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# Marble and Granite Demand and Supply Gap Assessment

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# Pakistan Marble and Granite Sector Demand and Supply Gap Assessment

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# Abstract:

This report presents an assessment of Pakistan's marble and granite sector from the demand and supply-side perspective. The report analyses the current market composition and trends in the local market as well as export trends. The requirements of the decision-makers from a quality perspective as well as the key challenges faced in dealing with the local marble processors are also presented. The report also includes a gap analysis of the supply end leading to the challenges on the demand end. Building upon the assessment, the report presents recommendations to build scale and profitability both in domestic and export markets for the sector.

# Acronyms

| | |
|---|---|
| APMIA | All Pakistan Marble Industries Association |
| B2B | Business to Business |
| B2C | Business to Consumer |
| CFTC | Common Facility and Training Centres |
| ERP | Enterprise Resource Planning |
| FATA | Federally Administered Tribal Areas |
| FIFA | Federation Internationale de Football Association |
| FY | Fiscal Year |
| ISO | Internationally Organization for Standardization |
| IAP | Institution of Architects Pakistan |
| IAPEX | Institution of Architects Pakistan Expo |
| IT | Information Technology |
| MOQ | Minimum Order Quantity |
| MT | Metric Tones |
| KPK | Khyber Pakhtunkhwa |
| PASDEC | Pakistan Stone Development Company |
| PCSIR | Pakistan Council for Scientific and Industrial Research |
| SOW | Scope of Work |
| TPC | To Be Confirmed |
| TPO | Total Product Offering |
| UAE | United Arab Emirates |
| US | United States |
| USAID | United States Agency for International Development |

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# EXECUTIVE SUMMARY

Marble and Granite are materials which have a lot of demand both at the domestic as well as in international market. The use of marble and granite is on the rise around the world. According to ITC Trade Map, the international trade volume was estimated to be $ 28.5 billion in 2012. In Pakistan, marble and granite is extracted from the mines by blasting it with explosives. Not only does this indiscriminate blasting cause damage to the raw marble, but also results in high waste levels of the material of up to 75% and the material that comes out is in irregular shape, adding to the inefficiency on the processing end. Most of the other countries with marble reserves have moved to much more efficient methods of extraction like the use of wire saws where the wastage is as low as 25%. As per PASDEC estimates, Pakistan's total marble and granite production for 2012 was estimated to be 3.22 million tons (See Annex 8, for details). 97% of this total annual production is consumed locally. In addition, the imported varieties have also over the years captured a significant share of the market at the high end. Based on the average selling prices, it is estimated that the bulk of the volume (70%) in the local market is in the Low/Mid Tier. The value contribution from this segment is 23%. The local top tier materials are estimated to be approximately 17% in volume and 23% in value, whereas the imported varieties skim the market with 40% of the market value with only 13% volume. In addition to marble, Granite varieties are also rapidly gaining acceptance. Some new trend gaining acceptance is using marble with different finishes especially for facades as well as decorative mosaic pieces. In terms of the quality of marble and granite materials, the following are the key quality parameters important for decision-makers.

- Materials in the right color, shade and pattern.
- Cutting direction of the materials.
- Calibration and cutting tolerance.
- No chipped or broken edges or cracks and materials delivered in pallets.

Following are the key challenges and issues faced by the decision makers at the demand end:

- Availability of the selected marble variety in the required quantities
- Product consistency
- Long timelines for the product availability.
- Lack of focus on product presentation. Absence of active websites with updated product information.
- Non-availability of key tests pertaining to the attributes of the marble and granite materials are available.
- Lack of knowledge and understanding regarding stones application.

As per ITC Trade Map, the exports of marble and onyx from Pakistan have been showing a steady increase amounting to $ 62.2 million in the calendar year 2012, a 17.8% increase over previous year. As per PASDEC, the exports for raw and finished marble and granite products are projected to exceed $100 million for the current fiscal year. However bulk of these exports i.e. nearly 69% is exported to China in raw form. Other key export markets include Saudi Arabia and other Middle Eastern countries, United States, Afghanistan, Russia and Malaysia. While there is a huge opportunity in the export market, Pakistani exporters are not completely able to tap this demand because of the following reasons:

- Limited processing capacity.

- Non-availability of buffer stocks.
- Inability to meet timelines due to precarious law and order situation and load shedding.
- Quality issues due to quarrying and production inefficiencies.

At the supply end, following were observed as the key issues
Blocks of irregular shapes from quarries reduce the efficiency at the processing level.

- Most of the machinery at the processing units is obsolete increasing the processing costs and downtime.
- Equipment being used beyond their rated capacity
- Lack of emphasis on proper layout of the processing units resulting in a lot of duplication and rework.
- Lack of material handling equipment like forklifts
- Limited focus on inventory management, including lack of monitoring of raw material volume and value as well as sales trends, tying up valuable working capital
- Lack of monitoring of sales trends
- Skill development gaps across all areas of processing. There is a very small pool of trained workforce, and there is a ot of difficulty in attracting quality human resource
- Poor housekeeping and working conditions at the processing plants
- Low consideration for environment friendly practices. Limited documentation and computerization at the processing plants

The suggested recommendations and interventions, based on the demand and supply assessment can be broadly divided into six key areas.

**Technical Assistance**

- Training on the concept of lean manufacturing and optimization of the plant layout from a lean manufacturing perspective.
- Assistance in setting up a simple ERP software system to integrate all facets of an operation,
- Training on export marketing and B2B marketing.

**Workforce Development**

- Skill upgradation of the workforce through induction of an educated workforce into the processing plants and exposing the existing workforce to the best practices and Standards Operating Procedures (SOPs)
-

**Technology and Equipment Upgrades**

- As a first step, equipment at some of the processing plants who are keen to upgrade their facilities can be upgraded to help these plants improve their quality and capacity and consequently their competitiveness.

**Industry Relevant Certifications**

- It is recommended to help and support the processing plants in getting the necessary industry relevant certifications like Eco Labeling and ISO Certifications

**Business Linkages**

Linkages need to be developed between the marble processors and the architects In this regard, collaboration can be built using a platform like the Institution of Architects Pakistan (IAP) or the marble industry can organize its own periodic events. Also, on a pilot basis, selling marble

products through ceramic retailers can be tested to increase the distribution reach of the marble products.

**Marketing Initiatives and Assistance**

Tests of key attributes and imaging of the local stones available in Pakistan should be carried out from a credible international facility. These should then be shared with the local and international decision makers.

- The marble suppliers need to have functional and interactive websites carrying all the relevant information where queries are responded timely.

- The marble processors should establish impactful display centres at convenient locations, particularly in the metro cities, with properly trained staff to showcase their entire range. Permanent displays of marble and granite varieties should be set up at high profile venues.

In addition to the initiatives carried out within the industry, a couple of external factors which are having an adverse impact on the operating environment for the marble and granite industry need to be addressed and taken up with the relevant stakeholders

- Discouraging the practice of quarrying through blasting needs to be actively taken up with the provincial governments and Department of Mining.

- The security situation which is hampering the day-to-day operations of the processing plants, particularly in Karachi needs to be taken up with the provincial government to ensure smooth operation of marble processing plants.

# 1. Introduction

## 1.1 Background

Pakistan is a country nature has endowed with a variety of valuable natural resources. One hand, it has been blessed with fertile land where a wide variety of crops like cotton, rice, sugarcane, mango, dates and other fruits and vegetables can be cultivated, On the other hand, it is also rich in a number of minerals. Besides huge reserves of natural gas, crude oil and coal and other minerals, Pakistan is also rich in marble and granite. It is a material in high demand internationally. It is the sixth largest mineral extracted and it is estimated to have approximately 300 billion tonnes of reserves. Internationally, the use of marble and granite is on the rise. According to ITC Trademap, the international trade for marble and granite for year 2012 was estimated to be $ 28.5 billion* Pakistan has a number of varieties of marble and granite available. There are different varieties available in Northern Pakistan (mainly KPK) and Southern Pakistan (mainly Baluchistan). The varieties found in Pakistan include:

**Marble**
**Varieties from North**
Ziarat White (Mohmand Agency KPK)
Jet black Marble (Nanher, District Buner, KPK)
Super White (Mohmand Agency KPK)
Ziarat White Gray (Mohmand Agency KPK)
Badal (Bajur Agency KPK)
Silky Black (Mohmand Agency KPK)
Sunny White/ Sunny Grey (Mohmand Agency KPK)
Pink Nowshere (Nowshera KPK)
Carrara Grey and Carrara White (District Buner KPK)
Black Zebra (District Buner KPK)
Bampokha No.1. (Now rarely available) (District Buner KPK)

**Varieties from South:**
Onyx All varieties (Dalbandin, Dist. Chaghi Baluchistan)
Black & Gold (District Lasbela Baluchistan)
Teak Wood (District Lasbela Baluchistan)
Fancy (District Lasbela Baluchistan)
Trevera (District Lasbela Bauchistan)
Flower/Tipi Trevera (District Lasbela)
Boticciono Cream (District Lasbela)
Indus Golden (Thatta Sind)
Konal Beige (Pasdec) (Naal, District Khuzdar Baluchistan)
Mustung Beige (Pasdec) (District Mastung Baluchistan)
Lorali Cream (pasdec) (District Loralai)

Other varieties of beige lime stone with small volume and mainly coming from South include:
Champagne (District Lasbela Baluchistan)
Mango Gadap (Gadap District lasbela Baluchistan)
Oceanic (District Lasbela Baluchistan)

Pietra Browm (District Lasbela Baluchistan)

**Granite:**
**Varieties from North**
Black Granite (Oghi District Manshera, KPK)
Sardo Pink (Kumrat Upper Dir KPK)
Tropical Grey/Metal Grey (District Dir, KPK)
Royal Blue (District Buner, KPK)
Salt & pepper (District Dir, KPK)
Blue Granite (District Balakot, KPK)

**Varieties from South**
Thar Red (District Tharparkar Sindh)
Indus Red (District Tharparkar Sindh)
Mehran Pink (District Tharparkar Sindh)
Sony Pink (District Tharparkar Sindh)
Thar Yellow (District Tharparkar Sindh)

New colors and expected to be added to range of available colors. About ten new varieties have arrived in the market in the past few months which are still to be named and branded.


