DIMENSION STONE MINING
CHAGHI, BALOCHISTAN

Cluster Study

Mineral Transformation Plan Vision 2025

Planning Commission,
Ministry of Planning, Development & Reform,
Government of Pakistan.

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1. ABOUT THE STUDY

Research/Feasibility Study on Onyx Mining, District Chaghi, is part of the overall Mineral Transformation Plan for Dimension Stone Sector. This particular research/feasibility study is consist of comprehensive analysis of the following key areas, outlined in relevant sections in this report;

i) Situational analysis including enterprises base, products, end markets, quantum of supply, quantum of demand, supply & demand gap and growth potential.

ii) Overall value-chain, process flow, institutional framework, legal framework, backward & forward linkages and SWOT analysis of the cluster.

iii) Evaluation of clusters' major drivers of success or failure and identification of the product, processes, market segment(s), technologies, infrastructure, human resources, and institutions that the cluster may be currently missing in meeting the potential high-end domestic and international demands.

iv) Improved technologies, processes, and products that need to be introduced/improved along the value chain to meet the high-end markets

v) Quantification of investment required along the value chain with its sources (public, private, donors, etc.) and geographical locations to make the commodity an internationally competitive product in high-end markets.

2. DESCRITPION OF THE CLUSTER

2.1. INTRODUCTION

District Chaghi is the largest district of Pakistan, located on the North West corner of Balochistan, Pakistan. According to census 2017, the total population of District Chaghi is 226,008. Chaghi is the biggest area District of Balochistan and is situated on the North West corner of Balochistan. It shapes a triangular outskirt with Afghanistan and Iran.

Its headquarters is Dalbandin town. The district is located in the west of Quetta the provincial capital of Balochistan, shares boundaries in the east with Nushki District and in the west with Iran. Afghanistan is on the north, and Kharan and Washuk Districts are in the south.

Deposits of high quality onyx (travertine) marble locally known as Malmal are found in Chaghi District at seven localities, 50 to 80 Kilometers away from the railheads of Dalbandin and Nokundi.

Onyx is quite popular as a decorative stone, and it is utilized in creating any number of indoor as well as outdoor carvings and shapes. Pakistan has a rich history of using onyx as a common gemstone and can be found referenced in many of its historic and cultural folklore where people cut onyx and seashells to create beautiful floral as well as geometric designs, which are often reflected in old paintings and historical artifacts.

Chaghi is very popular for its minerals and onyx is one of the key dimensional stone of Chaghi. Onyx is being extracted from Chaghi from 1950s and Chaghi's onyx is being used for many purposes due to its shades and quality.

Table 1: Mining In Balochistan

Name of Mineral	District	Estimated Reserves (Tons)	No. of Operational Mines/Leases	No. of Closed/ Non Functional Mines/Leases	Annual Production (Tons)	Total Labor
Marble Onyx	Chaghi	Inexhaustible	102	34	17,847	1,020
Marble Ordinary	Loralai	Inexhaustible	11	1	4,986	121
	Qilla Saif Ullah	Inexhaustible	0	2	0	0
	Ziarat	Inexhaustible	3	0	1,907	33
	Sibi	Inexhaustible	0	1	0	0
	Bolan	Inexhaustible	4	1	4,682	32
	Khuzdar	Inexhaustible	32	6	836,931	224
	Mastung	Inexhaustible	1	1	84	10
	Lasbela	Inexhaustible	66	14	917,363	528
Total			**219**	**60**	**1,783,800**	**1,968**

2.1.1. History

Nature has generously gifted Balochistan with natural resources. As per tectonic setting of Chaghi district, the region is bestowed with natural resources and minerals, in particular. Chaghi is also called the museum of minerals. Major deposits of minerals found in the district include copper, gold, silver, molybdenum, sulphide, iron ore, chromite, manganese, tungsten, barite, gypsum, pumice, onyx marble, sulphur and vermiculite.GSP has identified a number of world class porphyry type deposits which may contain a huge quantity of gold along with copper and silver in Chaghi district. According to geological literature, including a US government-led survey, the western Balochistan region, particularly Chagai district, is part of an arc extending all the way from Afghan province of Ghazni. This region is said to be rich in many precious minerals and rare earth metals besides gold and copper, specifically iron, lithium, and you guessed it, cobalt.

Marble in Chaghi district is of onyx variety and is being mined since 1950s. District Chaghi has an area of is 45,444 square kilometers and high quality onyx deposits of Chaaghi belt occur at several places in the central and western parts; among these are ZardKan, Patkok, Julhi, Butak, Mashki Chah, Tozghi and Zeh.

Onyx is mined by quarrying method that began in the 50s in Chaghi district. Deposits of Onyx are large enough to provide scope for sizable quarries with little or no overburden. For mining of Saindak Copper deposits, Iron Ore and Onyx, open pit mining method is being used. Saindak Copper ore is processed at site; its concentrates are produced and sold in the international market. Onyx is processed at Hub Marble City or in Karachi and its end product is utilized in the country and also exported.

2.1.2. Overview of the Onyx Cluster

The well-known high-quality onyx deposits of Chaghi belt occur at several localities in the central and western parts. Among these the main deposits are Zard Kan, Patkok, Julli, Butak, Mashki Chah, Tozghi and Zeh. The Chaghi onyx is locally called "malmal". The estimated reserves of in the province are more than 12 million tons. Onyx deposit of Chaghi district are large enough to provide room for sizable quarries with little or no overburden. Onyx mining in Chaghi district began in the fifties. However, the onyx production has never been constant.

Onyx is composed of compact rocks of carbonate nature of sedimentary origin formed through chemical precipitation generally in underground cavities. Specific gravity of Onyx ranges between 2.6 to 2.8. Onyx is mostly green in color with fine texture, nevertheless band and patches of red, brown and white are common, with rare patches of golden. Green variety is more valuable because of its demand in many parts of the world.

Dark green onyx with layers of light green, green with streaks of white and yellow and white with layers of light grey are found in Chaghi district in Balochistan. Major deposits of onyx in Balochistan are as follows;

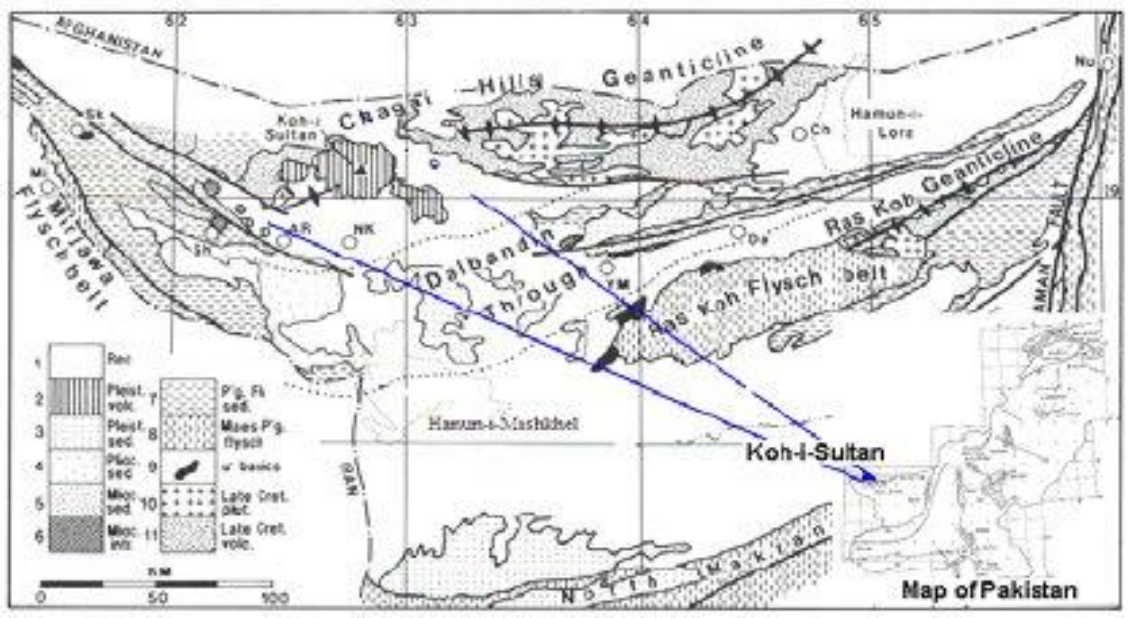
1) JULLI DEPOSITS – Pale to deep green beds. Deep green variety is the most desired decorative stones. Reddish and rusty brown known as multicolor onyx. Reserves of 1.5 million cubic feet.
2) ZARD KAN DEPOSITS – Yellow, pale green, grayish white and white dense, thinly bedded and fine grained. Reserves of 30 million cubic feet.
3) MASHKICHAH DEPOSITS – Transparent to translucent white, pale yellowish marble. Reserves of 6 million cubic feet.
4) PATKOK DEPOSITS – 3 feet thick bed pale green marble of 24,000 cubic feet reserves.
5) BUTAK DEPOSITS – Good quality thin bedded, dense yellow marble of 60,000 cubic feet reserves.
6) TOZGHI DEPOSITS – Opaque having off white color with ferruginous layers of 24,000 cubic feet reserves
7) ZEH DEPOSITS – Green good quality reserves; studies to be carried out to determine its quality and quantity.

2.1.3. Strategic Location of the Cluster

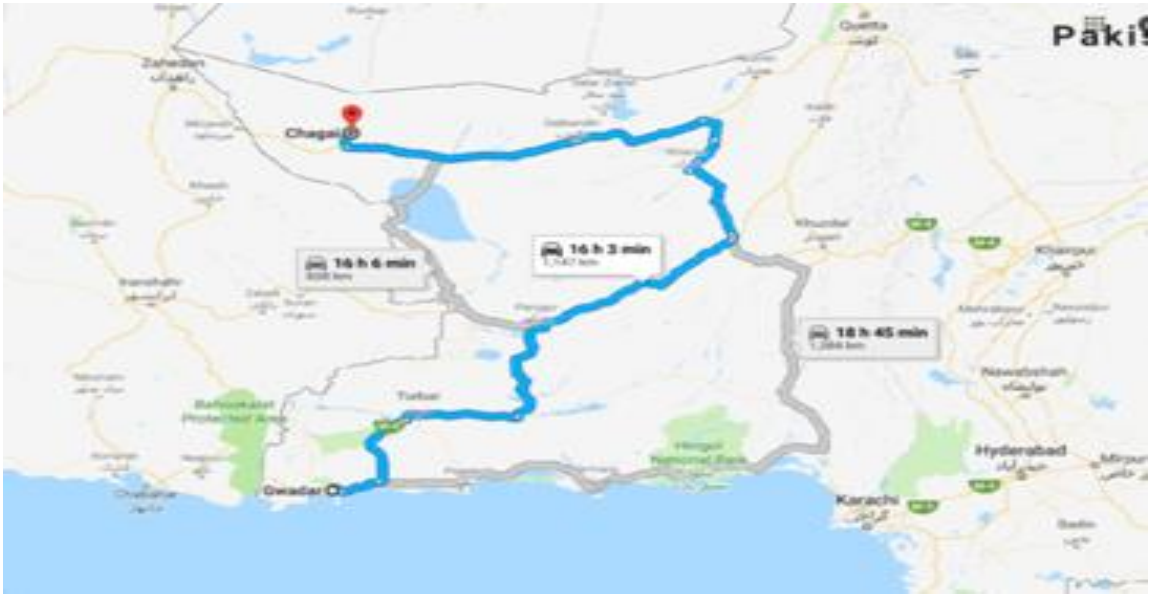
The below table illustrates the Tehsil and Unions Councils of Chaghi District. The below red highlighted area in the map is of Chaghi District.

