

DIMENSION STONE MINING

DISTRICT LASBELA, BALOCHISTAN

Cluster Study



Mineral Transformation Plan Vision 2025

Planning Commission of Pakistan,
Ministry of Planning, Development & Reforms,
Government of Pakistan

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1. ABOUT THE STUDY

This specific document aims to study the **Dimension Stone Mining of Lasbela**, Balochistan.

The conducted survey is mainly based on Focus Group Discussions (FGDs), Key informant discussion, and one to one interviews of 20 SMEs (30% of the operational mines) in the business of mining by random sampling techniques. The inputs were analysed by using Statistical Package for Social Sciences (SPSS) followed by the SMEDA team's review, and expert opinion by geologists and external management consultants.

The tools used in the study were:

-  Questionnaire for APMIA Balochistan
-  Questionnaire for Dimension Stone Miners of Lasbela
-  SPSS (Data Analysis Software)

2. DESCRIPTION OF THE CLUSTER

2.1. Introduction

Pakistan is bestowed with in exhaustible resources of Dimension Stone. The reserves are estimated to be about 300 Billion Tons of which 30% exist in Balochistan. The detail of dimension stone mining in Balochistan is given as under:

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

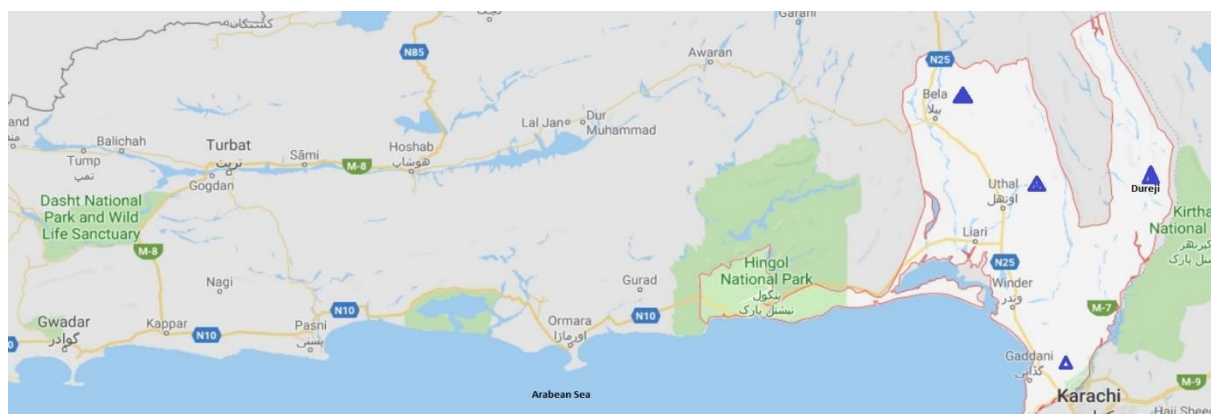
The contribution of district Lasbela to the Dimension Stone mining is 30%, 51%, and 27% in terms of operational mines, production, and labor employment respectively. Mining in this district started in late 1980s.

2.1.1. Strategic Location of the Cluster

As a whole the the exit points of the cluster are at distance of 680-KM from Gawadar Port, 35-KM from Karachi Port, 30-KM from the Processing Markets of Karachi, 1,100-KM from Lahore, and 1,488-KM from Islamabad. The situation of different mining areas of Lasbela is as under:

- Uthal: 110-KM from Marble City Gadani, 150-KM from Karachi Port, 20-KM from Makran Coastal Highway, and 680-KM from Gawadar Port
- Bela: 220-KM from Marble City Gadani, 250-KM from Karachi Port, 125-KM from Makran Coastal Highway, and 780-KM from Gawadar Port
- Hub:
 - Lalazar – 02-KM from HITE, 05-KM from Marble City Gadani, and 01-KM from Makran Coastal Highway
 - Gadani- 07-KM from HITE, and 02-KM from Makran Coastal Highway. (These are only reserves without any operational activity)
- Dureji: 136-KM from Marble City Gadani, 145-KM from Karachi Port, 128-KM from Makran Coastal Highway, and 725-KM from Gawadar Port.

FIGURE 1: DIMENSION STONE MINING AREAS OF LASBELA



2.2. Situational Analysis

2.2.1. Enterprise Base

As per the record of the DMM Balochistan, there are 80 Mines of Dimension Stone in the district Lasbela, out of which 66 are operational. Out of the 66 mine lease holders, 09 have their own marble processing factories. Total number of quarries in the district are about 565. The investment and employment situation is as given below:

TABLE 2: DIMENSION STONE MINING CLUSTER SUMMARY

Name of the Sub Sector	No. of Leases	Employment	Estimated Investment (Billion PKR)
MineLeases	66	3,675	1.13

TABLE 3: DIMENSION STONE MINING IN DIFFERENT AREAS OF LASBELA

Area	No. of Quarries
Dureji	500
Sukkan	10
Uthal	50
Others (Lalazar etc)	05
Total	565

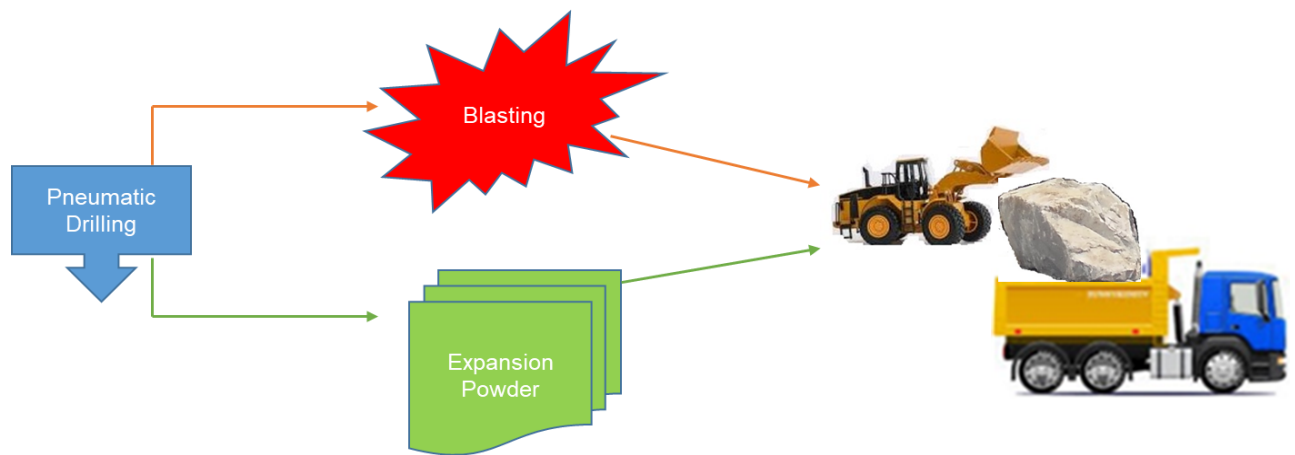
Dimension Stone mining is dominated by small scale enterprises, comprising 71% of the total in terms of investment as well as number of leases.

