

# Economic Impact of Mineral Resources: A Case Study of District Chitral, Pakistan

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## Abstract

This study examines the economic impact of minerals resources in the District Chitral. In addition to this, different ways of mining were undertaken. For this purpose primary and secondary data are used. In primary data, questionnaires were developed and distributed among the targeted samples of the population and for secondary data various articles were used. The objective of the study was to see the impact of mineral resources and the life standard of people employed in the mining factories and mining zones. Excel sheet was used to analyze the primary data. In conclusion, mining plays a vital role in the development of nation by providing employments, improving the quality of life of the masses and enhancing the infrastructure by providing roads and making trade favorable for the place.

**Keywords:** Economic impact, Development, Mineral Resources, Chitral.

## Background of the Study

Chitral (also known as chetral), translated as field in the native language Khowar, is the capital of the Chitral district, situated on the western bank of the Kunar river (also called Chitral river), in Khyber Pakhtoon khwa, Pakistan. It also served as the capital of the former princely state of Chitral. The town is at the foot of Tirich Mir, the highest peak of the Hindu Kush, which is 25,289 ft. (7,708 m) high. It has a population of 20,000. The altitude of the valley is 3,700 ft (1,100 m).

The easiest access to Chitral, other than by air, is in the southwest along the Kunar valley from Jalalabad. However the Pakistan (Durand Line) prevents this from being used as an internal route to the south. The other routes are over high mountain passes. To the south, the 3,200 meters (10,500 ft.) Lowari pass leads 365 kilometers (227 mi) to Peshawar. In the north, the easiest route during summer runs over the 3,798 meters (12,461 ft.) Broghol to the east, there is a 405 kilometers (252 mi) route to Gilgit over the 3,719 meters (12,201 ft.) ShandurPass. In the west, the 4,300 meters (14,100 ft.) Dorah pass the territory is cut off by snow from the rest of the country for up to six months a year, a problem soon to be relieved by the completion of the Lowari tunnel. Geology of the Chitral region, in a broad sense, is represented by the occurrences of thick Paleozoic to Mesozoic sedimentary series of Hindukush Karakorum (Asia) plate to the north, and a dominant cretaceous volcano-sedimentary sequence to the south. the Paleozoic to Mesozoic rock belts were strongly compressed and tectonically folded and faulted during the cretaceous-tertiary organic activities and were subjected to the emplacement of subduction related volcano plutonic complexes.

With reference to the relevant literature and field observations, the Chitral region is subdivided into five major tectonostratigraphic domains. From north to south, these are

## Wakhan Formation

The Wakhan formation of Permian to Jurassic age extend from Wakhan (Afghanistan) toward south in the northwest of Chitral and comprising a continuous zone of dark black homogenous slate, silt stone with marker beds of light quartzite and intercalations of calcareous schist and marble (buchroithner and gamerith, 1986) and thick bedded dolomite (gaetani and leven, 1993).

## Tirich Mir Fault Zone

The Tirich Mir fault zone represents the most prominent tectonic lineament with in hindukush Karakorum plate separating the Wakhan formation in the north from the Chitral central complex in the south. The fault zone is observed to have been associated with basic ultrabasic rocks of tens of meters to hundreds of meters in thickness.

## Chitral Central Complex

The Chitral central complex is characterized by regionally important NE-SW trending vertical to sub vertical longitudinal faults system along contact zones of rock in homogeneities. the most important and prominent of these faults is the reshun fault of tipper (in Pascoe, 1923) and calkins et al (1981) which passes along centre of

the complex and separate the upper Paleozoic series to the north from Mesozoic sequence, to the south in the western part of Chitral. the sedimentary sequence north of reshun fault comprises dark gray slate to silt stone with minor intercalations of quartzite's, calcareous schist and at places volcano sedimentary green stone beds and is also characterized by presence of thick fossiliferous Devonian carbonate of Hayden (1915) immediately along the north of reshun fault. this part of the complex coincide with the Sarikal shale of Hayden (1915), lun shale and north-west unit of Pudsey et al (1985), lun shale of desio (1966) and Devonian to carboniferous rocks of calkins et al (1981). immediately south of reshun fault the complex is represented by a varied Mesozoic lithology's of massive limestone (shoghore limestone) followed by polymictic red conglomerate, shale, slate and siltstone (reshun formation), dark grey slate and siltstone with intercalations of quartzite's, calcareous schist, conglomerate grey wacks and green stone (Chitral slate), chloritic epidotic quartz schist (Koghozi green schist) and coarse grained marble (gahirate marble) in the south-western part of Chitral, and permo-carboniferous dark grey slate to siltstone and quartzite with intercalations of calcareous rocks (Darkat group of ivanac et al, 1956) in the eastern part of the region.