Topography of Chaghi area comprises a vast sandy plain interrupted by low hills and isolated hillocks locally called ‘dik’. Miri Koh is the highest in the area with an altitude of 2332 m. The surrounding plain has an altitude ranging between 750 m and 900 m. The gradients are very gentle. Radial pattern of drainage is dominant as all the streams radiate away from the top of the volcanic cones (Todaka et al., 1988). The area can be classified as arid region since it receives scanty rainfall (about 160 mm/annum). Summers are very hot and winters are very cold. There are several hot springs in this area.

The Chagai arc is economically most important mountainous belts of Pakistan. The two adjacent districts of Chagai and Kharan are situated in the western and northern regions of Quetta and Kalat Divisions respectively, and lie between the parallels 27"10' and 29°53' N and the meridians 60°53' to 66°16' E covering an area of about 37,937 sq. miles. Afghanistan borders on the north, Iran on the west, Kalat District on the east and Makran District on the south.



Location and geological sketch map of Chaghi area



The above picture of Google map shows the the distance between Gwadar and Chaghi which is approximately 1150 Kilometers. Gwadar can be a potential market for the export of onyx from Chaghi. Approximately Chaghi is 500 kilometers away from CPEC Road.

2.1.4. China Pakistan Economic Corridor (CPEC) and Balochistan

Back to February 2013, Pakistan awarded operational contract of Gwadar port to China amid American pressure to look for alternatives. This port is a linchpin for China's dream of OBOR, providing the Maritime Silk Road with a link to the Arabian Sea. The port at the mouth of the Persian Gulf provides China with the shortest route to the oil rich Middle East, Africa, and most of the Western hemisphere. Gwadar will have the estimated capability to handle to 19 million tons of crude oil per year, which will be sent to China after being refined at the port.

For a successful CPEC and a peaceful South Asian region, Baluchistan's importance has grown beyond all estimates. It is in the best interest of all stakeholders, especially the host country, to sensibly deal with the prevailing circumstances in Balochistan.

The mining sector of Balochistan was ignored due to its locations in remote areas, where the lack of infrastructure is hindering the accessibility to mineral rich areas. CPEC is a good opportunity for government to invest in the mining sector. China is known to have good experience pertaining to the mining sector as it has developed its own modern technology that deals with new and improved industrial mining techniques. Utilizing Chinese experience and technology, Pakistan's mining sector can be developed at an accelerated pace; one that we can heavily hope to achieve.

The government is required to take appropriate actions to boost the mining sector of Balochistan because it the only sector in Balochistan which has the potential to meet international demands and develop the province and country.

2.2. SITUATIONAL ANALYSIS

2.2.1. Enterprise Base

The statistics shows the enterprise base of Onyx in Chaghi district.

Table 2: Onyx Mines in Chaghi Balochistan

Number of Operational Mines	Total Annual Production (tons)	Direct Labor Force	Total Investment (Million PKR)
102	1,820,294	10,200	1,224

2.2.2. Cluster Products

The term 'onyx' signifies a banded variety of quartz, highly prized as an ornamental stone. Onyx occurs mainly in Chaghi District, Balochistan. The onyx found in Chaghi district are dark green with layers of light green, green with streaks of white and yellow and white with layers of light grey. These stones are favorite in world markets and are used for facing, flooring and as decorative items.

Onyx in Chaghi is being extracted mostly in block and boulder forms. Blocks comprises of both large block and small blocks. Large blocks are generally bigger in size weighing up to 8 tons and above in rare cases. The small blocks usually range between 5-7 tons. Boulders are small round blocks with the standard weight of 2 tons. In Chaghi due to uncontrolled techniques the onyx blocks are of irregular size and that is a disadvantage for them.

2.2.3. Production Statistics

Productions of Onyx in Chaghi District of Balochistan are as follows:

Table 3: Onyx Chaghi Cluster Production Statistics

Number of Operational Mines	Annual Production Per Mine (tons)	Total Annual Production (tons)
102	17,847	1.8 million tons

2.3. INSTITUTIONAL FRAMEWORK

The type of institutions by role is different for mining and is explained as below;

2.3.1. Mines and Minerals Development Department Balochistan

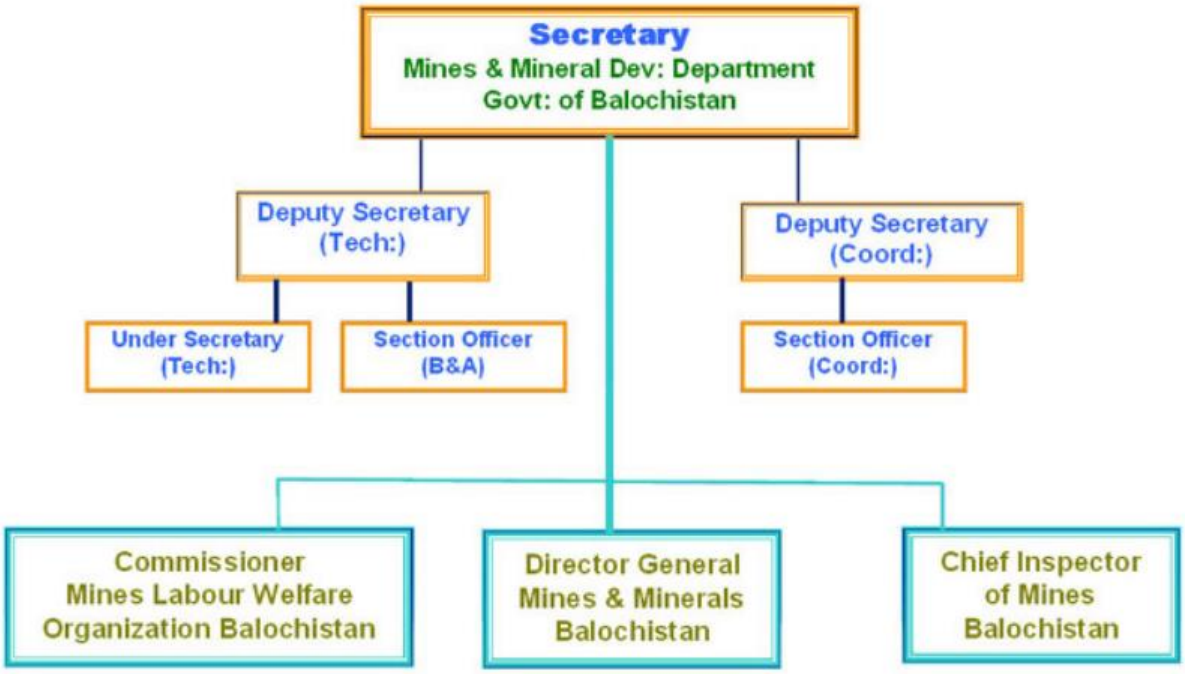
The Government of Balochistan has implemented the National Mineral Policy-1995 which provides appropriate institutional arrangements, a modern regulatory frame

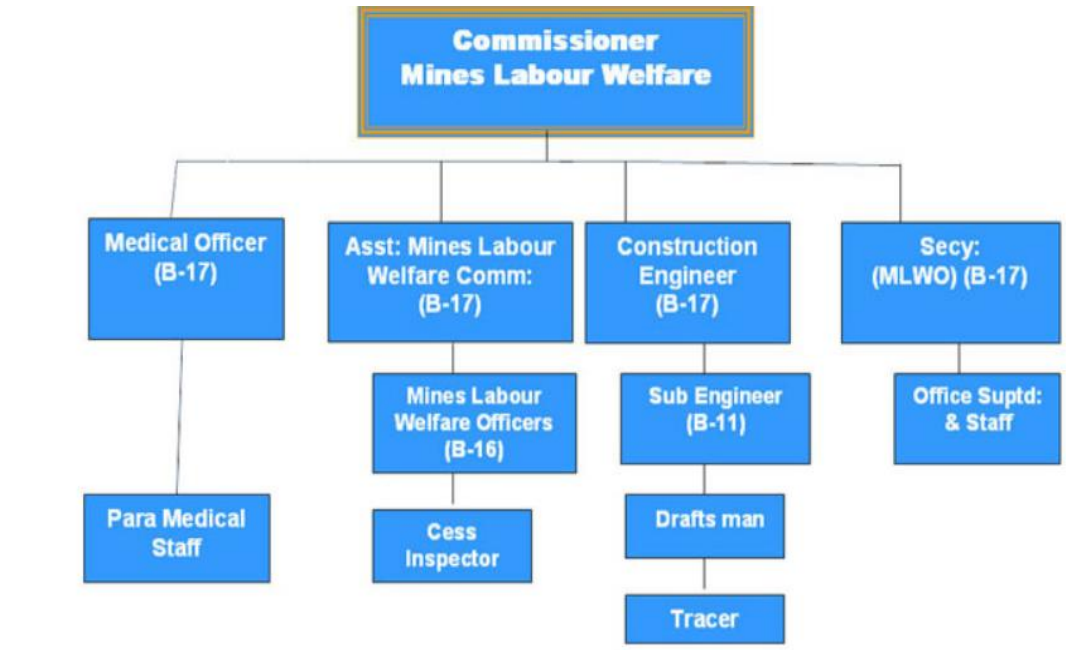
work, and equitable and internationally competitive fiscal program to expand mineral database.

