to the north, is deemed by the UNDP to be particularly susceptible to the threat of resource development (United Nations Development Programme 2014).

Key Minerals

Due to limitations caused by its small-scale nature, artisanal mining typically focuses on mineral resources that are easily extracted, without the need for foreign investment, significant infrastructure, or sophisticated mining techniques (Ministry of Mines and Petroleum 2018). While there has been significant investigation of Afghanistan's mineral resources to attract large-scale mining (LSM) investment (Peters et al. 2011a), investigations of ASM have been relatively small in scope and focused on specific minerals or geographic areas (Bowersox 2015; Bowersox et al. 2000; DeWitt et al. 2020; Williams 2018). These studies, together with the geospatial data produced by the USGS (DeWitt et al. 2021a) and the license information published by the MoMP on its Mining Cadastre Administration System (MCAS) Transparency Portal (Ministry of Mines and Petroleum (MCAS) 2021), are synthesized in this document to characterize the ASM of individual mineral commodities in Afghanistan. Generally, the focus of ASM activity is confined to commodities with a high value-to-weight ratio, such as precious and semi-precious stones, pegmatites, gold, and coal (Byrd and Noorani 2017; Malpeli and Chirico 2014). In addition to these, however, in Afghanistan, a variety of industrial and construction minerals, such as chromite, marble, talc, sand and gravel, and construction stone are also mined almost exclusively by ASM (Bowersox et al. 2007; Ministry of Mines and Petroleum (MCAS) 2021; Renaud 2020; United Nations Development Programme 2020).

EMERALDS

Emeralds are one of the foremost semi-precious stones mined in Afghanistan. Although historic accounts of emeralds originating from the Panjshir Valley exist, more recently, emeralds are known to have been produced in the Khenj, Mikeni, Yaknow (Butak), Buzmal (Dahane Revat), Rivat, and Darun mining districts since the 1970s[iv] (Figure 2) (Bowersox 2015; Bowersox et al. 1991; DeWitt et al. 2020). Estimates of gemstone grade in the Panjshir Valley, made by Soviet and Afghan geologists in the 1960s and 1970s, range from 0.6 carat/m^3 to 6.5 carat/m^3 (DeWitt et al. 2020).

Production in the late 1990s was worth an estimated USD 10 million; the largest cut stone at the time reportedly weighed approximately 15 carats (Bowersox 2015; Groat et al. 2008). A 2009 survey of the Panjshir Valley's deposits and mines found that approximately 1,400 miners worked at 172 mines, producing gemstones ranging from 4 to >100 carats (Bowersox 2015). More recent estimates indicate that approximately 67,500-86,000 carats of emeralds were produced at just two of the Panjshir Valley mine sites over four years (DeWitt et al. 2020).

ASM methods in this region have traditionally entailed the use of explosives and drills, but in recent years have shifted to mechanized trenching and open pits (Bowersox 2015; DeWitt et al. 2020). In addition to more efficiently removing overburden and reducing crystalline breakage, this transition to mechanized mining may also have enabled access to new or higher-grade parts of the emerald deposit, as the Swiss Gemological Institute has noted a new 'superior' type of high-grade emerald originating from the Panjshir Valley. These 'Panjshir type II' emeralds more closely match the inclusion features, physical properties, and trace-element concentrations of Colombian emeralds when compared to previously known 'Panjshir type I' emeralds (Krzemnicki et al. 2021).

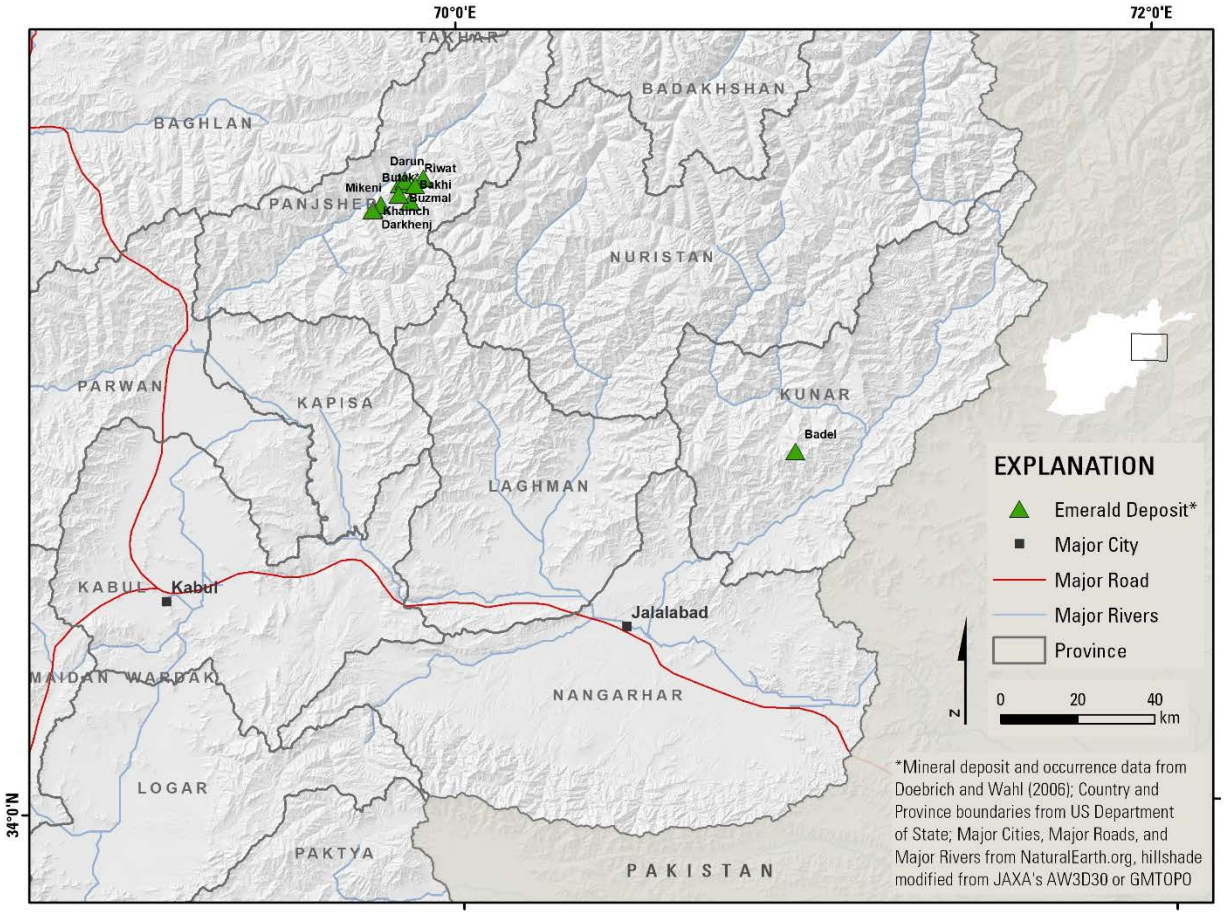


Figure 2. Locations of emerald deposits or occurrences in Afghanistan.

Interviews with Kabul traders and Badakhshan miners suggest that approximately 500 kilograms (kg) of emeralds are produced per year, valued at USD 100 million (United Nations Development Programme 2020). In 2017, ASM activity was observed broadly occurring across 72 km^2 of the Panjshir Valley (DeWitt et al. 2020). ASM of the Panjshir Valley's emeralds is controlled by local elites and is considered illegal by the GoIRA, though a 10% royalty is reportedly paid by miners to the provincial government (Byrd and Noorani 2017). Though three licenses have been registered with the MoMP, all have expired (Ministry of Mines and Petroleum (MCAS) 2021).

RUBIES

Rubies are primarily mined in the Jegdalek deposit, a 4-km-long belt located 100 km to the east of Kabul (Figure 3) (Byrd and Noorani 2017). Rubies range from a light purple to a deep red, and the best stones are similar in quality to those found in Myanmar. While estimates of potential production from the Jegdalek deposit are as high as several million USD per year, the ASM methods used to extract the gemstones are generally primitive. The marble layers that host the rubies are broken apart with hammers, prybars, and in some cases, pneumatic drills and dynamite. In recent decades, the mining area has been controlled by various non-state actors, affecting production. Estimates of the ASM workforce at Jegdalek are outdated: while approximately 400 men were reported to have worked at the mines in the late 1990s (Bowersox et al. 2000), no recent estimates are available. Miners work in small groups of 5-6 in the smaller mine areas and up to 15-20 in the larger mine areas (Bowersox et al. 2000). In the late 1990s, miners shared profits equally after providing the local military a commission of approximately 5%. At that time, it was estimated

that the Jegdalek deposit yielded approximately USD 500,000 annually (Bowersox et al. 2000). More recent reports suggest that the region's ruby deposits are under the control of the Taliban (Byrd and Noorani 2017). Miners must pay a 'royalty' to the Taliban, and in some areas, an additional royalty to the local police (Byrd and Noorani 2017).

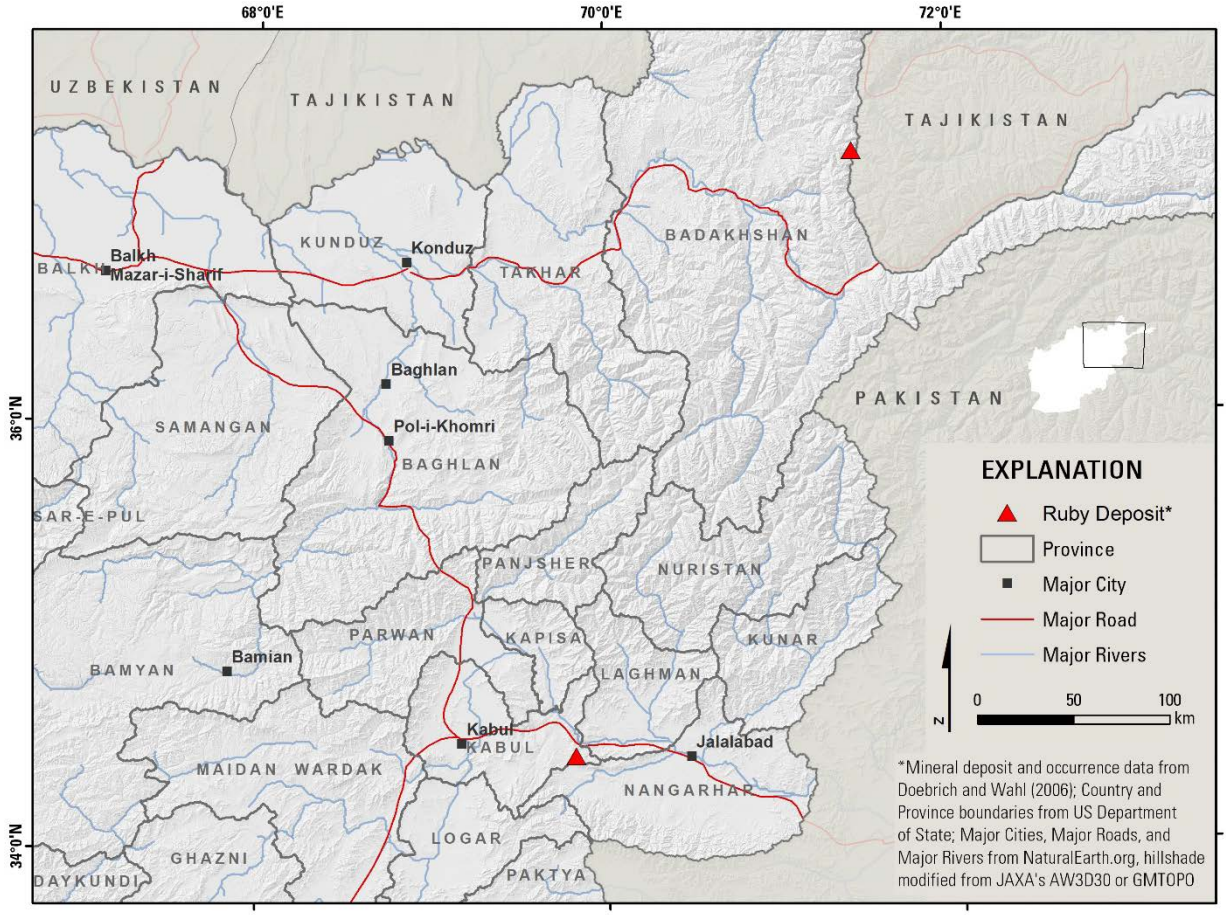


Figure 3. Locations of ruby deposits or occurrences in Afghanistan.

A ruby deposit has also been documented in Badakhshan, halfway between Khorog and Eshkashem along the Panj River and the Afghanistan/Tajikistan border (Figure 3) (Doebrich and Wahl 2006). In this area, ASM activity was detected at two separate locations in 2017 (DeWitt et al. 2021a). Recent interviews with miners and gemstone traders suggest that approximately 100 kg of rubies are produced per year, valued at USD 28.9 million (United Nations Development Programme 2020). However, no licenses have been registered with the MoMP for ruby mining as of April 2021 (Ministry of Mines and Petroleum (MCAS) 2021).

LAPIS LAZULI

Artisanal mining of lapis lazuli has occurred for millennia (e.g., The Metropolitan Museum of Art 2021). However, between at least the 1930s and 1970s, mining of this semi-precious stone was under strict government control (Byrd and Noorani 2017). Deposits of lapis lazuli are located primarily in the Kowcha Valley (Bowersox et al. 2007) of the Kuran wa Munjan district in Badakhshan, though other occurrences have been recorded near Jorm, Badakhshan, and off the Sanglich River in an area referred to alternatively as Chilak, Lagharaan, Shoka, or Strambi Valley (Figure 4) (Doebrich and Wahl 2006). These locations are

remote and poorly accessible. Miners traverse the steep mountainsides via donkey and live onsite, away from their families for long periods of time (Bowersox et al. 2007).

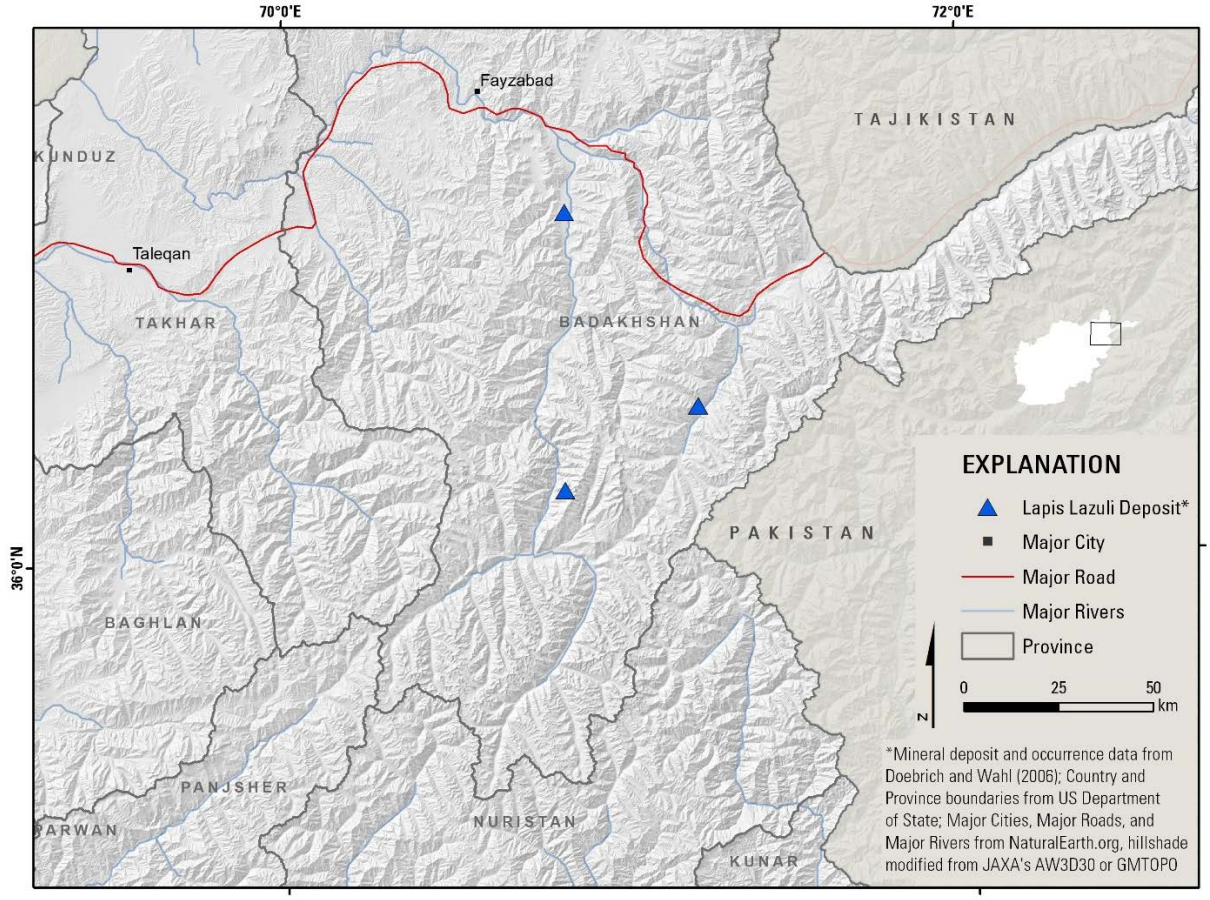


Figure 4. Locations of lapis lazuli deposits or occurrences in Afghanistan.