TABLE 4: INVESTMENT IN MINING -DISTRICT LASBELA BY SIZE OF ENTERPRISES

Size of Enterprise	Number	Average Investment (Million PKR)	Estimated Total Investment (Billion PKR)
Small Scale	400	01	0.4
Medium Scale	160	03	0.48
Large Scale	5	50	0.25
Total			1.13

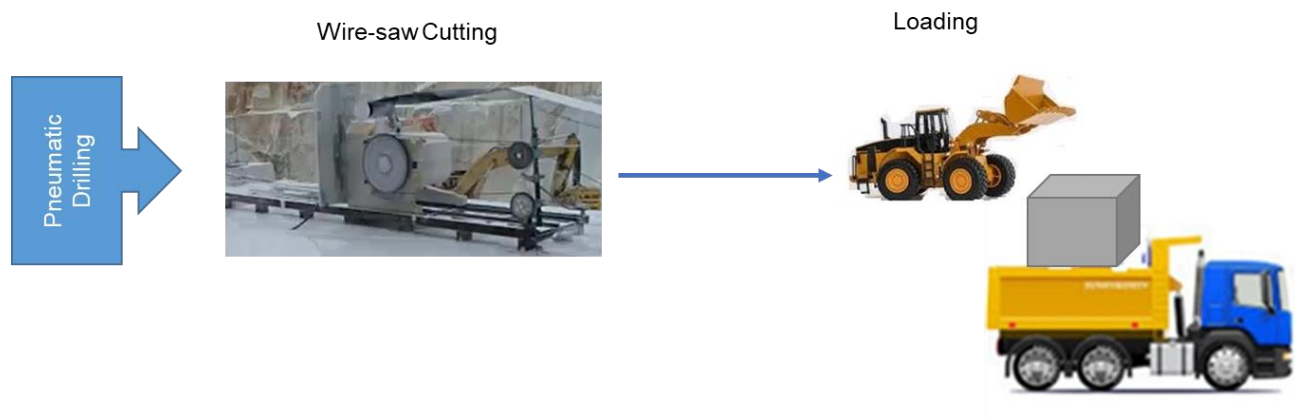
Small and Medium Scale Mining Operations

Both small and medium scale mining is either done on primitive method of blasting or the comparatively better technique of expansion material usage. However, the medium scale mine owners' capital expenditure are higher mainly because of the development of mine access roads development.



Large Scale Mining Operations

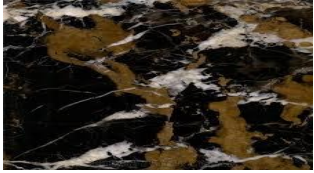
In this type of mining wiresaw or chain saw is used to extract block from surface quarry and then loaded onto trucks by loader.



2.2.2. Products

The blocks of 30 to 40 tons sizes are extracted in irregular shape locally called Aaloo (Potato)

TABLE 5: MARKETING MIX

Marble Variety	Basic Colour	Picture	Area of Extraction	Price (Rs./Ton)
Black and Gold	Black with Golden Lines		Uthal	2,000 to 10,000
Boticina	Biege		Dureji	2,000 to 5,000
Burmateak	Golden/Pink		Sukkhan	6,000
Fancy	Biege		Dureji	2,000 to 5,000
Sun Tippi	Biege		Dureji	2,000 to 5,000
Tervera	Biege		Dureji	1,800

2.2.3. Production Statistics

District Lasbela accounts for 80% of Balochistan's marble production. Though, the total production as per official data from DMM Balochistan is given as under, but, as per the meetings with private sector, the annual production of the cluster is estimated to be 0.24 million tons.

TABLE 6: PRODUCTION STATISTICS OF MINES

No. of Operational Mines	Average Annual Production Per Mine (Tons)	Total Annual Production (Tons)
66	13,899	917,363

2.3. Institutional Framework

2.3.1. Mines and Minerals Development Department Balochistan

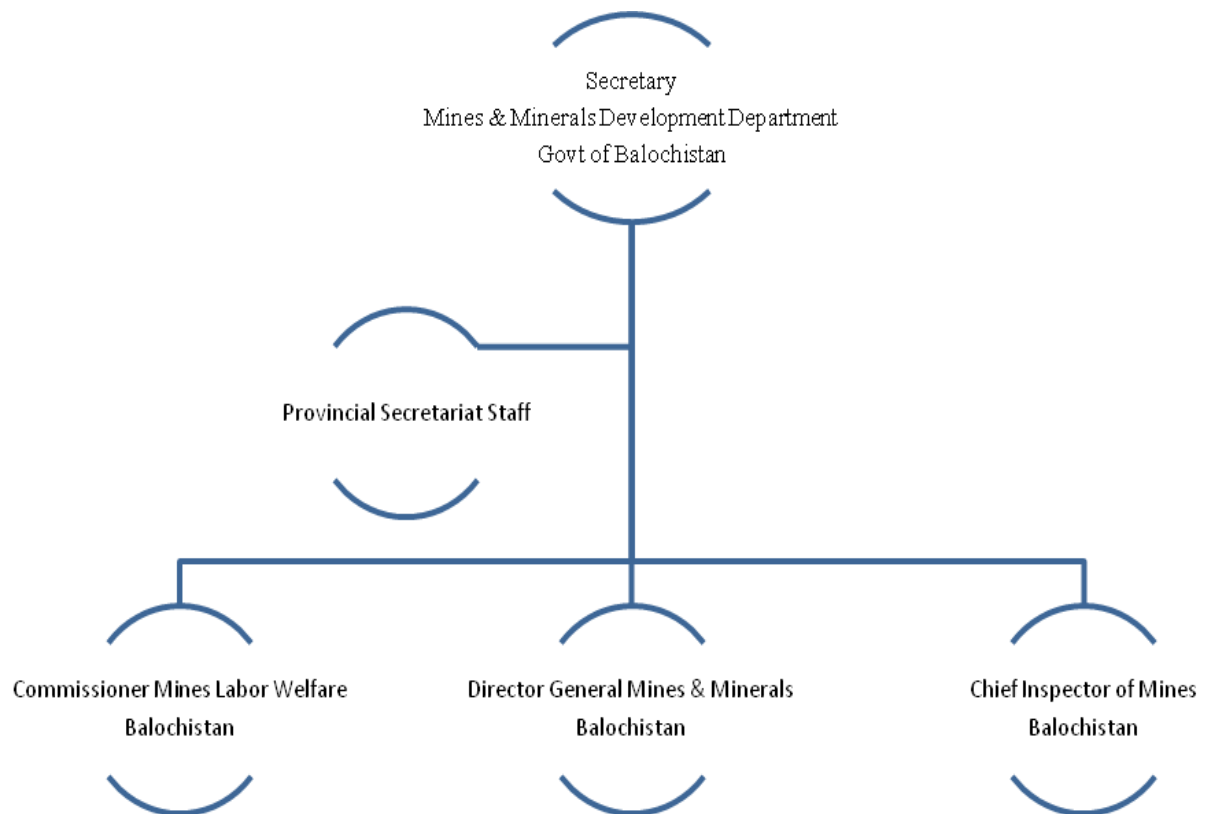
The Government of Balochistan has implemented the National Mineral Policy-1995 which provides appropriate institutional arrangements, a modern regulatory frame work, and equitable and internationally competitive fiscal program to expand mineral database.

In pursuance of National Mineral Policy 1995, the Government of Balochistan has created the Department of Mines and Mineral Development Department in March 2002. With implementation of National Mineral Policy and formulation of Balochistan Mineral Rules 2002 several national/multinational foreign mining companies have responded favorable 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.