**Figure 1 Different Varieties of Marble Found in Pakistan**

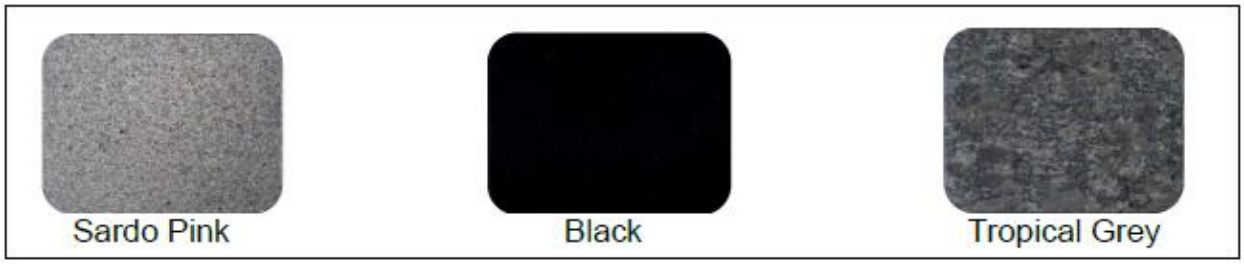


**Figure 2 Different Varieties of GraniteFound in Pakistan**

## 1.2 The Challenges

While Pakistan has large reserves of marble and a huge potential both locally and abroad, the industry is beset with internal and external challenges because of which it is not able to fully realize its potential in the local and the international market. In the local market, porcelain and ceramic tile industry has grown over the past fifteen years and is one of the biggest competition to the local marble industry as a surface material.A lot of imported materials have also found their way into the local market and are being used at the high end for homes and large projects. Similarly, in the export market, the landscape is becoming increasingly competitive with a

number of marble producing countries like Turkey, India and Egypt becoming more and more aggressive to capture a bigger share of the international market. Also countries like China import raw marble blocks from marble producing countries including Pakistan, and re-export them after processing and value addition. The practice of indiscriminate blasting at the quarries causes high wastage and quality issues. Also, there exist a large number of production inefficiencies at the processing plants which impact the local marble and granite industry‟s ability to be competitive in meeting the demand for local and export markets. At the processing end too, there are a number of challenges at the supply end, Most of the machinery at the processing plants is obsolete and is often used beyond rated capacity. These will be discussed in detail in section related to Supply Side Assessment. In addition to the industry specific challenges, the challenges at the macroeconomic level are also having a severe impact on the development of the industry. Most of the quarry clusters in Baluchistan and KPK, as well as the processing clusters in KPK and Karachi are faced with severe security challenges which are not only impeding the growth of this sector but in fact making it extremely difficult to even sustain the current level of operations. As a result, the industry has low investor confidence. Even the banks are not willing to finance ventures in this sector. These challenges as well as the recommendations to overcome them will be discussed in this report.

# 2. The Study

## 2.1 Purpose of the Supply and Demand Assessment Study

The purpose of this study is to assess demand of marble products both in the local and the export markets and analyze the supply gaps to identify quality, consistency, availability and other issues that the buyers and suppliers face in the purchase of local marble and granite

## 2.2 Objectives

To objective of the study is to engage with both the local industry stakeholders as well as players in the export markets. For the local market, work towards understanding the decision making process and key considerations for selection of surface materials. This will help in understanding the factors based on which the local marble and granite materials are selected and also understand the challenges that the decision makers face in dealing with the local marble processors because of which they may prefer other materials like tiles and imported marble. For the export markets, the objective is to assess the potential in the international marble trade, identify key existing and potential markets for Pakistani marble and granite and also understand the key issues which are hindering the growth of marble and granite exports

## 2.3 Scope of the Study

The scope of the study is to carry out market research by interviewing institutional buyers of marble products consisting of construction companies, builders, architects, as well as exporters to analyze the local demand, and validate the findings of the market research with selected processors in the northern part of the country (Punjab and KPK) as well as the southern region (Sindh and Baluchistan) to identify supply and demand gaps.

## 2.4 Study Methodology

In order to gain understanding on the subject matter, face to face interviews were carried out with the industry leaders and decision maker at the demand end to carry out a market needs assessment. A questionnaire was prepared for assessing local demand with respect to color, size, pattern, trend, logistics, market, quality, supply etc. Considering the high profile of the interviewees, these were put up as interview questionsa. Since the questions were put up to the interviewees as open ended questions, their individual views, experiences and observations beyond the questions asked were also captured.

## 2.5 Sample Size and Selection

In order to carry out the markets needs assessment, interviews were carried out with the following:

- Large construction companies, with multiple commercial and residential projects completed or on-going and presence in international market.

- Medium sized construction companies, which can be defined as having at least one commercial and residential completed project or on-going.
- Architect firms with experience of designing large commercial and residential projects,
- Exporters currently exporting to the Middle East, Europe, China and other markets.
- Director Projects / Head Architecture of large public sector organizations and government contractors,
- Members of the academia

The total sample size was kept at 40 with representation from both North and South regions. In addition, in order to understand and assess the issues at the supply end, 15 processors identified by the supply side consultant and agreed by USAID Firms were also interviewed.

# 3. Overview-Pakistan Marble and Granite Sector

## 3.1 Marble and Granite Process Flow

There are two types of process flows, for two main types of products i.e. Marble tiles and Marble slabs. The process flow for both types of products adopted locally varies from the internationally followed process on account of a number of factors mainly due to availability of cheap labor locally, lack of availability of high quality equipment, lack of international processing techniques, recent advancements and exposure

### 3.1.1 Marble Tiles

Internationally, standard sizes in standard thickness used for large surface area covering. Few very popular dimensions in meter unit of measure are as follows

- 30 x30 x 1cm,
- 30 x 60 x 1cm
- 30 x 30 x 2cm
- 30x 60 x 2cm
- 40x 60 x 2cm
- 60 x60 x 2cm

Other dimensions can also be processed according to project requirement provided the width of tiles not exceeds 60 cm. We plant are equipped with polishers which cannot process width beyond 30 or cm. Raw material in block from is first unloaded on to factory stock yard by mean of a gantry crane. These blocks are then loaded on to a block cutter to perform primary sawing operation that reduces the raw block into strips of required width and thickness.
After the strips are obtained, rough edges of strips are removed by means of a single blade cross cutter. The operation is called head and tail trimming. Trimmed strips are then introduced into a splitting machine; to split one strip into two of equal thickness. Strips are then moved out to calibration and polishing line. Here strips are first calibrated to obtain even thickness, and

then are moved forward to the dressing head where coarse grinding is done. After dressing, material is polished by coarse to fine polishing abrasives to give material a high gloss finish. Polished strips are then moved to a multi blades cross cutter. Here strip are cut to final required dimensions. Tiles are then moved to a chamfering machine which calibrates side face of each tile and chamfering two top edges. Material is then moved to other similar type of machines where same process in repeated for remaining side and two top edges. Tiles are then blow dried, buffed with cotton felt to remove any polishing residue. Last and final; all tiles are inspected for their quality and packed for dispatch. However, locally the process flow varies. Potato/Boulder type raw marble is unloaded into stock yard. Raw boulder type large marble piece weighing between 5 to 15 tons is loaded on block cutter (Vertical horizontal). Block cutter performs primary sawing operation of reducing raw marble into strip of mainly 12" width. These strip are then cut by means of a manual bench cutter or single blade cross cutter. For most units dealing in wholesale only; the process ends here. Retail buyers split these strips into two or three depending on thickness of the strip (9"" or 14""). After splitting, resizing is done, which is not required if the material processed with tolerance at early stage of sawing. Material is sold unpolished and unpacked to extent of 90-95%. Polishing is done after installation by fixing contractor or separate polishing party. A small quantity (about 5 to 10%) of material is polished at retailers workshops through a radial arm polisher. The above process flow assumes that material has no surface porosity and does not require filling.

### 3.1.2 Marble Slabs

Internationally for processing of marble slabs, material is unloaded into stock yard by means of gantry crane. These blocks are then loaded into gang saw machines; Gang saw machine performs primary sawing operation and reduces marble blacks into marble slabs of required thickness. Standard thickness are 2cm and 3cm. Most plants are also equipped with a mono lama or stationary wire saw machines. The purpose of this machine is cut block so as to optimize trolley filling of the gang saw machine; no squaring is done at factory as block that reach the factory are already squared at quarry. Slabs obtained are then moved to a polishing line, where the material is polished through progressive dressing and with polishing heads equipped with course to fine grinding abrasives. Polished slabs are then packed in either wooden up right pallets or loaded directly into container on steel "A" frame as per customer"s preference. For most of the bulk supply units, the process ends here. For the few units, which deal in cut to size job as per project requirement carry out cutting of these slabs into customers required sizes by meaning of a bridge cutter. In the local industry, large irregular shaped boulder is unloaded into stock by means of a derrick or gantry crane. This raw marble is loaded on gang saw machine. Gang saw machines perform primary sawing operation and reduce into marble slabs. For most of the units dealing with wholesale, the process ends here. These slabs are than sold by weight to retailers. The units dealing with end users cut these slabs into required sizes by means of manual bench cutter. If required; material is polished by means of radial arm polisher. The above processes assume that the material has no surface porosity and does not require any filling.

## 3.2 Quarrying of Marble and Granite

As per the Census of Mining and Quarrying Industries (CMQI) 2005-06, carried out by the Federal Bureau of Statistics, there are estimated to be about 2,511 marble quarries in Pakistan out of which 1,516 are active. The breakup of the quarries by regions is as follows:

**Table 1 Breakup of Quarries in Pakistan by Region**

| Regions | Total | Active |
|---|---|---|
| Punjab | 755 | 445 |
| Sindh | 401 | 279 |
| KPK | 820 | 496 |
| Balochistan | 535 | 296 |
| Total Pakistan | 2,511 | 1,516 |

In Pakistan, marble and granite is extracted from the mines by blasting it with explosives. Not only does this indiscriminate blasting cause damage to the raw marble but also results in high wastage of the material during extraction. Also, the material that is extracted comes out in irregular shapes which add to the inefficiencies at the processing end. The hazards of indiscriminate blasting can be summarized as follows:

### 3.2.1 At the Quarry Site

- Huge wastage of recoverable material about 75-80%
- Difficult to obtain large dimension slabs which fetch a higher value
- Huge variation of shade, color and texture due to non-establishment of cutting direction which results in future loss in value.
- Damage to the remaining material.
- A risky process which makes the workers prone to quarry accidents and several lives are lost annually on this account.
- Accumulation of huge waste at quarry face often hinders quarry operation.
- The whole process is very environmentally unfriendly, though no specific studies are available to establish the extent of damage.

### 3.2.2 At the Marble Processing Plant

- Blasted irregular shaped potato material reduces the processing capacity of plant by up to 60% in comparison to the same amount of regular shaped blocks for inputs such as electricity, diamond tools and labor.
- High maintenance cost of machines due to haphazard wear pattern on machines.
- Low recovery of material
- Inconsistent shade, color and texture variation resulting in low value of the products.
- Additional cost due to cracks and fractures.
- Leads to a dirty work environment due to accumulation of huge amounts of wasted material.

The situation is further compounded due to issues likes shortage of technically skilled manpower in the absence of a training institute as well as value lost during transportation from mine to the processor.

**Figure 3 A Local Quarry Where Blast is Being Carried Out**

**Figure 4 Transportation of the Blasted Material fFom the Quarry**

In comparison, most of the countries with marble reserves have moved to much more efficient methods of extraction like use of wire saws where the wastage is as low as 25%. In Pakistan also, PASDEC has installed the modern methods of wire saw at a small number of quarries but most of the quarries still use the blasting method.

**Figure 5 Extraction of Block Using Wire Saw**

**Figure 6 Transportation of Block Extracted Through Wire Saw**

The high wastages at the quarries due to indiscriminate blasting is one of the key challenges that the local marble and granite industry faces, thereby making it difficult for them to compete with other materials in the local market and with other marble exporting countries in the international market.

## 3.3 Marble Processing Units

It is estimated that there are 2,600 - 2,800 marble processing units across the country. While marble processing units can be found in almost all large cities of Pakistan, following are the key clusters of marble processing units.

- Karachi
- Lahore
- Rawalpindi/Islamabad
- Mohmand Agency in Federally Administered Tribal Areas (FATA)
- Buner in Khyber Pukhtunkhwa
- Mardan in Khyber Pukhtunkhwa
- Shabqadar, District Charsadda, Khyber Pukhtunkhwa

Out of these, Karachi is the largest cluster with almost 65% of the capacity.

Most of the units are small processing units which carry out cutting of raw material in standard dimensions, resizing, polishing and cut-to-size jobs of different marble varieties, primarily 1"x1" and 1"x2" in different thicknesses.

