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<b>Article:</b>	<b>Issues and Challenges faced by Artisanal and Small-Scale Miners in the Gemstones Sector of Gilgit-Baltistan (GB), Pakistan</b>
<b>Author(s):</b>	Dr. Arshad Khan Bangash Associate Professor/Chairman, Department of Sociology, Bacha Khan University Charsadda. Email: <a href="mailto:arshad.dwhh@gmail.com">arshad.dwhh@gmail.com</a>
	Dr. Syed Owais Assistant Professor, Department of Sociology, University of Peshawar. Email: <a href="mailto:owais@uop.edu.pk">owais@uop.edu.pk</a>
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<b>Author(s) Note:</b>	Dr. Arshad Khan Bangash is serving as an Associate Professor/Chairman at Department of Sociology, Bacha Khan University Charsadda. Email: <a href="mailto:arshad.dwhh@gmail.com">arshad.dwhh@gmail.com</a>
	Dr. Syed Owais is serving as an Assistant Professor at Department of Sociology, University of Peshawar. Email: <a href="mailto:owais@uop.edu.pk">owais@uop.edu.pk</a>

**ABSTRACT**

This paper presents the narratives of artisanal and small-scale miners (ASM) from the Gilgit-Baltistan (GB) province of Pakistan. The paper draws on the data from fourteen qualitative (semi-structured) interviews and a stakeholder workshop, which were conducted as part of a larger research project to identify factors inhibiting beneficiation of gemstones in Khyber Pakhtunkhwa and Gilgit-Baltistan. The paper finds that GB is full of gemstone deposits and almost all types of gems are mined in the area during mining season (June to September) every year. But throughout the mining season, miners face various types of challenges, which include transportation issues, technological backwardness, absence of safety equipment, shortage of explosives, health and safety issues, environmental issues, financial issues, lack of training opportunities, and marketing and trade issues.

**Key Words:** Gilgit-Baltistan, Khyber Pakhtunkhwa, Small-scale artisanal miners, gemstones, mine and mineral department.

**Introduction:**

This paper draws on the findings from a research project funded by the Higher Education Commission (HEC<sup>1</sup>) of Pakistan. Geographically the project covers the two provinces of Khyber Pakhtunkhwa and Gilgit-Baltistan (GB) region. However, this paper solely focuses on the issues and challenges that GB's artisanal and small-scale miners face. Across the globe, twenty to thirty million people are dependent on small scale mining most of whom are in developing nations (Buxton, 2013). Henstschel, Hruschka and Priester (2003) gave a rather modest estimate placing the total number of artisanal and small scale miners (ASMs) as about thirteen million in developing countries. Yet, very little research has been done on the socio-psychological and cultural dimensions of ASM's gemstone mining, processing, trade practices in Pakistan, which is considered to be one of the richest countries in terms of mineral resources, covering over 600,000 square kilometers (Lahiri-Dutt and Brown, 2017). but until recently very little is known in this regard as this sector is poorly researched. The main focus of the researchers is on material properties and sources of gems rather to focus on supply chain and problems connected with extraction, processing and gems business (Archuleta, 2016).

Pakistan's Gilgit-Baltistan (GB) province has huge gemstones deposits and is considered a central hub of gemstone mining. Its mountains are made of igneous, sedimentary, and metamorphic rocks characterized by number of mineral deposits, precious and dimension stones (Lahiri-Dutt and Brown, 2017). The common gemstones mined in GB are ruby, fluorite, spinel, pargasite, aquamarine, sapphire, corundum, calcite, axinite, diopside, tourmaline, kunzite, topaz, beryl, quartz, albite, microcline, emerald, apatite, tanzanite, feldspar, and garnet etc. According to Alam et al., (2022) 32 types of semi-precious and precious stones are mined in GB, covering 95% of the total gemstones produced in Pakistan, which originate from 2150 mines with 2500 miners. But the miners working in mines most often confronted with variety of problems such as ventilation, lighting and drilling.