Prior to 2001, the extraction and sale of lapis lazuli was used by the Mujahideen to fund their resistance to Soviet occupation and subsequent civil war with the Taliban regime (Byrd and Noorani 2017). The deposits have been contested by two primary groups: one associated with former Afghan president Hamid Karzai, and the other with the former Northern Alliance. The latter seized physical control of the mines in the Kowcha Valley in 2014 at the same time that a company associated with the former group was awarded a contract by the government. The change in government in 2014 led to an abrupt cancellation of this contract in 2015, though the group associated with the Northern Alliance continues, unlicensed, to mine the lapis lazuli deposit (Byrd and Noorani 2017).

Production is thought to have peaked around 2014 at 8,000 metric tonnes/year, and recent production estimates range from 4,000 to 5,000 metric tonnes/year (Byrd and Noorani 2017). Estimating the value of this production is challenging, but a potential range is USD 80 million-284.65 million (Byrd and Noorani 2017; United Nations Development Programme 2020). As of April 2021, only one expired exploration license was registered with the MoMP (Ministry of Mines and Petroleum (MCAS) 2021).

PEGMATITES & OTHER GEMSTONES & SEMI-PRECIOUS STONES

Other gemstones and semi-precious stones are hosted primarily in pegmatite deposits located in Mawi, Suraj, Nilaw, and Korgal in Nuristan province (Figure 5). These high-quality commodities include

tourmaline, kunzite, aquamarine, spodumene, and morganite (Bowersox et al. 2007). Other deposits and occurrences of pegmatites are located in Badakhshan, Kunar, Laghman, Kapisa, and Panjshir provinces (Figure 5) (Doebrich and Wahl 2006).

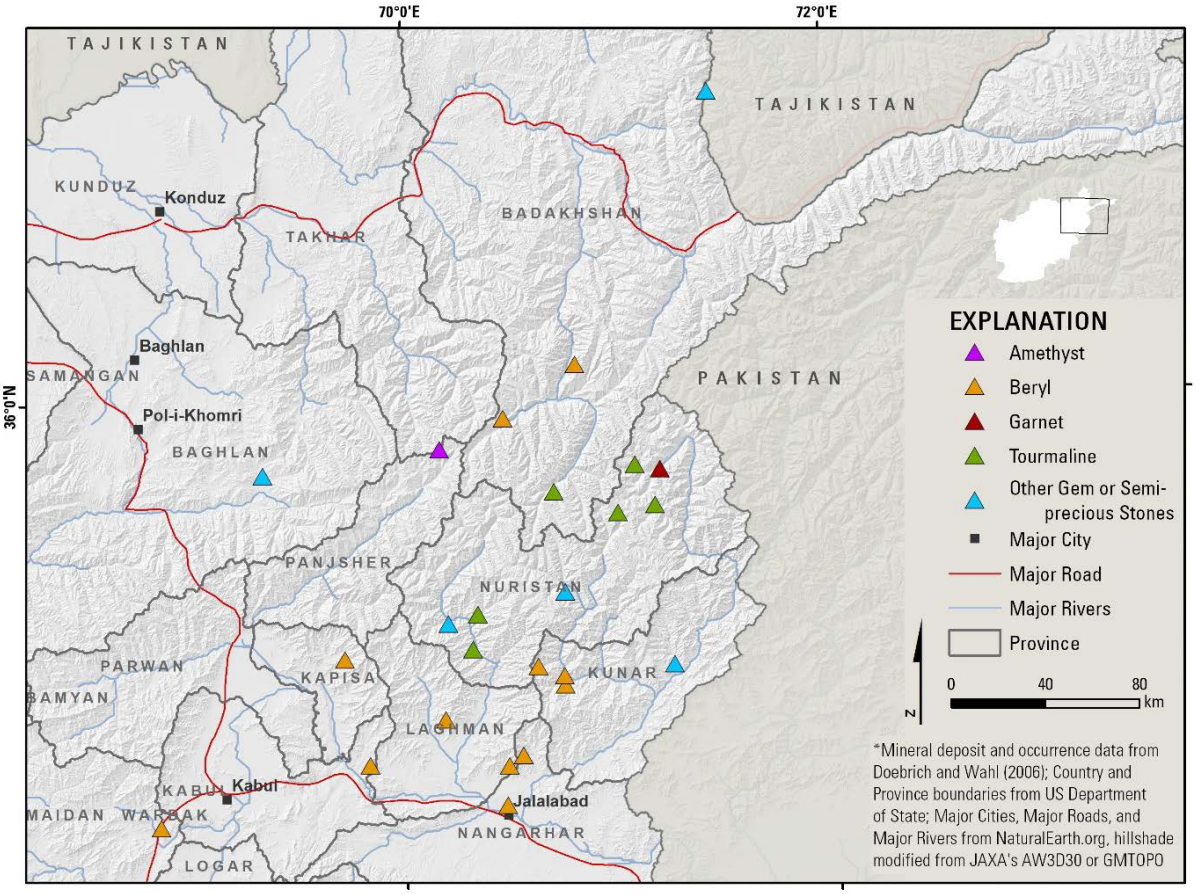


Figure 5. Locations of deposits or occurrences of pegmatites and other gemstones and semi-precious stones in Afghanistan.

Very little information exists about the artisanal mining of these semi-precious stones and pegmatites. In most areas, it is assumed that the mining is similar to the traditional blasting and tunneling methods seen in Panjshir Valley emerald mining; however, some evidence suggests that small-scale mechanized mining may also occur. In 2017, the UNDP estimated the production and value of these minerals through interviews with traders and miners (Table 1) (United Nations Development Programme 2020). Twelve licenses are registered with the MoMP for small-scale mining of semi-precious stones: tourmaline (9 licenses), garnet (2 licenses) and amethyst (1 license), but all have expired (Ministry of Mines and Petroleum (MCAS) 2021).

Table 1. Estimated artisanal & small-scale production in Afghanistan

Mineral	Production (kg)	Value (million, USD)
Tourmaline	1,000	15.0
Spinel	15	2.2
Garnet	1,000	1.5
Aquamarine	240	0.5
Sapphire	10	0.5
Kunzite	700	0.4
Amethyst	800	0.1
Agate	3,000	0.1
Total	**6,765**	**20.3**

Source: United Nations Development Programme (2020)

GOLD

Afghanistan has 88 mapped gold deposits or occurrences (Doebrich and Wahl 2006), which occur as skarn, porphyry, and alluvial deposits (Bowersox et al. 2007; Peters et al. 2007; Peters et al. 2011a). These are described below in greater detail.

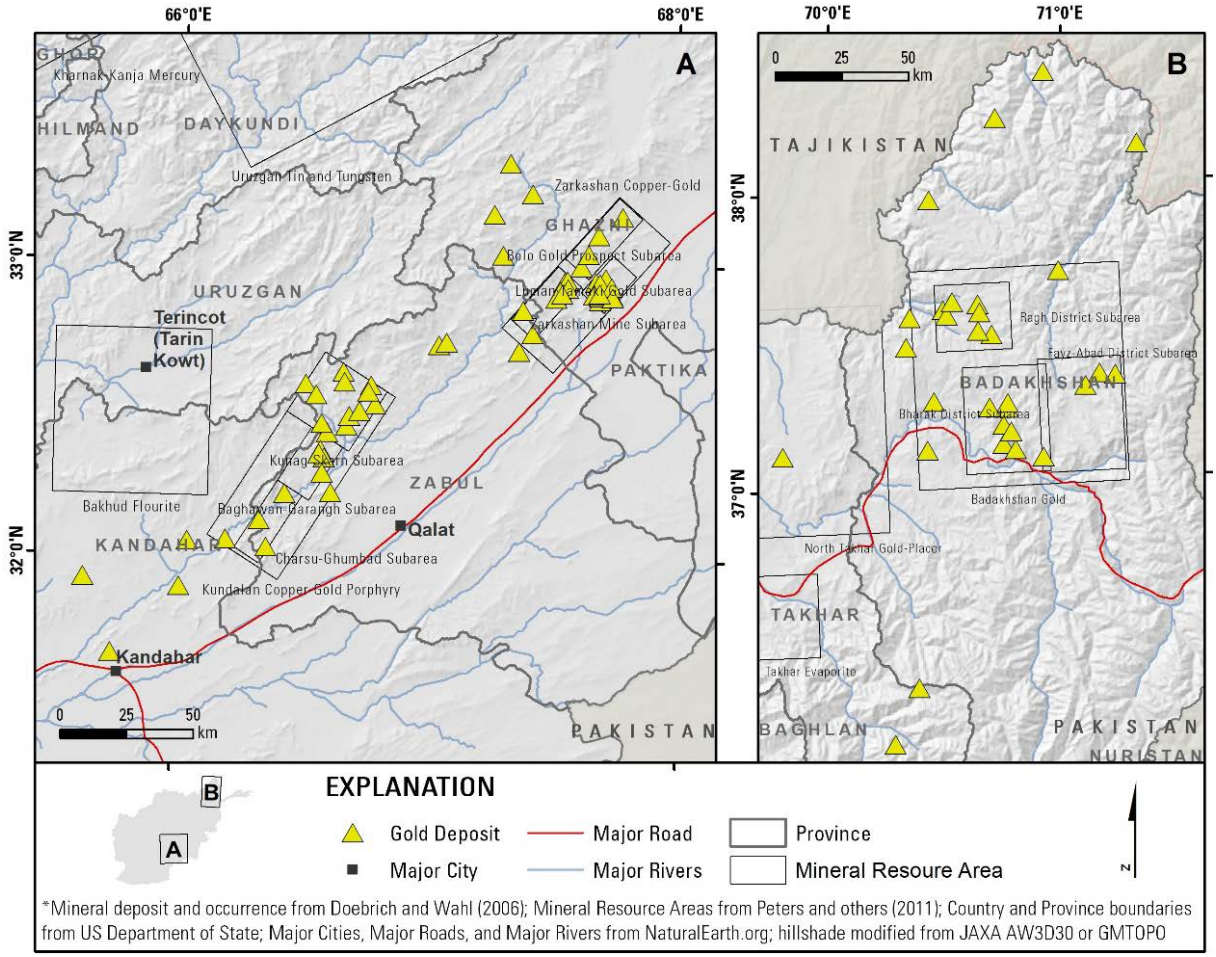


Figure 6. Locations of gold deposits or occurrences in Afghanistan.

Gold-bearing skarns are hosted in sedimentary rock and typically require mechanized mining; however, the geologic situations of the Zarkashan and the Vekadur deposits have the potential for artisanal mining (Benham and Coats 2010). The Zarkashan skarn gold deposit is located in Ghazni province (Figure 6). Mining has occurred in the vicinity of this deposit, an area referred to as the Mokur gold district, for decades. The Bolo gold 'subarea,' described in Peters et al. (2011a), consists of gold-bearing skarn with as much as 35 grams/ton (38.6 grams/metric tonne) gold, in addition to the potential content of related gold-bearing veins and placer deposits. The Zarkashan mine subarea, similarly described in Peters et al. (2011a), is a zone of gold and copper mineralization in skarn, with between 0.2 and 10 grams/ton (0.2 and 11.0 grams/metric tonne) gold. Small ephemeral streams draining this 'subarea' create the potential for small placer deposits that could be mined artisanally (Peters et al. 2011b). Thirty-five areas of ASM activity were observed in the Zarkashan subarea in 2018 (DeWitt et al. 2021a), though no corresponding mining licenses have been registered with the MoMP (Ministry of Mines and Petroleum (MCAS) 2021).

Placer gold deposits consist of elemental gold in grains and (rarely) nuggets that have been eroded from skarn or vein deposits by wind or water. Being typically hosted in unconsolidated eluvial, alluvial, or aeolian sedimentary deposits near the surface, placer deposits have greater potential than skarn or porphyry

deposits for ASM production (Peters et al. 2007). Large placer gold deposits are located along the northern border of Takhar and Badakhshan provinces and in the Mokur district of Ghazni province (Figure 6). Gold deposits in the northern region occur both in the current floodplain of the Panj River along the Afghanistan-Tajikistan border, as well as along terraces above the current river channel (Chirico et al. 2013; Peters et al. 2011a). Within the Takhar deposit, the Samti placer is the largest, and contains commercial grade reserves estimated to be more than 30,000 kg (Chirico et al. 2011). Located in the recent alluvial floodplain and lowest terrace of the Panj River, the placer is up to 40 meters (m) thick in places and stretches 8 km long and 0.9-17 km wide. While the distribution of gold in the placer is irregular, the average depth of mineralized alluvium is 31.5 m; the placer has been estimated to contain an average gold content of 408 milligrams/m^3 (Benham and Coats 2010; Chirico et al. 2013; Galchenko et al. 1972). Perhaps due to the depth of the mineralized zone, no significant ASM activity has been observed recently in the Samti deposit (DeWitt et al. 2021a); however, a mining contract was reportedly re-negotiated for the exploration and mining of gold in the Samti and Nuraba deposits in 2013 (Byrd and Noorani 2017). The Nuraba placer stretches 3.8 km long and 0.01-0.5 km wide along the alluvial valley flat of the Nuraba stream, a tributary of the Khasar River. The mineralized alluvium is 1-2 m thick and has a gold content of 100-760 milligrams/m^3, with the total gold reserve estimated to be 210 kg (Chirico et al. 2013; Popenko and Teplych 1970). Substantial mechanized ASM was observed in this region in summer 2020 (DeWitt et al. 2021a). The Khasar placer stretches 4.6 km long and 30-100 m wide along the Khasar River upstream of the Nuraba tributary. It contains an estimated 437 kg in gold reserves (Chirico et al. 2013; Popenko and Teplych 1970). In summer 2020, small pit ASM was observed along a distance of nearly 1 km in the vicinity of this placer (DeWitt et al. 2021a). The Anjir placer stretches 2.3 km long and 20-70 m wide along the Anjir tributary of the Khasar River. The auriferous bed is 1-2.5 m thick, with an average gold content of 123-2,716 milligram/m^3 and an estimated reserve of 155 kg (Chirico et al. 2013; Popenko and Teplych 1970). To date, no ASM activity has been recorded in the vicinity of this placer (DeWitt et al. 2021a). Finally, the Kocha placer deposit lies along the lower stretches of the Kocha River in northwestern Takhar. Several areas along its length are considered exploitable for gold ASM, but no reserve estimates exist (Chirico et al. 2013).

In 2017, the UNDP estimated that Afghanistan annually produced 1 kg of gold, worth USD 30,000, attributable entirely to ASM operators (United Nations Development Programme 2020). Though four areas of gold ASM were recorded in Takhar province in 2018 (DeWitt et al. 2021a), only one (cancelled) license has been registered in the MoMP Transparency Portal for gold exploration (Ministry of Mines and Petroleum (MCAS) 2021).

COAL

In addition to exports to Pakistan and other neighboring countries, Afghanistan's coal resources are used domestically to power brick kilns, for cooking, and for heating (Byrd and Noorani 2017). These resources occur primarily in rocks deep below the surface of north-central Afghanistan, in an area referred to as the North Coal district, but also occur in some western provinces (Byrd and Noorani 2017; SanFilipo 2005). Mining of these relatively deep layers requires significant infrastructure and technological capabilities that have limited the scale of production to date. Current coal production in Afghanistan is estimated to be similar to the pre-war peak reported in 1978, of about 2.2 million metric tonnes/year (United Nations Development Programme 2020). In 1978, coal was produced entirely by government-owned mines; however, by 2008, small, private, 'artisanal' mines produced the majority of coal resources. In the smallest of these mines, coal is manually extracted from hand-dug adits, sometimes referred to as 'dog holes', the tunnels of which lack roof support and proper ventilation (Figure 7). Miners operate in difficult conditions

using shovels, pickaxes, chemicals, and dynamite (Mining Technology 2014). These primitive mining methods are simultaneously hazardous and cause widespread damaging oxidation of adjacent unmined coal resources (Hare et al. 2008; SanFilipo 2005).