FIGURE 2: ORGANIZATIONAL STRUCTURE OF MINES AND MINERALS DEVELOPMENT DEPARTMENT



2.3.2. Department of Forestry, Environment, and Wildlife

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

2.3.3. Environmental Protection Agency, Balochistan

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 federal and provincial laws, and improving the protection of the environmental and natural resources of Balochistan, developing policies for improvement and sustainable use of natural resources. The Government of Pakistan, accepting the youth as being its most potential and valuable asset, created the wing 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. The department in the last few years 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 is the under-construction Youth Development Centre at Quetta with an estimated cost of PKR24.6 million. The project is funded by the 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) and warehouses. The goal of the PASDEC is to make Pakistan globally competitive and socially responsible player of the international dimension 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.)
- Development of industrial & market information

Following the PASDEC's machinery pool, miners started mechanization and today about 05 mines have been modernized in the Dhureji and 03 in Uthal area.

In the year 2018, Pakistan Stone Development Company (PASDEC) has signed a Memorandum of Understanding (MoU) with the Government of Balochistan for the overall development of marble and granite mining and processing sector of the province.

2.3.5. SMEDA Balochistan

SMEDA is a federal government organization working as subsidiary of Industries and Production for the facilitation and development of Small and Medium Enterprises. 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.

2.3.6. Labor

The Directorate of Labour (like its administrative Department i.e. Labour Department) is the custodian of the guaranteed rights of the workers like right to organize, right to collective bargaining, participation in the affairs of the respective organization, health & safety, minimum wages, compensation, etc.. For realization of its role, it enforces various labour laws. Through the implementation of the labour laws it ensures compliance of the international labour standards and thus contributes to achieving GSP, GSP+, GSP++, MFN, etc. status by securing higher position in the grading system applied by the granting countries, regions and organizations.

It also enforces international system of weights and measures in the province. Besides, it also carries out awareness raising drive in the workers, employers and other stakeholders on labour issues, labour laws and contemporary issues.

2.3.7. All Pakistan Marble Processors Association- Balochistan Region

The mine owners of Balochistan have been struggling on individual bases. Since last few years they had been trying to unite under the umbrella of Balochistan Marble Association which later emerged as the Marble City Association of Trade and Industry (MCAT) in the year.... Finally the MCAT succeeded in functionalizing the APMIA Balochistan region in the year 2018. Now the APMIA Balochistan is gradually expanding its membership and trying to convince the APMIA members to broaden the name and scope to the Minerals rather than limiting to Marble only.

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 of the Marble City Gadani and Karachi as compared to other districts of Balochistan and the Khyber Pakhtunkhwa.
- Smooth mining operations as compared to other mining areas of the country.
- Availability of rental machinery from the nearby Sohrab Goth Market of Karachi.

2.4.2. Weaknesses

- Obsolete mining techniques not only resulting in over 75% marble wastage, rather also tagged the irregular blocks to be of low average value of PKR 2,000 per ton.
- Reliance of export quality Black and Gold on demand from only 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 have low turnover in the local market due to their dark colour
- Beige colour mining areas face local disputes problems.
- Investors' trust in deploying their machinery on the mine sites for fear of being unable to move back, is a major hinderance 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 ANALYSIS - LOCAL MARKET

The demand and supply of the dimension stone of Lasbela exhibits two different traits. The dark coloured Black and Gold is seldom processed domestically whereas all of the beige coloured marble is sold in the domestic market.

3.1. Quantum of Supply

A total of 66 mines are supplying about 0.9 Million tons of raw marble in shape of blocks to the processors of Marble City Gadani, and the Manghopir Market of Karachi. 75% of the marble is supplied for processing and consumption in domestic market while 25% is exported (mainly in shape of squared blocks).

3.2. Supply Trends

The Black and Gold marble deposits are located in the region of Labela, where due to the partnership of locals, the mines remain operational for longer time. However, the constant supply of this marble remained dependent upon the demand of Squared Blocks from China. Starting with the exports to China in 2006, the supply reached about 85,000 tons per month during the year 2012, but with a gradual decrease in demand from China has fallen to around 15,000 tons per month. The cluster failed to position this high quality market as a finished product and hence has no domestic or export supply other than China.

In contrast to this, the supply of Biege colour marble from the Lasbela has faced severe mine closure problems, for example for Tippi. Apart from this, the comparatively lower prices have also increased its supply within the domestic market, especially in the Karachi.

3.3. Quantum of Demand

The demand for Black and Gold has been dependent upon the processing acitivity of monolama block squaring units supply to China accounting for almost 100% of the cluster's marble. The beige marble is dominantly demanded for domestic consumption. With existence of about 60 operational processing units at Marble City Gadani (0.19 million tons per year) and 700 processing units at Karachi (2.2 million tons per year), the total demand for dimension stone of Lasbela is about 2.4 million tons.

3.4. Demand Trend

The construction sector contributes 2.8% to GDP of Pakistan and growing with an average rate of 5.1%, that is estimated to reach 4% in the year 2025, valuing USD 17.63 Billion. In addition to the rapidly growing housing schemes and the new schemes the demand for Dimension stone will also maintain upward trend.

3.5. Key Market Segments

Following are the key market segments for Lasbela mining cluster:

-  Monoloma Units, squaring blocks for exports
-  Value added products' processors:
 - ❖ Slabs
 - ❖ Strips (14 sooter) gutka
 - ❖ Tiles
-  Waste Utilization Units, processing tiles from Talya of Biege colours

3.6. Potential Niche Markets

The marble waste of Black and Gold is currently being utilized in roads, and building foundations. It can be added value in shape of mosaic. Therefore, the marble mosaic field tiles, and borders processors can be its customers. An aggressive marketing for introduction of dark colours dimension stone in domestic market of Kitchen tops can be another venue.

3.7. Expected Growth of Cluster Products

The construction sector contributes 2.8% to GDP of Pakistan and growing with an average rate of 5.1%, that is estimated to reach 4% in the year 2025, valuing PKR 1,763 Billion. Taking into consideration the growth rate of the construction industry, the demand for dimension stone of the cluster is expected to reach 3 million tons.

4. DEMAND AND SUPPLY GAP ANALYSIS - EXPORT MARKET

4.1. Analysis of Current Exports

The marble mining sector of Pakistan is unable to contribute to the exports in proportion to its potential. Pakistan's share (50.7 Millions USD) in the international dimension stone market (26.32 Billions USD) is only 0.2%.

TABLE 7: MARBLE AND GRANITE RAW/MERELY CUT BLOCKS AND SLABS EXPORTS OF PAKISTAN VS WORLD

Region	Year 2018
World's Exports	04Billions USD
Pakistan Exports	24.8 Millions USD

Today, the blocks and slabs of marble and granite (rough, or merely cut/squared by sawing account for 66% of Pakistan's exports quantity, but, their contribution to exports revenues is 51%. As compared to this, in the world as a whole, this segment has only 15% share in total exports of dimension stone.