There are a very small number of processing units (approx. 30-35) which have a complete range of machinery and equipment capable of processing stone in accordance with international standards. However, these units operate much below their installed capacity due to inappropriate raw material and lack of technical skills.

## 3.4 Trade/Retail Environment

The trade environment for marble and granite can be divided into three distinct channels:
1. Business to Business (B2B)
2. Business to Consumer (B2C)
3. Retail: Direct to Consumer

### 3.4.1 Business to Business (B2B)

For the marble and granite required for large projects, both residential and commercial, the architects and builders directly interact with the marble processing units as suppliers. The quantities involved are generally in thousands of square feet. Price and timely delivery are critical in this segment.

### 3.4.2 Business to Consumer (B2C)

Individual consumers often also directly approach the marble processing units. This generally happens in the case of upper income consumers who have specific requirements in terms of size and cutting. For example, in Lahore and Islamabad, there is a trend of putting up marble fireplaces. Consumers often directly approach the processing units which specialize in these dealing directly with the processors can also be cost effective as the retailer margin is eliminated. However, in some cases, the processing units are located away from the city centre; particularly in Karachi.

### 3.4.3 Retail: Direct to Consumer

At the retail level, there are generally clusters of shops selling marble and granite to the end customers. In the metro cities, the largest clusters of marble and granite shops can be found in the following areas

**Karachi:**

- Pak Colony
- Gizri

Khayaban –e-Ittehad, Defence

**Lahore:**

- Ferozepur Road
- Ghazi Road

**Islamabad/Rawalpindi:**

- Sector I-9
- Westridge
- Tarnol

For sales related to projects, the marble processors directly interact with the architects, although in some cases, the retail outlets can also pitch for projects. The retail outlets selling marble and granite are generally small and mostly the owner is managing the outlet. Generally, there is not too much focus on display and presentation, except in the case of a few high end marble retailers.


**Figure 7 Shop Front of a Marble and Granite Shop in Karachi**

**Figure 8 Display of Material in a Typical Marble Retail Outlet**

# 4. Demand Assessment-Local Market

## 4.1 Evolution

The evolution of the current trends in surface materials can be traced back to the mid and late sixties when increase in local industrial activity and improvement in the key economic indicators spurred a construction boom both in the industrial and housing sectors. Initially, mosaic flooring and marble tiles were used for surface areas. In the case of marble, this led to the evolution of the local processing industry which met the burgeoning demand without too much focus on quality. The ceramic tiles started to appear on the scene in the early seventies although at that time their usage was mainly limited to washrooms etc. For decorative surfaces, marble was the most popular material, although carpeting was also extensively used through the seventies and eighties in homes and commercial establishments. In the mid seventies, the increase in demand resulted in improvement of the marble processing industry, with import of marble processing plant and equipment which improved the quality of the marble available. This process continued through the eighties and nineties. During these years, there was also significant improvement in the tiles sector in terms of varieties. Besides wall tiles, floor tiles started to be put up as a flooring solution in a big way. Increase in international travel also exposed Pakistani consumers to better quality materials and demand for quality surface materials started to soar after 2000. Imported tiles started to become a big market especially after the introduction of porcelain tiles. The value chain issues in the local marble sector impacting their quality and availability also contributed to the adoption of porcelain tiles as well as imported marbles by the local market. Over the past few years, the consumer demand behind granite has also seen a surge which has driven consumption of both the local and imported varieties of granite.

## 4.2 Current Situation

In terms of the surface solutions, following are the major surface materials used in the local market:

- Tiles Ceramic/Porcelain (Local)
- Marble /Granite Local
- Tiles Ceramic/Porcelain (Imported)
- Marble/Granite (Imported)
- Other materials (Wooden Flooring/.Laminates)

In terms of the current market trends, the market for surface materials is led by the tiles. The tiles market can be segmented by material i.e. between ceramic tiles and porcelain tiles. While ceramic tiles cater to the low and mid tiers, porcelain tiles cater to the top tier of this market. High end of both the segments in the tile market is catered by imported tiles. Ceramic tiles are mainly imported from China and Malaysia whereas the porcelain tiles are mainly imported from Spain, Italy and China. This is followed by the marble and granite sector. In the marble and granite sector again, the high end is mainly catered by imported materials largely driven by demand for consistent availability of quality materials. The countries from where these products are imported include China, Italy and more recently, Egypt Wooden Floors and Laminates are a very small component of the market at the high end.

## 4.3 Market Segmentation: Local marble and Granite

The market for the local marble and granite sector can be broken down into four distinct segments:

- Individual Home owners
- Small projects, mainly mosques
- Small and Medium Builders and Developers (Apartment and housing complexes, commercial establishments like offices, shops and retail establishments, banks etc.)
- Large and prestigious projects (large government buildings and monuments, educational institutions like universities as well as corporate head offices)

### 4.3.1 Individual Home-Owners

This is currently the largest segment which consumes the local marble and granite, as a large number of individuals in Pakistan across income levels get their houses constructed themselves. From a small home constructed in suburban areas and smaller cities to large bungalows and villas being constructed in the posh localities of the metro cities of Karachi, Lahore and Islamabad, marble is still the preferred material of choice. Here, the home owner himself or herself gets involved in the selection, which depends upon their own preferences, recommendations by the architect/contractor and their budget. Tiles, ceramic and porcelain as well as imported marble and granite all compete with the local marble and granite in this segment.

### 4.3.2 Small Projects, mainly Mosques

Marble is generally used for the construction of mosques, especially for the courtyards and ablution areas. Here marble has an advantage over synthetic material since the surface temperature on marble surfaces is inherently lower than the synthetic materials. Hence it is much more comfortable to stand on marble in high ambient temperatures.

Because of a higher coefficient of compression, the load bearing strength of marble is much higher as compared to synthetic material and thus it is able to take the load of hundreds of persons standing together for extended periods. Also, the coefficient of friction is of polished marble varieties is lower than other materials, hence marble gives a very soft feel upon walking barefoot. However, generally since small neighborhood mosques are constructed based on donations, the cost consideration overrides the demand for high quality.

### 4.3.3 Small and Medium Builders and Developers

In this segment, which mainly caters to apartments and housing complexes, offices, shops and retail establishments like shopping malls and banks etc, the ceramic and porcelain tiles have almost edged out marble and granite. Cost considerations and low maintenance requirements have resulted in adoption of synthetic materials especially for the floor areas. Marble and granite are added for aesthetic value and are generally used for stairs (where it is difficult to put up tiles), on pillars etc. or for bathroom vanity counters.

**Figure 9 Granite at the Entrance of a Newly Constructed Mall in Karachi**

### 4.3.4 Large and Prestigious Projects

(**Large Government Buildings and Monuments, Educational Institutions like Universities, Corporate Head Offices)**

This is potentially a high value and high volume segment for the local marble and granite sector. These are high budget projects with large government and private organizations as clients and leading architects and construction companies involved in the project. Aesthetic requirement and high quality standards override the cost considerations. Based upon discussions with the architects and contractors for large projects, the surface areas for marble in projects like these can be up to 30-40% of the total surface areas. In these projects, while porcelain tiles are mostly being used for flooring, imported marble terrazzo tiles are also used in some projects.

**Figure 10 Granite Being Installed At the Steps of an Under Construction Buliding in Islamabad**

**Figure 11 Tiles Installed for Flooring at the Under Construction Buliding in Islamabad**

## 4.4 Decision Making for the Use of Surface Materials

For the segments specified above, the key decision makers vary from segment to segment. However, the key considerations across segments which are taken into account while making the purchase decision include”

- Color/pattern and how it fits in the color scheme of the area where it will be applied.
- Sizes (Tiles, Slabs or Cut to Size)
- Origin (Local or Imported)
- Quality/Variety
- Price

At the low end in the individual home owners segment, where the home owner gets the project executed through a contractor, it is the end user himself who decides on the materials based on his taste choice and budget. At the high end, where a professional architect is engaged, it is primarily the architect who chooses and recommends the materials although the home owners also have a say in the final selection. For small projects like neighborhood mosques, the material is normally decided by the donors or a committee which oversees the construction of the mosque. However, this decision is mainly guided by the budget available. Even though in the case of mid-sized commercial projects like apartment and housing complexes, cost considerations have a disproportionate bearing on the material selected, it is the architect who finally picks the material within the given budget. For large and prestigious projects, it is primarily the architect who decides on the materials. The client normally goes with the recommendation of the architect. However, in case of non-availability of the proposed materials, the builders/ contractors may propose alternate materials. It is also important to point out that despite the heavy infiltration of tiles, a large majority of architects showed an inclination to use marble in their projects.

## 4.5 Market Composition and Opportunity Assessment- Local Market

An estimate of the product available for local market demand is given below:

**Table 2 Total Production for Local Market**

| Total Production ('000 MT ) | Total Local Consumption @ 97% | Average Yield per Tonne (Sq. Ft.) | Total Production (Local ) ('000 Sq. Ft) |
|---|---|---|---|
| 3,220 | 3,123 | 60 | 187,404 |

The total production for 2012 was estimated to be 3.22 million tonnes. 97% of the total annual production is consumed locally besides the imported varieties which have also over the years captured a significant share of the market at the high end. The volume and value split of the market is shown below:

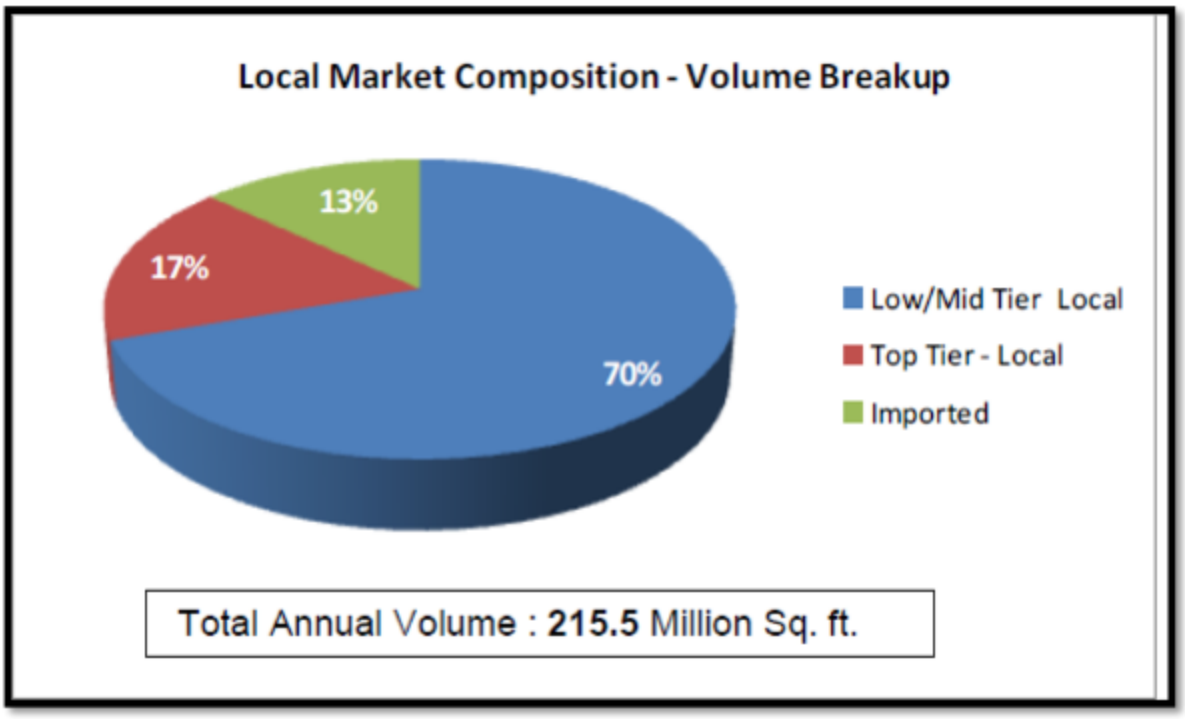


**Figure 12 Volume Breakup of Total Market Demand**

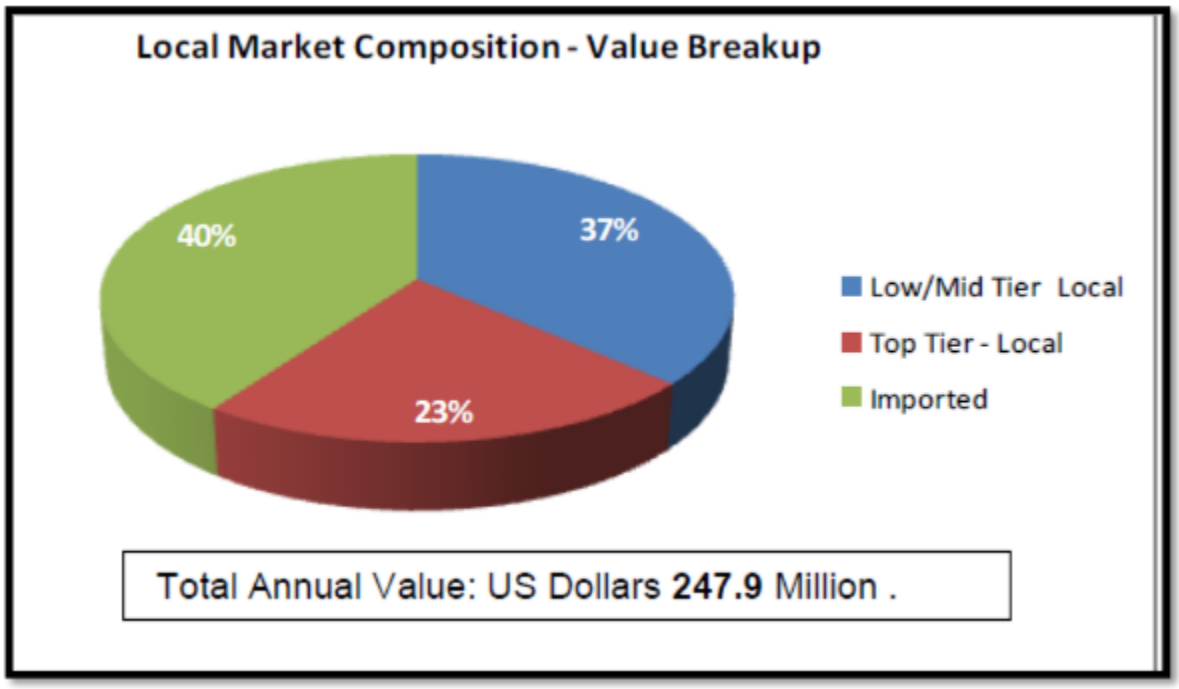


**Figure 13 Value Breakup of Local Market Demand**

Based upon interactions with retailers and processors, it is estimated that bulk of the volume (70%) in the local market is in the low/mid tier. based on average selling price of Rs. 60/sq.ft, the value contribution from this segment is 23%. The local top tier materials with an average selling price of Rs. 150/sq. ft. contribute approx. 17% in volume and 23% in value. In terms of the value, the imported varieties of marble and granite with an average selling price of Rs. 350/sq. ft. are skimming the market with 40% of the market value with only 13% volume. The segment serviced by the imported materials is clearly an opportunity for the local marble and granite sectors which the local marble sector can target. . Over the years, tiles have also captured market share from the marble and granite sector. It is also estimated that the market for tiles is clearly at least 10 to 15 times bigger than the current size of the marble and granite market. Bill of Quantities (BOQ"s) shared by the builders for a number of projects during the course of this project substantiate this estimate. Reclaiming even a small share of that market can turn around the local marble and granite sector.

## 4.6 Key Market Preferences

The market has clear preferences in terms in terms of varieties and sizes in low/mid and top tier market.

**Low/Mid Tier: Sizes**
In the low/mid tier which comprises almost 64% of the volume in the local market, the preferred sizes are:

- 12” x 12” x 4/8
- 12” x 24” x 4/8

These sizes are generally called “sections” as per the market terminology. In the low/ mid tier, the varieties which are most popular include:

**South Varieties**

- Flower/Tippi
- Verona Beige / Parleno
- Treviram
- Different Varieties of Boticino

**North Varieties**

- Sunny Grey (Bampokha)
- Sunny White
- Carrara
- Zebra
- Silky black
- Badal
- Ziarat Grey
- Ziarat Grey White
- Super White

**Top Tier**
In the top tier, the preferred sizes are 24” x 24” x 6//8” and cut to size options especially for steps and kitchen counters.

### Varieties

Besides the varieties mentioned above, additional varieties popular in the high end include

- Black and Gold
- Teak Wood

In addition, Granite varieties are also gaining acceptance rapidly, popular local granite varieties include:

- Black
- Sardo Pink
- Tropical Grey

### Finishes and Mosaic

Within marble, another new trend gaining acceptance is using marble with different finishes especially for facades. The most popular finishes include:

- Bush hammer finish
- Split Faced Finish
- Honed Finish
- Flamed Finish


**Figure 14 Bush Hammered Finish**

**Figure 15 Split Face Finishing for Wall Cladding**

**Mosaic**

Mosaic work, in which patterns are created using small pieces of marble, is also becoming popular. These mosaic pieces are used for entrances, stairways, wall hangings and table tops. This is a value added product which gives a high profit margin and has a lot of potential in local and export markets.

**Figure 16 Mosaic Pieces Which Are Being Produced Locally**

## 4.7 Key Quality Parameters

Quality of the marble and granite materials is critical for the decision makers at the demand end. Based upon the input of a number of decision makers, the following came out to be the key quality parameters important for them. The local marble processors need to address these aggressively.

### 4.7.1 Color, Shade and Pattern

Since the material selection is primarily based upon how it fits in the overall theme of the project, getting material in the right color, shade and pattern is the key consideration in the finalization of materials. In this regard, the decision makers are often not aware of all the options that are available which restricts their selection options

### 4.7.2 Cutting Directon:

The beauty of a marble surface increases manifold when the natural patterns of marble can be recreated on the surfaces where they are applied. Hence it is important that proper direction is maintained while cutting the raw material so that the natural patterns of marble are maintained in the cutting process.

### 4.7.3 Calibration

In the top tier, the calibration limit i.e. accepted thickness variation is +/- 0.50 mm. In the low/mid tier, the accepted calibration variation is +/- 1 mm. For any variation beyond 1 mm, the material is considered to be non-calibrated.

### 4.7.4 Cutting Tolerance

The acceptable limit for cutting tolerance for a 60x60 cm tile is less than 2 mm between diagonal lengths

### 4.7.5 No Chipped Edges

Edges of the tiles delivered to the customers often have chipped or broken edges mainly due to transportations issues as the materials undergo a lot of stress on the roads during long haul transportation. The same stress can also occur due to rolling and pitching of the vessel on the high seas for products which are exported. However, this is not acceptable for customer as it increases their wastage and costs.

### 4.7.6 Delivery of Material in Pallets

Customers would ideally prefer to receive the marble and granite materials in pallets as are delivered by the tiles manufactures. This also addresses the issue of counting at multiple levels which causes breakage and pilferage after delivery. Generally, this practice is not followed by the local suppliers.

### 4.7.7 No Cracks in Tiles

Because of inefficiencies at the quarry level as well as at the processing, the marble tiles and slabs often develop cracks. Due to quality control issues, the cracked tiles end up being included in the stocks delivered. Customers would like that this issue is addressed by the processor and the stocks delivered do not have any cracked tiles

## 4.8 Key Challenges and Issues at the Demand End

Based on the interactions with a cross section of the members of the local building and construction industry which included architects, builders and developers, it was clear that most of them do like to use marble and would also like to work with the local industry. They are even willing to pay a higher price compared to other materials like tiles. However, the following came out to be the key challenges and issues that the architects and builders are facing with the local marble and granite industry because of which they are compelled to use either artificial materials like tiles or use imported marble varieties.

### 4.8.1 Product Availability in Required Quantites

Availability of the selected marble variety in the required quantities is the biggest challenge that architects and builders identified in using the local materials. Whether it is a large prestigious project or a residence project, architects and builders are faced with this issue as the local marble processors or retailers are generally not able to commit availability. Some architects mentioned that they have faced supply issues even for quantities as low as 3,000 - 4,000 sq. ft. The architects also cited instances where the proposed quantities were initially committed but could not be delivered later by the marble suppliers and alternate material had to be used. This has seriously hampered the credibility of the local marble suppliers with the architects and builders.

### 4.8.2 Product Consistency

While it is a given that marble being a natural material, will have some inconsistencies in patterns. However these consistencies still have to be within a permissible limit. Wherever there are large quantities required, supply inconsistencies often compel the marble suppliers to mix stones from different sources which invariably result in color and pattern inconsistencies beyond acceptable limits for the decision makers.

### 4.8.3 Managing Timelines

For all construction projects, timely completion is critical since it has a direct bearing on the project cost. Because of the fact that marble processors do not carry buffer stocks and because of unreliable supplies from quarries, the marble processors often commit very long timelines for the product availability. These timelines further get extended driven by issues at the quarry end. Such unwarranted delays in the availability of marble for a project have a serious impact on the planned timelines of the project. Also, since the material is primarily selected by the architect, any delay on account of material availability puts him/her in a difficult situation with the client and the contractor. As a result, the architects are very apprehensive in choosing the local marble varieties for their projects; until and unless they feel they have a strong working relationship with a marble supplier who will be able to manage the specified timelines.

### 4.8.4 Product Presentation and Product Knowledge

There is a very large gap in this area between the expectations of the industry and the current practices of the marble processing industry. Almost all the industry stakeholders raised this point. All the products with which the local marble and granite industry competes, whether it is the ceramic and porcelain tiles sector or the imported marble and granite products, place a lot of emphasis on appropriate presentation of their material. Architects and builders are provided with sample catalogues, brochures and other presentation materials with all the necessary information and specifications about the product.

**Figure 17 Sample Board of an Imported Granite Supplier**

The tiles companies, both local and imported, also have a retail presence in the form of showrooms and display centers where all the varieties are displayed. Also in terms of the business development approach, the tiles sector and the vendors representing imported marbles and granite products are very proactive and aggressive. These companies have dedicated sales teams which maintain an on-going relationship with all the stakeholders in the building industry. As far as large projects are concerned, foreign representatives especially for companies based in Malaysia, UAE or China, also visit Pakistan to meet with the concerned decision makers. These teams are equipped with all the necessary product knowledge and other relevant information like current inventory status etc. so that all client queries can be addressed immediately. In comparison, the marble processors generally do not place the required focus on this area. Product presentation materials like samples etc. shared generally do not have a professional look. In fact, the general perception in the industry is that the architects and contractors need to do a lot of follow up with the marble processors to get supplies instead of the other way round. Another point in this regard that came out in the interactions was the absence of websites. Even for processors who do have websites, these are not user friendly and do not have updated product information. Also, any queries submitted on the websites are not promptly responded to.