Figure 7. Hand-dug adits for manual coal extraction (after SanFilipo 2005).

A comprehensive survey of artisanal coal mining has not been conducted; however, in 2018, 31 mines were mapped across a 9 km^2 area near the Doshi-Shibar Highway in Baghlan province, and two other areas of coal mining were mapped in Badakhshan province, indicating pervasive coal ASM in these regions (Figure 8) (DeWitt et al. 2021a). Some reports have suggested that there are about 2,000 "legal" coal mines in Samangan alone (Mining Technology 2014, paragraph 9), but the majority of these mining operations are not registered with the MoMP (Ministry of Mines and Petroleum (MCAS) 2021). The Dan-e-Toor and Garmak districts of Samangan support some of Afghanistan's most extensive informal coal mining – both mechanized and unmechanized (Byrd and Noorani 2017). In 2017, the UNDP estimated that 1.2 million metric tonnes of coal were exported per year (United Nations Development Programme 2020). Accounting for domestic usage of coal raises production estimates to 2.2 million metric tonnes annually (United Nations Development Programme 2020). Other estimates place the total extraction of coal at between 3 and 4 million tons/year (between 2.7 and 3.6 million metric tonnes/year) (Byrd and Noorani 2017). Of the 20 licenses registered with the MoMP as of April 2021, only five are in Samangan province, with the rest distributed across Baghlan (5), Bamyan (3), Herat (2), Kabul (2), Ghor (1), Parwan (1), and Takhar (1) provinces. Seven expired (or cancelled) licenses are specifically for small-scale mining, ten (7 active) are exploration licenses, and the other three (1 active) are exploitation licenses (Ministry of Mines and Petroleum (MCAS) 2021).

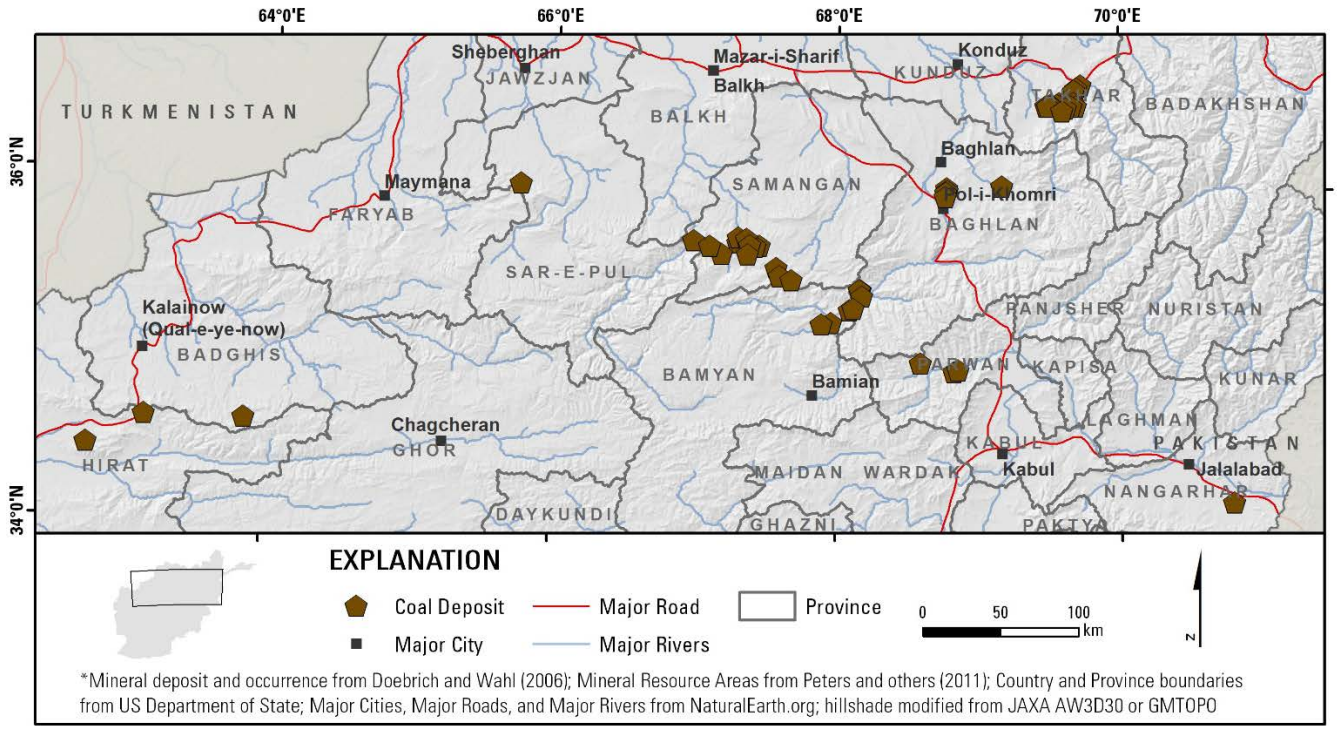


Figure 8. Locations of coal deposits or occurrences in Afghanistan.

TALC

Talc is a soft, inert mineral that has a variety of important industrial uses, with applications in paint and varnish, paper making, roofing materials, cosmetics, rubber, insecticides, and ceramics (Cocker 2011). Nine talc deposits and occurrences have been mapped in several provinces in eastern Afghanistan, including Baghlan, Parwan, Kabul, Maidan Wardak, Ghazni, Kunar, and Nangarhar (Figure 9) (Doebrich and Wahl 2006), but relatively little is known about these occurrences. Further exploration may yet identify additional deposits and occurrences. In Baghlan province, the Danay Ghury occurrence is located north-northwest of Kabul, but is of an unknown deposit type. While little is known about Kabul province's Mamadugha occurrence, the Lalandar occurrence to the southwest of Kabul, which has been exploited by local residents, consists of four talc-bearing zones measuring 100-800 m long with 20-30 m lenses of talc. In Kunar province, an unknown deposit type occurs near Narzi along the Pakistani border. In Maidan Wardak province, the talc occurrence consists of small talc lenses 3-5 m long and 0.1-0.5 m thick. In Parwan province, the Farenjal talc occurrence consists of a narrow zone of talc about 10 m wide (Sutphin et al. 2007). Finally, in Nangarhar province, the renowned Ghunday and Achin deposits occur as commercial-grade elongate bodies. At the Ghunday deposit, resources occur in northern and southern zones estimated collectively at 803,200 tons (728,650.8 metric tonnes): 356,300 tons (323,229.9 metric tonnes) in the northern zone and 446,900 tons (405,420.9 metric tonnes) in the southern zone (Sutphin et al. 2007). Talc resources at the Achin deposit occur over a 2-km-long zone and have an estimated mass of 1.25 million tons (1.13 million metric tonnes) (Sutphin et al. 2007).

The majority of Afghanistan's talc production comes from the deposits in Nangarhar province (Figure 9) (United Nations Development Programme 2020), where extensive mechanized ASM has been mapped in the districts of Achin, Dih Bala, Khogyani, Pachir Wa Agam, and Sherzad (DeWitt et al. 2021a; Global Witness 2018). While artisanal mining of the Achin deposit has reportedly taken place since the 1920s (Global Witness 2018), mining of the Sherzad deposit began more recently between 2005 and 2006

(ALCIS 2021). In both regions, early excavation methods were entirely manual and labor intensive (ALCIS 2021; Global Witness 2018). In 2010, the Talc Association of Nangarhar was formed by mine operators, talc traders, and the 22 talc processing facilities that have developed in Nangarhar province (United Nations Development Programme 2020). Substantial improvements were also made in local infrastructure, including roads and bridges, to enable the transit of large trucks and excavation equipment (ALCIS 2021). Talc production increased substantially after 2010, and most of the talc production throughout Nangarhar is now done via small- or medium-scale mechanized excavation (ALCIS 2021; DeWitt et al. 2021a; Global Witness 2018). The Ashraf Ghani administration reformed the industry in 2014 by prohibiting the export of raw talc from Afghanistan (ALCIS 2021). Additionally, the government provided land for talc processing factories on the Jalalabad ring road, resulting in significant investment in the region (ALCIS 2021): these benefits transcended the mining sector by reducing local reliance upon opium and hashish production. Though initially, many companies mined the talc deposits in Nangarhar, the MoMP moved, between 2018 and 2020, to select a single business to mine, process, and export talc from the region. That contract was awarded in 2019, as a result which the amount of talc mining in Nangarhar is now a fraction of its 2018 extent (ALCIS 2021).

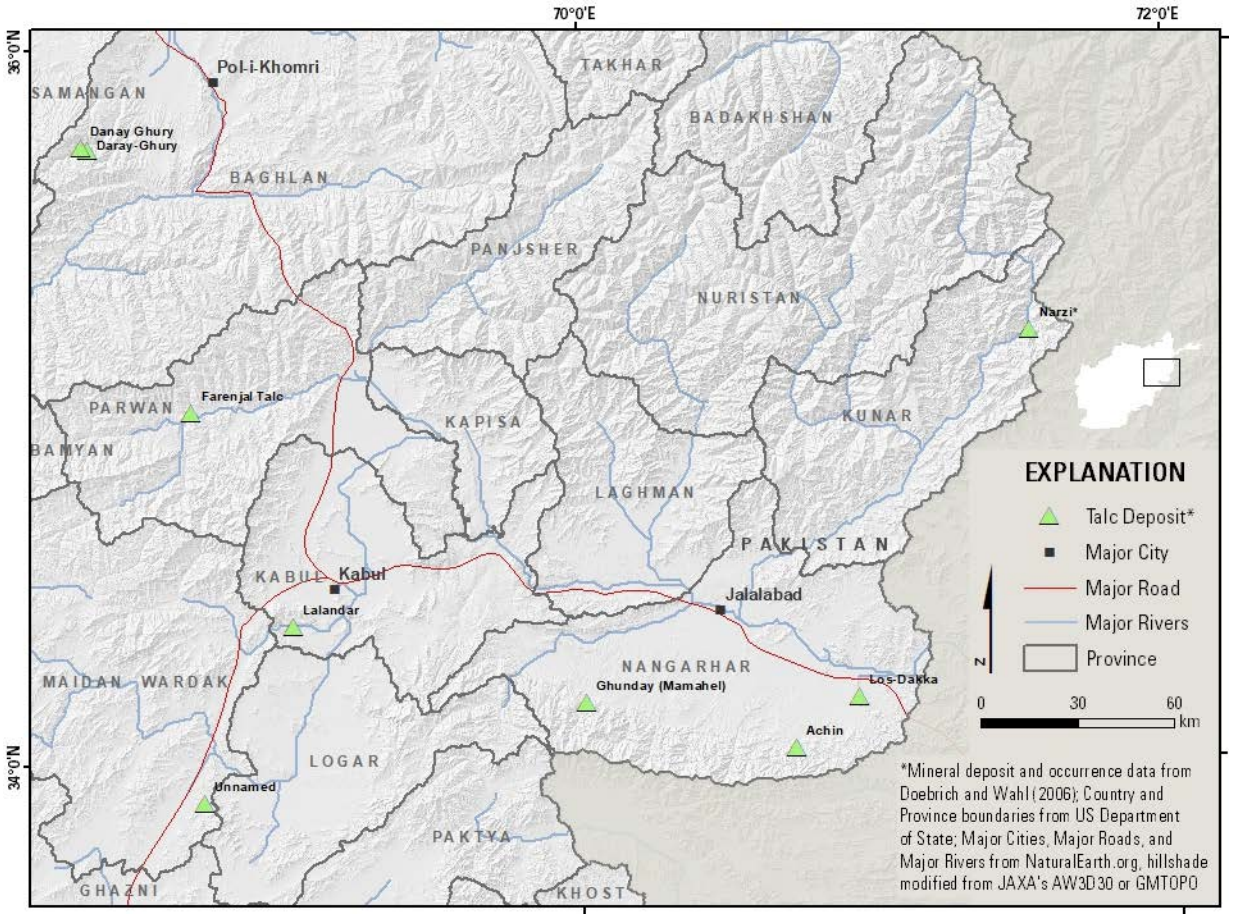


Figure 9. Locations of talc deposits or occurrences in Afghanistan.

Control over talc resources has significant political implications: both the Taliban and the Islamic State – Khorasan Province (ISKP) have profited from informal mining in Nangarhar (Byrd and Noorani 2017; Global Witness 2018). Estimates of the financial benefits gained by each group from talc production vary widely, ranging from USD 10,000 to USD 4 million per year. A multitude of human rights abuses, including restrictions on women's rights, executions, and beheadings, have reportedly been carried out by both

groups (Global Witness 2018). The GoIRA has made substantial efforts to curtail non-governmental actors and rein in mining activities that occur in the region.

In 2018, 157 ASM sites were mapped in the Achin and Ghunday deposits, covering an area of nearly 6 km^2. As of April 2021, 50 licenses were registered for the small-scale mining of talc, though all have expired or been cancelled. Of these 50 licenses, 48 were located in Nangarhar province, with the remaining two located in Parwan and Kapisa provinces (Ministry of Mines and Petroleum (MCAS) 2021). Estimates of talc production vary widely: the UNDP estimates that more than 1 million metric tonnes of talc are exported from Afghanistan annually, at a value of USD 100 per metric tonne (United Nations Development Programme 2020).

CHROMITE

Chromite ore is mined to produce the element chromium, which has a variety of metallurgical, chemical, and industrial uses, including in the manufacturing of stainless steel (Mishra and Sahu 2013). Of the 17 chromite deposits or occurrences that have been mapped in Afghanistan, 12 occur in Logar province; the others occur across Kandahar, Paktia, Nangarhar, and Parwan provinces (Figure 10) (Doebrich and Wahl 2006). Chromite mining has also been reported in Maidan Wardak, Logar, and Kunar provinces (Byrd and Noorani 2017).

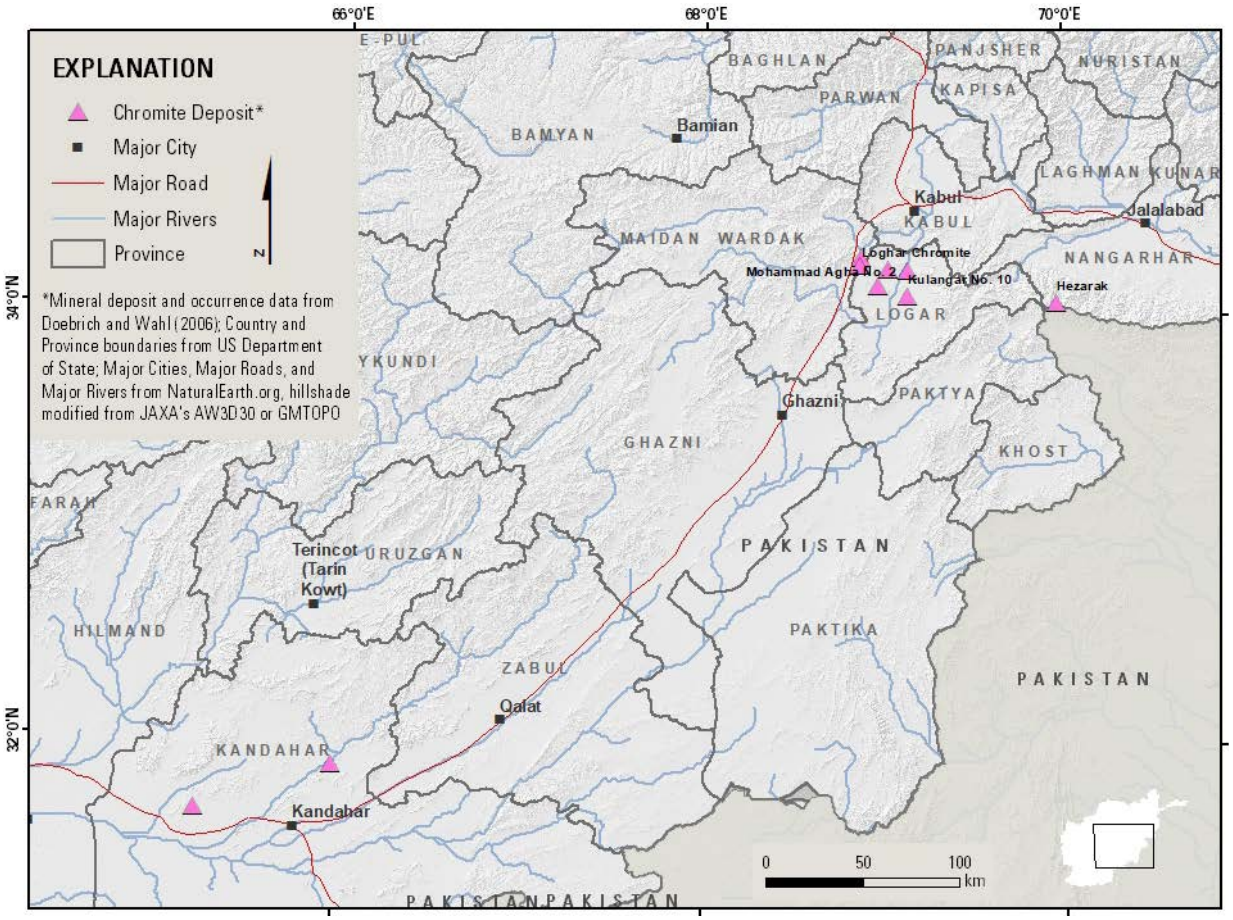


Figure 10. Locations of chromite deposits or occurrences in Afghanistan.