TABLE 8: PAKISTAN'S EXPORTS OF DIMENSION STONE BLOCKS AND SLABS (VALUE IN TONS)

HS Code	Products	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
251511	Marble and travertine, crude or roughly trimmed	9,951	9,616	22,253	37,212	44,572	25,395	29,374	17,962	15,125	23,843
251512	Marble and travertine, merely cut, by sawing or otherwise, into blocks or slabs of a square ...	51,638	86,196	169,580	270,313	412,404	359,145	290,790	204,056	205,334	198,230
251611	Granite, crude or roughly trimmed (excluding already with the characteristics of setts, curbstones	1,000	119		39	108	779	50	29	219	229
251612	Granite, merely cut, by sawing or otherwise, into blocks or slabs of a square or rectangular ...	428	413	64		265	114	96	301	956	1,426
Total		63,017	96,344	191,897	307,564	457,349	385,433	320,310	222,348	221,634	223,728

4.2. Analysis of Country wise Existing Demand

As the documents under review is about the dimension stone mining products, that is, blocks, therefore, the given analysis aims at providing information about the mentioned products demand in international market. World's total imports of of Dimension Stone Blocks and Slabs is products is 25.7Million Tons. Out of this, shares of different products with reference to Top 05 Importing countries are as given below:

TABLE 9:MARBLE AND TRAVERTINE, CRUDE OR ROUGHLY TRIMMED (YEAR 2018)

Importers	Tons	% Share
World	2,005,818	100
China	1,066,676	53
Egypt	161,208	8
Italy	146,993	7.3
Greece	130,536	6.5
Taipei, Chinese	101,734	5.1

TABLE 10:MARBLE AND TRAVERTINE, MERELY CUT, BY SAWING OR OTHERWISE, INTO BLOCKS OR SLABS (YEAR 2018)

Importers	Tons	% Share
World	8,792,614	100
China	6,838,540	78
India	892,569	10
Jordan	99,918	1.1
Lebanon	95,983	1.1
Syria	88,480	1.01

TABLE 11: GRANITE, CRUDE OR ROUGHLY TRIMMED (YEAR 2018)

Importers	Tons	% Share
World	12,900,202	100
China	5,734,843	44
U.K	2,892,737	22
Denmark	999,418	7.7
Russian	728,657	5.6
Taipei, Chinese	580,425	4.5

TABLE 12: GRANITE, MERELY CUT, BY SAWING OR OTHERWISE, INTO BLOCKS OR SLABS OF A SQUARE OR RECTANGULAR (YEAR 2018)

Importers	Tons	% Share
World	1,985,769	100
Maldives	691,408	35
Bangladesh	222,251	11
China	214,920	10.8
Taipei, Chinese	182,149	9.2
Thailand	95,067	4.8

TABLE 13: TOP 05 IMPORTERS OF PAKISTAN'S MARBLE AND TRAVERTINE, CRUDE OR ROUGHLY TRIMMED(TONS)

Importer	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
World	9,951	9,616	22,253	37,212	44,572	25,395	29,374	17,962	15,125	23,843
China	5,258	5,764	19,605	32,852	42,792	23,416	24,917	16,924	13,959	21,879
Oman				15		24			200	952
Afghanistan	64	111	519	225	20	32	551	406	137	304
Viet Nam	13	35	43	208	76	410	76	284	108	236
Italy	34	125	86	25	45	13	282	147	131	105

TABLE 14: TOP 05 IMPORTERS OF PAKISTAN'S MARBLE AND TRAVERTINE, MERELY CUT, BY SAWING OR OTHERWISE, INTO BLOCKS OR SLABS (TONS)

Importer	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
World	51,638	86,196	169,580	270,313	412,404	359,145	290,790	204,056	205,334	198,230
China	35,053	67,650	149,647	244,327	384,467	330,409	264,960	176,836	173,149	172,022
Qatar	165	221	286	142	215	420	1,071	300	3,460	4,728
Italy	1,330	2,114	2,728	1,768	4,851	3,298	3,033	4,217	3,253	4,007
Afghanistan	302	937	1,233	3,319	221	1,687	2,568	4,766	6,757	2,958
Bangladesh	67	125	348	820	1,302	308	1,436	842	1,929	2,623

TABLE 15: TOP 05 IMPORTERS OF PAKISTAN'S GRANITE, CRUDE OR ROUGHLY TRIMMED(TONS)

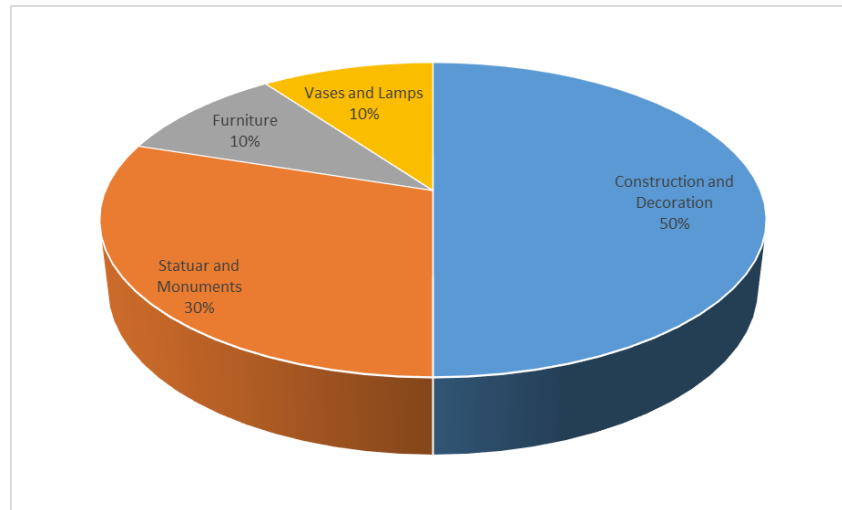
Importer	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
World		119		39	108	779	50	29	219	229
China		119		39	73		50		73	229
Afghanistan									143	
Bangladesh								25		
Germany					2			4		
Italy					33	779				

TABLE 16: TOP 05 IMPORTERS OF PAKISTAN'S GRANITE, MERELY CUT, BY SAWING OR OTHERWISE, INTO BLOCKS OR SLABS OF A SQUARE OR RECTANGULAR(TONS)

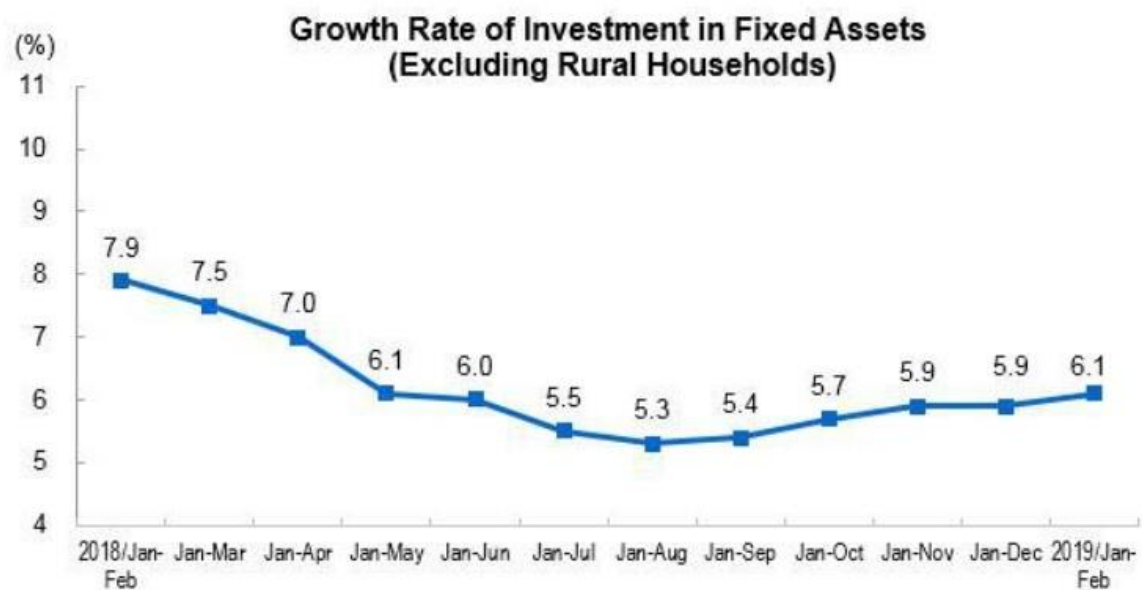
Importer	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
World	428	413	64		265	114	96	301	956	1,426
China	418	41	64		35	22		293	548	833
Bangladesh									100	200
Spain									24	199
Saudi Arabia					20		96			74
Oman										64

The world's demand for untrimmed or merely trimmed by sawing raw marble blocks and slabs has been growing at 10% per year. China has emerged as the leading raw marble importer for the category with an average growth rate 16% per year. In the year 2001 its share in world's imports of raw marble value was 34%, but today it accounts for 68% of the total value. Main reason for this being the increased real estate activities due to heavy focus of Chinese government on massive construction activities coupled with the conducive environment for marble processing.