In GB mostly the local are connected with Artisanal small-scale mining (ASM). Being informal in nature, neighbouring community members and miners' own family as well as the larger clan members help out in the process of extracting gemstones from 4000-6000 meters above the sea levels in summer season for two to four months using purely basic technology (Shah, Khayyam, and Mumtaz, 2021; Rupani Foundation, 2017). In comparison to national averages, poverty level is significantly high in mountain areas, but limited information about Northern Areas is available in this respect. Extant studies estimate that between 23 and 32 percent people live below the poverty line (Florkowska and Bryt-Nitarska, 2018; Narula, Magray, and Desore, 2017). That is probably why for fulfillment day-to-day livelihood requirements, the local opt for mining profession an important contributor of basic human requirements of foods and shelters (Narula et al., 2017). Makki and Ali (2019) concluded that in Pakistan, informal mining has long history and played increasing role in providing employment and uplift in revenue. It has had a substantial effect on the economic growth of the villages since the deposits were discovered in the area. In this way, ASM brings environmental and social justice through enhancing and mobilizing livelihood sustainable capital in areas lacking other formal income creating activities (Florkowska and Bryt-Nitarska, 2018).

Despite ASM's positive contribution to rural economy and people's livelihood, it also badly affects the natural environment and communities in many ways. Funoh (2014) and Hentschel, Hruschka, and Priester (2003) highlighted that ASM has several environmental effects such as air pollution, land degradation and deforestation, dust and noise, and pits with animal traps. This could be the result, that ASM in GB is neither highly mechanized nor proper inventiveness are initiated. Further, Lahiri-Dutt and Brown (2017) argue that ASM is not yet covered within legal framework and the miners lacks formal licenses to mine and sell their products. That is why, no reliable data exists regarding the level of gemstone extraction.

This sector is also confronted with several issues like crude and unscientific mining, lack of proper mining equipment, improper camps without hygienic facilities, lack of safety tools and basic health facilities and lack of repairing facilities of mining equipment at sites that contribute towards fractures and damages followed by overall destruction of gems due to ill blasting (Alam, et.al, 2019). Whitmore (2006) viewed that from mine affected communities' perspective, they continued to suffer ill effects to their health, way of life and environment. Moreover, basic safety equipment's are not available to miners like gloves, masks, googles, mining shoes, and helmets. Likely, they suffer from different diseases like silicosis due to explosive smoke (Alam, et.al, 2022).

Blasting and flow of people also damaged the Eco-system and mountain vulnerabilities increased due to inappropriate mines development, spreading of human filth, glaciers melting of thermal generators, and plastic waste that pollute the water (Alam, et.al, 2019). They further contended that gemstones mining sectors faced different difficulties like actual price of mined gems, lack of gems exchange centers, weak health facilities at mining sites, miner's suffrage from various lung diseases, eyes itching, explosive and dust allergies, short working session, difficult terrain, poor mining methods, lighting, ventilation and suffocation issues etc.

Although, mining industry played an important role in economic development of countries as across the globe 20 million people depends upon mineral resource extraction (Jenkins, 2004). Beside the economic benefits of this industry, it is also blamed for various environmental risks affecting both environment and people. Zhiguo, et. al., (2011) concluded that mining activities leads towards various environmental and geological problems like water and land deterioration, ecological landscape destruction and geologic hazards.

## **Methodology**

As mentioned above the data for this paper comes from a research project on *factors inhibiting beneficiation of gemstones in Pakistan: a mixed-methods value chain analysis of mining and trade in gemstone industry of Khyber Pakhtunkhwa and Gilgit-Baltistan*. The project is based on the logic of mixed methods research (MMR) design. We particularly adopted the exploratory sequential design, which is a "three-phased mixed methods design in which the researcher starts with the collection and analysis of qualitative data that is then followed by a development phase of translating qualitative findings into an approach or tool that is tested quantitatively" (Creswell and Plano Clark, 2018: 84). The dearth of data and empirical reports regarding the working conditions, operations, and processes involved in the mining, processing, cutting, polishing, and sale of gemstones warranted the initiation of the project. Similarly, a lack of information on the subjective aspects of actors' lives engaged in the gemstone sectors of Khyber Pakhtunkhwa and GB was yet another justification of the research project. An exploratory sequential design seemed the most viable option for firstly

documenting the subjective, lived, and experiential accounts of research participants, and building on a thematic analysis of interviews with them, the researchers developed questionnaires for generating quantitative data.