### **Northern Suture zone**

The northern suture zone is the major known tectonic suture of Himalayan orogeny in Chitral region which separates hindukush Karakoram plate in the north from Kohistan arc batholith terrains to the south. the suture zone is characterized by the occurrence of blocks of volcanic rocks, limestone, red shale, conglomerate, quartzite, and serpentinites in a shaly to salty matrix mostly derived from the Kohistan arc terrains and have preserved in the small back arc basin which closed 102-85 ma (Treloar, 1989 b) and is interpreted as olistostromal in nature (Pudsey et al 1985, Pudsey 1986, sear et al 1987, and searl 1991).

### **Kohistan arc batholiths**

The Kohistan arc batholith represent late Jurassic to early cretaceous tholeiitic to Calcalka line volcanic (Shalt-Drosh volcanic group) late early Cenozoic acidic lava flows and pyroclastic volcanic (Dir Shamran volcanic group) and cretaceous to tertiary intrusion of Kohistan batholith.

### **Variety of dimension stones**

- 1) Dimension stones: classical carbonate marble mainly white and gray and other shades of marble in the province are black, pink and green.
- 2). granites: a range of granites of dark and light coloured are abundantly available mainly in shades of green, gray, black, & pink.
- 3). Other rock varieties: massive limestone, sand stones, slate, phyllite are also amenable to processing as substitute of marble and granite.

Estimated resource of marble in the province is about 3.0 billion tonne. major occurrences are Chitral marble block having a potential of more than 1000 million tonne, Shangla par (swat) marble of more than 200 million tonne, Buner marble belt having geological resources of 1400 million tonne and Swabi marble block of about 200 million tonne and Nowshera pink marble of about 100 million tonne.

Estimated resources of granite are available in billion of tonne. The potential occurrences of dark coloured granites, mostly with green shades, are more than 1000 million tonne and light coloured granite is more than 1000 million tonne.

### **Variety of Gem stones**

- 1). Pegmatite-hosted beryl tourmaline topaz-garnet, occurring within a linear belt of about 30 km in Chitral as well as in other localities.
- 2) corundum/ruby occurrences in dir along a geological unite of amphibolites.
- 3) The swat emeralds belt over a linear extension of more than 50 km. the known prospects of emeralds are rated to about 100 million carats.
- 4.) Carbonate-hosted topaz (pink, yellow, white and other shades), in Mardan Katlang area.
- 5). Met sediments-hosted corundum (ruby and sapphire) in Kaghan-Naran valleys. Industrial rocks and minerals:
- 6). Cement-grade limestone and clay in Dargai (Malakand Agency), Nowshera, Kohat-Lachi and Dera Ismail khan. The resources are in billions of tons.
- 7). Fertilizer-grade phosphate (22 million tons) in Hazara.
- 8). glass and ceramic-grade nepheline syenite and associated granites about (85 million tons) in Buner.
- 9). Rock salt, gypsum and clay minerals in Kohat and Karak.
- 10) Other industrial minerals include soap stone, feldspar, dolomite, barite and graphite.

### **Metallic Minerals**

- 1). Iron literate near Nowshera (150 million tons) in addition to 30 million tons in Pezu D.I.Khan and 40 million

tons in Langrial, Hazara.

- 2). Mining and processing of iron magnetite (one million tons) at Domel Nissar in Chitral.
- 3). Small scale mining and processing operations on poly metallic lodes in Chitral and lead-zinc in Besham.
- 4). Chromite (one million tons) in Malakand.
- 5). Deposit scale exploration of Mirkhani copper gold prospects.
- 6). 33 identified targets of gold and base metals in Chitral, Malakand and Hazara regions

### Objectives of the study

- To study the socio-economic impact of mineral resources on Chitral.
- To prepare maps to show the distribution of important minerals of the district.
- To determine the total number of people currently employed in the entire process of extraction, transportation and consumption of these resources for various purposes.

### Literature Review

This section deals with the review of the research studies previously conducted on the economic impact of mineral resources in Pakistan and some other countries, so that we have an insight into their objective methodologies, results conclusion about the economic impact.

Auty (2004) attempted to maximize the positive socio economics impact development in transition economics the capital intensive production function of mining tends to limit backward and final demand linkages.