### 4.8.5 Non-Availabity of Stone Specifications and Test Results

Non-availability of specifications regarding the various local stones as well as test results regarding key attributes of different stones was highlighted as a key issue by the decision makers. The tile manufactures share the specification of the products with the samples. However, in the case of marble, no such specifications or key tests regarding the attributes are available and the architects and other decision makers have to rely on the product knowledge of the contact person from the marble processor or their own previous experience with the materials. As a result, architects are often apprehensive to try out new marble varieties.

### 4.8.6 Lack of Awareness about Stone Application

Another need identified at the demand end is awareness about stones application. A number of architects and builders admitted that their knowledge regarding selection of stone for different applications was limited. As a result, they sometimes end up picking the wrong stone for an application. They are very keen to receive information to enhance their knowledge in this very

important area. Addressing all the above challenges is critical so that local marble and granite becomes a viable value proposition for the industry.

# 5. Demand Assessment-Export Markets

Like the local market, the international marble and granite export markets also present a huge opportunity for the local marble and granite sector. Pakistani marble and granite are exported to over 50 countries. The exports of marble and onyx have been showing a steady increase As per ITC Trademap, export earnings amounted to $ 62.2 million in the calendar year 2012 as compared to $52.8 million in calendar year 2011, an increase of 17.8%. As per PASDEC, exports for the first half of the current FY (2012-13) have reached $52 million. Based on this trend, it is projected that the exports for raw and finished marble and granite would exceed $100 million by the close of current FY.

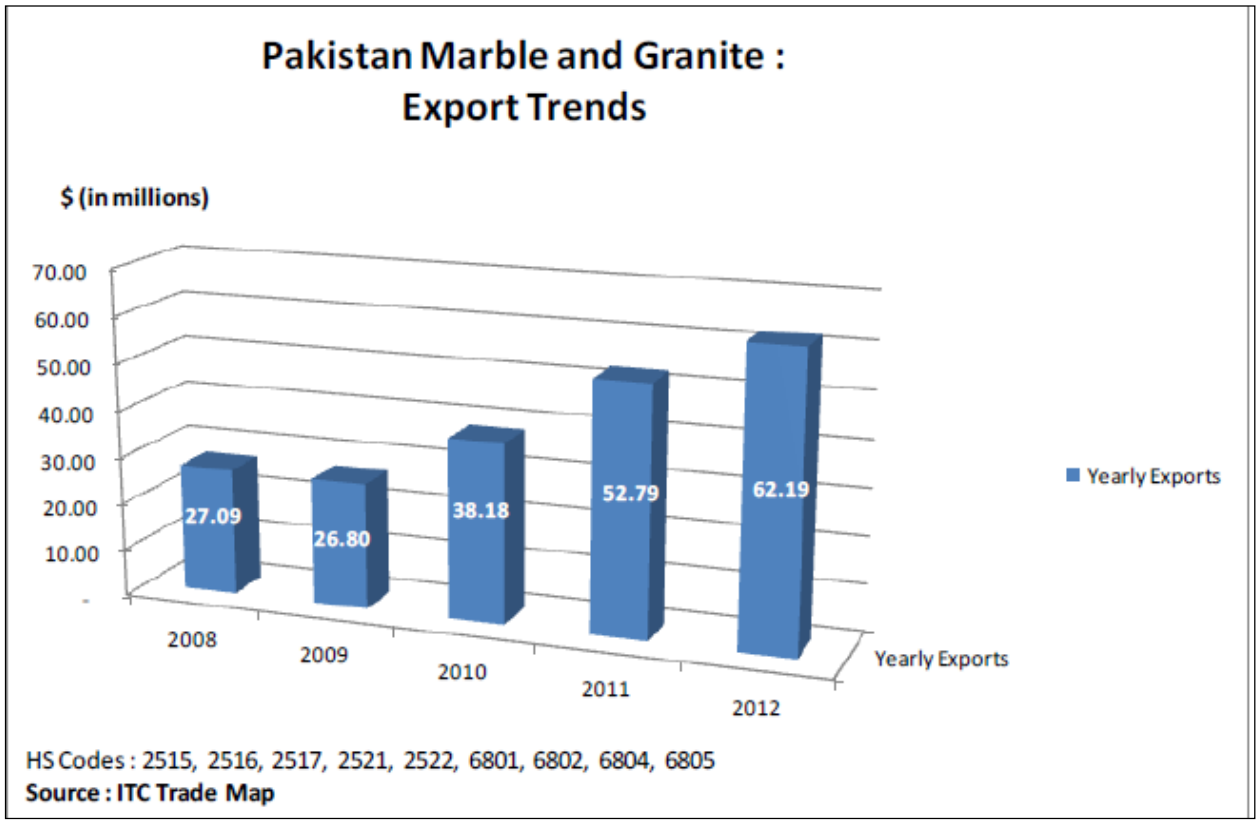


**Figure 18 Pakistan Marble and Granite Export Trends**

However, it is important to see this rising export number in the correct perspective. Considering that the international trade was estimated to be $28.5 billion, Pakistan‟s contribution to this is still very small . Considering the high quality and quantity of marble reserves in Pakistan and low contribution to exports at this point, there is a huge opportunity for exports to significantly increase beyond the current level. Also, the bulk of the current exports (72%) are in the raw form, a trend which needs to be reversed with more focus on export of finished slabs and value added products which have a much higher export value and profitability.

## 5.1 Pakistan's Key Export Markets

China is the largest importer of Pakistani marble and granite, predominantly in the raw form and contributing to 69% of the total export value. The blocks of marbles imported by China are processed, value-added and exported to various countries in the world at higher prices. Saudi Arabia and other Gulf countries mostly import marble slabs and tiles from Pakistan. Semi-finished marble and onyx products find their way into Russia, the Middle East, the United States and Malaysia. The export of marble and semi-processed material to Afghanistan is worth approximately $6-7 million. These are not formally documented, but traders from Afghanistan travel to Pakistan mainly to processors in KPK, purchase the products and take them back to their country. This business remains unaccounted in export statistics. However, the international marble export scene is getting increasingly competitive with Turkey, Egypt and India working aggressively to consolidate their position in the international market.

## 5.2 Potential Export Markets

Although a large component of Pakistan marble products are being exported to the Gulf, there is still a lot of opportunity to be tapped especially if high quality products and varieties can be supplied. Within the Gulf Region, the use of marble and granite is on the increase in all the major projects like hotels, airports, monuments and mosques. Also within the Gulf countries, Qatar is rapidly developing its infrastructure and also hosting the 2022 FIFA World Cup and is a huge potential market.

The demand in US and Europe is also going up as recessionary trends have begun to decline. Africa is witnessing the most rapid infrastructure growth across markets and has a number of high potential markets like Libya, Algeria and South Africa from the perspective of marble exports. While there is a huge opportunity in the export markets, Pakistani exporters are not completely able to tap this demand because of a number of reasons which are as follows:

## 5.3 Key Challenges and Barriers in Marble and Granite Exports

### 5.3.1 Limited Processing Capacity

Limited processing capacity in the marble industry is one of the key factors holding back the growth. In fact, a number of leading exporters are in a situation where they have to decline large orders with stringent quality specifications. A number of exporters are not pursuing buyers from markets like USA or attending trade fairs as they feel that they will not be able to meet the quality and quantity requirements of these buyers

### 5.3.2 Non-Availability of Buffer Stocks

The international buyers are increasingly showing a preference to work with suppliers who have ready stock available or have short lead times. In the case of Pakistani marble exporters, since there are no buffer stocks maintained, the lead times committed are long. The average lead time for a 20 ft container is 21-40 days

### 5.3.3 Inability to Meet Timelines

Pakistani exporters are finding it difficult to meet the committed timelines which severely impacts their credibility, mainly because of two critical factors

Law and Order Situation

Extremely precarious law and order situation both in the North and South clusters is having a crippling effect on the industry. The areas where the marble mines are located in KP and Baluchistan as well as processing unit located in KP and Karachi face an extremely poor security situation. This impacts day to day operations and meeting timelines.

Load shedding

Severe and unplanned load shedding of up to 8-12 hours is making it difficult to adhere to timelines and also draining the processors financially.

### 5.3.4 Quality Issues due to Production Inefficiencies

A fundamental difference between the local and the export market is that while products with any production inefficiencies and quality issues may still end up in the local market and sell at a lower price, the same is not applicable to the export markets.

Export orders are placed based on strict quality standards and specifications in terms of pattern consistency calibration, tolerance and other quality parameters mentioned earlier. Any consignment which does not meet these specifications runs the risk of getting rejected after being shipped and upon reaching the destination which is a huge financial loss for the supplier.

Inefficiencies at the processing level have a severe impact in maintaining the quality standards. These are discussed in detail in the section on the Supply Side Assessment and Gap Analysis.

Also, as discussed above, a large number of inefficiencies at the processing end emanate from the inefficient and primitive quarry practices. Hence in order to achieve the desired quality standards for export orders, it is important to address the practices at the quarry end.

Another factor that needs to be taken into consideration is that the prevalent practices across the value chain, especially blasting at the quarry end is a major concern for the international buyers from the perspective of compliance with environment friendly practices, and needs to be addressed accordingly.

# 6. Supply Side Assessment and Gap Analysis

While the expectations at the demand have been discussed in detail in the previous section, this section assesses the situation at supply side i.e, the processing end. While other sectors like ceramic tiles have developed and improved their product and service delivery capability over the past few years, the marble sector has not had any significant development and is practically operating in the same manner as it was operating 15-20 years back. This has created a big gap between the expectations at the demand end and the delivery capability at the supply end and has impacted the growth of this sector. There are a number of areas pertaining to the infrastructure and human resource development at the processing plants contributing to this gap. This section attempts to identify these areas. Based on visits to a number of processing plants, the following were observed as the key issues at the supply end:

## 6.1 Processing Inefficiencies due to Irregular Shaped Blocks

Blocks of irregular shapes, also called “potato” or “”boulder” coming from the quarries because of indiscriminate blasting significantly reduces the efficiency at the processing level. An irregular shaped stone reduces the efficiency at the gang saw level by up to 40% and results in 20 - 30% wastage of electricity. The unequal wear of the cutting tools at the gang saw can increase the tool cost by up to 30%. Further, the material recovered may also result in further fractures.

**Figure 19 Highly Fractured Material under a Gang Saw**

## 6.2 Obsolete Machinery

Most of the machinery at the processing units is obsolete. Although a lot of the processing units have imported equipment, but these units are generally second-hand with outdated technology,

having already undergone a lot of wear and tear thereby reducing the equipment efficiency and increasing the maintenance cost. Compared to the new machines, these machines have a very high maintenance cost as well as a high downtime. For example while a new gang saw may run on 4 liters of oil for a month, i.e. an expense of approx. 600, an old gang saw may consume an entire drum of oil which is an additional expense of around Rs. 50,000. A number of processing plant owners are also carrying machinery which has outlived its functional life simply because the owners have had this equipment since the time they started their processing plants and are not willing to dispose it off.