FIGURE 3: MARBLE CONSUMPTION IN CHINA¹



Top importer of the raw marble blocks for Pakistan is also China, however, the exports to China has been showing declining trend due to slow down in its real estate growth rate. Following is the trend of this growth rate for the year 2018²:



¹ Source: <https://daxueconsulting.com/the-marble-market-in-china>

² Source: http://www.stats.gov.cn/english/PressRelease/201903/t20190319_1654966.html

FIGURE 4: IMPORT OF CHINA - RAW OR MERELY TRIMMED MARBLE (VALUE MILLIONS USD)

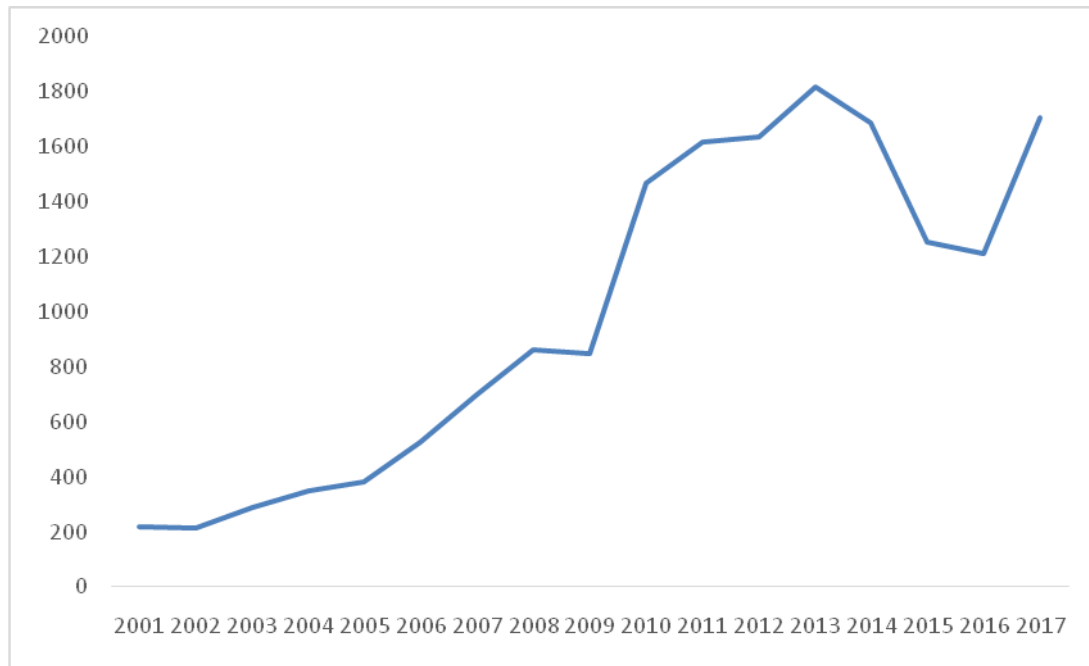
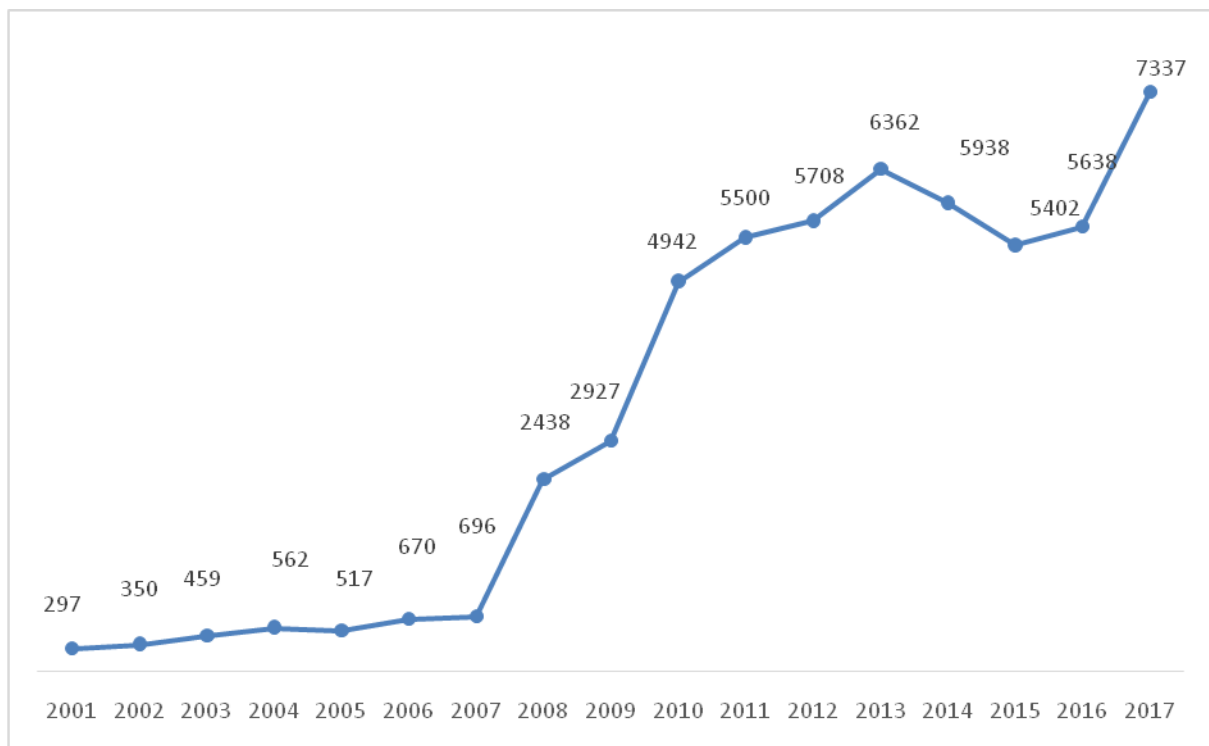


FIGURE 5: IMPORTS OF CHINA- RAW MARBLE OR MERELY TRIMMED BY SAWING (QUANTITY IN TONS)



The prices of Black and Gold started from USD 375/Ton in the year 2006 have now decreased to USD 100/Ton. In comparison to this, the same quality marble “Portoro” from Italy has shown increased prices from USD 1,000 to USD 2,500/ton during last five year. The main reason is the poor marketing strategy of Pakistani exporters, who kept on competing on prices with each other.

4.3. Demand and Supply Gap

World market for dimensional stone is about USD 26.32 Billion of which Pakistan's share is only 0.002%, that is USD 50.7 million. Being blessed with highest quality dimensional stones, the country has huge gap to fill.