Wright and czelusta (2003) worked on mineral resources and economic development. Recently studies assert that natural resources abundance (particularly studies) has adverse consequences for economic growth. This paper subjects this resources "curse" hypothesis to critical scrutiny, our central point is that it is inappropriate to equate development of mineral resources with terms such as "windfall" and "booms".

Krautkramer (1998) and Tilton (2003) through rarely arise in the resource curse literature. Less well known is the fact that returns to investments in country specific minerals knowledge have stayed high in recent decades, so that production and reserve levels have continued to grow in well managed resource economics.

Asrarullah (1960) investigated about the marble deposits of Chitral, swat and madam districts. He discussed and investigated the quality and color of marble deposits the Chitral marble deposits.

Martin (1984) produced a report i.e. "marble deposits of KPK. In this report, they discussed all the pronouns work done on the marble in KPK. They also discovered some new marble deposits".

Hussain (1990) investigated the marble from Chitral, Swat and Swabi areas discussing their used and their economic important.

Zahid Aziz, chief EAC(experts advisory cell) (1995) said that with the adoption of modern mining technology, cutting polishing, the resources can be developed and proper marketing can earn the government millions of dollars of foreign exchange through exports.

Mr. Shahrukh Arbab, secretary mineral development department (1996) highlighted the salient of provincial governments' mineral policy. He said that a vocational center was being established in the private sector in collaboration with export promotion bureau to ensure best use of marble. He reported that 70% of marbles goes waste during exploration due to non-utilizing of latest technology.

Ihsanullah khan (2000) has been widely inviting investors to invest in marble and granite sector and stressed on the achievement of profits through its exports. a policy for mineral development is approved by kpk government for the uplift of this sectors.

Ijaz Abbasi (2008) said that it Arab countries are rich due to their oil reservoirs. Pakistan is also rich because of its marble deposits. he reported that Pakistan has vast resources of marble but due to old blasting system, about 75% of marble went west while quality of some marble in not up to international standard.

Malik Azam (1999) the kpk minister of industries. Mineral development and technical education, assured that the government would take all positive steps for exploration of mineral resources in the provinces. He reported that number of mines lease had reached to 1400 from 47 in 1970 with revenue showed increase from Rs. 70,000 to 150 million annually but still there was a space for further improvement.

Anwar Shamin (2008) prepared his thesis on army of socio economic impact on Nizam pur is district nowhere. He had collected the data retarding the factory from many sources such as production, financial and mechanical departments.

Muhammad Nafees (2005) prepared his thesis on this PTC in terms of employments potential in his district Now Shera. He had collected the dale regarding the factory from many souses such as HR departments, Dipos, Pakistan tobacco board Peshawar. He had taken some village as a sample as Khalilabad, Jahangir and Shadu.

President Ijaz Abbasi (2008) said that it Arab countries are rich due to their oil reserves; Pakistan is also rich because of its marble deposits. He reported that Pakistan has a vest resource of marble but due to old blasting system, at most 75% of marble went west while quality of some marble is not up to international

standard.

The ministry of industry and production report (2003). That objective of mineral extraction leads to economics developments in an area of under developed and under privileged. This further leads to equation of income and employment.

### Research methodology

In order to achieve the objectives of the study, a carefully planned research methodology was adopted. Both primary and secondary data was collected using standard research instruments and techniques.

### Tool of data collection

Keeping in mind the importance of the study, I used interview schedule for the data collection from the respondents.

### Primary data

In order to obtain primary data, some of important mines and quarries were visited. The primary data was collected through interview schedule, which included both open ended and closed ended questions. The interview schedule was filled from owner of mines, local people, and agencies and the owners and workers of the marble industry.

### Secondary data

A variety of sources were consulted, in order to gather secondary data. Different departments' i.e. geological survey of Pakistan, market development section of agha khan rural support programme, mineral association of Chitral and mining department of Chitral as well as the directorate of minerals, KPK were visited. Any data relevant to the topic was collected from these departments.

In addition, the department of geology, geography, Pakistan studies and area study center were visited for the collection of secondary data. Moreover, a number of books, journals, and internet websites were also visited, in order to obtain more reliable data about the.

### Data Analysis

In order to achieve the objective of the studies, the proposed research methodology was followed in order to collect secondary data secondary data has already been presented in the "literature review" chapter.

In order to obtain primary data structured questionnaire, interviews and discussion were carried out in the field the data thus obtained was properly coded and transferred to tele chart later, the entries data was decoded and the resulting information is being presented in the following chapter in the form of tables, diagrams and text.