## 6.3 Machinery Operated Beyond Capacity

A number of processing units are using equipment much beyond their rated capacity which damages the equipment and increases the maintenance cost. The most common incidence is of cranes being used to lift loads far beyond their capacity. It was observed at a number of plants that a crane with a rated capacity of 10 tonnes was being used to lift blocks of up to 25 tonnes. Practices like these severely impact the performance and life of these machines

**Figure 20 A Crane Being Used to Lift Loads beyond Its Rated Capacity**

## 6.4 Poorly Planned Layouts

There seems to be a lack of emphasis on proper layout of the processing units. The space available is generally not optimized. Equipment placement on the plants is not aligned as per the process flows resulting in a lot of duplication and rework. In a number of units, there are no separate areas for raw material inflows and finished goods and they are placed as per the space availability on the unit. As a result, in most of the plants, there is hardly any walking space. The system of water circulation at most of the plants interferes with unhindered movement at the plants. This problem is further complicated with overhead cables being used for power supply which compromise the working height at the plant. The concept of line configuration seems to be missing totally at the plants. As a result, the materials need to be handled again and again. It is estimated that on average any material which comes to the

processing plant ends up being handled approximately five times. In a line configuration, the material is handled only once, significantly improving the efficiencies

**Figure 21 Unplanned Layouts**

## 6.5 No Material Handling Equipment

Despite the fact that marble and granite raw materials and finished goods are very heavy and pose a challenge in terms of material handling, most of the processing units do not have any sort of material handling equipment. Instead of using heavy material handling equipment like forklifts, the heavy marble and granite blocks and finished product like slabs and tiles are moved manually through use of labor. Not only is this physically taxing on the labor but is also time consuming and results in a lot of breakages. Inefficient use of space at the plants discussed above also acts as a limiting factor in deploying material handling equipment at the plants.

**Figure 22 Heavy Stones Being Moved Manually**

## 6.6 Limited Focus on Inventory Management

There is a very limited focus on inventory management. Raw material volume and value is not monitored very closely and is often not optimized on the basis of sales trends. The sales trends are also not monitored very closely. As a result, there is no concept of keeping buffer stocks for their fast running materials, which can significantly reduce the delivery lead times, a critical requirement for local and international buyers. A key gap in the area of inventory management is that the concept of Minimum Order Quantity (MOQ) is not established and even very small orders are entertained which has an adverse impact on the plant capacity and production efficiencies.

Re-counting of the materials at various stages also needs to be discouraged since it results in a number of inventory discrepancies. Lack of inventory management also results in a lot valuable working capital being tied up in inventory.

## 6.7 Skill Gaps in all Processing Areas

The personnel at the processing plants generally do not undergo formal training and mostly learn on the job. There is a huge gap in terms of skill development across all areas of processing like cutting, sizing and polishing. This in turn impacts both the efficiency and the quality of the output of the plants.

## 6.8 Non-Availability of Trained Workforce

Due to the absence of formal training in the marble sector and the industry being concentrated in clusters, there is a very small pool of trained workforce available for the marble industry. Also since for most of the positions in the processing plants, the work involved is laborious and hazardous; it is difficult to attract quality human resource at the processing plants. Thus, it is a challenge for the processing unit to find a replacement in case a trained resource decides to leave.

## 6.9 Poor Housekeeping

The overall housekeeping at the processing plants leaves a lot to be desired. The plants are generally strewn with small marble pieces from the raw material inflows and wastage from the production process. The management at the processing plants does not make the effort to clear this wastage. This restricts free movement and gives a perpetually untidy look to the plant.

**Figure 23 Poor Housekeeping at the Processing Plants**

## 6.10 Poor Working Environment

The processing units have poor working conditions from the point of safety and working conditions for the workers. There are practically no safety measures at the plants and the workers are not given any kind of safety trainings. The workers handling heavy stone blocks and machinery like heavy cranes and gang saw are at risk of accidents. There are frequent incidents where workers either lose their lives or are severely injured in accidents at the processing unit.

**Figure 24 Poor Working Environment at the Processing Plant**

Using handling equipment beyond their rated capacity, lack of training for the workforce as well as the absence of a regular preventive maintenance regimen all contribute to the adverse worker safety situation on the plants. Another major safety hazard is the exposed electricity wires used to provide power to equipment placed in different parts of the plant in the absence of a proper layout.

**Figure 25 Safety Hazard at a Processing Plant**

Working conditions at the processing floor also leave a lot to be desired. There is a lot of sludge and water that is generated at the various stages during the processing. This gets deposited on the surrounding walls and on the floor around the machines and also covers their body and face. Attention is not paid to small measures which can make an improvement to the working conditions. For example, showers in front of cutters are generally not covered with a shroud to prevent the water getting on the worker's faces.

## 6.11 Low Consideration for Environment Friendly Practices

While the blasting at the quarry end is already considered to be adversely impacting the environment, there is hardly any consideration for environment friendly practices even at the processing units. A key example of this is the waste disposal system at the processing units. The waste generated during the processing is stored in underground tanks

**Figure 26 Waste Being Collected To Be Handed Over To a Private Contractor For Disposal**

This waste is then taken out by private contractors in tankers and disposed of in open area and streams at the contractor‟s discretion. In the processing units located in KPK, the slurry and waste is often made to flow into open streams. Another issue related to the environment is the excessive noise level at the processing units. There are two factors contributing to this:
- High noise levels generated due to cutting and sawing, which can be reduced by improving the quality of blades and using copper sandwich blades.

High mechanical noise which can be reduced by having proper covering on different equipment.

Moreover, inefficient use of electricity at the plants also increases the carbon foot print.

## 6.12 Poor Documentation

There is very limited documentation at the processing plants. At most, the material inflows and outflows are captured; and record of wages and bills are maintained, but beyond that, there is hardly any documentation covering the areas of inventory management and financial accounting. Also, most of the documentation is manual and hardy any documentation is computerized.

## 6.13 Lack of Marketing Capabilitites

Based on the interviews with the stakeholders at the demand end as well as interactions at the processing units, it was clear that there are a number of gaps in marketing capabilities especially when these are compared to the capabilities in this area with those in the ceramic industry which caters to the same market segments. The processing plant, across the board, do not have any dedicated specialized sales or marketing resource, and the responsibility of sales and marketing function is normally handled by the owner himself. Since the owners are mostly from a process background with limited exposure to sales and marketing techniques, there is often a gap in terms of capability and time that can be devoted to sales and marketing efforts especially in comparison to the leading players in ceramic industry, where dedicated and experienced teams look after this functions.. Hence there is a capability gap in planning the total product offering (TPO) which requires focus on the areas of standard product development, planning and consistently implementing packaging solutions , focus on development and management of all sales & distribution channels as well managing the branding and promotions. Focus on all these areas requires allocation of both human resource and marketing investment. The ceramic industry has been making these investments for the past many years and is now reaping the benefits of this investment. The marble and granite industry also has the opportunity for significant gains by building capabilities in this area.

## 6.14 External Factors

Besides the internal factors at the processing plant, there are a number of factors beyond the control of the processing unit which are having a crippling impact on the industry and are probably impacting the industry even more than the factors within the processing units.

### 6.14.1 Fragile Law and Order Situation

Processing units in KP and Karachi comprise almost 85% of the marble processing ecapacity in the country. Both these areas have been severely impacted by an adverse law and order situation for the past few years. In Karachi, which has almost 65% of the national processing capacity, the area where the marble processing units are located has virtually turned into a no-go area. Most of the processing unit owners hardly go to their units due to security concerns. There have been incidents like kidnapping for ransom of a marble processor and armed attacks on processing units. The owners of the marble processing units are spending disproportionate time and effort in grappling with the security issues which results in quality and capacity issues taking a backseat

### 6.14.2 Availabilty and Cost of Electricity

Load-shedding and high cost of electricity is also adversely impacting the industry. Most of the areas are facing 8-12 hours of load-shedding. Unplanned load shedding is also very common which has a multiple cost impact as despite no production; the labor still has to be paid.

### 6.14.3 Poor Infrastructure

In some areas, particularly in South, the marble processing units work in a tough operating environment and do not have access to basic factors of production like water, which has to be arranged through water tankers upon payment. Condition of the roads in the area where most of the marble processing units are located is also very poor. Persistence of these issues over the past many years has also demoralized the processors.

**Figure 27 Poor Conditions of the Road near Manghopir Road, Where Most of the Processing Units Are Located**

# 7. Recommendationd and Proposed Interventions

Based upon the demand and supply side assessment of the local marble and granite industry, the suggested recommendations and interventions are shared in this section. These can broadly be divided into six key areas. An overview of the key proposed interventions along with the key demand/supply gaps that it addresses are given below:

**Table 3 Overview of Proposed Interventions**

| Area of Interventions | Proposed Intervention | Key Demand/Supply Gap Addressed |
|---|---|---|
| Technical Assistance | Training on Lean Manufacturing | Streamlining Plant Layouts and Process Flow |
| | Set up ERP Software System | Optimize Plant Operations |
| | Trainings on Export /B2B Marketing | Lack of B2B and International Marketing Expertise. |
| | Support in Developing Export Marketing Plans and Exploring International Markets | Lack of International Marketing Capability |
| Workforce Development | Functional Training of the Staff at Processing Plants | Lack of exposure to training and best practices in functional areas impacting quality and effficiency. |
| Technology and Equipment Upgrades | Equipment Upgrades at Selected Processing Plant . Details in Table : | Build Capacity, Quality and Efficiency at the Plants. Improve Housekeeping and make the plants adopt environment friendly practices. |
| Industry Relevant Certifications | Eco Labeling and ISO Certification | Improve Quality Standards and Protocols at the Plants |
| | | Improve International Competitveness |
| Business Linkages | Build linkages with Architect Community.Extended participation in IAPEX | Disconnect bwtween marble processors and architect community. |
| | Explore Channel Development Initiatives with Ceramic Retailer to explore Ceramic Retail as a channel for Marble and Granite | Limited reach of Marble Retail. Lack of Impactful displays. |
| Marketing Initiatives and Assistance | Availability of Stone Specifications and Test Results | Lack of Focus and Capability in the area of Product Presentation and Branding |
| | Marble Varieties Imaging | |
| | Participation in International Exhibitions | |
| | Sample Boards | |
| | Websites | |
| | Focus on Displays | |

## 7.1 Technical Assisstance

Skill and capability gap in a number of areas is a critical factor impeding the growth of the marble and granite sector. Starting from the processing plant management to marketing and business development, a number of areas have been identified where skills and capabilities at the local processing plants need to be upgraded.

Following are the areas which have been identified where the skill levels of the personnel at the processing plants need to be upgraded on a fast track basis

### 7.1.1 Streamlining Plant Layouts and Process Flow

Ill-planned layouts result in the loss of valuable time and effort and results inrework, thereby drastically reducing the plant capacities and efficiencies. All the processing plants that were visited presented a lot of opportunity for improving the plant layouts and process flow.

Also, improvement in the layout does not seem to a high priority with the processing unit because of a lack of awareness of this very important area. In order to address this, the processing plants should be exposed to modern production practices like lean manufacturing, a production concept which works to optimize the production processes reducing waste and maximizing customer value. It is proposed that the selected processing plants should be imparted training to help them understand the concept of lean manufacturing and their plant layout are evaluated from a lean manufacturing perspective to help them optimize their layouts. Through lean manufacturing, the importance of line configuration, which reduces the material handling, also needs to be highlighted to the personnel at the processing plants.

### 7.1.2 ERP Management

As identified in the situation assessment, there is no planning effort going into optimizing the inventory and raw material as well as other key areas.

The concept of inventory and raw material management simply does not exist. This seems to tying up working capital for the processing plant. At the same time, there is also a huge opportunity to serve the local and export market efficiently by building buffer stocks of the right products. Similarly, resources in other key functional area also need to be aligned and optimized as per the business requirements. In order to address these issues, it is strongly recommended that the plants should be given assistance in setting up a simple ERP software system which will allow the processing units to integrate all facets of an operation, including raw materials and inventory planning, manufacturing processes, accounting, sales and human resources

The use of an ERP system will help the processing units to optimize the use of working capital and also move them to a planning and forecasting mode where they can plan their production as per their sales trends and also monitor their costs.