4.4. Expected Growth of Cluster

Currently the cluster's growth is highly volatile depending upon China's imports of Black and Gold and the domestic beige colour supply. The implementation of proposed intervention may change the entire scenario by the year 2025. With government's support to mine owners and proper marketing strategy by the private sector the cluster can grow by more than 20% per year in terms of quality, quantity, and profitability.

4.5. Potential Niche Market with Growth Trends

The cluster needs to focus upon the value added products like slabs, tiles, and mosaics to the highly paying US and European markets as well as calibrated and polished tiles to the domestic market.

4.6. Key Requirements of Potential Market

The squared blocks are demanded in perfectly 6 sided cut shape with an average weight of 28 to 30 tons. The demand for slabs and tiles in Middle East follows the pattern of uncalibered and unpolished product, whereas that of the advance economies demand perfectly calibrated and polished products.

4.7. Analysis of Core Competing Products and Countries

With reference to mining products, the analysis here covers only products codes (Pakistan's position for exports to China is 7th) and 251512 (Pakistan's position for exports to China is 8th). Pakistan's major customers along with the competition is as under:

TABLE 17: PAKISTAN'S COMPETITIVE POSITION MARBLE BLOCK AND SLABD IN TERMS OF PERCENTAGE OF VALUE

Product	Top 3 Exporters in World	Top 3 Importer in World	Top 3 Importers for Pakistan	Competitors of Pakistan for its 3 Top Importers
251511- Marble and travertine, crude or roughly trimmed	1. Italy (31.5%) 2. Greece (31%) 3. Turkey (11.1%)	1. China (49.8%) 2. Italy (16.2%) 3. Chinese Taipe (9.6%)	1. China(91.5%) 2. Republic of Korea (2.1%) 3. Oman (1.5%)	1. Turkey (34%), Italy (19.7%), Iran (11.5%) 2. Guatemala (23.4%), Macidonia North (20.5%), China (20.1%) 3. UAE (69.8%), Iran (13.2%), Italy (9.1%)
251512 Marble and travertine, merely cut, by sawing or otherwise, into blocks or slabs of a square	1. Turkey (62.5%) 2. Italy (10.6%) 3. Iran (6.4%)	1. China (72.7%) 2. India (12.5%) 3. Algeria (1.5%)	1. China(83.7%) 2. UAE (2.6%) 3. Qatar (2.2%)	1. Turkey (54.1%), Italy (9.7%), Egypt (7.9%) 2. Italy (31.4%), Spain (22.5%), China (21%) 3. Italy (59.3%), Egypt (16.6%), Greece (4.5%)

Products having resemblance to Lasbela's Black and Gold

- Italy: Portorio
- Turkey: Art Gray
- Egypt: Black
- Spain: Black

4.8. Cluster's Existing and Potential Competitiveness

The clusters' current competitiveness lies in its strength of:

- Export Quality Black and Gold sold to exports for squared blocks
- Biege colour blocks sold to processors for slabs and tiles supplied in domestic market

The mining cluster of Lasbela should focus on revisiting its strategy as:

- ✓ Black Gold to be processed into slabs for domestic market and tiles to be exported to advanced countries
- ✓ Developed countries markets to be aggressively explored for beige colour

4.9. Major Drivers of Success or Failure

- Reliable and Consistent supply
- Aggressive Marketing
- Ability to stock blocks in domestic market as well warehouse in export markets
- Reliable trading partners in domestic as well as export markets
- Rationing the prices at certain level

5. CLUSTER GAP ANALYSIS IN THE LIGHT OF INTERNATIONAL BEST PRACTICES

Several developed countries following the basic definition of economics, consider the mining as primary industry. In the dimension stone mining and processing sector, initial crushing is done in the mining area after which the crush is shifted to the processing zones for further processing. The focus of these countries remain on the value addition rather than export of crude Dimension Stone. For this, policies are formulated accordingly so that to ensure optimum value addition, improved infrastructure, modern machinery and techniques, compliance to labor laws, access to finance and environment friendly mining and processing.

5.1. Infrastructure

The mining policies of advanced economies ensure that the investors get optimum facilitation while entering into a mining project. The state mining policies consider infrastructure to be an integral part of the state mining policy. Mining areas are developed through provision of roads network, electricity, gas, water and communication. This is the reason for the best performance of dimension stone sectors of the countries like, China, India, Italy, and Turkey etc. For instance in China, the provision of electricity, water and communication is inbuilt in the lease agreement such that leases will be allotted if these facilities are provided by state.

FIGURE 6: MARBLE QUARRIES IN NORTHERN ITALY³



As compared to this, the mining cluster of the district Lasbela, has none of these state sponsored facilities. Though after the completion of the Makran Coastal Highway and the upgradation of the main RCD Highway, the general logistic conditions have improved, but the mine access roads are still neglected. During the study team's visit to mining areas and the survey analysis, it was observed that every mine operator develops an average 26-KM mine access shingle road with a average cost of PKR 2.1 million incurred by an SME. The average distance of a mine from main market is 76-KM. None of the mining site has state supplied electricity and all of the mines rely upon generator. Water scarcity is a common problem and the SMEs have to arrange it themselves. Finally, for cooking at mines, minerd either use wood or gas cylinders.

³ Photo Credit: NY Times (An excerpt)

5.2. Technology

The mining in advanced economies is done by use of modern machinery such as wire saw, chain saw, speed cutters. In these developed and dimension stone rich countries, mine blasting techniques are totally banned. The use of modern technology ensures efficient mining with 04 sided squared blocks and lowest wastage of precious resource.

FIGURE 7: WIRESAW AT MINE



FIGURE 8: CHAIN CUTTER



FIGURE 9: BLOCK EXTRACTORS⁴



FIGURE 10: MARBLE HANDLING AT QUARRY



⁴Photo: YMZ 1500/2000 Quarry Machines

In comparison to this, the mining in Lasbela is either carried out by obsolete mining technique of blasting (beige colour) or shell removal techniques (Black and Gold). During the survey, the following issues were reported by respondents:

- Excavators: 95% use rented and 5% own the machinery
- Loaders and Trucks: 100% use rented vehicles
- Pneumatic Compressors: 100% use own machinery, but all purchase in second hand
- Drill machines: 100% owned

The obsolete mining results in 55% wastage of dimension stone at mine. Inferred from the production statistics and survey of mines, the wastage is estimated to be about 0.8 million tons.

5.3. Human Resource

In the advanced economies quarrying activities are undertaken by qualified, well trained and experienced persons. Normally in countries like Italy and Turkey etc apprenticeship is mandatory for unskilled workers. semi-skilled workers (technicians, foremen, safety officers and warehouse supervisors) need to have a 2 to 4 years college diploma in relevant field. Managers, engineers and more specialized roles in the industry require a relevant university degree.

In contrast to this, the situation of the Lasbela mining cluster is totally different. Relevance of education is only seen in the large scale organizations whereas majority of mine owners simply hire persons with reference and upon basis of few years experience. The results of the survey for this specific study indicate the following trend:

Managerial Jobs

20% of the managers were having simple intermediate level education whereas the 80% though graduates, but without any relevant education to their role. The average experience for this category was 7 years drawing an average monthly salary of PKR 47,000/.

Skilled Labor (Operators)

The machinery operators are either hired upon simple interview and demonstration of skills on site to ascertain their experience or trained on mines as labor and then upgraded as operators. With an average experience of 4.5 years, 65% were hired on third party contact piece rate (PKR200/ton) whereas 35% salaried persons with average monthly drawing of PKR 35,000/.