#### 4.1 Age and profession of the respondent

When asked about the age and profession, following was the information obtained from the respondent

Age-Group	% of Respondent	Respondents profession	%age
15-20	0%	Mine owner	15%
21-25	11%	Mine laborer	75%
26-30	10	Factory owner	10%
31-35	20%		
36-40	45%		
Above 40	14%		
Total	100%		100%

The table a above shows that the majority of the respondents were among the working age-group and experienced people. Similarly they were either directly or indirectly related to the business of mineral extraction and utilization here the information obtainer from these respondents is quite reliable and related to the topic of study.

#### 4.2 Information about the family of respondents

Family type	Percentage	No of family member	Percentage
Join	100%	1-5	44%
Nucleated	0	6-10	11%
Extended	0	11-15	44%
		16-20	1%
Total	100%		100%

The above given table explains the family status of the respondents. It can be discerned that all the respondents belonged to the joint families and the number of family member varied from 1-15 persons.

#### 4.3 Source of income before mineral business

Sources of income	%age
Daily wages labour	0%
Farmer	0%
Shopkeeper	11%
Government employee	0%
Others	89%
Total	100%

The table shows that almost all the respondents were previously involved either in personal business or other types of income generating activities.

#### 4. Monthly income from mining

Income range	%age
1000-5000	11%
5001-10000	12%
10001-15000	22%
15000+	55%
Total	100%

The table above gives very important information about the fact that the respondents earning a lot of money from mineral business and in this way; mineral industry has played a very important role in uplifting their economic status. It can be seen that the majority of the respondents are earning more than fifteen thousand rupees monthly from the mining business while 22% earn 10000 to 15000 rupees. In this way, mining has become a major source of income for the respondents.

#### 4.5 Number of people employed in miner/factory:

No of people	%age
1-10	55%
11-20	33%
21-30	11%
30+	0%
Total	100%

The table shows that the mining industry is providing job to a considerable number of people in the study area. Majority of the factories employ up to ten persons as laborer which signifies the role of mining industry in the economy of the study area.

#### 4.6 Number of people engaged in mineral transportation

No of people	%age
1-5	55%
6-10	33%
11-20	0%
20+	11%
Total	100%

The table explains the fact that besides providing employment to the local people directly, the mining industry also plays an important role in providing indirect employment to the people. As it can be understood, a number of people are engaged in the transportation of the minerals from the mines to the market. In this way, they are able to earn their living and improve their economic condition.

#### 4.7 Presence of mining facilities for the laborers

Status of facilities	%age
Present	100%
Absent	0%
Total	100%

The table above shows that all the respondents claimed that they provide all the basic facilities to their laborers.

#### 4.11 Annual income

Amount	%age
50000-10000	11%
10001-150000	12%
150001-200000	33%
200001-250000	44%
Total	100%

The annual income from the mining industry ranged among the respondents from 50000 to 250000 per head. However, the majority of them were earning a good amount of 150000 to 250000.

#### 4.13 Manner of sale

Sales process	%age
Directly	100%
Indirectly	0%
Total	

The process of selling these minerals to consumer was stated to be direct selling to the consumers.

### Conclusion

This study conducted in the district Chitral has brought into light a number of important facts. It is quite clear from the data analysis that mining plays a vital role in the economy of the study area as well as the life of the local people. The industry has a very positive impact on the economy both in terms of earnings and payments. Besides, by providing employment opportunities to the local population, mining is also gradually becoming a vital and promising field with great future potential. It provides all the basic facilities and a number of luxuries of the people engaged in mining and has gradually made its own position in the economy. Besides providing employment opportunities to the local people, mining also contributes to the economy of the country in the form of local and government taxes. However, this sector is still facing a lot of problems which are curtailing its progress. These include the lack of good infrastructure including good roads and bridges, government incentives, awareness and training programs, modern machines and techniques etc. if the government pays attention towards the improvement of this industry and provides all these requirements, this industry can flourish very well and can contribute tremendously to the economic well-being of the district Chitral.

### Recommendation

#### Establishment of mineral development facilitation cell

The promotional role of the provincial government to facilitate local private investors in the mineral sector is negligible against the revenue generation from the minerals in the form of deal rents, royalties and excise duties. There is, as such, no provincial agency which provides technical and financial assistance in the form of technical services and relevant packages, machinery and soft loans to the private mine owners and mining communities.

To overcome the shortcomings, there is a need to establish Mineral Facilitation Cell under the control of district government having necessary equipment facilities to play a promotional role in offering technical assistance and generation of exploration/mine development data packages to facilitate investors in the mineral sector of districts.

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