### 7.1.3 Export/B2B Market Training

Focused and effective marketing is a vital link which is missing as far as the local marble processors are concerned. There is a clear need to upgrade the skills of the local marble community in this area especially since the tiles sector and even imported marble supplier have made significant strides in that area. Trainings on export marketing and B2B marketing can help the local processors realize their full potential in terms of product management, creating product awareness and planning marketing initiatives for the relevant stake holders locally and in the international market. Also, there is a need for them to understand how marketing has evolved and transformed in the digitally connected world. In addition, areas like export documentation can also be added in these training initiatives.

### 7.1.4 Support in Developing Export Marketing Plans

Building upon the training imparted, selected processors can also be provided support in developing an export marketing plan and exploring opportunities in the international market and participating in international trade fairs.

## 7.2 Workforce Development

The skills of the workforce play a critical role in helping the processing plants achieve the optimal capacity and reducing inefficiencies. Most of the workforce at the processing plants has had limited or no formal education, having acquired the technical skills that it possesses on the job, without any exposure to formal training. The skills of the workforce need to be upgraded and this can happen when educated workforce is inducted on the processing plants and the existing workforce is exposed to the best practices and Standards Operating Procedures (SOP"s) in technical skills like cutting, sizing and polishing through formal training sessions and on the job training. The recommendations for educational background and required skills for key technical positions are shared below. Also since equipment upgrades at some of the processing plants will necessitate addition of personnel to these plants; it is recommended that inductions as per these requirements can start with recruitment required for equipment upgrades at the plants. The following grid shows the recommended skills and capabilities for key positions at the processing plants:

**Table 4 Eligibility Requirement for Key Personnel at the Processing Plant**

| S. No. | Position | Key Requirements |
|---|---|---|
| 1 | Plant Supervisor | Should be Engineering Diploma Holder (DAE) |
| 2 | Gang Saw Operator | Should be Engineering Diploma Holder (DAE)<br>Should possess a combination of technical understanding and physical rigor, so that he can move loads safely and efficiently.<br>Should have knowledge of sawing as a subject and should be technicallly sound to handle the machinery and preventive maintenance schedules. |
| 3 | Cutters (Local Market Lathe Operators) | Should preferably be Matriculate .<br>Lathe Operator from local market can be inducted. |
| 4 | Helpers and Jobbers | Matriculates |
| 5 | Polishers | Matriculates who can be do on-th-job training. |

### 7.2.1 Functional Trainings

Following functional trainings can be imparted to the staff at the processing plants

**Table 5 Proposed Functional Training for Key Personnel at the Processing Plant**

| | |
|---|---|
| **Gangsaw Operator** | Safe Handling of Loads and Best Practices of Load Handling |
| | Sawing Parameters for Different Materials |
| | Preventive Maintenance and Trouble shooting |
| **Cutter Man** | Training on Metric and Imperial System |
| | Maximizing Recovery from the Material |
| | Quality Awareness of the |
| **Polisher** | Understanding of Grains |
| | Polish Levels of different stones |
| | Measurement of Polish Levels |

These trainings can be carried out at the PASDEC Common Facility and Training Centers (CFTC) in Risalpur and Gadani. In addition, training related to lean manufacturing can make the workforce aware as to how adoption of lean manufacturing practices can help them perform more efficiently so that they apply these practices on a day to day basis.

## 7.3 Technology and Equipment Upgrades

As discussed in the section covering the Supply Side Assessment and Gap Analysis, a large number of processing plants are working with outdated machinery which is often being used beyond its rated capacity. This has a severe impact on the capacity available in the industry and the quality of the output from the processing plants. Improvement in capacity and quality is the first step in gearing the industry to better serve both the local market as well the export markets. While there is a large scale need for technology upgrade, but as a first step, some of the processing plants which had applied for equipment upgrade were visited to objectively evaluate their facilities and installed equipment and identify and recommended equipment upgrades to help these plants improve their quality and capacity and consequently their competitiveness. An overview of the key recommended equipment upgrades and the key supply gaps these address is given in the grid on the next page. Another important area which needs to be looked at and properly addressed is the assembling of diamond cutting tools with circular and linear saw. At present diamond segments are brazed through torch welding which result in swelling of the segment reducing its life and sometimes the quality of cut is also compromised. Moreover, the blades/saws are not tensioned. As a result, the life of the blade is further shortened and accuracy of cut further compromised. Due to extra requirement of cutting force, the electricity requirement also increases. It is recommended that induction welding should be introduced and

technician should be trained on blade tensioning procedure and be provided with some basic equipment.

**Table 6 Overview of the Key Equipment Upgrades at the Processing Plant**

| Equipment Proposed | Key Benefits | Key Supply Gap Addressed |
|---|---|---|
| Gantry Crane to replace Derrick Cranes | Load can be vertically lifted and stacked any ware in yard with efficency and safety | Capacity |
| | The stocks in the yard can be better organized as the material can be loaded on machines trolleys as per requirement. | |
| | Saving of time in loading and unloading operation compared to Derrick Cranes. | |
| | Can lift blocks as heavy as 15 to 25 tons compared to Derrick Cranes which are under rated and designed to lift 5 to 7 tons at standard boom angle. | |
| Jib Crane | Unloads cut strips from block cutter to free roller conveyer with help of scissors clamp. This machine greatly improve the efficiency of block cutter by reducing un loading time, it adds safety to the entire operation. | Efficiency and Safety at the Plants |
| Free Roller Conveyors | Used for handling material flow between the machines. Transport sawn strip from block cutter to single blade cross cutter and from single blade cross cutter to three blade cross cutter and splitter. | Efficiency, reduction in material lost in process due to manual transporation of material between machines |
| Single Blade Cross Cutter | Used to unload cut strips from block cutter to free roller conveyer with help of scissors clamp. Improves the efficiency of block cutter by reducing un loading time, it adds safety to the entire operation. | Efficiency and Safety at the Plants |
| Multi-blade Cross Cutter (3 Blade Cross Cutter) | Cuts strip into tiles of required dimensions. i.e. 12"x12" or 12"x24", after removal of rough end at head and tail of the strip. | Increase Capacity and Improve Quality. |
| Two blade splitting machine. | Splits a single tile into two tiles of equal thickness by means of two blades working simultaneously, each cutting half of the required splitting height. | Split materail can add value to processor , when material is split at factory rather than at |
| Radial Arm Polisher. | Used to polish marble and granite. Uses coarse to fine grain abrasives to polish marble/ granite | Capacity and Quality. Polishing will put these unit one step ahead in value addidtion |
| Bridge type Vertical horizontal block cutter | Saw strips from raw marble block by means of one vertical blade (Diameter between, 900 to 1600) and one horizontal blade. The principal cut is made by vertical blade and horizontal blade performs under cut to separate strip from the block. | Increase Capacity and Improve Quality. |
| Silo Tanks. | During sawing operation slurry (saw dust mixed in water) is produced, this slurry is required to be removed so that water can be recycled. Silo tank are used to decant water and send the near clean water back into the system | Poor Housekeeping. Will greatly reduce enviormental impact of marble processing |
| Auto Polishing machine . | Polishes marble strip, tile or slabs. Several polishing head are mounted above conveyer belts fitted to different grains of grinding and polishing abrasives. | Increase Capacity and Improve Quality. |

## 7.4 Industry Relevant Certifications

To make adherence to quality standards a way of life at the processing plant and to turn it into a competitive advantage, getting the industry relevant certifications can be a very effective initiative. It is recommended to help and support the processing plants in getting the necessary industry relevant certifications .These can include certifications such as:

- Eco Labeling Certification
- ISO Certification

Getting these certifications can also improve the competitiveness of Pakistani exporters in the international market.

## 7.5 Business Linkages

One of the key areas of opportunity that came out of discussions with the industry stakeholders from the perspective of demand assessment is the disconnect between the marble industry and the local industry stakeholders

### 7.5.1 Building Linkages with the Architect Community

There is clearly a need for more interaction between the marble processors and other industry stakeholders the architects. This can be done by establishing new platforms and leveraging the existing platforms and channels.

The All Pakistan Marble Industries Association has so far had a very weak role in promoting the use of natural stones. The Association practically has no linkages with architects, developers, and builders. Capacity building of APMIA is required so that gap between industry and stone users may be bridged.

A key opportunity in this regard for marble processors is the Institution of Architects (IAP) (www.iap.com.pk) platform. IAP is the representative community of the architect community in Pakistan. This platform can be effectively used to bring the architects and the marble processing community closer. IAP organizes their yearly events, IAPEX, which are held in the metro cities of Karachi, Lahore, Islamabad and Peshawar. While some marble processors do put up stalls at the IAPEX, but there is an opportunity to exploit this platform further in an organized manner through an increased participation to showcase all the available varieties and provide an opportunity to the processors to network with the architects. Seminars and session on the sidelines of the IAPEX can also be organized to further create awareness on different usages of the marble and granite varieties and strengthen the linkages with the architect community. Another possible opportunity could be to use the IAP portal to share the information about marble varieties with the architect community.

In addition, the marble industry can also develop its own periodic events, where the architects and builders can be invited. One such initiative was carried out by a group of marble processors by the name of “Stoneca” in May last year in Lahore. Although, it could not create the desired impact because of lack of proper advertising and promotion as well as event management issues, it can be planned more effectively for the next editions.

### 7.5.2 Channel development Initiatives with Ceramic Retailers

In order to increase the reach of the marble products, one opportunity that can be explored and tested is to make marble available at ceramic outlets as the consumers as the timing of purchase for ceramic and marble products often coincide. Marble processors can benefit from

the high footfall in ceramic tiles, their convenient locations and impactful displays. Based on the discussions with some ceramic retailers, some standard tile sizes, mainly 24" x 24" can be made available at the ceramic outlets. The ceramic retailer channel can also be tapped to provide the cut-to-size options for counter tops etc. as these have to be matched with the color theme based on tile selection anyway. This can provide a one stop solution to the consumer in term of the surface materials needs. However, the ceramic retailer also had the same concerns as the other stakeholders at the demand end in terms of supply availability and consistency. Marble processors will also need to ensure that the ceramic retailers get a comparable or a slightly higher margin than what they get on tiles so that it is win-win arrangement. The ceramic retailer make between 15-25% margin, as besides stocking local varieties, a large number of retailers directly import tiles from China. Hence the proposed approach is to carry out a pilot study where a couple of processors can approach a small number of retailers (approx 5-8) and make their marble variety available at their outlets and manage the product availability for these retailers, besides creating visibility at the outlets through display material and point of sale material. Based on the results, this distribution channel can be scaled up to include more retail outlets, and even a wholesaler/distributor can be added to cater to this demand consistently.

## 7.6 Marketing Initiatives and Assisstance

Effective presentation of the product offerings is a critical factor in the materials selection process for a project. As identified in the situation assessment of the demand side of both local and export markets, the industry feels that this is one of the key areas where the local marble sector needs to improve significantly. In this connection, following are the important elements that need to be focused:

### 7.6.1 Availability of Stone Specifications and Test Results

Non-availability of specifications regarding the various local stones as well as test results regarding attributes of different stones has been identified as a key issue by the decision makers. In this regards, it is strongly recommended that the specifications of all the stone varieties available in Pakistan should be made available to the decision makers. In addition, tests of key attributes of the local stones should be carried out from a credible international laboratory and those results should also be made available to the decision makers Test can be conducted for the following attributes.