As mentioned above, the GB's mining community is almost entirely engaged in ASM. Therefore, the researchers first conducted a stakeholders' workshop in Gilgit city, the capital of Gilgit-Baltistan. The workshop's participants included officials from Mineral Development Departments, miners, local gemstone traders and local lapidarists to elicit their views and perspectives on the overall scenario of gemstone mining in the province. The workshop stakeholders were engaged in group-based participatory activities and dialogues to elicit their views. The thematic analysis of the workshop's procedural report was used as a bases for the development of an interview guide for conducting semi-structured interviews (SSIs) with ASMs, lessees of mines in Skardu, and staff-members of the Mineral Development Department of GB. The breakdown of the interviews is given in the table below.

S No	Types of Interviewees	No. of SSIs
1	Staff-members of Mineral Departments of Gilgit-Baltistan	05
2	Lessees of mines in Skardu	04
3	Artisanal Small Scale Miners in Skardu	05
<b>TOTAL</b>		<b>14</b>

The empirical data presented below is based on the thematic analysis of the stakeholder workshop and the fourteen research participants who were interviewed afterwards.

### Data Analysis

Although mining is common in GB, it is not an easy occupation for every one as most of the mines are either situated on the top of the mountains or much away from the home towns of the miners. Most often the miners are confronted with transportation and access issues primarily due to the tough mountainous terrain and harsh weather. A participant referred to this aspect of ASM in GB as follows:

*“We work in mines that are situated on top of the hill. To reach these mines we sometimes have to spend more than ten hours. The available sources of transportation are either donkey or mule, but when it rains, then hiking by foot is our only option.”*

State and development actors (e.g., NGOs) cannot be expected to provide adequate transportation route to every mine, for ASM often operates outside the “legal” boundaries prescribed in state laws. Yet, ASM miners did raise this issue both during the stakeholder workshop and in interviews. For example, during the fieldwork, after an FGD at Khyber Village in Hunza (GB), while showing us a road that the community member had constructed out of own pocket contributions, a community member complained:

*“We, the locals, by ourselves constructed the existing rough road which is only enough for walking and animals and the state does not provide any transportation facility despite the fact that they are well aware about our difficulties.”*

Working hours of the miners is not fixed but they worked for long hours. Although, they worked in breaks and both the number and time of time of break vary from mine to mine and area to area. In some areas of GB, once the miners reach the base-camp of the mines they stay there for months and return homes after the closure of mining season. An interviewee reflected on this aspect in the following:

*“Our mines are much away from the village and the route is extremely tough and tough. In early morning we leave for mining and work there till evening in three breaks, i.e., tea, lunch and tea; in some areas, the miners leave early, work till late in the evening without a scheduled break; Yet in terrains that are difficult to traverse, once miners reach the site, they return homes after the end of the mining season in month October or soon thereafter.”*

Miners in GB are not only confronted with transportation and access issues, but they also have no access to advance scientific technologies. Mostly, mining in the area are carried out with traditional tool and equipment, such as shovel, spade, grape hoe, hand barrow, chisel, and hammer. Change is universal and equally applicable to mining sector as some improvements are made in comparison of the past with respect technological uses in mining. But still mining in GB lags the developed world as no advance technology is used by miners, as a participant disclosed:

*“We used shovel, spade, grape hoe, chisel, hand barrow, and hammer in mines. We also have a drill and pressure machine which is used for cutting rocks and making holes inside for fixing explosive. In the past pressure machine was not available and we simply used shovel, chisel, and hammer. The introduction of drill and pressure machine in mine save much of our time as its easily makes holes in the mine to fix explosive for blasting”.*

With the passage of time, extraction and processing methods of gemstone have changed and changing continuously. The availability of third and fourth generation wireless networks in the area, local people accessed social media networks easily that in turn provide connectivity not only with the local miners but as well international miner community. Such technological change positively affects the mindset of miners with respect of mining technologies. As in the past there were no use of machine but now simple technology is available for miners in each mine as a participant added that:

*“In the past we worked with shovel, chisel, hand barrow, and hammer, but now we also use drilling machine. We are also aware about advance mining technologies as when we interact with international miners on social media, they tell us about such technologies. In short, extraction and processing methods were changed in many ways after the arrival 3G and 4G networks in the area”.*