In many areas, surface deposits are manually worked using pickaxes and shovels; however, in some areas, mechanized ASM using bulldozers and excavators is the norm. In the Tani district of Paktia province, conventional mining began around the mid-1990s and transitioned to small-scale mechanized mining around 2004 (Williams 2018). On-site milling of the mineral enables transport between districts and, in some cases, smuggling across the border into Pakistan (Williams 2018). Though chromite production records are sparse, it is known that some 900 tons (816.5 metric tonnes) have been extracted from one Paktia site (Williams 2018), and 120,000-140,000 tons (108,862.2-127,005.9 metric tonnes) have been extracted from another (Byrd and Noorani 2017). It is estimated that more than 50 chromite mines exist in Logar province (Byrd and Noorani 2017). However, only 10 licenses are registered for chromite, of which 6 are active, including 3 exploration licenses, 2 exploitation licenses, and 1 processing permit (Ministry of Mines and Petroleum (MCAS) 2021).

MARBLE, ABRA STONE, ONYX, & TRAVERTINE

Afghanistan's significant marble resources are estimated at roughly 1.3 billion metric tonnes, with potentially 400 varieties of marble valued at USD 150-200 billion (Ministry of Industry and Commerce 2018; Rassin 2012). Afghan onyx is considered one of the country's highest quality dimension stone exports, though there is some debate as to whether it is, in fact, onyx (where mineralogically, onyx is generally defined as a banded variety of chalcedony, a cryptocrystalline silica)[v] (Mitchell and Benham 2008). There are also substantial granite resources throughout the country.

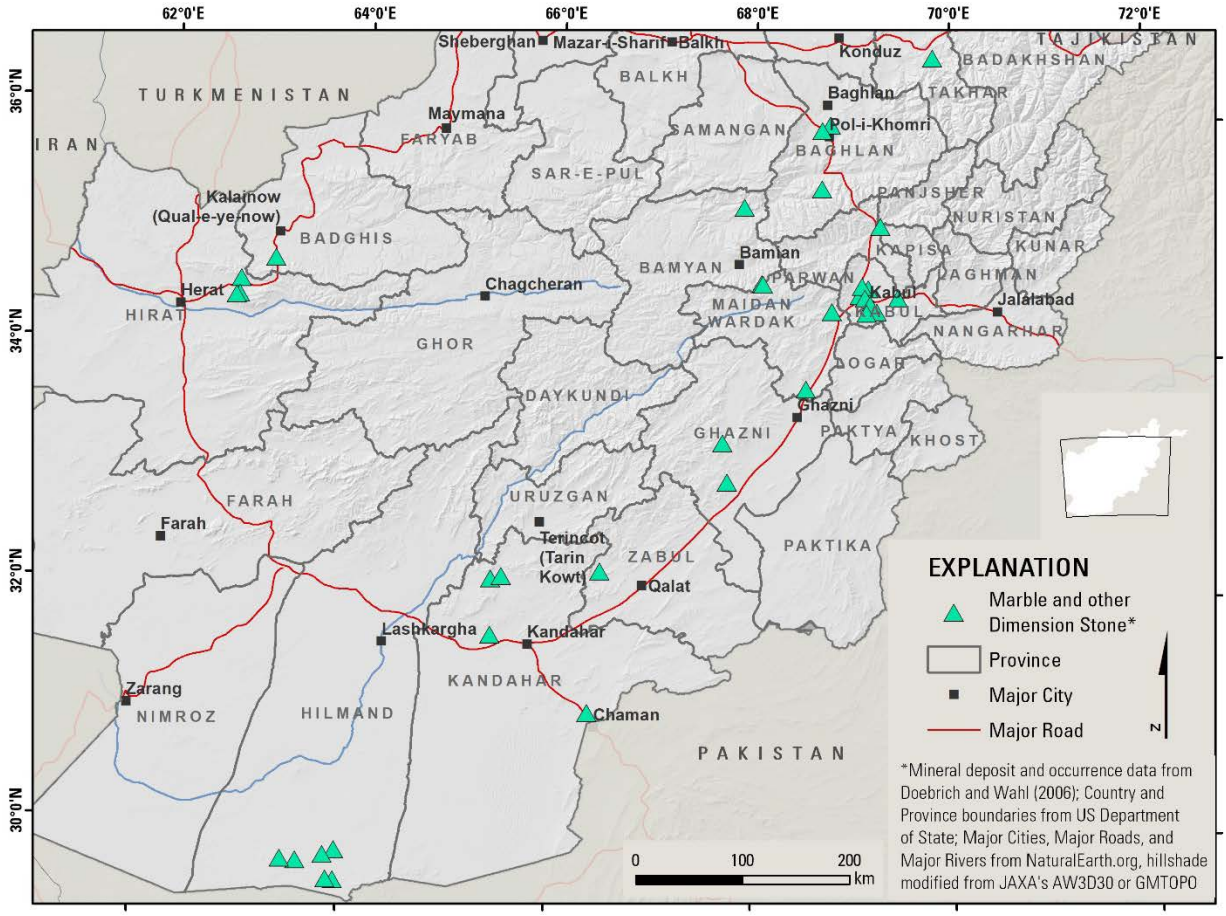


Figure 11. Locations of marble and other dimension stone deposits or occurrences in Afghanistan.

Mining of marble resources increased exponentially between 2008 and 2011, with an estimated 4,000-5,000 people directly employed by several companies in the industry (Mitchell and Benham 2008). In 2018, marble production was estimated at 130,000 m^2/month by the Ministry of Industry and Commerce (MoCI). Of the 130 companies counted by the report, approximately 90 were classified as "Category C" companies, indicating that they were small or startup companies (Ministry of Industry and Commerce 2018, 21). As of April 2021, 75 total licenses have been registered with the MoMP for small-scale mining, exploration, or exploitation in this sector: marble (39 licenses, 17 active), abra stone (1 license, expired), onyx (28 licenses, 9 active), travertine (7 licenses, 5 active), and serpentine (1 license, expired). Of these licenses, 18 are in Herat, 16 in Helmand, 9 in Maidan Wardak, 7 in Kabul, 7 in Nangarhar, 4 in Bamyan, 4 in Samangan, 4 in Ghazni, 2 in Parwan, 1 in Daykundi, 1 in Faryab, 1 in Kunar, and 1 in Kunduz (Figure 11) (Ministry of Mines and Petroleum (MCAS) 2021). It is unclear why 130 companies were listed in the 2018 report, despite the registration of only 75 licenses with the MoMP. In 2018, the UNDP estimated onyx production at 4,325 metric tonnes/year based on the number of contracts registered with the MoMP, but field research suggests that production is likely closer to 6,000 metric tonnes/year (United Nations Development Programme 2020). Similarly, marble production based on contracts currently registered with the MoMP is estimated at 60,000 tons (54,431.1 metric tonnes) annually, which is less than half of the annual 124,000-155,000 tons (112,490.9-140,613.6 metric tonnes) estimated by the Afghanistan Investment Support Agency (AISA) in 2012 (Rassin 2012).

Despite substantial resources and strong global demand for marble and related mineral commodities, extractive and processing companies in Afghanistan are not operating at their estimated potential capacity (Rassin 2012). This is partially due to lack of investment, poor infrastructure, and an insufficient regulatory framework (Ministry of Industry and Commerce 2018). However, the development of the marble sector is also hampered by a lack of market competition (Rassin 2012). Despite the substantial number of artisanal and small mining companies involved in the marble industry, the few large companies control and set product prices. This, in addition to the domination of the market by foreign products from China, undermines competition. The result is a negative environment of high prices, poor product quality, and a lack of innovation within small Afghan marble companies (Rassin 2012). Other challenges that impede the development of this sector include lack of access to land, lack of access to capital, and a lack of skilled workers. Government intervention in key areas, such as incentives to boost the supply side of the market, development of a specialized industrial park for marble processing, provision of long-term financial solutions, and technical and management skills trainings, may drastically improve the production and potential of the marble mining sector (Ministry of Industry and Commerce 2018; Rassin 2012).

CLAY

Clay resources are used widely in ceramic products, in construction materials such as bricks and adobe walls, and in industrial applications such as the lining of kilns (Mossotti 2014). Although only 12 deposits or occurrences of clay have been mapped (Peters et al. 2007), clay – or a combination of silt and clay – is mined throughout Afghanistan for use in brick making. In most instances, the clay is mined and processed in close proximity to a kiln, where it is hardened into bricks or tiles for construction purposes. While the quarrying of clay and loess surface materials is sometimes done by mechanical excavators or bulldozers, the process of wetting the material, shaping it into bricks, stacking the wet bricks to sun dry, and transporting them to a kiln is entirely manual. In the Kabul region in 2019, an estimated 27,500 laborers worked at 625 kilns, producing 1.579 billion bricks per year (DeWitt et al. 2021b). Similarly, ASM of clay resources has been observed near urban areas in other parts of the country, including Kandahar, Balkh, and Badakhshan (Figure 12) (DeWitt et al. 2021a). This workforce is reportedly made up primarily of bonded

and forced labor, including child labor (International Labour Organization 2012; Mitra and Valette 2017). The tasks of molding and carrying clay are strenuous and potentially hazardous, and kiln-related work has been linked to various human health concerns such as respiratory and cardiovascular disease and musculoskeletal stress (Sanjel et al. 2017; Schmidt 2013). Brick kilns also have substantial impacts on the environment through air pollution, heat emissions, use and contamination of groundwater resources, and removal of surficial soil nutrients (Bhanarkar et al. 2002; Ziaul and Pal 2018).

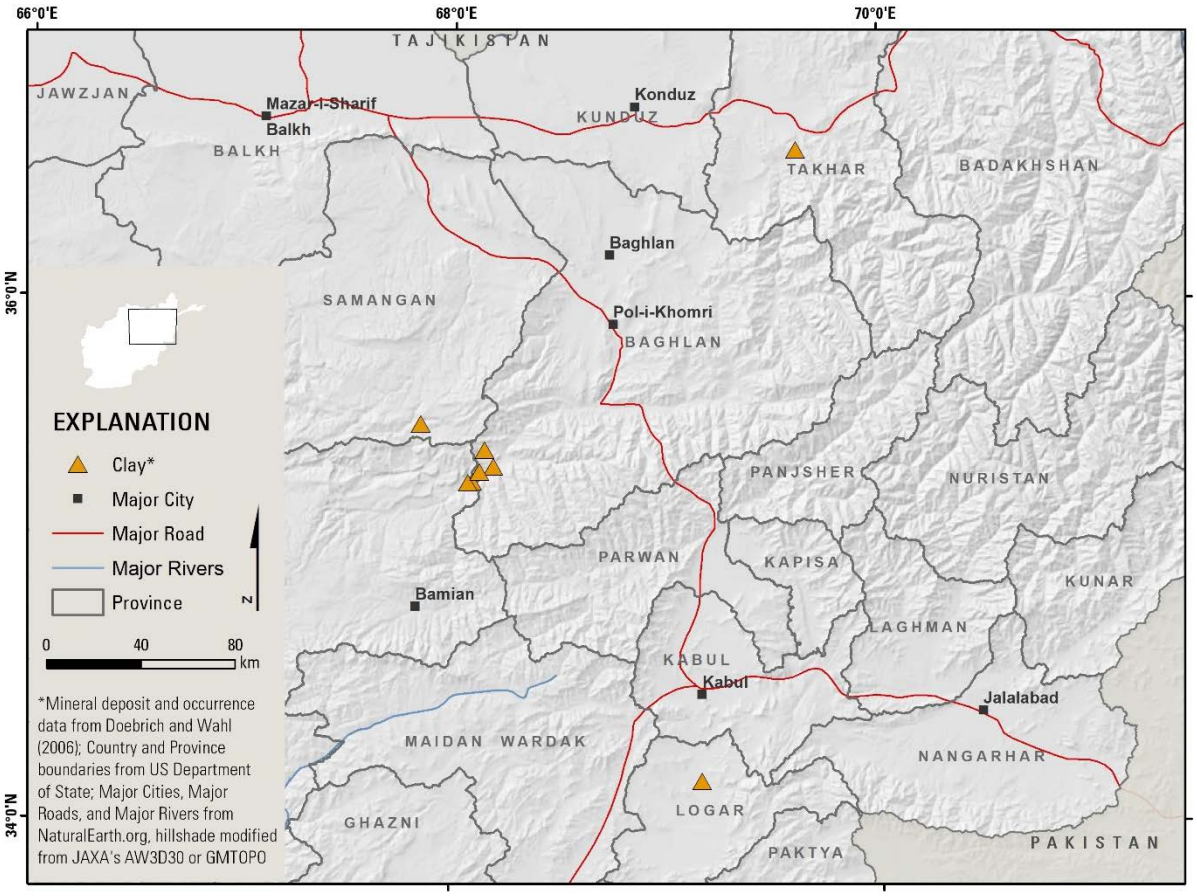


Figure 12. Locations of clay deposits or occurrences in Afghanistan.

Brick production has been shown to have increased exponentially since the 1970s, tracking the exponential increase in the urban population (DeWitt et al. 2021b). No licenses for clay quarrying are registered as of April 2021 (Ministry of Mines and Petroleum (MCAS) 2021).

OTHER INDUSTRIAL MINERALS

Other industrial and construction mineral resources that are mined artisanally include sand, gravel, construction stone, limestone, fluoride, and gypsum. Sand and gravel are typically the materials in greatest demand (Mossotti 2014), followed closely by construction stone. While only 15 small deposits of sand and gravel have been mapped in Badakshan and Ghazni (Peters et al. 2007), mining of these industrial minerals occurs near ubiquitously in the vicinity of the urban space or project site from which demand originates (Mossotti 2014). Areas of sand and gravel ASM have been mapped in Badakhshan, Kabul, Kandahar, Balkh, and Takhar (Figure 13) (DeWitt et al. 2021a). The MoMP Transparency Portal documents the registration of 401 (27 active) licenses for sand and/or gravel mining as of April 2021 (Ministry of Mines and Petroleum (MCAS) 2021). Construction stone is also quarried in many provinces for industrial and construction

purposes (DeWitt et al. 2021a), with 410 licenses (28 active) registered with the MoMP (Ministry of Mines and Petroleum (MCAS) 2021). Other industrial mineral licenses reported in the database include 65 licenses (6 active) for gypsum, 2 licenses (1 active) for fluoride, and 1 license (expired) for limestone (Ministry of Mines and Petroleum (MCAS) 2021).