Semi Skilled (Helper)

Like the machinery operators, miners don't required this category of worker to have any education. Experience is also not mandatory however preferred. The average experience and monthly of helpers is 3.5 years and PKR100/Ton (65% of labor) or PKR 15,000/Month (35% of labor) respectively.

Unskilled (Labor)

These are totally illiterate people with an average experience of 1 year, and hired through third party contract on basis of PKR 75/ton.

5.4. Access to Finance

In the countries with well developed mineral development sector provides multiple banking products are available for financing the mining activities particularly technology. In these countries mine itself is used as collateral to avail bank finance. Secondly there are dedicated warehouses where the mine product is accepted as collateral for bank loan. Another important financing facility in these countries is debt financing. Other common financing options available for mine owner are; assets based finance, royalty based finance and income stream based finance.

Mining cluster of Lasbela like, the rest of country has the same problem that neither their mine lease is considered as collateral nor there is any bank specific warehousing facility.

6. KEY ISSUES

6.1. Regulatory

1. Allotment of mine leases on mere influence to unqualified people resulting in the non operational mines for year.
2. Subletting is declared to be illegal as per mining act, but still such type of mining is very common. Under such circumstances the investor's money is highly insecure and one the major hinderance to the modern mining.
3. None of the secondary data available about reserve estimation which results in guess bases nonprofessional mining.
4. Poor law and order situation.

6.2. Infrastructure

1. Shingle mine access roads in poor condition pose major issue of transportation. During the survey 50% of responding mine owners termed it as the biggest infrastructure related issue.
2. Unavailability of electricity and water results in high operating costs.

6.3. Technology

1. Obsolete technology resulting in blasting and wastage at mine.

6.4. Financing

1. Unavailability of Capital and Operating Loan for Mine Lease Holders

6.5. Human Resources

1. Unavailability of skilled labor and the workers attitude towards work.

6.6. Social

1. Despite collection of Social welfare fund, no benefit is given to the mine labor.

7. PROPOSED INTERVENTIONS

In order to be able to tap the potential of the district's dimension stone cluster, the following intervention with an estimated investment of **PKR 39.62 Billion** are identified below:

7.1. Regulatory

Required Interventions

1. Mine leases to be allotted on the basis of merit, based on the relevant experience, and financial soundness of the firm or individual.
2. The tenure for non operational mine lease should not exceed 04 years, so that genuine investors get opportunity of mining.
3. Reserve estimation to be conducted

Responsibility

1. Mines and Minerals Department of Balochistan
2. DMD, GSP, and PASDEC

Required Budget

Required Total Budget: **PKR 01Million-** One Time

7.2. Infrastructure

Required Interventions

1. Mine Access roads development with a total cost of **PKR35.8 Billion**: On the basis of mining survey, the average length of a mine access road is estimated to be 26 Km per mine. Keeping in view the geography of the district, this study suggests to:
 - a. Black top the existing shingle mine access roads of about 800 Km in the coming 5 years with a cost of PKR32 Billion.
 - b. Lay shingle roads of about 1,800 Kms for new mines with a total cost of PKR 3.8 Billion.
 - c. Optimum utilization of the dimension stone Solid waste of the relevant mining area in the roads of that region.
2. Provision of solar electricity and water to 04 mining areas with a total estimated cost of **PKR1.9Billion** as:
 - a. Solar Electric Power Plant of 40 MW over an area of 200 acres with a total investment of PKR1.82 Billion.

TABLE 18: SOLAR ELECTRICITY REQUIREMENT FOR A SINGLE MINING AREA

Requirment Per Mine	No. of Mines	Total Electricity (Mw)
200 Kva	200	40

TABLE 19: COST OF SOLAR SYSTEM FOR LASBELA CLUSTER

Description	Cost Per Unit(Million PKR)	Total Cost (Million PKR)
200 Acres Land (5 Acre for 1 Mw)	0.1	20
Solar System (40 Mw)	45	1,800
Total		1,820

- b. Waterprovision in the mining areas with an estimated total estimated cost of PKR 80 Million.

Responsibilty

- Mines and Minerals Department of Balochistan
- WAPDA
- SBP

Required Budget

Required Total Budget: **PKR 37.7Billion**

7.3. Cross Cutting: Financing and Technology

The modern mining is heavily dependent upon machinery and skilled workers. For a new mine to start operations, it takes about 06 months to clear the overburden and develop the mine access road. The financing required thus, is for the procurement of machinery and working capital. Owing to the huge investment required for machinery purchase, it suggested to support mine owners for subsidized loans, whereas the working cost to be a total responsibility of the mine owners.

7.3.1. Subsidizing the modern machinery

Required Interventions

The provincial mining department should offer subsidies for machinery procurement to the mine owners having proven track record or the ability to demonstrate genuineness in case of new investors. The government is suggested to subsidize the procurement of main machinery in shape of incurring the cost of interest against loan from bank.

TABLE 20: DETAIL OF THE REQUIRED MACHINERY AND SUBSIDY

Machinery	Cost/Unit (PKR)	No. of Units	Total Cost (Million PKR)	Subsidy (PKR)
Excavator (New)	38,000,000	100	3,800	494
Excavator (Used)	8,000,000	100	800	104
Loader (New)	25,000,000	100	2,500	325
Loader (Used)	9,000,000	100	900	117
Pneumatic Compressors (200 to 400 cfm)- New	6,000,000	150	900	117
Pneumatic Compressors (200 to 400 cfm)- Used	1,000,000	50	50	6.5
Wiresaw (50 Hp)	4,000,000	100	400	52
Wiresaw (25 Hp)	3,000,000	100	300	39
Manual Jack Hammer	2,500,000	200	500	65
Hydro Pushing Plant	3,000,000	200	600	78
DTH	4,000,000	200	800	104
Hydraulic Jacking Plant	3,500,000	200	700	91
Generator (200 Kva)	4,500,000	200	900	117
Total			13,150	1,709.5

Responsibility

Mines and Minerals Department of Balochistan

Required Budget

PKR 1.7 Billion as subsidy

7.3.2. Revitalize Existing Machinery Pools for Mining

Required Interventions

1. Increase the number of machines in existing machinery pool of PASDEC
2. Rental rates to be revised to lower possible range
3. Miners have to pay around PKR 2.5 Million as security deposit for complete set of machinery which needs to be waived off.

Responsibility

- PASDEC

Required Budget

Total budget of **PKR 100 Million** will be required for the purpose.

7.4. Human Resources

Required Interventions

Dimension Stone Mining and Processing courses to be introduced in the CFTC of TUSDEC located at Hub Industrial Trading Estate.

Responsibility

- TUSDEC

Required Budget

PKR 90 Million.

7.5. Social

Required Interventions

Social welfare fund should be utilized for benefit of mine labor in shape various fiscal and non fiscal incentives. However, the financing for compensation against accidents to be immediately available for mine workers

Responsibility

Socail Welfare Board

Required Budget

PKR 30 Million per Year

8. ECONOMICAL, SOCIAL, AND ENVIRONMENTA IMPACTS

The proposed interventions will ensure the durable sustainability of the cluster with overall positive impacts on economy, environment, and social aspects.