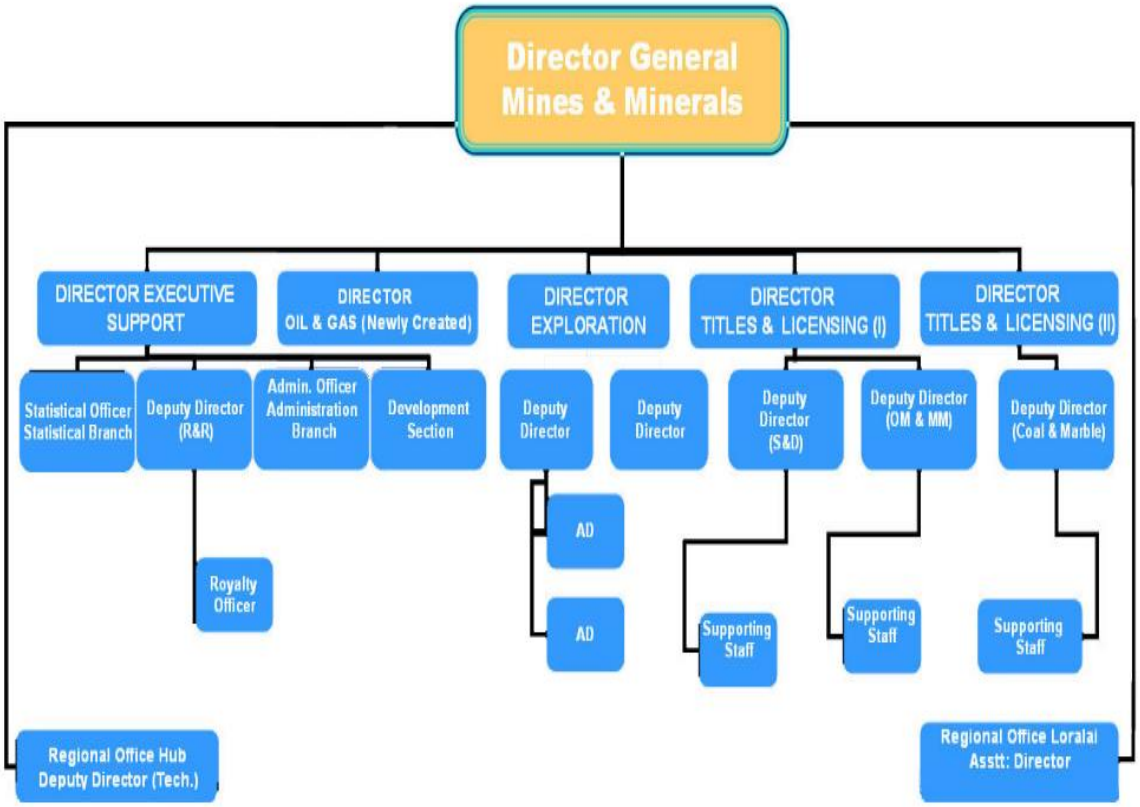
In pursuance of National Mineral Policy 1195, the Government of Balochistan has created the Mines and Mineral Development Department in March 2002. After implementation of National Mineral Policy and formulation of Balochistan Mineral Rules 2002, several National / Multinational Foreign Mining Companies have responded positively for the exploration and development of Mineral potential of the province.

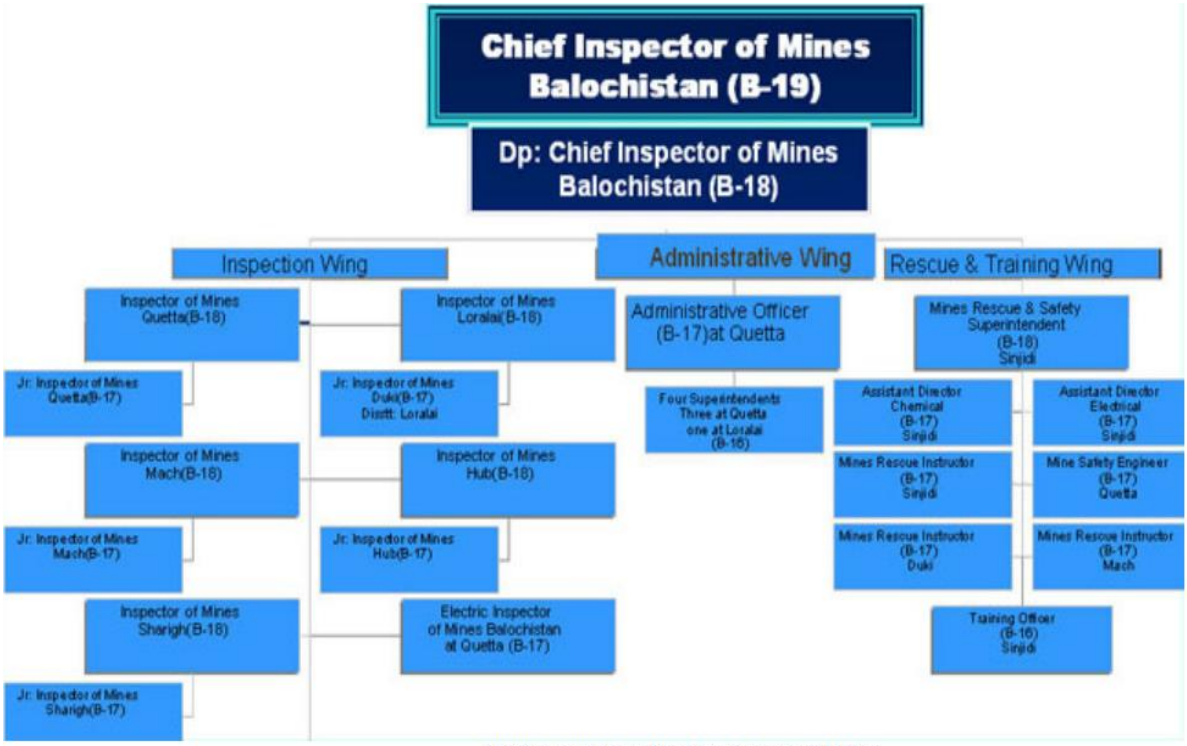
Main function of the Mines and Mineral Development Department

- To facilitate and provide service for the exploration / exploitation of Mineral resources in the province
- Encouraging foreign investment in exploration / exploitation of large scale mining.
- Encouraging / pursuance for establishment of mineral based industry within province.
- Establishment of more export processing zones as result mine owner / business community involved in mining will be benefited.
- To provide infrastructure facilities to the mining areas
- Generate / increase the revenue in the mineral sector.
- Strengthening of Departmental Capacity.

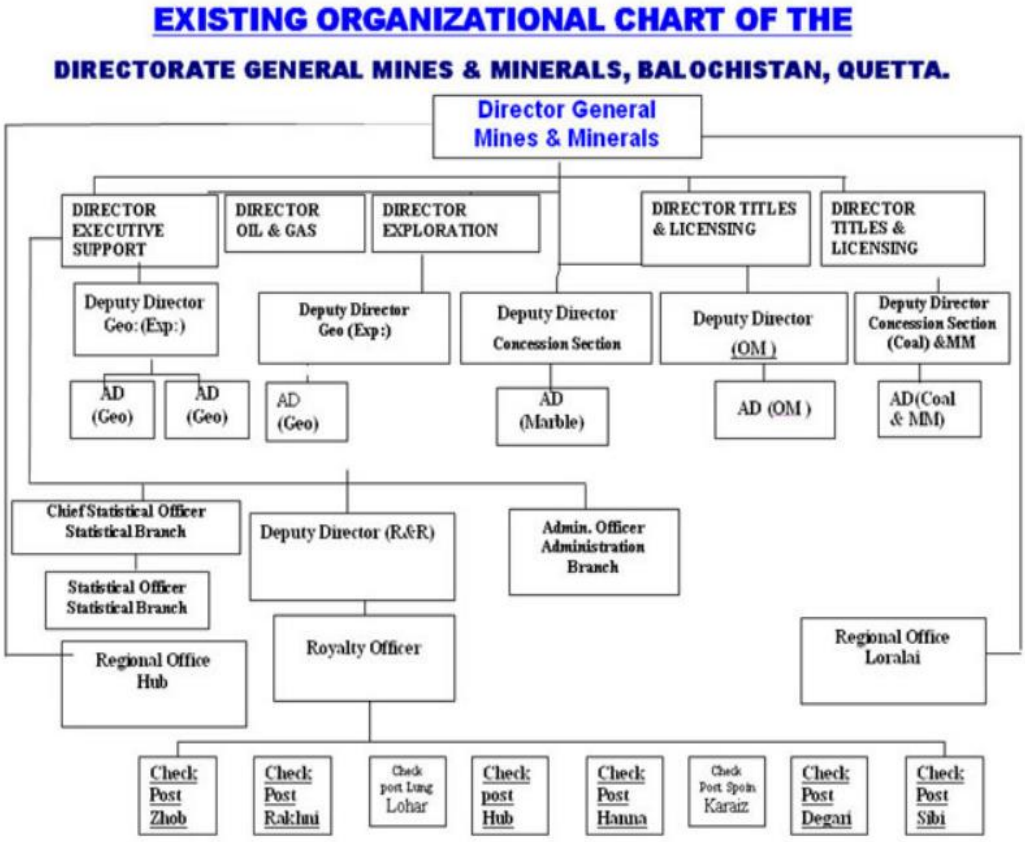



Commissioner
Mines Labour Welfare
Medical Officer (B-17)
Asst: Mines Labour Welfare Comm: (B-17)
Construction Engineer (B-17)
Secy: (MLWO) (B-17)
Mines Labour Welfare Officers (B-16)
Sub Engineer (B-11)
Office Suptd: & Staff
Para Medical Staff
Cess Inspector
Drafts man
Tracer


Director General
Mines & Minerals
DIRECTOR EXECUTIVE SUPPORT
DIRECTOR OIL & GAS (Newly Created)
DIRECTOR EXPLORATION
DIRECTOR TITLES & LICENSING (I)
DIRECTOR TITLES & LICENSING (II)
Statistical Officer Statistical Branch
Deputy Director (R&R)
Admin. Officer Administration Branch
Development Section
Deputy Director
Deputy Director
Deputy Director (S&D)
Deputy Director (OM & MM)
Deputy Director (Coal & Marble)
Royalty Officer
AD
AD
Supporting Staff
Supporting Staff
Supporting Staff
Regional Office Hub Deputy Director (Tech.)
Regional Office Loralai Asstt: Director

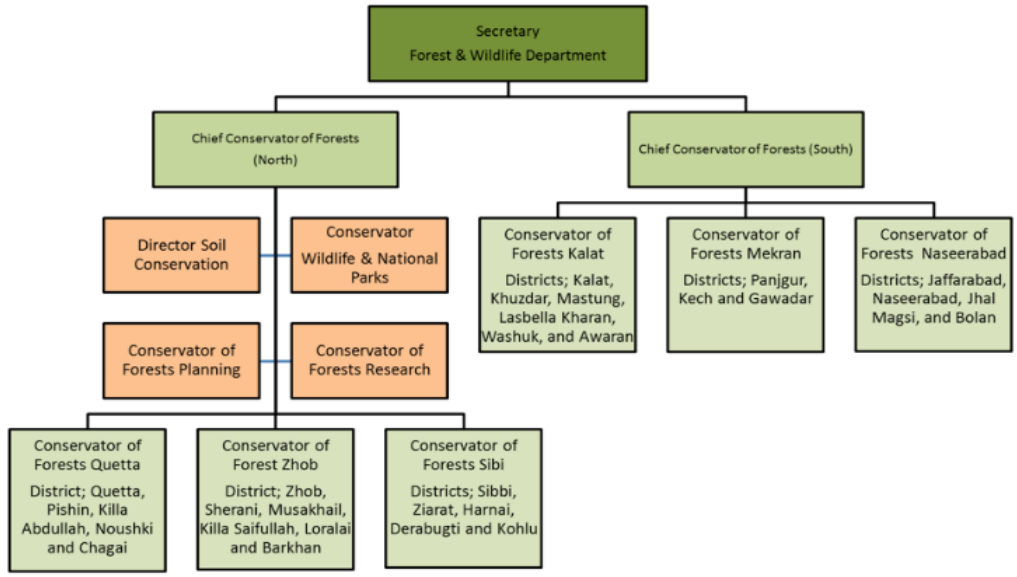


Main functions Chief Inspector of Mines



2.3.2. Department of Forestry, Environment and Wildlife

The Department Forests and Wildlife and is headed by a Provincial Secretary Forest and Wildlife. It has a history of over a century, initially established during the British Colonial Rule. Later on, the department was working under West Pakistan Forest Service that separated in 1970s as a Provincial Department.