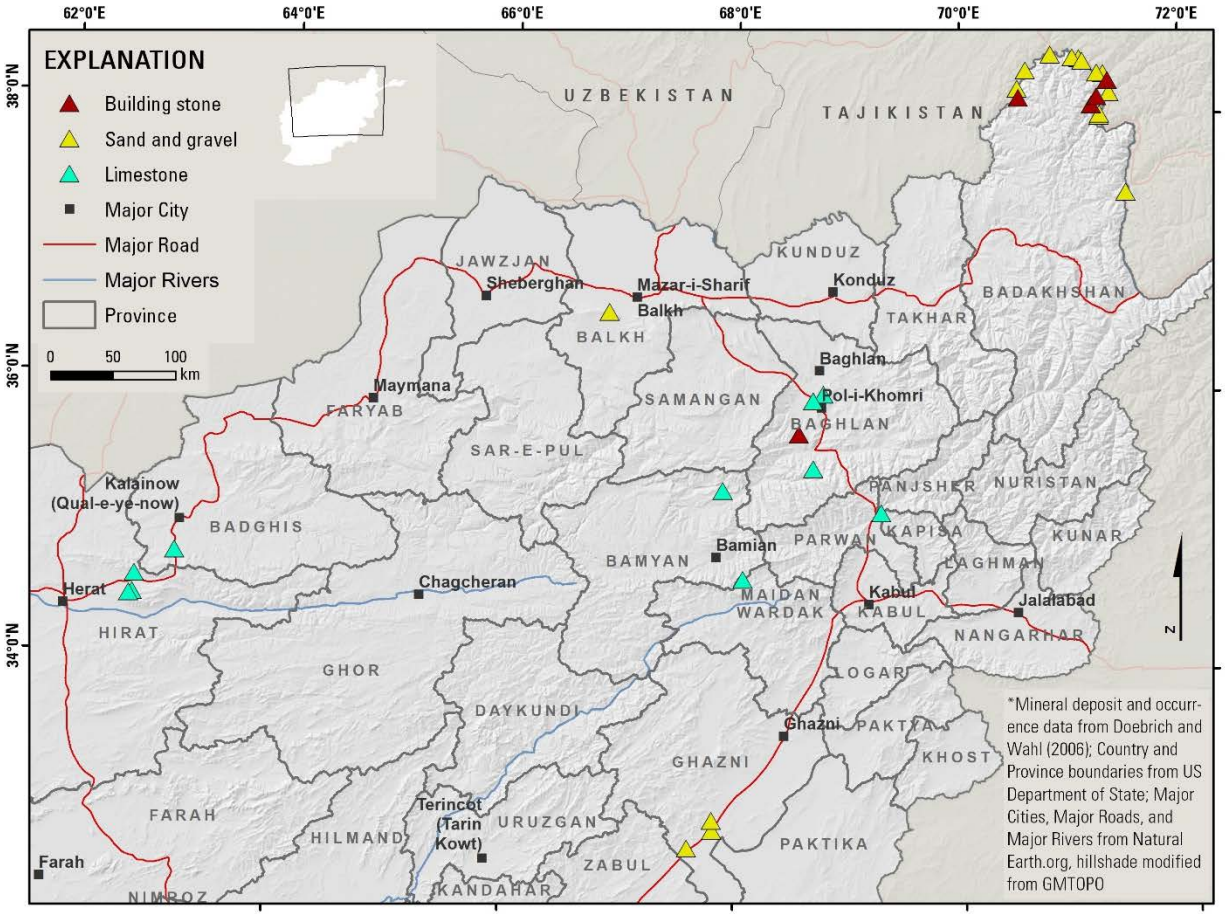


Figure 13. Locations of deposits or occurrences of other industrial minerals in Afghanistan.

Development & Economic Indicators

Though Afghanistan has experienced significant economic growth over the last 10 years, its human development in that timeframe has been affected by economic, political, and social difficulties, including COVID-19 (World Bank Group 2021). Afghanistan is one of 193 countries to have adopted the United Nation's Sustainable Development Goals (SDGs), which aim to address global challenges such as poverty, climate change, environmental degradation, inequality, and conflict (United Nations Development Programme 2020). While ASM positively contributes to the achievement of some SDGs, the attainment of others is negatively impacted by the sector. The GoIRA has recognized that the country's relatively unexploited mineral wealth can be used to further its progress towards achieving the SDGs; however, there is still much work to be done to optimize the country's human development and economic potential (Ministry of Economy 2017).

GENERAL DEVELOPMENT & ECONOMIC CONTEXT

In 2016, Afghanistan's primary economic drivers consisted of agriculture (23%), industry (21.2%), and services (55.8%) (Central Intelligence Agency 2021). These figures do not include the country's opium production, which has permeated Afghanistan's rural communities and, in 2016, was worth more than two-thirds the economic output of the entire agricultural sector (United Nations Office on Drugs and Crime 2017): the United Nations Office on Drugs and Crime (UNODC) reported that Afghanistan's gross opium economy, if expressed as a share of the total economy, would account for 7-12% of its 2019 gross domestic product (GDP) (United Nations Office on Drugs and Crime 2021). Afghanistan's reliance on foreign aid has decreased substantially from 2009, when it made up 100% of the GDP. However, external support still accounts for a significant amount of the GDP – about 42.9% in 2020 (World Bank 2021b). Despite this reduction in aid, Afghanistan's GDP reached USD 19.291 billion in 2019 (World Bank 2021a).

The mining sector accounted for 5.4% of the country's exports and 0.9% of the GDP in 2017 (BDO LLP 2019). On average, mining added to the country's GDP by 0.85% between 2011 and 2017 (BDO LLP 2019; World Bank 2021a). However, these figures do not include production in and income from the unlicensed sector, which has been estimated to be 300 times the GoIRA's annual mineral revenue (Lakhani and Corboz 2017).

Despite an upward economic trend, Afghanistan ranks 169 (out of 189 countries) in the Human Development Index (HDI) (United Nations Development Programme 2019). The HDI measures, on a scale of 0 to 1, the attainment of key human development indicators within a country. Indicators used to calculate HDI include life expectancy, education, and gross national income (GNI); in 2019, the life expectancy of an Afghan was 64.8 years, the average years of schooling was 3.9, and the GNI per capita (Atlas Method) was USD 530 (United Nations Development Programme 2019; World Bank 2021a). Afghanistan's HDI in 2019 was 0.511, as compared to the world average at 0.737 (United Nations Development Programme 2019). Other development indicators echo these numbers: in 2018, the average literacy rate was an estimated 43%, and in 2019, the percentage of the population living at or below the poverty line was an estimated 47.1% (World Bank Group 2021).

Economic change, political instability, and, most recently, the effects of COVID-19, are key challenges impacting the country's development. The 57% decrease in foreign aid contribution to the overall GDP over the last 11 years has had a noticeable effect: with less aid supporting the services sector, the Afghan economy has experienced a decrease in overall employment and income rates (World Bank Group 2021). Afghanistan's development is further constrained by the country's ongoing political instability: for example, after the 2014 presidential election, politically motivated attacks caused more than 10,000 civilian casualties per year between 2014 and 2019 (World Bank Group 2021). The ongoing withdrawal of international forces has contributed to uncertainty over Afghanistan's security, leading to a decline in investment (World Bank Group 2021). The onset of COVID-19 has increased the precarity of the country's economic situation: Afghanistan's GDP is estimated to have declined by 1.9% in 2020. Industry and service sectors are estimated to have declined by 4-5% due to lockdown measures and border closures. Similarly, urban poverty was worsened by lockdown measures, peaking at 55.2% at the start of the pandemic (World Bank Group 2021).

ASM LINKAGES TO DEVELOPMENT INDICATORS

The Ministry of Economy (MoEc) is in charge of coordinating, monitoring, and reporting the country's SDG-related progress. In 2017, Afghanistan conducted its first voluntary SDG review, outlining targets and indicators to achieve the SDGs (Ministry of Economy 2017). The review highlighted positive progress on SDGs related to poverty, food security, healthy lives, gender equality, and infrastructure. However, financing collaborations between private and public organizations, building awareness of the SDGs at the local level, and weak technical capabilities were identified as major issues. While these issues have yet to be resolved, the report specifically points to minerals, precious stones, gas, and oil as resources that could be utilized to further the GoIRA's progress toward meeting the SDGs (Ministry of Economy 2017).

The data demonstrates that the practice of ASM contributes to achieving goals 1, 4, 8, 9, 11, 15 and 17, but poses a challenge to achieving goals 2, 3, 5, 6, 8, 11, 13, and 15. The table below outlines linkages between ASM and SDGs in Afghanistan.

Table 2. ASM linkages to development indicators in Afghanistan

Sustainable Development Goal[vi]	Evidence of ASM linkage to development
 *End poverty in all its forms everywhere*	o An estimated 450,000 people are indirectly dependent on ASM practices for employment (Hart Group 2016). Goods and services that support mining activity come from numerous other industries, including agriculture, transportation, and light industry, among others (McMahon and Tracy 2011). o In 2017, the extractive sector provided employment for 0.2% of the country's labor force (BDO LLP 2019).
 *End hunger, achieve food security and improved nutrition and promote sustainable agriculture*  *Ensure availability and sustainable management of water and sanitation for all*	o ASM and the agricultural sector often compete for labor, resources, and land. In many cases, ASM leaves the land degraded, rendering it unsuitable for subsequent agricultural use (Ofosu et al. 2020). o Clay quarrying and brick making, while employing many (DeWitt et al. 2021b), use and contaminate groundwater resources (Bhanarkar et al. 2002; Ziaul and Pal 2018). o The use of mercury in the amalgamation of trace gold at ASM sites has been known to pollute surrounding water sources used for drinking and irrigation. Polluted water contaminates crops, soil, and fish, impeding agricultural production and potentially leading to illness (Ofosu et al. 2020). While undocumented to date, it is possible that mercury and cyanide are used in artisanal gold mining in Afghanistan.

 *Ensure healthy lives and promote well-being for all at all ages*	o Clay mining, widespread throughout Afghanistan, entails strenuous work such as the manual molding of bricks. Kiln-related work has been linked to respiratory, cardiovascular, and musculoskeletal health concerns (Sanjel et al. 2017; Schmidt 2013). o Talc miners, mainly located in Nangarhar province, are at risk of lung disease due to the inhalation of dust and hazardous gases (United Nations Development Programme 2020). o The possible use of mercury at ASM sites could have negative health effects on the nervous, digestive, and immune systems, as well as the lungs and kidneys (Ofosu et al. 2020; World Health Organization 2017).
 *Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*	o Afghanistan's ASM Policy recognizes the need for collaborations between ministries to enable the development of educational and training services related to the mining sector (Ministry of Mines Directorate of Policy 2012a). Such efforts can provide ASM laborers with greater vocational knowledge and improve safety practices in the ASM sector.
 *Achieve gender equality and empower all women and girls*	o At present, ASM in Afghanistan primarily employs male adults and children. Limited data exists on women's participation in ASM, but it is known that they support the sector through food preparation, water collection, and household maintenance (The Guardian 2009; United States Agency for International Development 2018). o The MoMP's 2018 ASM Formalization Strategy recognizes women's interests in gemstone processing and notes that training will need to be provided to women entering the sector (Ministry of Mines and Petroleum 2018). Similarly, Afghanistan's National Export Strategy incorporates plans for the inclusion of women in the processing, design, and sale of gemstones and associated jewelry (Islamic Republic of Afghanistan et al. 2018).
 *Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*	o The extractive sector has contributed to Afghanistan's rising GDP by 0.85% on average between the years 2011-2017 (BDO LLP 2019; Hart Group 2017). o The practice of ASM and agriculture often go hand-in-hand, with farmers obtaining seasonal employment in mines during the dry season. Income gained through ASM has also been used to purchase farming resources such as fertilizers and insecticides (Ofosu et al. 2020). ASM thus serves as a way to diversify one's income while simultaneously stimulating other sectors. o In most cases, there is little regard for miner safety in ASM. For example, the hand-dug tunnels of artisanal coal mines typically lack roof support, risking miner safety (BDO LLP 2019; SanFilipo 2005). o 50% of Afghanistan's children aged 7-14 worked a job in 2011 (World Bank 2021a). Child labor is known to occur widely in the mineral sector, specifically in coal, gold, salt, brick, and clay mining (Bureau of International Labor Affairs 2019; Hidrón and Koepke 2014; International Labour Organization 2012; Mitra and Valette 2017). Child labor has been found at many ASM sites in Afghanistan (BDO LLP 2019), as against the SDG target of eliminating all forms of child labor.
 *Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*	o The MoMP's prioritization of mineral extraction is hampered by the current capabilities of Afghanistan's infrastructure. The sector's need for greater access to electricity and transportation is known, and rail and road projects are moving forward to tackle this limitation (Ministry of Mines and Petroleum 2019b).
 *Make cities and human settlements inclusive, safe, resilient and sustainable*	o Generally, negative indirect impacts of the presence of miners in ASM communities include instances of forced labor, child labor, prostitution, and human trafficking (Hidrón and Koepke 2014). o Social impact assessments are now required for mining licensure (Ministry of Mines 2019). These assessments are meant to describe the potential impacts of a mining operation on a community and detail mitigation measures to be taken by a mining operation. Measures such as resettlement, rehabilitation, and

	compensation for mining activities are to be jointly agreed upon by the community, the mining company, and the government (Ministry of Mines 2019).
 *Take urgent action to combat climate change and its impacts*  *Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss*	o Afghanistan's Minerals Law encourages environmental preservation by stating that mining cannot occur in prohibited areas, including those set aside as nature reserves (United States Agency for International Development 2018). o Article 29, Section 1 of Afghanistan's Minerals Law describes application requirements, one of which is a proposed environmental management plan. When necessary, NEPA will require an environmental impact statement or a brief on mitigation measures based on the proposed management plan (Ministry of Justice 2019). o The environmental impacts of ASM include declining water table levels, deforestation, air and water pollution, river channel regime shifts, topsoil erosion, and unfilled shallow pits (Ministry of Mines and Petroleum 2018; United Nations Development Programme 2020; United States Agency for International Development 2018). o Brick kilns negatively impact the environment by polluting air and water and by removing surficial soil nutrients (Bhanarkar et al. 2002; Ziaul and Pal 2018). o The use of explosives and the construction of tunnels for ASM affects air quality and reduces the stability of land and mountainsides (Ministry of Mines and Petroleum 2018).
 *Strengthen the means of implementation and revitalize the global partnership for sustainable development*	o Conducting the 2010-2017 AEITI reports contributed to increased transparency in revenue-generation and in socioeconomic factors closely related to several of the SDGs (BDO LLP 2019).

Sources: Authors' work based on various sources cited in-line

Mineral Governance Framework & ASM Formalization

Chapter 1, Article 9 of the Afghan Constitution provides the legal framework for the ownership and development of the country's mineral and gem resources (Islamic Republic of Afghanistan 2004). Nevertheless, Afghanistan's mineral governance has been in a state of constant evolution since the 2004 adoption of the Constitution. A Minerals Law was approved by the Afghan Parliament in July 2005 to address the mining of Afghanistan's mineral resources and allow for public tender of mineral extraction using internationally accepted standards. However, the provisions of this law did not realistically align with the functioning of certain parts of the Afghan mining sector. Initially, the government's ability to regulate the mining sector was limited by reliance upon Soviet-era practices of production-based operation, monthly minimum rights' payments, and disregard for value chain operations for mineral exports (Bowersox et al. 2007). In particular, the gem industry was firmly entrenched in business practices that included family-based mine production, unofficial agreements with government agencies, and smuggling of gem resources out of the country (Bowersox et al. 2007). Since 2005, the Afghan Cabinet has amended the Minerals Law in 2009, 2012, and 2018, making substantial modifications to the policy framework. These changes include the development of new institutions to support the legal system and the realignment and redefinition of existing governance institutions. A National Mining Policy was implemented in 2019 to fill in the framework and provide guidelines for the development of the country's mineral resources. These documents now reflect the GoIRA's twin goals: to develop the country's mineral resources according to international best practices and to encourage diversity of investment and technical capabilities (Ministry of Justice 2019; Ministry of Mines 2019).

MINING STRATIFICATION

Mining licensure is an area of Afghanistan's mineral law that is still under review and improvement. The MoMP's Mining Sector Roadmap (Ministry of Mines and Petroleum 2019b) discusses the need to revise the classification of mineral assets and mining licensure to rely less on the maximum mining area, and more on the type of mineral and the investment necessary to produce it. At present, the various applicable legislative documents contain slightly different categories of licensure: while the Minerals Law lays the regulatory foundation of the mining sector, it defines categories of licensure including exploration, exploitation, and small-scale mining, in addition to investment and transitional licenses (Ministry of Justice 2019). On the other hand, the MoMP's Mining Sector Roadmap specifies the additional licensure categories of reconnaissance, artisanal, and quarry and construction materials and omits investment and transitional licenses (Ministry of Mines and Petroleum 2019b). Table 3 draws information from both these sources to provide a complete list of licenses described in Afghanistan's mineral laws and policies. Different approval processes and decision-rights apply to different license types. Reconnaissance licenses, small-scale mining licenses, artisanal licenses, and quarry and construction materials licenses require application submission and MoMP approval. Exploration and exploitation[vii] licenses require a tender and bidding process and approval from the HEC and Afghan Cabinet.