Miners issues in GB is not only limited to technology and resources. They also face different types of health issues. In total, no proper health related facilities are available for them. Neither doctor is accompanied by the miners nor they have proper first-aid facility in or near mines. They usually carry some medicines, such as pain killers and anti-biotic, for routine uses when leaving from the hometowns. But in case of severe emergency and injury they have only access to bandage, and ointment and isopropyl rubbing alcohol (spirit) etc. In this regard, a participant mentioned that:

*“In my whole life I have never seen either a doctor or a health practitioner with miners in mines. Only miners are there with some medicine for fever, cough, diarrhea and some bandage and spirit etc., for minor injuries. In case of severe emergency, e.g., due to explosives, we rush towards the nearest hospital and have no option of initial treatment there in mine sites.”*

Mostly, miners are even unaware about the names and uses of health and safety equipment being used in developed world such as filtering face piece respirators, reusable respirator, air respirator, powered air purifying respirator, hearing conservation, push-to-fit earplugs, foam earplugs, reusable earplugs, protective eyewear and reflective material such as high visible jacket. The miner wear simple protective hats and plastic shoes for protection. When the researchers showed the pictures of a variety of health and safety equipment to the interviewees, none of them acknowledge to have ever seen, heard, or used those items. For example, one of the interviewee remarked that:

*“I never heard, used or seen such equipment before you showed these in the pictures. We simply use hard hats and plastic shoes available in the local market, but these are completely different from the stuff you are talking about.”*

Due to a lack of proper protective equipment, miners become sick due to poor working conditions for which no proper and adequate medical insurance and health facility are available. If a miner is seriously injured, e.g., by losing a hand or a limb, then they manage some financial contribution by themselves to mitigate the injured and support his family. The government does not do anything in this connection. A participant highlighted this in the following:

*“Illness among miners is not common but not rare either. Some times, when one of us is seriously injured, we manage financial contribution from our pockets to lessen the financial burden of the injured. There is no financial support available from the government side.”*

No proper external (artificial) ventilation facility is available for miners inside the mines; it is arranged from adjacent mines and as result some time they have breathing issues, especially after blasting:

*“There is no need of ventilation inside mines and if needed then we arrange crossed ventilation from other mines but no mechanism of artificial ventilation is available in mines. That is why some times we faced breathing issues especially after blasting”.*

Miners in GB never received the required training such as excavation techniques, health and safety, processing of mined stuff and disposing off mined debris. Since, as mentioned above, miners do not have knowledge of and access to latest health and safety equipment, they cannot be expected to have any idea about their use either. Their knowledge and learning is based on self-learning; followed by working from their co-workers as a participant added:

*“I never received training about mining procedures and techniques but learned through trial and error and where I face problems then I asked from my co-workers, other miners in the village or neighbouring communities.”*

In contrast to emerald mining in Swat valley of Khyber Pakhtunkhwa, miners in GB excessively used explosive for cutting rocks and hard surface throughout the mining session. For using explosives, miners face hurdles in acquiring them. The regularly use pretexts to acquire explosives as the government has banned the use of explosives in mining. Because miners can receive the required explosive only through proper licensing and license can be arranged either for the purpose of modifying a mountainous area into agriculture fields or for constructing houses. For attaining license and acquiring explosives, miners spend huge sums of money. A participant disclosed that:

*“Explosive warehouse are not available in each district of Gilgit-Baltistan and for getting explosives we spend huge amount in the form of its transportation and other related expensive such food and shelter in other districts. The process of getting explosive is much complicated and for this purpose we need a license that can be obtained either in the name of constructing a home or agriculture fields. Even with a license, a person can receive only 5 Kilograms of explosive which is very low”.*

After the last of wave terrorism in the country, the process of getting license has become extremely difficult. In the past, government issued licenses very easily, but now the process is complicated and it is ordinarily not possible to obtained license. The miners are not able to secure license directly for mining purposes as mining in GB is not institutionalized in most of the cases. According to an interviewee,

*“getting license for a miner is not an easy task after Talibanization in Pakistan and it can only be obtained either for making house or agriculture fields in comparison to the past where the process was very easy. The government never issued license directly for mining purposes as mostly mining is not registered in GB with Mines and Mineral department.”*

Provision of enough explosives for mining may enhance gems-production in the area and that is why miners demanded from the state to make the procedure of getting explosive more simple and be issued directly for mines:

*“If the government could provide enough explosive to the miners directly for mining, then we could increase the production of gemstones five to ten times higher than the present. But for enhancing our production the process of issuance of license need to be simplified by the government.”*

Miners in GB are aware about the conservation of environment and they endorse that mining has negative impact on environment, particularly due to the use of explosives in mining. They acknowledged that explosives contaminate water, air and soil , which in turn contribute to biodiversity loss. But they have no access to advance technologies. Hence, explosives are the only available source of mining in the area. A participant mentioned that:

*“The use of explosive in mining is not good for health and overall environment, but we have no advance technologies. That is why we run our mining activities with the help of explosive only.”*

Miners’ other issues include lack of detecting equipment and low production for which they blame non-availability of technology and explosives. A participant added that:

*“We have no idea that from where the gems deposits will come as we select a mine site without use of any type of detective technology and even after exploration of gems we have not enough explosive to take full benefits from the deposits.”.*

The miners categorically denied leasing of their respective mines and added that they were working in their land and that the state had no right to compel miners to lease mines in their are to non-GB investors. They did welcome the idea of collaborative partnership with non-GB investors. According to an interviewee,

*“External investors are encouraged if they want to invest in collaboration with the local miners, but we will not allow anyone to lease our mines as it is our own land and no one has the right to lease our mines. We will never allow the government to strictly implement their proposed leasing policy.”*

The miners are not against the state, but they blamed government lack of interest in general and mining in particular as they received no support from government side that flourish gemstone industry in the area. A participant expressed his views as follows:

*“Where is the state? We have never seen it. Till date we have not received any support from government in the form of technical mining training nor they provided any exploration and excavating equipment to make our life easy.”*

The miners mined almost all types of gems in Gilgit-Baltistan such as Aquamarine, Apatite, Emerald, Epidote, Morganite, Quartz, Ruby, Sphene, Tourmaline, Zircon, Topaz, and Epidote etc., but faced the issues related to marketing and businesses. According to an interviewee, who was a miner and occasional trader of gemstones:

*“I have mined all types of gems you just named. We have no issues of gems exploration as these (GB) mountains are full of gems, but once a pocket is explored than we sell the deposit in the mine or in the local market for very low price.”*

Once the gems are explored then miners call the owners of the machine and explosive-providers and after their arrival they fixed the rate of gems; if one of them agree to the price fixed then it is sold to them. Otherwise, gems are taken to the nearby local market for sale. The poverty of real owner of gems, i.e., miners, stand as barrier in their way to take maximum benefit of the product. That is,

*We have no access to international market and we cannot buy our own gems as we have not enough resources. That is why, conventionally, we are bound to sell the product either to the owner of machine or the explosive-providers. After extracting gems, both the shareholders are called and if they agree to purchase those according to the miners' proposed price then that is the end of it. Otherwise, we sell it in the local market”.*

## **Conclusion**

Gems like aquamarine, apatite, emerald, morganite, quartz, ruby, sphene, tourmaline, zircon, topaz, and epidote are commonly mined in Gilgit-Baltistan, Pakistan for which miners worked for long hours in hills throughout the mining season, i.e., June to September. Miners confront with transportation and access problems to reach mining sites as no proper roads are available. Gems mining are carried out with the help of traditional tools such as shovel, spade, grape hoe, chisel, and hammer etc. Drill and pressure machine are used by miners but they have no access to technologies which is used for mining in the developed world. Use of explosive and blasting is common in mining that adversely affect health of the miners for which neither doctor nor health practitioner is available at mining site. No proper safety equipment and artificial ventilation facility is available for miners as they use simple hats and plastic shoes during mining. In case of severe injuries, the miners give some financial contribution by themselves to decrease the financial burden of the injured as no support from state authorities is extended. Training opportunities are exceptionally rare for miners. That is why learning is either on trial and error basis or they learn the craft from co-workers. Huge amount of explosive is required for mining which are provided by a shareholder. Explosive can only be obtained through proper licensing and getting license is no more an easy task for a miner especially after the last wave of terrorism. But still the existing blasting in mining badly affects health of the miners and the overall environment such as water, air and soil etc. Miners are hesitant to lease their mines but encouraged external collaborators if they want to invest with the local miners. Lastly, miners have limited access to international market that is why they sell their product either in mines to shareholders who provide machine and/or explosives or in the local gems market.

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