KEY:

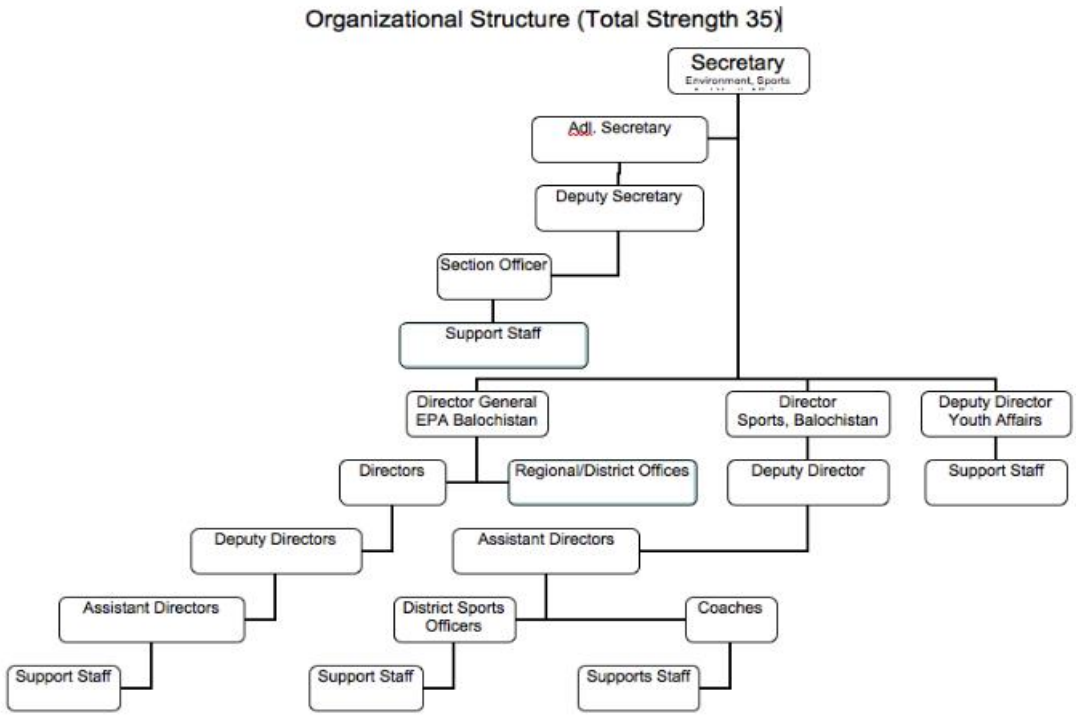
CCF	Chief Conservator of Forests
CF	Conservator of Forests
DCF	Deputy Conservator of Forests
EDO	Executive District Officer, Forest & Wildlife
RFO	Range Forest Officer
ADO	Assistant District Officer, Forest & Wildlife
DR	Deputy Ranger
FR	Forester
FG	Forest Guard
GW	Game Watcher
FW	Field Watcher

2.3.3. Environmental Protection Agency

Environmental Protection Agency, Balochistan (BEPA) was created on 22nd February 1992 and under the administrative control of the Urban Planning & Development Department. Subsequently it was relocated under the administrative control of the Department of Environment, which was abolished and put under the administrative control of Environment, Wildlife Livestock and tourism Department. At present due to the long consultations and endeavor the Government of Balochistan has notified it as a separate department headed by Secretary Environment and Sports.

Balochistan Environmental Protection Agency's role is to serve as main environment regulatory body for Balochistan Province, responsible for implementing National and Provincial Laws, and improving the protection of the Environmental and Natural Resources of Balochistan, developing policies for improvement and sustainable use of natural The Government of Pakistan, accepting the Youth as being its most potential and valuable assets, created the sector of youth in the Department of Culture and Sports in 1984. The wing, after remaining part of various departments was finally upgraded and given the status of full-fledged department in 2005. During last few years the department has mainly carried out activities like organizing workshops, seminars and exchange of youth tours to various countries, etc. At provincial level

too, Youth Affairs Department were created, but except for Secretary Youth, the Department has no other employee, nor has it ever been allocated any budgetary support to carry out its duties. The only major contribution of the Youth Affairs Department is the under-construction Youth Development Centre, Quetta at the estimated cost of Rs.24.6 million. The project is funded by the Federal Ministry of Youth Affairs. The center will go a long way in promoting, guiding and training the youth of Balochistan as the Centre has provision of basic infrastructure like debating hall, indoor games, boarding and lodging facilities etc.



2.3.4. Pakistan Stone Development Company (PASDEC)

PASDEC was established as subsidiary of PIDC for development of model quarries, up-gradations, machinery pools, common facility and training centers (CFTC's) & warehouses. PASDEC's vision is "To make Pakistan globally competitive & socially responsible Player of the International Dimensional Stone Industry". PASDEC short term goal is to develop Quarrying sector of Pakistan to reduce quarrying wastage from 75% to 45%.

At initial stage, five marble cities projects of Karachi, Risalpur, FATA, Gaddani & Islamabad projects were initiated by PASDEC. Later on, Marble City Chitral and Loralai were also included in this plan.

PASDEC has following major objectives:

- Raise Value Chain Productivity
- Investment in Workforce Development
- Export Marketing

- Promote Strategic Partnerships (J.V. & D.F.I.)
- Develop Industrial & Market Information

2.3.5. SMEDA

SMEDA is a federal government organization working as subsidiary of the Ministry of Industries and Production for the facilitation and development of Small and Medium Enterprises in Pakistan. SMEDA also provides help desk facilitation, legal facilitation, capacity building, networking and linkages development directly to SMEs.

SMEDA has designed number of long term economic development initiatives including rock mining training institute, model quarry project, industrial state and etc. SMEDA has provided number of trainings on controlled blasting techniques, safety, product development, business management, quality standards, marketing and exports.

2.4. SWOT ANALYSIS

2.4.1. Strengths

- Reserves and production of the
  - Famous export quality Black and Gold
  - Beige colour marbles, namely, Boticino, Sunn Tippi, Tippi, and Travera having a well established domestic market across the country.
- Proximity to the huge processing markets.
- Smoother mining operations as compared to other mining areas of the country.
- Availability of rental machinery from the nearby markets.

2.4.2. Weaknesses

- 40% of the entrepreneurs engaged in the mining of Black and Gold have switched off the business due to the decline in demand from the only importer China.
- Failure of introducing Black and Gold in the domestic market of:
  - Slabs against the granite and imported Indian green marble for kitchen tops
  - Tiles having low turnover in the local market due to their dark colour
- The 45% wastage from Black and Gold block squaring can not be utilized by the tile section processing units because of :
  - Hardness of the rock increasing per unit production costs
  - The smaller size tiles of 4x12 an 6x12 in dark colors remain unsold in the market
- Unique color mining areas face local disputes problems.
- The lack of trust by investors trust to bring their machinery to the mine sites and fears of being unable to move back are major hindrances in developing mechanized mining in the district.

2.4.3. Opportunities

- Increased awareness among the consumers about the benefits of natural stone
- CPEC in shape of export opportunities as well as spurred up domestic construction projects

2.4.4. Threats

- Competition from alternate products, like, ceramic tiles replacing the sales of marble in domestic market and hence decreased demand for marble in domestic market.
- Decreased export of black and gold to China on account of slowing growth rate in real estate and purchase of fixed assets at around 7.6%.

3. DEMAND AND SUPPLY GAP- DOMESTIC MARKET

3.1. QUANTUM OF SUPPLY

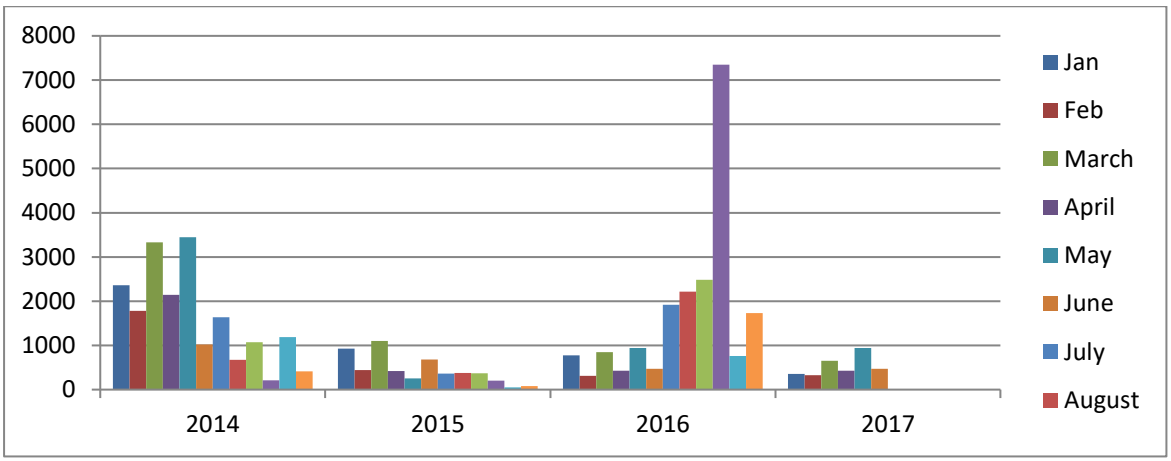
The supply of Onyx is neither adequate nor consistent because of unexpected closure of mining activities, lack of government support in resolving issues with local communities, market trends and low pricing. Due to lower prices the mine owners are reluctant to operate their mines because they don't get fair price for their products. The domestic consumption is less, and alternates are available easily, for that, it is affecting supply too much.

A total of 102 mines are supplying about 1.8 million tons of raw Onyx in shape of blocks to the processors of Marble City Gadani, Khuzdar, Chaghi and the Manghopir Market of Karachi. About 80% of the Onyx is supplied for processing and consumption in domestic market while 20% is exported from Pakistan mainly in shape of squared blocks raw slabs.

3.2. SUPPLY TRENDS

Supply from mines is largely associated with better law & order situation, free flow on access roads and enhanced processing activities. The supply trends of Onyx in Balochistan are very uncertain because of many influential factors. As from production statistics it is very obvious that production of onyx in Chaghi district is very low due to inconsistent prices and monopolistic demand.