The Minerals Law (Article 4, Sections 8, 18, and 72; Article 19) specifies that licensure for small-scale mining authorizes exploration and exploitation of an area not exceeding 1 km^2 and to a maximum depth of 60 m for all minerals except restricted minerals[viii] (Ministry of Justice 2019). It also requires that an application for a small-scale mining license include a description of the plan area, a capability statement, a small-scale work program, and a proposed environmental management plan (Article 29, Section 1). The Minerals Law indicates that these reports are not required for artisanal mining licenses (Ministry of Justice 2019). However, the MoMP's ASM Policy specifies not only that artisanal mining activities require licensure, but also that "Environmental and social safeguards apply to such small scale mines and quarries, as do legal requirements for the payment of taxes and applicable royalties" (Ministry of Mines Directorate of Policy 2012a, 4). The ambiguity between 'artisanal' and 'small-scale' mining is problematic in the current text of these policies. Small-scale mining licenses are granted for a duration of five years, with eligibility for multiple additional terms of up to five years each (Ministry of Justice 2019, Article 31). The law stipulates that the licensee must pay surface rent and royalty, and lodge technical, environmental, exploration, and royalty reports on a quarterly or annual basis (Ministry of Justice 2019, Article 35).

The MoMP's mining regulations provide additional details for specific sectors of Afghanistan's mining industry, with policies specifically dedicated to ASM (Ministry of Mines Directorate of Policy 2012a), production of construction materials (Ministry of Mines Directorate of Policy 2012b), and production of dimension stone (Ministry of Mines Directorate of Policy 2012c). The construction materials sector is legally considered part of the ASM sector because of its composition: small enterprises primarily utilizing mechanized equipment and attendant mining techniques.

Table 3. Categorization of Afghanistan's Artisanal and Small-scale Mining activities

Mining License	Description	Period	Maximum geographic coverage
Reconnaissance	For aerial, geological, geophysical, geochemical, seismological, and hydrogeological surveys, geological mapping, and soil and rock-chip sampling.	2 years; no extensions	20,000 km^2
Exploration	License granted under Article 28(1) for activities conducted for the purpose of identifying the mineral composition of lands or waters or assessing the feasibility of mining and processing the mineral subject of the license area, including aerial, geological, geophysical, geochemical, seismological, and hydrogeological surveys, geological mapping, soil and rock-chip sampling, drilling and assaying, and trenching and test-pitting. Authorizes such exploration for LSM projects.	3 years + 2 extensions	250 km^2
Exploitation	License granted under Article 28(3) or 28(9) for activities related to mining and processing, including mineral extraction and benefaction activities such as crushing, screening, washing, leaching, concentrating, smelting, and refining. Authorizes such activities for LSM projects.	30 years + 15-year extensions	50 km^2
Small-scale mining	License granted under Article 29, which authorizes exploration and exploitation for small-scale mining projects, including artisanal operations.	10 years + 5-year extensions	1 km^2 and <60 m in depth
Artisanal	For mining by individuals, groups, families, or cooperatives with minimal or no mechanization.	5 years + 5-year extensions	1 hectare = 0.01 km^2
Quarry and Construction Materials	For mining of rock, limestone, gravel, aggregate, sand, or other materials used in construction work by open-pit mining methods.	5 years + continuous 5-year terms	1 hectare = 0.01 km^2

Investment	Issued by the Afghanistan Central Business Registry to identify a person engaged in mining industry activities.	unknown	N/A
Transitional	Any license or contract signed by the MoMP for mineral rights prior to the Minerals Law going into effect OR any license granted or contract entered into by the MoMP for mineral rights pursuant to a bidding process initiated prior to but not completed in advance of the Minerals Law going into effect.	unknown	N/A

Sources: Authors' work based on the Minerals Law (Ministry of Justice 2019) and the MoMP's Mining Sector Roadmap (Ministry of Mines and Petroleum 2019b)

MINING FORMALIZATION REGULATIONS (ASM FOCUS)

Artisanal mining is defined by the MoMP as "mining by individuals, groups, families or cooperatives with minimal or no mechanization, often in the informal (illegal) sector of the market" (Ministry of Mines Directorate of Policy 2012a, iv). The primary difference between artisanal and small-scale mining based on this and other GoIRA policies appears to be the usage of mechanized equipment in mineral production. While at first glance this distinction seems straightforward, it is complicated by the fact that the international discussion of ASM does not necessarily hinge upon mechanization, and many small, family-operated mines utilize some form of mechanization. Given that the overwhelming majority of mineral production in Afghanistan falls into the collective category of 'artisanal and small-scale mining,' the implications of this grey area become significant.

The GoIRA acknowledges the substantial contribution of ASM to the economy, including the exploration and discovery of mineral resources, mineral production, and the employment opportunities afforded to rural communities by ASM activity (Ministry of Mines and Petroleum 2018). For Afghans, ASM is largely a poverty-driven activity (Ministry of Mines and Petroleum 2012a), with significant numbers of people engaged in informal mining activities. The prevalence of ASM and its known social, environmental, and economic challenges highlight the need for and importance of formalization and subsequent government oversight (Ministry of Mines and Petroleum 2018).

Formalization may improve the access of ASM miners to capital and provide mechanisms for its coexistence with LSM. The MoMP's ASM Policy proposes that the government provide a baseline study on ASM, improve political coordination between ministries, and provide incentives for unlicensed miners to apply for mining rights (Ministry of Mines Directorate of Policy 2012a). The MoMP recommends monitoring and management of ASM activity occur at the provincial level (Ministry of Mines and Petroleum 2018). Formalization has the potential to significantly improve the ASM situation, particularly for dimension stone – both in updating the methods of extraction, and in moderating the currently uncompetitive royalty rates and export taxes. Collaboration between ministries can enable the development of educational and training services for the dimension stone sector to improve laborers' technical, fiscal, legal, and environmental skill sets (Ministry of Mines Directorate of Policy 2012c).

GOVERNMENT PRIORITIES & KEY TOPIC AREAS

The Minerals Law was approved in 2005 and has been subsequently amended in 2009, 2012, and 2018. The MoMP has identified four key issues as priority for amendment in the most recent version: 1) address the imbalance of decision rights for mining contracts, 2) improve transparency of the approval process for all types of contracts, 3) modify the license and mineral asset categorization to focus more on the type of

mineral and required investment level than on the 'maximum mining area,' and 4) standardize the majority of contractual terms in the Mining Law (Ministry of Mines and Petroleum 2019b).

Table 4. The Minerals Law's key issues, as identified by the Ministry of Mines and Petroleum

Priority	Objective	Action (stipulated in the Revised Mining Law)
Decision rights	Balance the role of the MoMP and Minister of Mines with that of the High Economic Council in contract approval	HEC approval will be required for most future contracts, with larger contracts requiring Cabinet approval.
Tendering process	Improve transparency in the approval of all types of contracts	An open tendering process for all future production mining is jointly proposed by the MoMP and the National Procurement Office for approval by the Afghan President. As part of this process, a professional board will evaluate all submitted mining tenders.
Classification of mining assets	Reduce misclassification of mining activity: current license categories rely heavily on 'maximum mining area' to distinguish between mining classes, leading to the subdivision of mining areas into smaller blocks	Adopt a classification scheme that reduces the types of licenses to reconnaissance, exploration, exploitation, and small-scale mining. The proposed classification scheme would focus on type of mineral and required investment level. All licenses would require review by the Standing Technical Board prior to presentation to the HEC and Cabinet.
Royalty rates	Clarify which contractual terms should be stipulated in the Minerals Law versus in individual contracts, taking into account the trade-off between certainty for investors and flexibility for the government	Move towards a system of standardized contracts and financial terms, reducing the number of terms to be negotiated during the bidding process. For example, the royalty rate could be built into the Minerals Law instead of into contract negotiation.

Source: Authors' work based on Ministry of Mines and Petroleum (2019b)

Other priorities of the GoIRA in respect of its mineral policies include reforming and moderating the role of the MoMP. Under its current mandate, the MoMP is tasked with elements of policymaking, regulation, and operation. The MoMP states that the reformation would focus the ministry on policymaking alone, reassigning the tasks of regulation and operation elsewhere (Ministry of Mines and Petroleum 2019b).

With regard to mineral prioritization, the government aims to address the mining of construction materials first, followed by industrial metals, precious metals, and, lastly, bulk minerals (Ministry of Mines and Petroleum 2019b). This sequencing acknowledges current limitations in the country's transportation and electric grid that would complicate bulk mineral extraction, allows the MoMP to build expertise with smaller contracts before handling a large long-term mining contract, and allows mining operations to develop throughout the country (Ministry of Mines and Petroleum 2019b). Moreover, the government aims to move forward with a large mining tender in each of the country's five regions, based on the MRAs identified in Peters et al. (2011a):

West: Limestone mineral resources to advance the cement sector in Western Afghanistan.

South: Rare earth minerals and uranium reserves in the Khanneshin MRA.

Central: Zinc and lead deposits in the Nalbandon MRA of Ghor province; mines in this region may be able to connect to western transport and power infrastructure but will be difficult to operationalize quickly due to rugged terrain and a lack of existing infrastructure.

East: Talc and gemstone deposits in Ghunday, Achin, and Panjshir; formalization of the talc mines and increased investment in the region is a significant priority, followed closely by formalization of the gemstone industry.

North: Limestone in Baghlan province to produce material for cement construction in the region.

GOVERNMENT INSTITUTIONS

Several government organizations are responsible for the administration, oversight, regulation, fiscal management, revenue collection, environmental management, human resource development, beneficiation, trade, and contract evaluation of ASM.

Ministry of Mines and Petroleum (MoMP) – Primary government agency responsible for the administration, oversight, and regulation of the exploration and exploitation of the mining sector. Also responsible for policy development and the regulation and promotion of the mining and hydrocarbon sectors in Afghanistan. The MoMP and its related departments set forth the parameters of mining sector policy and relevant legal and regulatory frameworks, are responsible for the licensing, registration and inspection of mines, publish geoscientific data, and work with relevant government agencies to establish a clear fiscal and operating regime for the sector. The ministry is also responsible for developing and administering fair and reasonable royalty schemes for commercial mine production. Since 2003, the MoMP has been engaged in institutional and legislative reform of its mining and hydrocarbon administration regime. For some parts of the mineral sector, such as those related to quarry and construction materials licensure, the MoMP's provincial offices take a greater role than the national office.

Afghanistan Geological Survey (AGS) – Responsible for conducting geoscientific studies, including regional geological mapping, geochemical and geophysical surveys, and regional mineral district assessment, as well as for maintaining an archive of technical reports, aerial photographs, and maps of the geology and mineral resources of Afghanistan. The AGS collaborates with various domestic and international stake holders, including geoscientific research organizations, academic institutions, and private sector companies.

Ministry of Industry and Commerce (MoCI) – Responsible for regulation of various downstream aspects of the mineral sector, including processing, refinement, trade and export of mineral products, and other relevant activities.

Ministry of Finance (MoF) – Responsible for the implementation of certain fiscal management and revenue collection functions relevant to the Afghan mining sector, including tax and customs payments, filing requirements, and issues related to the import and export of mining equipment.

National Environmental Protection Agency (NEPA) – Responsible for the certification of mining operations in accordance with the Environment Law and its supporting regulations. Develops requirements for and collects reports on the environmental management plans and on-the-ground operations of mines.

Ministry of Labor and Social Affairs, Martyrs and Disabled (MoLSAMD) – Responsible for regulating the labor market and providing the necessary and proper technical, educational, and vocational training opportunities for different sectors.

Inter-Ministerial Committee (IMC) – Established by the Minerals Law to ensure broad-based oversight of extractive industry activities in Afghanistan and to inform various government players of the status of sector developments. IMC membership is legally prescribed: MoMP (Chair); MoF (Vice Chair); MoEc (Member); MoCI (Member); Ministry of Foreign Affairs (Member), Independent Directorate of Local Governments (member), and NEPA (member).

Independent Directorate of Local Governments (IDLG) – Independent coordination of sub-national governance, established through presidential Decree No. 1047 (August 30, 2007), responsible for providing support to provincial administrations, building capacity at the provincial and district level, enforcing laws and regulations, and enhancing the accountability and transparency of local governments. As of April 2021, the IDLG represented 34 provinces, 374 formal and informal districts, and 153 municipalities.

ASM ASSOCIATIONS & ALLIANCES

Afghanistan Investment Support Agency (AISA) – Intended to serve as a coordinating unit to facilitate the engagement of investors interested in economic sector development with other investors, chambers of commerce, embassies, and donors. AISA maintains a web page that includes minerals and gem information and conducts worldwide investment promotion programs. The MoMP has indicated some hesitance in working with AISA, citing its own ability to do the work that AISA proposes to do.

Extractive Industries Transparency Initiative (EITI) – Global organization assisting 55 countries with transparent management of oil, gas, and mineral resources. In each participating country, the initiative is supported by a stakeholder group comprised of the government, companies, and civil society. Countries disclose annual reports with data from the point of extraction to government revenue records (Extractive Industries Transparency Initiative (EITI) n.d.). Afghanistan was an active implementing country from 2010-2019. They were temporarily suspended due to inadequate progress in implementing the 2016 EITI standards; however, the suspension was lifted in 2020 for progress in implementing the 2019 EITI standards (Extractive Industries Transparency Initiative (EITI) 2019; Extractive Industries Transparency Initiative (EITI) 2020).

International Council on Mining and Metals (ICMM) – International organization of 28 mining and metals companies and over 35 national, regional, and commodities associations committed to a safe, fair, and sustainable mining and metals industry. Every ICMM member adheres to a set of Mining Principles which comprehensively address environmental concerns, social and governance requirements, site-level validation of performance, and assurance of corporate sustainability. The ICMM collaborates with organizations such as the United Nations, Organisation for Economic Co-operation and Development, World Bank, and International Maritime Organization to move the mining and metals industry towards safe, fair, and transparent practices. Additionally, the ICMM shapes the policy environment through leadership and evidence-based perspectives to inform standards that support sustainable development outcomes (International Council on Mining & Metals 2021).

Northern Coal Enterprise (NCE) – State-owned enterprise (SOE) that oversees 3 active and 1 inactive coal mine: the Tala wa Barfak mine located in Baghlan province and the Shabashak, Dan-e-Toor, and (inactive) Abkhorak mines located in Samangan province. Headquartered in Baghlan province, the organization is managed by a Chief Executive Officer, two deputies (Administrative and Technical), and a Chief Financial Officer. According to Article 33 of the SOEs Law, the NCE must defer to the high board of

Tasadee, consisting of the MoMP (chair) and the MoF, MoEc, and MoCI (members), in matters involving financial planning and strategic decisions (Ministry of Mines and Petroleum 2021).

Key Data Needs & Next Steps

The most significant obstacles to progress in Afghanistan's ASM sector begin with the overall lack of information and data upon which to build policy and management decisions. The ASM Formalization Strategy published in 2018 points to a shortage of baseline information on the scope of ASM activity in various parts of the country (Ministry of Mines and Petroleum 2018). Demographic information is almost entirely absent in existing studies of ASM, and anecdotal accounts or local-scale studies are the only available sources for information about the complex relationships between ASM miners, the economy, the local and national political and security situation, and basic local needs such as schools, clinics, and human rights (United Nations Development Programme 2020). This information is needed to successfully integrate current ASM activity with the national economy in a manner to benefit Afghanistan's citizens, its economy, and its investors.