8.1. Economic Impacts

- ✓ The production is expected to increase to 1.7 million tons.
- ✓ Contribution to GDP increased to PKR 12.7 Billion.
- ✓ Number of Mine Leases Increased to 200 in shape of:
 - Operationalization of the closed 14 mines
 - Investment in new mines
- ✓ Number of legal quarries to increase to 3,000
- ✓ Modernized mining may help in wastage reduction of about 0.8 million tons worth at a minimum of about PKR2.4 Billion per year saving to the cluster and the nation at mine.
- ✓ Quality marble blocks without cracks and damages and 04 sided squared will reduce about 40% wastage to processors and hence better prices for mine owners to be assured in the long run.
- ✓ Reliable and consistent supply from mines.

8.2. Environmental Impacts

Modern mining will:

- Save the valuable resources for a long time and cumulative saving of the Lasbela's Dimension stone alone will be about 8 million tons in 10 years
- Decreased aerial and solid waste pollution

8.3. Social Impacts

- Direct employment to about 9,000 people
- Better socio economic conditions of local people, and the labor
- Social uplift due to increased skill oriented jobs
- Improved safety of mine workers

8.4. Key Economic Indicators Analysis

8.4.1. Contribution to GDP

Current contribution of the Lasbela mining cluster is about **PKR14.6 Billion** per year. After the proposed interventions this contribution is estimated to be **PKR41.4 Billion** per year.

8.4.2. Economic Rate of Return on Investment

With the total cost of intervention to be PKR39.7 Billion the following economic benefits may be expected:

- IERR: 54%
- Net cost benefit ratio: 1.14
- PV of economic benefits: 255.2 Billion
- PV of economic costs: 224.7 Billion

9. ADDITIONAL INFORMATION

ANNEXURE-1: Record Note of Lasbela Cluster FGD

Focus Group Discussion (FGD) on Dimension Stone Sector-Lasbela

Venue:Hospitality Inn Hotel, Lasbela

Dated: September 14, 2018

Agenda: The Focus Group Discussion (FGD) was aimed at securing inputs of Dimension Stone sector stakeholders at Lasbela on; (i) validation and prioritization of key issues (ii) Identification of most viable and doable interventions/projects pertaining to the specific sector, and, (iii) costing for the identified interventions.

Background:

The Vision 2025 aims to improve Pakistan's competitiveness in commodity producing sectors through cluster based development through building collaborations among private firms, the government, and academic & research institutions. In line with the vision 2025, Planning Commission, Ministry of Planning, Development & Reform has engaged Small and Medium Enterprises Development Authority (SMEDA) to undertake a comprehensive Research/Feasibility Study on Cluster Based Mineral Sector Transformation Plan. This comprehensive study is aimed to assess complete value chain study of selected mineral across 20 potential clusters in three sub sectors; mining, processing & trading for further development of mineral sector to international standards.

The mineral transformation plan study team has initiated the second stage of this study, data collection and analysis after successful completion of the first stage, inception report. During the second stage of the study, the process of sector/mineral wise consultations involving all the relevant public and private sector stakeholders has been initiated.

In this regard, 1st focus group discussion (FGD) on Dimension Stone sector was conducted on September 14, 2018 at Marble City Gadani, Lasbela. A total of 25 persons attended the FGD. These included representatives from Directorate of Mines & Mineral (DMM), Lasbela Industrial Estates Development Authority (LIEDA), State Bank of Pakistan (SBP), All Pakistan Marble Industries Association (APMIA) Balochistan Zone, Lasbela Chambers of Commerce and Industries (LCCI), Marble Miners, processors and traders of Lasbela.

Discussions:

The focus group discussion started with recitation from Holy Quran and was followed by introductory session. Mr. Anwer Iqbal (Value Chain Analyst- Dimension Stone) briefed the participants about SMEDA and the project “Mineral Sector Transformation Plan”. Mr. Haji Shabbir (Office Bearer, APMIA-Baluchistan) thanked all the participants for their participation in FGD. Mr. Abdur Rashid (Secretary General, LCCI) informed the audience about the Common Facility Training Centre of TUSDEC at HITE.

This was followed by group discussion which deliberated on key issues, possible interventions, key responsible implementer and cost of interventions. After detailed discussion at Conference Room of M/s, IMG, the participants visited the processing units of M/s. Stock Point, M/s. SKYWORDS, and M/s. MOD Minerals.

Key issues identified along with required interventions, and responsible authorities. However cost estimates have to be calculated in detail.

S #	Issues Faced By Cluster	Required Interventions	Responsibility
Regulatory			
01	Policy framework non existent	✓ Mining Act to allot lease to the qualified individuals or firms	DMD, Baluchistan
02	As per policy locals must be the shareholders in mining, therefore leases on the basis of mere influence regardless of their Financial and technical ability and cause the leases to remain nonproductive for years.	✓ Mining leases to be allotted to the qualified investors preferably the marble processors. ✓ The condition of local shareholding to be removed.	DMD, Baluchistan
04	Role of DMD not supportive in Reserve estimation. They have mining engineers but no geologist.	✓ Hiring o geologists by the DMD, for reserve estimation.	DMD, Baluchistan
05	Law and order situation result in investors' insecurity	✓ Improved law and order situation	Provincial Govt.
06	The Social Welfare fund of Rs. 5/Ton collected but no utilization for the social welfare of labor.	✓ Utilization of social welfare funds for provision of facilities to labor.	Labor Department

S #	Issues Faced By Cluster	Required Interventions	Responsibility
Infrastructure			
01	Unknown reserves major hindrance to the mining	✓ Start with pilot project of Kheer Thar range Reserve Estimation by the Geology Department of Karachi University.	- DMD, Baluchistan - SMEDA - KU - APMIA
02	Granite Mining Establishment cost is too high therefore. Low cost Imported granite finds its way to processing in shape of unpolished blocks and slabs because of no import duty.	✓ Machinery Pools in granite bearing areas.	- APMIA - DMD, Baluchistan - PASDEC
03	Beige Color marble due to inconsistent supply from mines get negative ranking in the international market.	✓ Non local Processors and investors should be allowed mining without condition of local shareholders.	

S #	Issues Faced By Cluster	Required Interventions	Responsibility
Technology			
01	- Unavailability of modern technology at mines because the mine owners don't have the capacity whereas the investors cant risk their machinery at mines for being unable to move it back. - PASDEC Machinery pool costs are high. PASDEC charges Rs. 4,000/hour as compared to (Hitachi-400) that of the Rs. 3,500/Hr (Rs. 3,000 machine + Rs. 500 jack hammer) by Private sector. - Repair and maintenance problem due to delay in spares availability.	✓ Machinery Pools of PASDEC to revisit its per hour charges.	- APMIA - PASDEC

S #	Issues Faced By Cluster	Required Interventions	Responsibility
Access to Finance			
01	Unavailability of financing to miners	✓ Financing on the basis of stock evaluation as collateral.	- SBP - Commercial Banks
Human Resource Development			
01	Availability of skilled labor	✓ Marble Mining Courses to be Started at TUSDEC CFTC HITE.	- PASDEC - SMEDA - TUSDEC
Cross Cutting			
01	Lack of Coordination between Association and the Chambers	✓ Increased coordination	- APMIA - LCCI - SMEDA - TDAP

Pictures



List of Participants

List of Participants
Focused Group Discussion/Workshop
Research/Feasibility Study on Cluster Based Mineral Sector Transformation Plan

Date: September 14, 2018

Venue: Marble City, Gadani

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List of Participants
Focused Group Discussion/Workshop
Research/Feasibility Study on Cluster Based Mineral Sector Transformation Plan

Date: September 14, 2018

Venue: Marble City, Gadani

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