From production statistics it can be easily gauged that supply trend of onyx is downward from year 2014 onward. As from the below graph we can see the inconsistent supply of onyx. In October 2016 the supply was 7350 tons that is manifold higher than the production of first six months of 2017.



The supply mostly depends on the demand but there is too much variation in the supply of onyx from 2014 to 2017.

3.3. QUANTUM OF DEMAND

The processing industry for onyx in Pakistan started in late sixties at the time there was much demand for low cost, low quality, locally processed stone produced by local processing equipment. The mid-seventies brought imported plants from Italy. Thus, improved machines enabled local processors to produce better quality products for domestic and international markets.

There is big demand for raw onyx and products made from onyx in both domestic and international market. There are some unique and valuable varieties been extracted in Onyx cluster Chaghi have great demand in China, Italy and in the gulf countries. Demand is being affected by the inconsistent supply from mines due to various intervening variables.

3.4. DEMAND TREND

The colors and varieties of Onyx found in Balochistan are widely accepted in the local as well as in the international markets. Balochistan Onyx is one of the favorites in the world markets and is used for facings, flooring and decorative purposes.

Being prime recipient the processing industry in downstream areas is sole variable manipulating demand trend. During the period of 2005-2012 there was increasing demand of the raw onyx stone extracted in Chaghi and average per day demand increased from few hundred tons to thousands of tons.

Howeve,r due to the poor law and order situation in the area resulted in major setback for the mining activities and demand dropped suddenly. but, during the last few years the processing industry has shown upward trend due to boom in the construction industry, thus demand for raw stone has also increased.

3.5. KEY MARKET SEGMENTS

- The key market segment for onyx produced in Chaghi cluster are processing hubs in Chaghi, Gaddani and Karachi. There are only few onyx processing units in

Chaghi district and therefore they take their raw products to Gaddani and Karachi. Very small quantity is processed and remaining is exported to china without value addition. The outside processing hubs other than Chaghi are the primary markets for all the varieties extracted in this cluster consuming about 80-90% of the production.

3.6. POTENTIAL NICHE MARKETS

The potential niche markets are the metropolis areas of Pakistan and other areas where construction is in boom. Local as well as foreign investments are increasing home construction around the major metropolitans in the country. The potential niche market can be the marble city Gaddani and other processing units present in Khuzdar and Lasbela. Onyx is being used in handicrafts too so handicraft manufacturers can be the potential niche market too.

3.7. EXPECTED GROWTH OF CLUSTER PRODUCT

Focus on the importance and its export cam trigger robust growth of this market and contribution to the economy. The processing sector Baluchistan and other parts of the country in general and Karachi in particular has registered gradual growth and new processing units area emerging, increase in the demand of the onyx of Chaghi is also expected to growth. Secondly in wake of the international investment particularly Chinese investors are more interested in onyx thus it is expected that in the next 5-10 years the cluster itself and products being produced will grow to maximum extents. With the government support, marble industry has the potential to become the backbone of the economy.

There is a huge opportunity for the growth of onyx cluster if the raw form of onyx is processed on site or near mines and then sold to the international and domestic markets. It has been witnessed that China imports onyx from Pakistani market and processes it and then sell back the finished products to Pakistan, which means that there is enormous potential for growth of this cluster. All needed is government should play his part in growing the onyx cluster of Chaghi.

4. DEMAND & SUPPLY GAP - EXPORT MARKET

Pakistan’s dimensional stones exports though very small but growing.

Table 3: Pakistan's Exports of Dimension Stone (Year 2017)

Code	Product	Millions USD
251511	Marble and travertine, crude or roughly trimmed	2.0
251512	Marble and travertine, merely cut, by sawing or otherwise, into blocks or slabs of a square ...	25.1
251520	Ecaussine and other calcareous monumental or building stone of an apparent specific gravity ...	1.1
251611	Granite, crude or roughly trimmed (excluding already with the characteristics of setts, curbstones	0.0
261612	Granite, merely cut, by sawing or otherwise, into blocks or slabs of a square or rectangular ...	0.2
251620	Sandstone, whether or not roughly trimmed or merely cut, by sawing or otherwise, into blocks ...	0.9
251621	Sandstone, crude or roughly trimmed (excluding already with the characteristics of setts, curbston	0.0
251622	Sandstone, merely cut, by sawing or otherwise, into blocks or slabs of a square or rectangular ...	0.0
251690	Porphyry, basalt and other monumental or building stone, whether or not roughly trimmed or ...	0.0
251741	Marble granules, chippings and powder, whether or not heat-treated	0.7

4.1. ANALYSIS OF COUNTRY WISE EXISTING DEMAND

Table 4: Pakistan's Export of Marble, Onyx and Travertine- Crude or Roughly Trimmed (Value 000 USD)

Importers	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
World	**1439**	**1490**	**1941**	**4644**	**7272**	**9652**	**4416**	**4021**	**2606**	**2005**
China	465	656	1129	3876	6447	9308	4094	3414	2419	1834
Korea, Republic of	0	0	31	12	64	10	26	191	8	42
Oman	0	0	0	0	3	0	4	0	0	30
Italy	12	6	26	24	6	10	2	45	23	21
Spain	0	0	0	0	0	0	0	0	0	21
Afghanistan	0	11	24	119	41	4	4	49	59	16
Viet Nam	0	3	9	13	45	18	60	10	78	15
Canada	0	2	3	46	0	0	0	0	0	14
Turkey	0	0	0	0	0	0	0	0	0	10
Bangladesh	1	2	0	1	12	36	22	2	3	3

4.2. QUANTUM OF SUPPLY

The mining cluster of onyx Chaghi produces 1.8 million tons annually and out of the total production more than 60% is exported to China while remaining is consumed locally or exported in the shape of processed or value added products.

The semi processed products of the processing cluster are transported to high end processing hubs in Islamabad and Punjab. The processing hubs in Islamabad and Punjab exports dimension stone products to customized international markets in limited quantities. However, there is no precise data on type, quantity and value of the exported products from these hubs. So, currently there is no supply of raw or finished marble from Chaghi for the export market.

4.3. QUANTUM OF DEMAND

China is main market for Pakistani marble, with major share of total exports, but only for raw products—slabs and blocks, which are imported in China at zero-rated duty under FTA.

There is huge demand for onyx and onyx products produced in Pakistan across the world because of unique patterns, variety and comparatively lower prices. Demand for Pakistani onyx has increased over the last three years and has reached over 100 million tons in 2017.[1]

Amongst all China accounts for 80% of Pakistan's total marble export. However, the major portion of the exports to china is in raw form. Russia, USA, Japan, Korea and

[1] Cumulated based on total exports and imports of the marble, onyx and granite in Pakistan

European countries are demanding finished marble products, and thus it constitutes less than 10 % of our export.

Demand for Pakistan marble and granite is higher in the Gulf Cooperation Council (GCC) countries, particularly in Saudi Arabia and UAE. The GCC stone market is worth over USD 5 billion and is approximately 20% of the global demand. There are an estimated 20,885 active construction projects in the GCC; the major construction activities appear to be in the United Arab Emirates and Saudi Arabia, both of which constitute approximately 70% of all construction projects in the region.[2] Besides, these demands for Pakistani marble is much higher in Afghanistan, India, Kazakhstan, Bangladesh, Malaysia and etc.

4.4. DEMAND AND SUPPLY GAP

Pakistan's overall dimension stone production, exports and import data analysis indicate an annual demand of over 500 million tons for Pakistan dimension stone products. Out of this about 100 million tons is for onyx as per available data and industry experts. Whereas, Pakistan has exported very limited quantity of onyx thus there is huge gap between demand and supply of onyx.

4.5. POTENTIAL NICHE MARKETS

Onyx, a rare marble, is abundant in the Chaghi district of Balochistan; its dark green variety is found in five countries only. Pakistan is the 6th largest mineral extractor of marble in the world. In spite of the huge size of deposits and the long-term export potential, the country's annual production of such stones has stagnant at around 2.5m tones, which contributes merely 2% to the global market. The Marble is one of the emerging industries of Pakistan and has great potential to expand export manifold, but the I still not serious to solve the problems, the exporters and mine owners are highly dissatisfied.

Huge demand of onyx handicraft of Pakistan exists in international market like, China, Australia, and USA. The product has limited local retail market due high prices of the products. However, trading houses and exporters of these products require these products in large volumes which may be targeted initially for sale of products that could be made in the units.

Onyx is a rare marble and is being wasted by using old exploration techniques. Niche market for the onyx is the construction sector and the neighboring countries including Europe and Middle East. Other countries except china require processed products but due to lack of facilities and old technology almost all of it's the share is being exported to China in raw form (blocks). China processes those raw onyx and then export to other countries even to Pakistan. In local markets there are many alternates available relatively at a cheaper price, but still onyx has high demand and is mostly unavailable except in metropolis areas.

[2] BNC Project Intelligence

4.6. GROWTH OF CLUSTER PRODUCTS

Pakistan has sizable reserves of high quality of Onyx and Marble. Yet while neighboring India occupies fourth position in global export of marble product share of Pakistan is insignificant. In order to increase the exports, it is essential to reduce cost of production, improve product quality and develop a sustainable market.

With improved technology and better marketing practices, total export of marble and onyx is projected to increase to $2.5 billion. Given the marble zone's close proximity to Karachi and Gwadar port, the province has an edge over other marble mines in Balochistan. The global trade in marble and granite was estimated at $46 billion in 2017 and Pakistan's share was minimal which shows there is huge potential for growth in this cluster.

5. CLUSTER GAP ANALYSIS

This section deals with analysis of gaps between the cluster underlying practices and best practices in domestic and international market in mining. In order to identify gaps both the domestic market and international markets are assessed separately. Efforts are made to assess the best practices in those countries that are newly emerged, and Pakistan can get into their position with available resources.

5.1. GAPS IN MINING CLUSTER

Mining is the extraction of valuable minerals or other geological materials from the earth, usually from an ore body, lode, vein, seam, reef or placer deposit. These deposits form a mineralized package that is of economic interest to the miner. It is very important to market those minerals in potential market to get handsome revenue. Onyx being a unique mineral is not being marketed well and due to extraction gaps we are unable to meet international standards or compete internationally. As mentioned we lack behind in the processing of onyx and adding more value into it, for that we don't get higher quotations for onyx present in Chaghi. The below mentioned are the analysis of what international companies do (Chinese, Indian etc.) and what Chaghi onyx miners are doing here in Pakistan. This will show a clear picture that why onyx is being sold at cheaper price and why we are unable to anticipate the market trends and production.

5.1.1. Reserve Mapping & Estimation

The sample countries except India, modern scientific methods and modern techniques are used for identification, estimation and mapping of their dimension stone reserves. Remote surveying and geological mapping of potential mineral sites is done through light detection and ranging (LIDAR) and unmanned aerial vehicle (UAV) technology that pave way for easy allotment of mining rights through tenders. Even Afghanistan has mapped their mineral resources of all the existing and potential clusters. Scientifically mapped and estimated resources help in better planning and utilization of the natural resources.