DATA CHARACTERIZING ASM ACTIVITY

In studies of ASM, the first questions that need to be addressed are generally, 'Where is mining occurring?', 'What is the scope and scale of the mining activity?', and 'What commodities are mined by ASM?' Because quantitative, reliable, and comprehensive data about ASM is lacking and difficult to acquire, the answers to these questions pose serious challenges in terms of legal, regulatory, and social policy making as well as the scientific understanding of the sector. Recent database developments by external organizations have begun to address this critical information gap (e.g., Dewitt et al. 2021a). The goal of that particular project is to develop a comprehensive dataset characterizing ASM throughout Afghanistan; the project is ongoing, and new versions published in 2020 and 2021 continue to provide additional areas of observed ASM activity. More importantly, unlike much of the available literature, which relies heavily on estimations derived from supply-chain and interview analysis, the ASM database published by DeWitt et al. (2021a) maps ASM extent as interpreted from high-resolution satellite imagery and available geologic and geomorphic data. It covers areas of key mineral resources, including gemstones, gold, talc, dimension stone, construction minerals, and other mineral commodities. The polygon-based geospatial database consists of 1 km^2 grid cells, within each of which is recorded the commodity or commodities mined by ASM within that 1 km^2 area, the confidence in interpretation of commodity, the number of mine sites, and the date of satellite image acquisition. It is possible, from this dataset, to create maps of ASM activity at a range of scales, and to understand the spatial pattern of ASM activity by commodity, district, or province. Figure 1 of this report uses the Dewitt et al. (2021a) database to show the number of mine sites that occur in each of Afghanistan's districts. Figure 14 offers two examples of local-scale maps created from the database, one in Herat and one in Jalalabad. These local maps indicate both the commodities mined and the number of mine sites interpreted within each 1 km^2 grid cell.

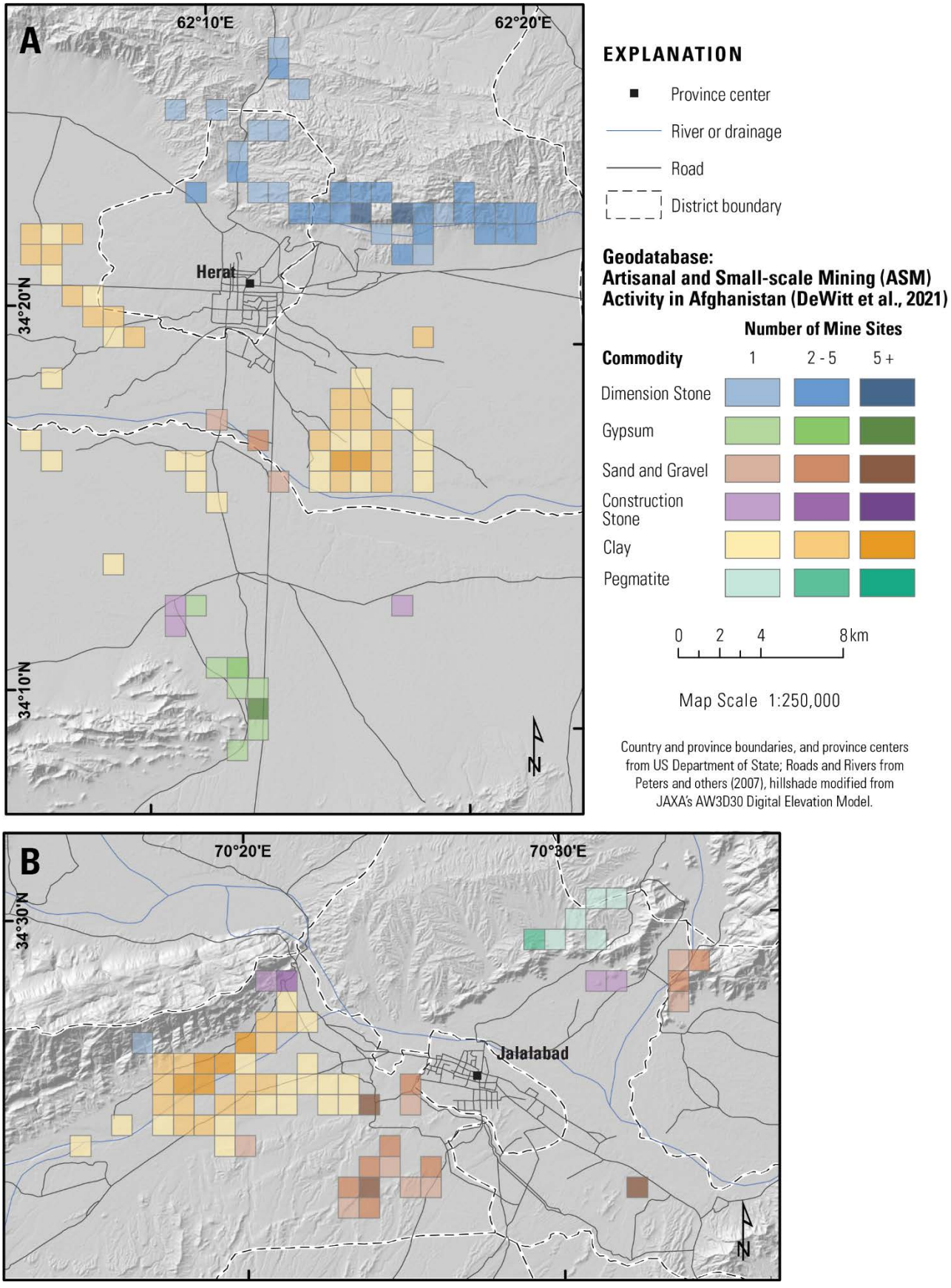


Figure 14. Examples of local-scale maps of ASM activity created from DeWitt et al. (2021a)
A) ASM activity in Herat, B) ASM activity in Jalalabad.

Other studies have also documented specific areas of ASM in Afghanistan (e.g., Bowersox et al. 2000; Brittan et al. 2019; DeWitt et al. 2020; DeWitt et al. 2021b; Global Witness 2018; International Labour Organization 2012; United Nations Development Programme 2020; Williams 2018); together, the results of these studies and the ASM database (DeWitt et al. 2021a) indicate that undocumented ASM of many different mineral resources is pervasive in much of the country. Because unlicensed mining generally does not generate revenue for the national government, formalizing the apparently vast extent of Afghanistan's ASM would be beneficial to the country's development (United Nations Development Programme 2020). However, addressing the issue of unlicensed mining is a significant challenge (Ministry of Mines and Petroleum 2018). ASM has been shown to produce several times the income of rural economic activities like small-scale farming. Furthermore, to many miners, the incentive of land rights recognition does not offset concerns over the government's history of corruption in the mining sector (Siegel and Veiga 2009; Special Inspector General for Afghanistan Reconstruction 2016).

ADDITIONAL CHALLENGES

While formalization has the potential to address poverty in many parts of the country through rural industrialization (Ministry of Mines and Petroleum 2018), Afghanistan's ASM sector must address a great many other issues that cannot be solved by formalization alone. The biggest of these is continued conflict and violence between the GoIRA and various non-state actors. This violence creates a situation wherein security at an ASM site may be administered (and/or contested) by GoIRA, local warlords, local militia, the Taliban, the IS, or other groups. Moreover, in many cases, commodities mined via ASM serve as a means of financing conflict (Lakhani and Corboz 2017, Shroder 2015, United Nations Development Programme 2020).

The tangle of owners, hidden shareholders, and beneficiaries of mining companies complicates the extractives industry in Afghanistan and poses a challenge to the transparency initiatives of the AEITI (Lakhani and Corboz 2017). Though the EITI's standards are largely concerned with medium- and large-scale mining ventures, the political and economic fallout (Extractive Industries Transparency Initiative (EITI) 2019) from stagnating progress in such mining transparency initiatives has ramifications for the ASM sector as well.

Progress in reforms and transparency initiatives was slow under the guidance of previous iterations of the MoMP and other government ministries (Byrd and Noorani 2017, Ministry of Mines and Petroleum 2019b). Miscommunication between various ministries, particularly about exports and revenues, has also plagued the mining sector (Byrd and Noorani 2017). A related challenge is poor communication between the GoIRA and Afghanistan's citizens. In many areas, ASM has been conducted for multiple generations, with a system of community-based mining established outside of, and prior to, the relatively new legal framework established by the MoMP (Ministry of Mines and Petroleum 2018). Limited education and literacy throughout the country make it difficult to widely convey policy changes and the benefits of formalization to miners and the community. Moreover, the consequences of not adhering to the new laws and regulations passed by the government are poorly understood. Improved connections with artisanal and small-scale miners and local communities may help ensure a successful future for ASM in Afghanistan's mineral sector.

Several reports have pointed to the entrenched political and economic approach of Afghanistan's extractive industries sector, which has resulted in a system where specific individuals, groups, and networks retain power over either MRAs or the government approvals necessary for resource extraction (Byrd and Noorani 2017, Lakhani and Corboz 2017, McMahon and Tracy 2011, Noorani 2015, United Nations

Development Programme 2020). Formalization of the ASM sector entails the recognition of formal land rights, such as the rights to occupy land and extract minerals. These rights allow miners access to capital through micro-loans, which enables them to make operational improvements in ASM methods. They also provide a legal basis for support from the donor community, encourage joint ventures with LSM projects, and enable assistance from the government (Ministry of Mines and Petroleum 2018).

Finally, Afghanistan's few unmodernized processing facilities for mined commodities have weakened the ASM sector, resulting in a situation where ore must be exported to neighboring countries for a fraction of its value (Rassin 2012, United Nations Development Programme 2020).

Endnotes

[i] World Bank and Organisation for Economic Co-operation and Development National Accounts data files

[ii] Asian Development Bank, Poverty Data: Afghanistan. Basic Statistics 2021. April 2021.

[iii] USD equivalent based on historical currency conversion of 300 Afghanistan Afghani to United States Dollar for December 31, 2014 using Oanda.com

[iv] An emerald occurrence has also been recorded in Badel, Kunar province (Doebrich and Wahl 2006)

[v] "Afghan onyx may in fact be a variety of aragonite (calcium carbonate) called travertine." (Mitchell and Benham 2007)

[vi] All goals as defined by the United Nations.

[vii] Exploitation licenses are subject to a tender and bidding process. However, when an exploration license leads to a mineral finding the licensee is granted priority for a transferal from exploration to exploitation license (Ministry of Justice 2019)

[viii] Restricted minerals include radioactive minerals, rare earth elements, beryllium, and lithium

References

Al Jazeera, 2007, Lapis Lazuli mining in Sari-i-Sang in northern Afghanistan, YouTube video, accessed online at https://www.youtube.com/watch?v=pwyc5uRxvYE.

ALCIS, 2021, Case Study 1: The talc trade – A Policy Led Disruption: The Talc Industry of Shirzad – Value chain mapping and visualisation of the talc trade in Afghanistan: ALCIS, 18 p. https://pdf.usaid.gov/pdf_docs/PA00XFJC.pdf

BDO LLP, 2019, AEITI 6th Report for the fiscal years 1395-1396 (2015/16 - 2016/17): BDO LLP, 228 p., accessed online at https://eiti.org/document/20162017-afghanistan-eiti-report-addendum.

Benham, A., and Coats, S., 2010, Minerals in Afghanistan – the potential for gold: British Geological Survey, 6 p., accessed online at http://nora.nerc.ac.uk/id/eprint/10926.

Bhanarkar, A.D., Gajghate, D.G., and Hasan, M.Z., 2002, Assessment of Air Pollution from Small Scale Industry: Environmental Monitoring and Assessment, v. 80, no. 2, p. 125-133. https://doi.org/10.1023/a:1020636930033.

Bowersox, G., 2015, The Emerald Mines of the Panjshir Valley, Afghanistan: InColor, v. Winter, p. 81-87. http://www.thegemhunters.com/pdf/articles/emeraldmines-panjshirvalley122215.pdf.

Bowersox, G.W., Foord, E.E., Laurs, B.M., Shigley, J.E., and Smith, C.P., 2000, Ruby and Sapphire from Jegdalek, Afghanistan: Gems & Gemology, v. 36, no. 2, p. 110-126. https://pubs.er.usgs.gov/publication/70022220.

Bowersox, G., W., Sibley, D., Snee, L., and Vitelli, Esq., M.L., 2007, Afghanistan small and medium enterprise development project: Assessment of Afghanistan gemstone industry: Sibley International Corp. for Development Alternative Inc., 23 p., accessed online at http://pdf.usaid.gov/pdf_docs/PNADK597.pdf.

Bowersox, G., Snee, L.W., Foord, E.E., and Seal II, R.R., 1991, Emeralds of the Panjshir Valley, Afghanistan: Gems & Gemology, v. 27, no. 1, p. 26-39.

Brittan, R., Byrd, W.A., and Alston, M., 2019, In Plain Sight – Use of Satellite Imagery to Analyze and Monitor Extractive Activities in Afghanistan: ALCIS, 53 p.

Bureau of International Labor Affairs, 2019, 2019 Findings on the Worst Forms of Child Labor: Afghanistan: U.S. Department of Labor, 13 p., accessed online at https://www.dol.gov/agencies/ilab/resources/reports/child-labor/afghanistan.

Byrd, W.A., and Noorani, J., 2017, Industrial-Scale Looting of Afghanistan's Mineral Resources: United States Institute of Peace Special Report 404, 20 p., accessed online at https://www.usip.org/publications/2017/05/industrial-scale-looting-afghanistans-mineral-resources.

Central Intelligence Agency, 2021, The World Factbook: Afghanistan, accessed online at https://www.cia.gov/the-world-factbook/countries/afghanistan/#economy.

Central Statistics Organization, and UNFPA, 2017, Economically Active Population: Provinces of Kabul, Bamiyan, Daykundi, Ghor, Kapisa and Parwan: United Nations Population Fund, 46 p., accessed online at https://afghanistan.unfpa.org/en/publications/sdes-economically-active-population-monograph.

Chirico, P.G., Malpeli, Katherine.C., and Moran, T., W., 2013, Reconnaissance Investigation of the alluvial gold deposit sin the North Takhar area of interest, Takhar Province, Afghanistan: U.S. Geological Survey Open-File Report 2013–1180, 18 p., accessed online at https://pubs.usgs.gov/of/2013/1180/pdf/of2013-1180.pdf.

Chirico, P.G., Stamm, R.G., Moran, T.W., and Chaihorsky, A., 2011, Chapter 12A. Summary of the North Takhar Placer Gold Area of Interest: 2013–1180, 18 p., accessed online at https://afghanistan.cr.usgs.gov/nonfuel-report.

Cocker, M.D., 2011, Chapter 20A. Summary for the Mineral Information Package for the Ghunday-Achin Magnesite and Talc Area of Interest: U.S. Geological Survey – Summaries of important areas for mineral investment and production opportunities of nonfuel minerals in Afghanistan, 15 p., accessed online at https://pubs.usgs.gov/of/2011/1204/pdf/20A.pdf.

DeWitt, J.D., Chirico, P.G., O'Pry, K.L., Boston, K.M., Duncan, E.L., and Flemming, C., 2021a, Artisanal and Small-scale Mining (ASM) Activity in Afghanistan (ver. 3.0, June 2021): U.S. Geological Survey Data Release, accessed online at https://doi.org/10.5066/P9CCXO7R.

DeWitt, J.D., Chirico, P.G., Alessi, M.A., and Boston, K.M., 2021b, Remote Sensing Inventory and Geospatial Analysis of Brick Kilns and Clay Quarrying in Kabul, Afghanistan: Minerals, v. 11, no. 3, p. 296-317. https://doi.org/10.3390/min11030296.

DeWitt, J.D., Chirico, P.G., O'Pry, K.E., and Bergstresser, S.E., 2020, Mapping the extent and methods of small-scale emerald mining in the Panjshir Valley, Afghanistan: Geocarto International, p. 1-22. https://doi.org/10.1080/10106049.2020.1716394

Doebrich, J.L., and Wahl, R.R., 2006, Geologic and mineral resources map of Afghanistan: U.S. Geological Survey Open-File Report 2006–1038, accessed online at https://pubs.usgs.gov/of/2006/1038/.

Extractive Industries Transparency Initiative (EITI), 2019, Board decision on the Validation of Afghanistan: EITI International Secretariat 2019-1/BC-264, accessed online at https://eiti.org/scorecard-pdf?filter%5Bcountry%5D=51&filter%5Byear%5D=2017.

Extractive Industries Transparency Initiative (EITI), 2020, Board decision on the second Validation of Afghanistan: EITI International Secretariat 2020-78/BC-298, accessed online at https://eiti.org/board-decision/2020-78.

Extractive Industries Transparency Initiative (EITI), n.d., Who we are, accessed online at https://eiti.org/who-we-are.

Galchenko, I.I., Zakandyrin, V.V., and Vaseckiy, F.N., 1972, The Samti placer gold deposit—Report of the Nurabin prospecting-explorational group on the works of 1970-72, aimed at preliminary exploration of placer gold deposit of Samti with estimation of the reserves as by 1–VI–1972: Department of Geological and Mineral Survey part I, unpaginated.

Global Witness, 2018, "At any price we will take the mines" – the Islamic state, the Taliban, and Afghanistan's white talc mountains: ISBN 9781-911606-18-5.