5.1.2. Regulatory Framework

In china and India there is a uniform and investment friendly mining regulatory framework synchronized with other laws of the state. In these countries there are specific policies for foreign investments that safeguard their investments. A single entity is responsible for all mining related activities that allow for speedy and transparent process of all mining related activities. Across the sample regions, mining leases are awarded through an open and competitive tendering system with proper mechanism to ensure that mining operations starts within stipulated time period.

In glance to the above mentioned international practices, In Chaghi there are many complications which are not in favor of miners. There is unavailability of basic infrastructure and also lack healthy working conditions. They don't have safe access to mines because the roads are shingle. The Government bodies are so busy in corruption and have no concern about mining and the requirements; there is no implementation of mine rules and regulations in Chaghi district.

5.1.3. Infrastructure

The major obstacles in the expansion of the mining industry are the persistent electricity blackouts, outdated quarrying techniques, inconsistent supplies of raw materials, a dearth of value-addition, poor law and order situation, and a lack of infrastructure in areas where quarries are located.

In China, electricity, water and communication is inbuilt in the lease agreement such that leases will be allotted if these facilities are provided by state. The concept of developing Industrial Zones/Estates including facilities of processing, polishing, packaging, machinery manufacturers, machinery repairing workshops near mining hubs is also becoming a success model. In Chaghi there is poor physical infrastructure (water systems, power, and roads) and poor social infrastructure (consultative systems, local vocational training, and community-based education). The access to mines is the major issue because government doesn't support.

Pakistan is among lowest ranked countries in 'global infrastructure ranking' though the country has invested heavily in public infrastructure development yet poor governance remains major plague to its assets. It is estimated that due to insufficiency, Pakistan looses about 4 to 6 percent of its GDP (approximately $6 billion).

5.1.4. Technology

The major drivers for failure for this sector are use of old techniques for onyx extraction in Chaghi district. Due to inadequate machinery and outdated technology blocks are not of large size and are relatively small in size. In international market they prefer and buy larger blocks because then they can use them in different places according to their need.

In the other countries improved and efficient technology such as diamond wire saw is commonly used in mining practices. Whereas in countries like China, Turkey and

Spain the technology has transformed from diamond wire saw into state of the art chain saw and speed cutters. The utilization of chain saw, and speed cutters has doubled the mine production as compared to wire saw and has reduced quarry waste.

5.1.5. Human Resource

In the sample countries and other countries like Greece, Palestine and Egypt improved and efficient mining practices are carried by qualified and trained work force. From the mining engineer, quarry master to machinery operators every individual has relevant qualification; apprenticeship, formal training, diploma or a university degree.

In these countries there are state of the art public and private sector technical training institutes providing training in scientific mining practices, drilling, machinery operations, quarry management and etc. In most of the sample countries there are dedicated training institutes and centers in the mining hubs that provide training and apprenticeship, only in the mining sub sector. The quarry workers also undergo extensive training (both on the job and off the job) as a complementary requirement for mining operations.

The competence level of the workers can be gauged from this, that in Chaghi you won't find a single qualified engineer working on the site. All the workers are skilled and semi-skilled, but they don't have proper qualification and adequate training.

5.1.6. Access to Finance

In this era, it seems taking loan is an easy process, but it is just speculation. State Bank of Pakistan (SBP) has taken many initiatives to encourage mine owners to take loan and enhance their business. In reality the conditions are strict, and we have the concept of "Riba" which is known as 'interest' in financial terms. Mine owners are reluctant in Chaghi district to take loan on interest because they see this loan as a destroying commodity. Commercial banks do not accept mine or mineral products as collateral because there is no policy/law or framework that allows for mine collateralization. Banks require commercial property in urban areas as collateral, but most of the investors are from other districts of the province having no commercial property in Chaghi while mines are also concentrated in rural areas only.

Government has not taken healthy steps to help them financially, rather government wants them to take loan from commercial banks and that is very hard in mining business because banks want commercial property or other collateral which miners don't have.

5.2. BUSINESS MODELS

Maruti Granites and Marbles

Maruti Granites and Marbles is a modern factory equipped to process both imported and Indian marble and is spread over a sprawling area of 10000 sq. mts. of land in the heart of industrial area of Udaipur known as Sukher. The company has indisputable reputation across the stone industry in India and is a trusted name owing to its honest and dedicated

business policies in countries including Italy, Spain, Turkey and China. Since its incorporation in 1988 it has a come a long way.

Dazzle Onyx

Dazzle Onyx a unique fine grain marble from Rajasthan which has the feel and translucency of an Onyx but strength of a marble. It is a very good option for flooring as well as wall cladding application. This discovery has created a buzz in domestic as well as foreign market in a short span of time. Its homogenous nature, extremely high gloss, warm cream color background goes well with all interior designs and matches extremely well with wooden furniture. It has a much better strength than imported counterparts like Bottocino, Diano, Perlato Sicilia and Crema Marfill. Due its beige color background, good levels of production in the quarry, high processing standards in the factory and cost competitive pricing it is a highly suitable material for residential as well as commercial projects for real estate developers across India.

Mines

The quarry is situated in village Kothara near Towanda in Rajasthan and is spread over a vast and expansive area of 4 hectares. It has come into operation since Jan 2013 and right from the outset by god's grace has been producing blocks which are sound, compact and having an evenly distributed color scheme. This quarry has been the most coveted discovery for the company and it has been developed ever since with a highly futuristic and long term growth strategy. In a short span of time Dazzle Onyx from this quarry has been widely accepted around the world including countries like USA, Kuwait, Nigeria, Malaysia, Indonesia, Thailand, China and Taiwan.

Stockyard

The stockyard has 2 vast industrial sheds spread over an area of 11,000 sq.ft and each shed is equipped with an EOT crane having a loading capacity of 5 MT and all our imported material stock is kept under these sheds. This has resulted in total mechanization in shifting of heavy marble slabs from cutting units till stockyard which were earlier done manually and had a lot of risk involved.

Machinery

Our factory is equipped with state of art modern machinery. In addition to the marble gang saw units having a capacity to cut up to 2, 40,000 sq.ft of marble monthly we also have a imported automatic resin line plant from Italian company S.E.I. for processing of marble slabs. Double disc edge cutting machines are used to make export quality tiles which require high precision and low margin for error. Polishing is done using the heavy machines having a weight up to 2 metric tons which ensure polish with a mirror like effect.

Packaging


5.3. CLUSTER'S EXISTING AND POTENTIAL COMPETITIVENESS

Due to the fine quality of stone available in the Chaghi and expertise in manufacturing finished products, exports can be enhanced to a much higher level. The country could benefit by exporting of all kinds of marble products to Qatar, Middle East, Saudi Arabia and Japan. Pakistan should develop Gwadar into a communication and economic hub of the world by speedy completion of China Pakistan Economic Corridor (CPEC) which will benefit marble sector to boost their supply.

There is a lack of well-defined policy and shortage of warehouses in the country, therefore, government should establish a warehouse in Dubai, as the Gulf Region has huge demand for Pakistani onyx and Dubai may be a hub station.

Quarries with greater cracks were deemed unfit for business but those that weren't were exploited. The marble test ensured that any marble that was mined was extracted in larger slabs and not smaller pieces. "With blasting, what we tend to end up with is smaller pieces that have little worth to larger buyers," explains one local exporter and retailer. "The smaller pieces tend to end up for handicrafts, for example, or tiles". What adds to this loss of marble in production is the fact that a majority of our mining is done through blasting and due to that the wastage rate is very high. There is huge potential in onyx cluster if they reduce their wastage and opt the modern technology in extraction.

6. KEY ISSUES

The key challenges confronted by Onyx Cluster in Chaghi enumerated as follows:

6.1. REGULATORY FRAMEWORK

Regulatory regime plays a pivotal role in the mineral sector development of the country. According to the 1973 Constitution all minerals excluding oil & gas & Strategic minerals are the property of the federating units. The same are being granted on lease to the investors by the respective governments under mining concession rules. Surface under which mineral exist is the property of the local people, either individuals or families. This has always been a graves issue both in the tribal and settled areas of the country. To address this issue, many regulatory steps have been taken from time to time but so far none of them has been able to solve the issues as per the satisfaction of the leaseholders and owners of the surface.

Generally, lease transfer of the mine becomes a problem for the people associated with the marble industry in Balochistan as mountains in the province are considered government property. According to the industry sources, the government offers lease of mine to investors with attached conditions. Unlike Sindh and NWFP, lease is offered in Balochistan when a Sardar or a local native becomes the partner with the investor.

6.2. INSTITUTIONAL FRAMEWORK

Marble industry lacks the technical facilities, as it has remained neglected. The industry directly depends on the marble quarries. The province has undeveloped and unsecured marble quarries due to which the industry has been losing business.

Open-ended policies mean that just as there is no control over exports, there's no check on what's being imported either. Whereas the outflow is that of prime raw marble, the inflow is that of top-end finished products. Since the local industry's growth is stunted and there's no local value-addition, the import of value-added is a double-whammy. Forget foreign markets, Pakistani producers even cannot compete in their own country with thanks to the influx of Spanish and Italian products. Government should implement the rules and work for the better of onyx cluster to gain more revenue and move towards economic prosperity.

6.3. BASIC INFRASTRUCTURE

Mining areas in Balochistan are wide spread and access to the mining sites is very difficult due to poor infrastructure, lack of easy access to the mines. Other problems include shortage of water supply and lack of sewerage system, electricity infrastructure, improper road network, telecom system and law and order.

The marble industry is also losing business due to undeveloped and unsecured marble quarries situated in the province that is directly dependent on the marble quarries".

The poor infrastructure of mining and processing clusters constraint the investors to meet increasing demand in domestic and export market as constant supply could not be ensured.

6.4. INEFFICIENT TECHNOLOGY

Technology is one of the main issue, mine owners are lacking the high-tech machinery for mining. Due to lack of technological advancement the mine owners are facing serious difficulties to continue their operations. They are using blasting technique, which is considered to be an old and ineffective technique because it somehow damages the block and causes more wastage that is direct loss to the mine owners.

Presently very primitive and small equipment's are being used for mining and they are not adequate for mining onyx. The below picture was captured in Chaghi which shows irregular sizes of onyx loaded on truck that are rejected by international buyers.

6.5. VALUE ADDITION

Due to the fine quality of onyx available in the Chaghi and expertise in manufacturing finished products, exports can be enhanced to a much higher level. The country could benefit by exporting of all kinds of marble and onyx to Qatar, Middle East, Saudi Arabia and Japan. Pakistan should develop Gwadar into a communication and economic hub of the world by speedy completion of China Pakistan Economic Corridor (CPEC) which will benefit onyx cluster to boost their supply.

Onyx marble from Chaghi can meet the international standards if it is processed efficiently. The efficiency of marble processing industry depends on the quarry products. We can earn millions of dollars from export of this mineral by tapping world markets and improving quality by value addition and bringing down the extraction losses.

6.6. WORKFORCE DEVELOPMENT

One of the most critical problems faced by the investors in this cluster is lack of qualified and trained workforce. The existing workforce including skilled and semi-skilled workers at mines does not have any qualification in the relevant trade and has also never undergone any such training.

There is not a single technical or vocational training institute that offer technical trainings in marble mining and resultantly, unqualified workers are employed that not only lead to limited production capacity rather also increases the wastage.

6.7. ACCESS TO FINANCE

Despite estimated deposits of 2.5 billion tons marble and onyx worth approximately $ 60 billion in Balochistan, there is no financing from banks to the marble industry Interest (Riba) is also one major issue in Chaghi, as investors take it in Islamic perspective and avoid taking loans from banks. Most of the mine owners are not ready to take loans and they want government to finance their new tech machinery and ready to pay it in installments.

6.8. ENVIRONMENTAL AND SOCIAL ISSUES

Despite these multi-billion projects yet the life of the dwellers is pathetic. It is mineral rich district but only for the entrepreneurs. According to estimates, 75% of the people are living below the line of poverty. Literacy rate in the district has not exceeded 30 %. The conditions of schools, hospitals and other infrastructure are deplorable.

According to Mines Act 1923, each mining firm shall work for the betterment of the local citizens, which includes health, education and infrastructure, but irony is that no one has headed towards it. While some of the development funds for the District Chaghi have fall prey to rampant corruption of the influential class.

7. PROPOSED INTERVENTIONS

In view of the long-standing issues faced by the Onyx sector some of the key and core interventions identified during stakeholder's consultations and filed data collection are summarized as below;

7.1. REGULATORY FRAMEWORK

7.1.1. Mineral Governance Act

Rationale/Justification:

District Chaghi has enormous potential for investment in marble mining, however, lack of appropriate regulatory framework/mineral policy results in a nuanced situation for local and foreign investors. The existing mineral Policy on one hand has put restrictions on existing mine owners and on the other hand do not offer any special incentives for new investors. The policy does not cover investment security of local and particularly foreign investors.

Consequently, due to very limited local investment and absence of foreign investment the cluster is unable to transform and become competitive in the international market. Thus, there is dire need for revision of the mineral policies in line with international best practice to win the confidence of the foreign and local investors.

Proposed Project:

It is proposed that in close coordination with relevant public sector and in consultation with relevant private sector stakeholders and platforms, the existing provincial mining policy should be revised. A high level committee should be formed to prepare draft

policy in light of consultation and based on international best practices in mining laws i.e. mining law of China, Turkey, Iran and etc.

The mineral policy should be backed by properly legislated incentivized regulatory framework. These legislative initiatives should be backed by strong institutional setup. Clearly-defined legislation will encourage investors to invest in the mining sector due to its inherent sureties and quarantines.

The proposed policies/regulatory frameworks should include the following amendments at minimum;

- The mining/quarrying sector should be given the status of industry with appropriate legal cover in the proposed mining laws/policies.
- The existing mines in terms of covered area should be treated as it as and the clause of minimum area of 200 acres for small scale mining should be applicable on new mine owners.
- Type of mining should be divided into categories based on nature and value of minerals and mining rights should be granted as per the new categorization.
- Investment friendly clauses and incentives for foreign investments, which should provide special guarantees between the foreign investors and the State of Pakistan. This law should ensure free repatriation of profits and capital, as well as tax stability and non-discrimination against foreign investors.
- Complete ban on use of explosive for mining activities as otherwise allowed by the competent forum for special cases if applicable. The competent forum that grants leases shall have the authority to assess need for explosive and allow/grant permit for such.
- Clauses regarding utilization of locally made marble and granite in government funded/constructed projects should be made part of the mineral policy and proper legal cover should be granted to them.
- All taxes/levies/royalties/fees/surface rent etc should be merged and collected under one head, “Mining Royalty” by the government. The collected amount from mine owners should further be provided to relevant departments, land owners etc by the authority which collected the royalty.

Responsibility

Provincial Directorate General of Mines in Minerals in collaboration with Inspectorate of Mines, Commissionerate of Mines, Provincial Board of Investment, All Pakistan Marble Industries Association, Sector experts and local mineral sector associations should formulate their respective policies.

Estimated Cost:

Cost estimates are not applicable to this activity, as this will be undertaken by relevant public sector departments.

Required Timeframe

Development of New Mineral Policies/Regulatory Framework is a short term activity and the proposed timeline is 01 year.

Results/Benefits:

The proposed mineral policies/regulatory framework will have following expected benefits in both short term and long term;

- Investment mobilization of over 2.0 billion including foreign direct investment of over 1.0 billion in the first 5 years.
- Increase in overall exports of the dimension stone as a result of foreign investment by over 30% of raw, semi processed and processed stone.

7.1.2. Mining Magistrate

Rational/Justification:

In Pakistan, mine owners are confronted with multiple issues but the most critical issues faced by the mine owners very commonly are;

i) Dispute among mine owners and local DGMMs, EPA & Forest department, Disputes with local public sector departments include; cancellation of mine lease, non issuance of NOC for mining, closure of mines, heavy penalties and etc. Such issues results in either closure of business by the SME or court cases that continue for years and years.
ii) Frequent conflicts between mine owners and local communities over surface rent. Payment of surface rent is fixed prior to mine operationalization. However, due to lack of clarity in land ownership as well as the terms and conditions associated with surface rents, disputes often arise between miners and land owners causing frequent disruption and sometimes stoppage of the mining activities. Disputes resolution between mine owners and local community is mandate of Disputes Resolution Committee (DRC) nominated under DGMM. Contrary to its role the DRC has no active role and no legal jurisprudence for solution of critical issues.

In view of the aforementioned facts it is imperative to formulate an independent "Mineral Magistrate/Tribunal" for resolution of these disputes.

Proposed Project:

Mineral magistrate will serve as an independent tribunal for resolution of disputes among mine owners, local line departments and local communities. The proposed magistrate will also have the domain of legal cases related to incidents at mines and disputes between mine owners and workers as well. It is proposed that initially one mineral magistrate should be established in each province.

Mining Tribunal will have the jurisdiction to hear and determine proceedings relating to any of the following matters:

- The area, dimension or boundary of land which is subject to a mineral tenement and the right to the possession or occupation of land under a license or lease;
- Any demand for debt or damages arising out of prospecting, exploring or mining;
- The right to any mineral in, or to be recovered from, any land which is subject to mineral tenement and the rights under, or arising out of, any contract relating to any such mineral and any transfer or disposition of, or charge on, a mineral tenement;
- Trespass or encroachment on, injury to or any matter affecting roads, railways or other property constructed, held or occupied under this Act;
- The working or management of land which is subject to a mineral tenement;
- The refusal of the holder of an exploration license to give consent to the holder of a prospecting license to prospect on land which is subject to the exploration license;
- The amount of compensation payable for loss or damage caused to land, any dispute relating to a mineral tenement or former mineral tenement between the holder of the mineral tenement and the owner or occupier of land.
- Any dispute relating to a mineral tenement or former mineral tenement in respect of private land, any appeals and objections under this Act.

Responsibility:

The mineral magistrate should be formulated and notified by the provincial government through DGMM, ministry of law and etc.

Estimated Cost:

The estimated cost of setting up one mining magistrate is Rs. 80.0 million

Required Timeframe:

The proposed intervention of mining magistrate is a short term activity and the estimated timeline for completion is 6 months.

Results/Benefits:

The proposed investment mobilization desk will have following immediate impacts in first 2-3 years;

- Processing and resolution of disputes will be quick and every concerned will receive his due right within the ambit of law.
- Constant and regular supply of raw stone from mines will be ensured as a result of quick and better disputes resolution.
- Increase in economic activities are more people will start investing in mining and processing as currently they are reluctant to invest due to absence of such facility.

7.1.3. Investment Mobilization Desk

Rational/Justification:

Less investment in mineral sector in general and marble & granite sector in particular is directly linked with absence of investment enabling regulatory framework, involvement of dozens of departments in the overall process from license to production, duplication of laws/rules and policies, time taken for acquiring multiple permits and lack of investment security. In most instances investors either do not even take interest in investment or withdraw the decision of investment in this sector somewhere in the middle due to all such factors.

All these elements leads to a common phenomenon, "lack of centralized facility for facilitation and support of investors". Availability of centralized facilitation and support unit will not only contribute to promotion of investment opportunities and maximum investment in this sector. At higher level increased investments will introduce improved technology, standardized production, increased number of enterprises and employment opportunities for thousands of local people.

Proposed Project:

It is proposed to establish an "Investment Mobilization Desk" at the Provincial Directorate General Mines & Mineral (DGMM) Balochistan. Investment mobilization desk will be a one stop facility for local, national and international investors in the mining sector in general and in marble & granite sector in particular in Balochistan. The desk will be equipped with abundant quantity of technical and financial resources.

The investment mobilization desk will have updated information on mineral wise deposits/mapping, mine leases, potential mine leases, joint ventures, public private partnerships and etc. The desk will be linked with all relevant public and private sector department/organizations for updated information, templates and requirements to be provided to the investors.

The center will provide the following services to investors;

- Facilitation in each step of the investment process from design/licenses to actual production of the product. This will also cater to registration of business, NOCs, permits, bank account, NTN, security, etc required in this sector.
- Investment opportunities in marble and granite sector coupled with investment briefers/mini feasibilities as per investor needs.

Responsibility:

The investment mobilization desk will be established and operated by DGMM in close collaboration with SMEDA and BOI from design to operationalization.

Estimated Cost:

The total capital cost of setting up investment mobilization desk is estimated to be Rs. 5.0 million.

Required Time Frame:

The proposed timeline for setting up investment mobilization desk is one year.

Results/Benefits:

The proposed investment mobilization desk will have following immediate impacts in first 2-3 years;

- Availability of one stop facility for facilitation and support of investors.
- Increase in existing base of enterprises, production and turnover by over 20% across the value chain.
- Additional investment mobilization from local investors of over Rs. 1 billion across the mining and processing sub sectors.
- Employment opportunities for over 5,000 local people generated.

7.2. ACCESS TO FINANCE

7.2.1. Bank Loan Products

Rationale/Justification:

Lack of banking products for marble mining and processing sub sector is Chaghi is among the key elements hindering rapid economic development and growth. Lack of mine mechanization, state of the art processing facilities and standardized production for export markets is because of absence of bank loan facilities on soft terms and conditions.

Similarly, in some instances the mine owners and processors could not entertain large scale orders due to lack of working capital. Another key issue been faced by business people in this cluster is lack of required power/electricity for business operation. There is need for customized banking products for meeting working capital requirements and modern machinery need of both Mine owners and processors in Chaghi.