Groat, L.A., Giuliani, G., Marshall, D.D., and Turner, D., 2008, Emerald deposits and occurrences: A review: Ore Geology Reviews, v. 34, no. 1-2, p. 87-112.

Hare, T.M., Davis, P.A., Nigh, D., Skinner Jr., J.A., SanFilipo, J.R., Bolm, K.S., Fortezzo, C.M., Galuszka, D., Stettner, W.R., Shafiquallah, S., and Nader, B., 2008, Large-scale digital geologic map databases and reports of the North Coal District in Afghanistan: U.S. Geological Survey Data Series 317, accessed online at https://pubs.er.usgs.gov/publication/ds317.

Hart Group, 2016, AEITI Inception Report and Fourth Reconciliation Report for 2012-2013 (FY 1391-1392): Hart Group, 106 p., accessed online at https://eiti.org/document/20142015-afghanistan-eiti-report.

Hart Group, 2017, Inception Report and Fifth Reconciliation Report: Afghanistan Extractive Industries Transparency Initiative (AEITI) – EITI report for the fiscal years 1393-1394 (2014-2015): Hart Group, 74 p., accessed online at https://eiti.org/document/20142015-afghanistan-eiti-report.

Hidrón, C., and Koepke, R., 2014, Addressing Forced Labor in Artisanal and Small Scale Mining (ASM): A Practitioner's Toolkit: Alliance for Responsible Mining Version 1.1, 114 p., accessed online at https://web.unep.org/globalmercurypartnership/addressing-forced-labor-artisanal-and-small-scale-mining-asm-practitioner%E2%80%99s-toolkit.

International Council on Mining & Metals, 2021, About Us, at International Council on Mining & Metals, accessed online at https://www.icmm.com/en-gb/about-us.

International Labour Organization, 2012, Buried in Bricks: Bonded labour in Afghanistan, A Rapid Assessment of Bonded Labour in Brick Kilns in Afghanistan: International Labour Organisation, 81 p., accessed online at https://www.ilo.org/asia/publications/WCMS_172671/lang--en/index.htm.

Islamic Republic of Afghanistan, 2004, The Constitution of Afghanistan.

Islamic Republic of Afghanistan, Ministry of Industry and Commerce, and Afghanistan Chamber of Commerce and Industry, 2018, Afghanistan's National Export Strategy 2018-2022: Precious Stones & Jewellery Sector: International Trade Centre, 50 p., accessed online at https://www.ottawa.mfa.af/publications/afghanistan-national-export-strategy-precious-stones-and-jewellery-sector-2018-2022.html.

Krzemnicki, M.S., Wang, H.A.O., and Büche, S., 2021, A New Type of Emerald from Afghanistan's Panjshir Valley: The Journal of Gemmology, v. 37, no. 5, p. 474-495. https://gem-a.com/images/Documents/JoG/JoG2021_37_5_Krzemnicki-2.pdf.

Lakhani, S., and Corboz, J., 2017, Illegal Mining in Afghanistan: A Driver of Conflict: United States Institute of Peace, 4 p., accessed online at https://www.jstor.org/stable/resrep20203?seq=1#metadata_info_tab_contents.

Malpeli, K.C., and Chirico, P.G., 2014, A sub-national scale geospatial analysis of diamond deposit lootability: The case of the Central African Republic: The Extractive Industries and Society, v. 1, no. 2, p. 249-259.

McIntosh, R., and Benham, A., 2007, Minerals in Afghanistan: Gemstones of Afghanistan.

McMahon, G., and Tracy, B., 2011, The Afghanistan Mining Sector as a Driver of Sustainable Growth: Benefits and Opportunities for Large-Scale Mining: Oil, Gas, and Mining (SEGOM), World Bank, 50 p., accessed online at https://openknowledge.worldbank.org/handle/10986/12370.

Mining Technology, 2014, Coal mine explosion in Afghanistan leaves 17 dead and three missing: Mining Technology, accessed online at https://www.mining-technology.com/news/newscoal-mine-explosion-in-afghanistan-leaves-17-dead-and-three-missing-4256110.

Ministry of Economy, 2017, SDGs' Progress Report: Afghanistan: Sustainable Development Goals Voluntary National Review at the High Level Political Forum, 73 p., accessed online at http://sdgs.gov.af/80/sdgs-forum.

Ministry of Industry and Commerce, 2018, Marble and Granite Sector: The cornerstones of the Afghan economy: Islamic Republic of Afghanistan, Afghanistan's National Export Strategy 2018-2022 Report, 73 p.

Ministry of Justice, 2007, Labour Law: Issue No. 914, Islamic Republic of Afghanistan, Unofficial English translation, accessed online at https://www.ilo.org/dyn/natlex/natlex4.detail?p_lang=&p_isn=78309&p_country=AFG&p_count=75.

Ministry of Justice, 2019, Minerals Law [Draft], Islamic Republic of Afghanistan, accessed online at https://momp.gov.af/laws-and-regulation.

Ministry of Mines, 2019, National Mining Policy, Islamic Republic of Afghanistan, accessed online at https://momp.gov.af/momp-polices.

Ministry of Mines and Petroleum, 2018, Artisanal and Small Scale Mining Formalization Strategy, Islamic Republic of Afghanistan, accessed online at https://momp.gov.af/publications.

Ministry of Mines and Petroleum, 2019a, Annual Report: 2017-2018, Islamic Republic of Afghanistan: Kabul, Afghanistan, 32 p, accessed online at https://momp.gov/af/publications.

Ministry of Mines and Petroleum, 2019b, Mining Sector Roadmap: Islamic Republic of Afghanistan, 34 p., accessed online at https://momp.gov.af/publications.

Ministry of Mines and Petroleum, 2021, SOEs, accessed online at https://momp.gov.af/index.php/soes.

Ministry of Mines and Petroleum (MCAS), 2021, MoMP Transparency Portal, accessed online at https://afghanistan.revenuedev.org/dashboard.

Ministry of Mines Directorate of Policy, 2012a, Artisanal and Small scale Mining Policy: Hoot 1390, Islamic Republic of Afghanistan, 12 p., accessed online at https://momp.gov.af/momp-polices.

Ministry of Mines Directorate of Policy, 2012b, Construction Materials Policy: Jadi 1390, Islamic Republic of Afghanistan, 10 p., accessed online at https://momp.gov.af/momp-polices.

Ministry of Mines Directorate of Policy, 2012c, Dimension Stones Policy: Jadi 1390, Islamic Republic of Afghanistan, 11 p., accessed online at https://momp.gov.af/momp-polices.

Ministry of Planning, 1976, First Seven Year Economic and Social Development Plan: 1355-1361. Vol I Text, Government of the Republic of Afghanistan, accessed online at http://www.afghandata.org:8080/xmlui/handle/azu/790.

Mishra, H., and Sahu, H.B., 2013, Environmental Scenario of Chromite Mining at Sukinda Valley – A Review: International Journal of Environmental Engineering and Management, v. 4, no. 4, p. 287-292.

Mitchell, C. and Benham, A., 2007, Minerals in Afghanistan: Marbles of Afghanistan, Afghanistan Geological Survey, Kabul, Afghanistan, accessed online at http://nora.nerc.ac.uk/id/eprint/3863/.

Mitchell, C., and Benham, A., 2008, Afghanistan: revival and redevelopment: Industrial Minerals, v. 489, p. 58-63.

Mitra, D., and Valette, D., 2017, Environment, Human Labour, and Animal Welfare – Unveiling the Full Picture of South Asia's Brick Kilns and Building the Blocks for Change: International Labour Office, The Brooke Hospital for Animals and The Donkey Sanctuary, 58 p., accessed online at https://www.researchgate.net/publication/338902496_Environment_Human_Labour_Animal_Welfare_Unveiling_the_full_picture_of_South_Asia's_brick_kiln_industry_and_building_the_blocks_for_change.

Mossotti, V., G., 2014, Heuristic Economic Assessment of the Afghanistan Construction Materials Sector – Cement and Dimension Stone Production: U.S. Geological Survey Open-File Report 2014–1208.

Nathan Associates Inc., and Louis Berger International, Inc., 1992, Mineral Resources in Afghanistan: Office of the A.I.D Representative for Afghan Affairs, 93 p., accessed online at https://pdf.usaid.gov/pdf_docs/Pnabl961.pdf.

National Environmental Protection Agency, 2007, Environment Law: Official Gazette No. 912, Islamic Republic of Afghanistan, Unofficial English translation, accessed online at https://momp.gov.af/laws-and-regulation.

O'Donnell, L., and Khan, M., 2020, The Taliban, at Least, Are Striking Gold in Afghanistan: Foreign Policy, accessed online at https://foreignpolicy.com/2020/09/22/taliban-afghanistan-mining-peace-talks/.

Ofosu, G., Dittmann, A., Sarpong, D., and Botchie, D., 2020, Socio-economic and environmental implications of Artisanal and Small-scale Mining (ASM) on agriculture and livelihoods: Environmental Science & Policy, v. 106, p. 210-220.

Omrani, B., 2010, Afghanistan and the Silk Road: The land at the heart of world trade, UNAMA: United Nations Assistance Mission in Afghanistan, accessed online at https://unama.unmissions.org/afghanistan-and-silk-road-land-heart-world-trade-bijan-omrani.

Peters, S.G., Ludington, S.D., Orris, G.J., Sutphin, D.M., Bliss, J.D., and Rytuba, J.J., 2007, Preliminary Non-Fuel Mineral Resource Assessment of Afghanistan: U.S. Geological Survey Open-File Report 2007–1214, p. 484-676, accessed online at https://pubs.usgs.gov/of/2007/1214/.

Peters, S.G., King, T.V.V., Mack, T.J., and Chornack, M.P., 2011a, Summaries of important areas for mineral investment and production opportunities of nonfuel minerals in Afghanistan: U.S. Geological Survey Open-File Report 2011–1204, 1,810 p. plus appendixes on DVD, accessed online at http://pubs.usgs.gov/of/2011/1204.

Peters, S.G., Mirzad, S.H., Scott, E., and Hubbard, B.E., 2011b, Chapter 15A. Summary of the Zarkashan Copper and Gold Area of Interest: U.S. Geological Survey Open-File Report 2011–1204, p. 1113-1153, accessed online at https://afghanistan.cr.usgs.gov/nonfuel-report.

Popenko, S.N., and Teplych, V.I., 1970, Report on the preliminary exploration of the Khaisar placer gold with estimated reserves carried out in 1967-1969: Afghanistan Department of Geological and Mineral Survey, unpaginated.

Rassin, A.G., 2012, A comprehensive study of marble industry in Afghanistan: Research & Statistics Department, Afghanistan Investment Support Agency, 62 p.

Renaud, K.M., 2020, 2017-2018 Minerals Yearbook: Afghanistan [Advance Release]: U.S. Geological Survey Minerals Yearbook, 6 p., accessed online at https://www.usgs.gov/centers/nmic/asia-and-pacific#af.

Reuters, 2010, Afghan mineral wealth put at $1-3 trillion – minister: Reuters, London, England, accessed online at https://www.reuters.com/article/afghanistan-mining/afghan-mineral-wealth-put-at-1-3-trillion-minister-idUKLDE65O0FS20100625.

SanFilipo, J., 2005, Assessing the Coal Resources of Afghanistan: U.S. Geological Survey Fact Sheet 2005–3073, 3 p., accessed online at https://pubs.usgs.gov/fs/2005/3073/.

Sanjel, S., Khanal, S.N., Thygerson, S.M., Carter, W.S., Johnston, J.D., and Joshi, S.K., 2017, Respiratory symptoms and illnesses related to the concentration of airborne particulate matter among brick kiln workers in Kathmandu valley, Nepal: Annals of Occupational and Environmental Medicine, v. 29, no. 1, 9 p.

Schmidt, C.W., 2013, Modernizing Artisanal Brick Kilns: A Global Need: Environmental Health Perspectives, v. 121, no. 8, 8 p.

Shroder, J.F., 2014, Natural resources in Afghanistan: Geographic and geologic perspectives on centuries of conflict: Elsevier, San Diego, CA.

Shuja, A., 2016, “They Bear All the Pain”: Hazardous Child Labor in Afghanistan: Human Rights Watch, accessed online at https://www.hrw.org/report/2016/07/15/they-bear-all-pain/hazardous-child-labor-afghanistan#.

Siegel, S., and Veiga, M.M., 2009, Artisanal and small-scale mining as an extralegal economy: De Soto and the redefinition of “formalization”: Resources Policy, v. 34, no. 1-2, p. 51-56.

Special Inspector General for Afghanistan Reconstruction, 2016, Afghanistan’s Oil, Gas, and Minerals Industries – $488 Million in U.S. efforts show limited progress overall, and challenges prevent further investment and growth: SIGAR 16–11, 51 p., accessed online at https://www.sigar.mil/pdf/audits/SIGAR-16-11-AR.pdf.

Sutphin, D.M., Orris, G.J., and Bliss, J., 2007, Ultramafic-Hosted Talc-Magnesite: U.S. Geological Survey Preliminary Non-Fuel Mineral Resource Assessment of Afghanistan Open-File Report 2007–1214, 74 p., accessed online at https://pubs.usgs.gov/of/2007/1214/.

The Guardian, 2009, Afghanistan’s Emerald Miners, YouTube video, accessed online at https://www.youtube.com/watch?v=LaK0A082G1I.

The Metropolitan Museum of Art, 2021, Bull’s head ornament for a lyre, Bronze, inlaid with shell and lapis lazuli, circa 2600 BCE, Sumerian/Mesopotamian archive, accessed online at https://www.metmuseum.org/art/collection/search/324023.

United Nations Development Programme, 2014, Project document: Establishing integrated models for protected areas and their co-management in Afghanistan, accessed online at https://open.undp.org/projects/00076820.

United Nations Development Programme, 2019, United Nations Development Programme: Human Development Reports: Afghanistan, accessed online at http://hdr.undp.org/en/countries/profiles/AFG.

United Nations Development Programme, 2020, Pitfalls and Promise: Minerals Extraction in Afghanistan, UNDP Afghanistan Country Office, 124 p., accessed online at http://hdr.undp.org/en/content/national-human-development-report-2020-afghanistan.

United Nations Office on Drugs and Crime, 2017, Sustainable Development in an opium production environment: Afghanistan opium survey report 2016: United Nations Office on Drugs and Crime, 84 p., accessed online at https://www.unodc.org/unodc/en/frontpage/2017/May/afghanistan_-total-area-under-opium-poppy-cultivation-expanding--threatening-sustainable-development-in-the-country.html.

United Nations Office on Drugs and Crime, 2021, Afghanistan opium survey 2019: United Nations Office on Drugs and Crime Socio-economic survey report: Drivers, causes and consequences of opium poppy cultivation, 75 p., accessed online at https://www.unodc.org/unodc/en/crop-monitoring/index.html?tag=Afghanistan.

United States Agency for International Development, 2018, Property Rights and Resource Governance: Afghanistan: USAID Country Profile, 57 p., accessed online at https://www.land-links.org/country-profile/afghanistan/.

U.S. Department of State, 2020, 2020 Trafficking in Persons Report: Afghanistan: Office to monitor and combat trafficking in persons, unpaginated, accessed online at https://www.state.gov/reports/2020-trafficking-in-persons-report/afghanistan/.

Williams, M., 2018, Khost Community Chromite Mining: Pathway to Local Economic Stability, Hisarak, Tani District, Khost Province, Afghanistan, 11 September - 27 October 2017: Allsource Analysis, Phase Zero Solutions, Inc., PPT presentation attached to written communication from David Bailey on July 24, 2018.

World Bank, 2021a, Afghanistan Data, The World Bank: Data, accessed online at https://data.worldbank.org/country/afghanistan.

World Bank, 2021b, Afghanistan Overview, The World Bank in Afghanistan: Overview, accessed online at https://www.worldbank.org/en/country/afghanistan/overview.

World Bank Group, 2021, Afghanistan Development Update April 2021: Setting Course to Recovery: The World Bank, 38 p., accessed online at https://openknowledge.worldbank.org/handle/10986/35363.

World Bank Group, n.d., World Bank Country and Lending Groups, accessed online at https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

World Health Organization, 2017, Mercury and Health, accessed online at https://www.who.int/news-room/fact-sheets/detail/mercury-and-health.

Ziaul, Sk., and Pal, S., 2018, Anthropogenic heat flux in English Bazar town and its surroundings in West Bengal, India: Remote Sensing Applications: Society and Environment, v. 11, p. 151-160.

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