Proposed Project:

In view of the financing needs of mine owners and processors 3 different loan products are proposed here;

Particular	Working Capital Facility	Machinery Leasing Facility	Industrial Generator Facility
Tenure	10 years with no requirement of Annual Cleanup for principle amount. However, regular payment of markup is must for		

	renewal of limit.		
Loan Limit	Loan Limit, Rs. 2-10 million *(Maximum limit is set based on 50% mark-up of average revenue estimated for this sector)*	Loan Limit, Rs. 5-50 million	Loan Limit, Rs. 5-10 million
Documentation	One time documentation (as required by banks) for a period of three years		
Markup	Discounted mark up of 5-6 %.		
Security	Raw material stock. Mortgage of business premises for those who operate from owned premises.	Existing Assets including Machines & Premises	Existing Assets including Machines & Premises

Responsibility:
The proposed access to finance schemes should be introduced by State Bank of Pakistan (SBP) through commercial banks.

Estimated Cost:
The total estimated budget for the proposed banking products is Rs. 3.0 billion.

Results/Impacts:
Increase in mechanization of the existing mines and creation in new mechanized mines by over 50%.

7.3. Human Resource Development

7.3.1. Rock Mining Training Institute

Rationale & Justification:
District Chaghi is blessed with the variety of valuable marble resources; most of these deposits are being exploited by the private sector on primitive methods. The absence of scientific mining, which includes, conducting geological studies, mine development, benching and appropriate mining technology have endangered the valuable natural resource is badly endangered and result in the following problems;

- Low productivity at mine due to unqualified staff, and inappropriate technology and loss of up-to 75% of mined marble product with poor quality of remaining product.
- Destruction of valuable natural resource through uncontrolled blasting and injury to the in situ rocks & severe environmental degradation.
- Premature closures of mines due to inappropriate mine opening and loss of development cost.
- International non-competitiveness due to low quality of product.

To save the industry from further destruction & make it competitive in the international market, it is imperative to resolve these issues so it is proposed to establish state of the art Rock Mining Training Institute in Chaghi.

Proposed Project:

The proposed Rock Mining Training Institute will be a dedicated training institute equipped with modern machinery for all required training in marble & granite quarrying. The institute will be set up in accordance with accepted international standards and with the technical support of expatriate quarry master. The project would be aimed at training, capacity building and technical development / orientation of mining staff / industry to carry out the mining activities on scientific lines.

The institute will impart practical trainings to mine managers, mine sardars, geologists, mining engineers, machinery operators and other staff in mine layout & development, quarrying, machinery operation, safety and health management. An expert expatriate quarry master will provide trainings and practical exposure visits to nearest mechanized mines. The trained staff will be directly linked with operation and under process marble & granite mines for practical exposure and provision of services. The trained geologists and mining engineers trained in the institute staff will further train mine managers, mine sardars and workers besides provision of technical services.

The total estimated cost of the proposed training institute is given as follows;

S. No	Cost Heads	Total Cost (Million PKR)
1	Machinery & equipment, (Annexure A)	40.00
2	Building & Civil Works (Annexure A)	70.00
3	Preliminary Expenses & Project Management	30.00
Total Project Cost		**140.00**

Responsibility:

The intervention should be implemented by provincial Directorate General Mines and Minerals in collaboration with provincial TEVTA and Local Engineering Universities.

Estimated Cost:

The total estimated budget/cost of this entire intervention is *Rs. 140 million*.

Required Time Frame:

Setting up Rock Mining Training Institute is a medium term activity and estimated timeline is two years.

Results/Benefits:

The proposed rock mining training institute will have the following immediate impacts in first 5 years;

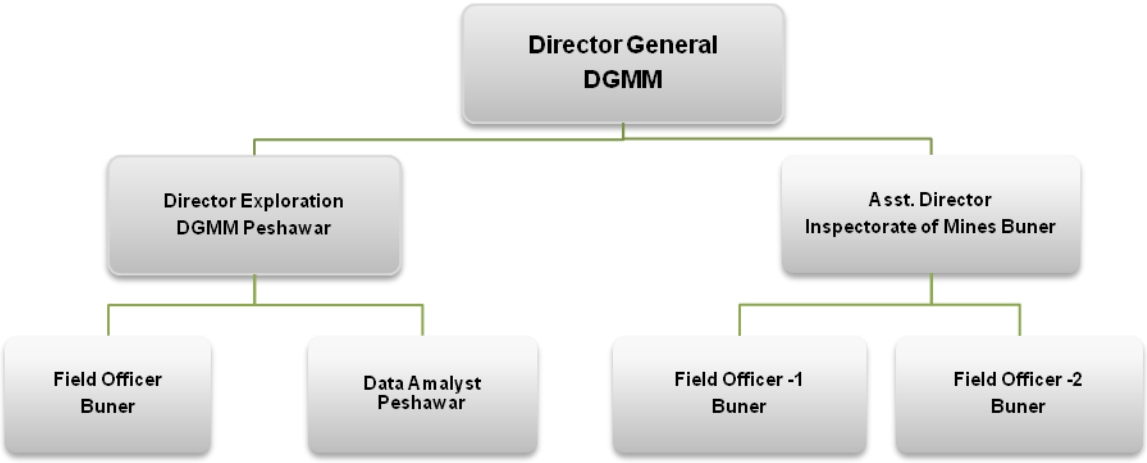
- Employment generation for over 30 local people in operationalization and maintenance of one training institute.
- Exposure, training and technical assistance for developing mines on scientific lines to existing and new mine owners.
- Provision of highly trained skilled manpower to the industry for the recovery of squared blocks with increased profitability for local processing as well as greater sale of raw product in the international markets.
- Increase the level of recovery of dimensional stones blocks from current 27% to at least 40%, by adopting scientific mining techniques and use of mining machinery.

7.4. CLUSTER MANAGEMENT STRUCTURE

Rationale/Justification:

In order to ensure better and effective implementation of the proposed interventions in Marble Mining Cluster Chaghi, it is imperative to have a dedicated and well focused mechanism. For this purpose it is recommended to develop separate "Management Structures" for mining and processing with existing resources and human resource. Roles of the concerned department and management structure for mining is given below;

Management Structure for Mining



Role of the Cluster Management Team

The key responsibilities and roles of the cluster management team are outlined below;

- Regular management and supervision of the entire cluster actors, resources and etc.
- Collect, compile and manage data from all the enterprises regarding investments, technology, production and etc.

- Coordinate with relevant public and private sector organizations for better and improved service delivery to the cluster.
- Monitoring and evaluation of all the activities related to the cluster including enterprises, production, human resource and investments.

Responsibility:

The interventions should be implemented by provincial Directorate General Mines and Minerals and Directorate of Industry Commerce and Technical Education.

Estimated Cost:

There is no cost involved in this intervention.

Required Time Frame:

The proposed timeline for developing management structure for the cluster is one years.

Results/Impacts:

The management structure will ensure better and effective implementation of the proposed interventions that will help in achieving desired objectives efficiently. This will result in strengthening and expansion of existing mining units to greater extent, creation of new improved enterprise, increasing competitiveness and thousands of employment opportunities for local people.

8. Economical, Social & Environmental Impacts

The proposed interventions outlined in this cluster feasibility study are expected to generate big economic returns and benefits for the national economy, SMEs and all other concerned, provided that these interventions are implemented as proposed and within the recommended timeline. Each intervention proposed in this feasibility study is equally significant and critical for the cumulative growth and development of this particular cluster.

It is pertinent to mention that every project/intervention will have stand alone huge r impacts as outlined under each intervention. However, more importantly the collective benefits that these projects will generate will be phenomenal. The economic, social and environemtal impacts of all the proposed projects are given separately below;

8.1. ECONOMIC IMPACTS

Economic impacts here refer to the direct and indirect benefits obtained by all the concerned stakeholders i.e. federal government, provincial government, district administration, SMEs and etc. This may translate into expansion of existing enterprises, new enterprises started, enhanced production, direct exports, investment mobilization, increased income generating opportunities, direct and indirect employment.

Key economic impacts are summarized into the following table;

Table 5: Key Economic Impacts of the Proposed Interventions

Economic Indicators	Pre Interventions	Post Interventions
Mining Enterprises	102.00	150.00
Cumulative Investment (PKR million)	1,224	2,500
Annual Production-Mining (tons)	1.8	3.00
Direct Employment	10,200	20,000
Indirect Employment	20,000	30,000

SUMMARY OF ISSUES & INTERVENTIONS

Issues and Interventions- Dimension Stone Mining Cluster Chaghi

a. Mining Sub Sector

S #	Issues Faced By Cluster	Required Interventions	Responsibility	Cost of Intervention
Regulatory				
01	• Mineral policies and acts are formulated without consultations of relevant stakeholders. • There is no compensation and incentive for mine owners in the provincial mineral policy & acts. • Unjustified increase in royalty and other taxes. • Ban/restriction on explosives for mining without provision of support for alternate way out.	✓ Revision of provincial mineral policy and mining concession rules in close coordination with relevant stakeholders. ✓ Development of appropriate and supportive regulatory framework for mining sub sector.	• Directorate General Mines & Minerals- BALOCHISTAN	N / A
Infrastructure				
02	• Poor mine access roads in areas where mine leases are awarded, access roads are non-existent in areas where minerals are explored but leases are not awarded. • Absence of key support infrastructure such as electricity and water in mine areas.	✓ Development of black top / suitable road infrastructure in major mine bearing areas. ✓ Development of network of roads in new potential areas where investors could start mining. ✓ Provision of separate electricity line and proper permanent water sources for mining areas.	• Directorate General Mines & Minerals- BALOCHISTAN • Provincial Govt BALOCHISTAN	2 billion
03	• Lack of warehouses that not only limits constant and regular supply of raw material but also affects standardized production.	✓ Establishment of warehouses for major mining areas	• Provincial Govt BALOCHISTAN	1 billion
Technology				
01	• Absence of modern and mechanized mining practices that result in over 75% of wastage. • Poor quality and non standardized products due to outdated technology.	✓ Matching Grants Program for Technological Advancement & Innovation on the pattern of SMEDA ERKF. ✓ Establishment of Machinery Pools on the pattern of PASDEC for provision of modern mechanized mining &	• Ministry of planning, development & reforms. • Pakistan Minerals	10 billion

	• Modern technology is much more capital intensive and investors lack finances to adopt modern technology. • Absence of technology for processing/value addition of mine wastage. • Lack of qualified and trained quarry masters/skilled workforce.	raw material handling machinery. ✓ Establishment of Common Facility Centers for value addition & processing of mine waste. ✓ Strengthening and Establishment of Modern TVET Centers for Skilled Human Resource	Development Corporation • SMEDA	
Marketing				
01	• Lack of regular and consistent transportation due to poor mine access roads. • Absence of appropriate repair & maintenance facilities.	✓ Development of modern and suitable trucking stations with all allied services in major mining areas.	• Provincial Govt	100 million
02	• Lack of warehouses that not only limits constant and regular supply of raw material but also affects standardized production.	✓ Establishment of warehouses for major mining areas.	• Provincial Govt	1 billion
Access to Finance				
01	• No specialized banking products for mine owners. • Issue of collateral as mines are not accepted as collateral by banks.	✓ Introduction of specialized banking products for mining sub sector with easy terms and conditions. ✓ Development of specialized mining facilitation desks at major commercial banks.	• Federal Govt • Govt of Balochistan • State Bank	50 million