- Compressive Strength
- Flexure
- Density, Porosity and Water Content
- Hardness
- Abrasivity
- Permeability
- Freeze Thaw
- Petrography
- Coefficient of Linear Expansion
- Coefficient of Friction
- Loss on Ignition etc.

These specifications and test results will serve as the much needed reference for the architect and builder/developer community in selection of marble and granite materials and will also help them to compare the specifications with other materials including tiles and imported marble.

This will also address the issue of lack of awareness of stone application in the architect/builder community.

### 7.6.2 Marble Varieties Imaging

It is difficult to capture the colors and patterns of marble varieties through conventional imaging techniques. Hence, images of the marble varieties, when shared with the local decision makers and export buyers do not reflect the actual colors and patterns.

Imaging of marble varieties is carried out at specialized imaging facilities. There are very few such facilities in the world. One such facility is Videomarmoteca (www.videomarmoteca.it) in Verona, Italy. At these facilities, through the use of special imaging techniques, the colors and patterns of marble varieties are captured. Other export markets like India have also carried out imaging for their varieties and using these for marketing their varieties

It is recommended that imaging of popular varieties is carried out at one of these imaging facilities so that these can be shared with the decision makers. The specifications, test results and the images can be combined into a reference document for local industry and export markets.

### 7.6.3 Participation in International Exhibitions

Once the reference document containing the specifications, tests results and images is developed, Pakistani marble varieties can be showcased at international fairs and exhibitions, where this information can be shared with the international buyers. In this regard, the three most important trade exhibitions that should be targeted are:

- Marmomacc Verona (Verona, Italy)
- Coverings (Las Vegas, USA)
- China Xiamen Stone Fair (Xiamen, China)

### 7.6.4 Sample Boards

Sample boards with samples of varieties should be developed by the marble processors to be shared with all the leading architects. Once the sample boards and the reference document are developed, the marble processors should ensure that these sample boards reach the offices of all the leading architects. These will equip the architects and builders with all the information that they require in the decision making for choosing local marble and granite products

### 7.6.5 Websites

In an increasingly connected world, websites offer a valuable opportunity to showcase the products even before a face to face contact has been made. It is convenient for the architects, builders and exporters to find out details about the products available with the individual suppliers. Hence the marble suppliers need to have active and functional websites where their products can be showcased, carry all the relevant information and are interactive so that the visitors to the website have an option to submit online queries. It is also important to ensure timely response to online queries.

### 7.6.6 Focus on Displays

Over the past few years, the retail environment in Pakistan has undergone tremendous change. Companies dealing in products competing with local marble and granite, especially tile

manufacturers and importers have invested in attractive display centers which are conveniently located. These display centers play a critical role in influencing the purchase decision.
This is an area where the local marble and granite sector also needs to step up its efforts. A large majority of the marble processing units are away from the city centre. In Karachi, the situation is further complicated by the fragile security situation in the area where most of the marble processing units are located. The marble processors should establish impactful display centre showcasing their entire range. These display centers should be set up at convenient locations, so that end users and architects can walk in easily. The staff at these units should be properly trained for customer handling. In addition, permanent displays of marble and granite varieties should be displayed at high profile venues like TDAP offices, Lok Virsa, Chamber of Commerce offices in Islamabad, Lahore and Karachi.

## 7.7 Initiatives for an Enabling Environment

In addition to the initiatives carried out within the industry, the issues related to the operating environment discussed in this report need to be taken up with the relevant stakeholders

### 7.7.1 Ban on Quarrying Through Blasting

Quarrying practice through blasting is the single most critical issue that the marble and granite industry is facing. This issue needs to be actively taken up with the provincial governments and Department of Mining. PASDEC can play an active role in taking up this issue with the relevant stakeholders

### 7.7.2 Improvement of Security for Marble Processors

While there are security challenges in our operating environment, the situation is particularly very serious in Karachi, where the security situation is hampering the day-to-day operations of the processing plants. This issue needs to be taken up with the Sindh Government so that they can arrange for additional security in the area where the marble processing units are located to ensure smooth operation.

# 8. Appendices

## Appendix 1 List of Meetings

| | | |
|---|---|---|
| 1 | Mr. Ihsan Ullah Khan | CEO, Pakistan Stone Development Company Islamabad |
| 2 | Mr. Jahangir Khan Sherpao | President (IAP), CITE' Islamabad |
| 3 | Mr. Fawad Suhail Abbasi | Partner – Architect, Suhail & Fawad Architects Islamabad |
| 4 | Mr. Qaiser Mehmood | Deputy Contract Manager, Matracon Islamabad |
| 5 | Mr. Rana Muhammad Amin | Project Cooidnator, Matracon Islamabad |
| 6 | Mr. Abid Mahmood | Architect, National Engineering Services Pakistan(NESPAK) , Islamabad |
| 7 | Mr. Ahmed Ghazal Usmani | Managing Director, Usmani Associates, Karachi |
| 8 | Mr. Arif Masood | Architect, National Monument |
| 9 | Mr. Sardar Hayat Ahmed | CEO Exceed (Pvt.) Limited |
| 10 | Mr. Saqib Farid | SK Stones |
| 11 | Mian Irfan | Amish Marbles |
| 12 | Mr. Naeem K Pasha | Architect, Sohail and Pasha Associates |
| 13 | Mr. Kashif | Senior Manager, Development and Projects, Emaar Pakistan |
| 14 | Mr. Junaid Ahmed Usmani | Chief Executive, Musafa International, Karachi (Hashwani Hotels) |
| 15 | Mr. Sanaullah | BE (Civil), Machiyara group of companies. |
| 16 | Mr. Syed Zia Askari | Partner Architect, Naqvi & Siddiquie Associates, Karachi, Islamabad, Quetta, UAE |
| 17 | Mr. Muhammad Arif Changezi | General Manager & Divisional Head, National Engineering Services Pakistan Pvt Limited, Kar |
| 18 | Mr. Mukhtar Husain | Executive Director, FNMH Architecture, Karachi |
| 19 | Mr. Shoaib Ahmed Khan | Principal Architect, SAK Achitects, Karachi |
| 20 | Mr. Shoaib Sultan | Director Foreign Trade, Popular Marble Industries, Karachi |
| 21 | Mr. Tanveer Ahmad | Architect, Tanveer Ahmad Associates, Karachi |
| 22 | Mr. Tariq A. Shaikh | SMB Marble, Karachi |
| 23 | Mr. M. Haroon Rashid | Chief Executive, Finesse Corporation, Karachi |
| 24 | Mr. Tariq Hussian Aamir | Chief Architect, The Aga Khan University Hospital, Karachi |
| 25 | Dr. Ali Akbar Husain | Head, Department of Architecture, The Indus Valley School of Art and Architecture |
| 26 | Mr. Sanaullah Khan | Managing Director, Sanco Marble, Karachi. |
| 27 | Mr. Hamid Shera | Director, Marina Industries, Karachi |
| 28 | Mr. Kabir | Head of Design Office, Serena Hotel |
| 29 | Mr. Asfandyar | Asfandi Builders, Hayatabad, Peshawar |
| 30 | Arch. Mr. Aqrab Ali Rana | CEO, Pakistan Green Building Council, Lahre |
| 31 | Mr. Aamir Saghir | GM Sales and Marketing, Shabbir Tiles Limited |
| 32 | Mrs Asiya Hussain | Chief of Design, Arshad Shahid Abdulla and Associates, Karachi |
| 33 | Mr. Ramiz Baig | RBD Design, Karachi |
| 34 | Engr. Arif Ali Khan | Izhar Construction, Lahore |
| 35 | Mr. Farhan Aftab | Ex General Manager , Eden Group |
| 36 | Shahid Rafiq / Habib Rafiq | Habib Rafiq Pvt. Ltd., Lahore |
| 37 | Haqeeq Ahmed | Haqeeq Marble, Lahore |
| 37 | Mr. Farooq Bhatti | Farooq Marble, Lahore |
| 38 | Engr. Afzaal Ahmed Warraich | Head Engg. Department , SKB Engineering and Construntion |
| 39 | Arch.Arif Ghani | Arif Ghani Associates |
| 40 | Arch. Dr. Shakeel Qureshi | Dean, School of Art, Architecutre and Design, Imperial College of Business Studies, Lahore |

# Appendix 2A Questionnaire for Architects

**QUESTIONNAIRE - ARCHITECTS**

**1. BUYERS PROFILE**

Company Profile:
Number of Projects designed in the last two years
Scale of Projects
Current project going on
Type of Project : residential /commercial/industrial / public utility etc.
No. of Senior Architects
Scope of Operation : National/Local
Name and Designation of the Interviewee:

**2. SECTION 2: USAGE PATTERNS**

2a, **What are the surface materials used in the project designed in the past three years.**

| | |
|---|---|
| Square Footage (Absolute) | |
| Approximate Percentage % | |
| Ceramic | |
| Marble Local /Imported | |
| Granite Local/Imported | |

2b. **Reasons for Selection of Ceramic/Porcelain and other flooring materials**

| | |
|---|---|
| Cost | |
| Supply Consistency/ Turnaround Time | |
| Client Preference | |
| Regular Follow-up | |
| Ease of Procurement | |
| Quality | |
| Lack of Awareness | |
| Low Maintenance | |
| Consumer Perception | |
| Any Other | |

2c. **Reasons for Selection of Marble/Granite**

| | |
|---|---|
| Aesthetics | |
| Quality | |
| Client Preference | |
| Cost | |
| Supply Consistency/ Turnaround Time | |
| Regular Follow-up | |
| Ease of Procurement | |
| Lack of Awareness | |
| Any Other | |

| | |
|---|---|
| 3. | **DEMAND PREFERENCES - MARBLE AND GRANITE (COLOR /SIZE/PATTERN)** |
| 3a. | **Size and Thickness for Marble /Granite used**<br>a. 1x1x1/2<br>b. 2x2x(6/8)"<br>c. Cut to size<br><br>Varieties Used : (Color/Size/Pattern) |
| 3b | **Local Top 10 (2x2) Varieties** |
| 3c | **Local Top 10 (1x1) Varieties** |
| 4. | **ISSUES WITH USAGE OF MARBLE** |

| | |
|---|---|
| Cost | |
| Maintenance Required | |
| Uniform Pattern | |
| Supply Consistency/ Turnaround Time | |
| Regular Follow-up | |
| Ease of Procurement | |
| Quality | |
| Lack of Awareness | |
| Quality Consistency | |
| Ease of Application | |
| Any Other | |

# Appendix 2B Questionnaire for Builders/Developers

**QUESTIONNAIRE - BUILDERS AND DEVELOPERS**

| | |
|---|---|
| 1. | **BUYERS PROFILE** |
| | Company Profile<br>Number of Projects in the last two years<br>Scale of Projects<br>Current project going on<br>Type of Project : residential /commercial/industrial / public utility etc.<br>Company Structure<br>Name and Designation of the Interviewee: |
| 2. | **SECTION 2: USAGE PATTERNS** |
| 2a. | **What are the surface materials used in the past three years.**<br>Square Footage (Absolute)<br>Approximate Percentage % |

| | |
|---|---|
| Ceramic | |
| Marble Local /Imported | |
| Granite Local/Imported | |

| | |
|---|---|
| 2b. | **Reasons for Selection of Ceramic/Porcelain and other flooring materials** |

| | |
|---|---|
| Cost | |
| Supply Consistency/ Turnaround Time | |
| Regular Follow-up | |
| Ease of Procurement | |
| Quality | |
| Lack of Awareness | |
| Low Maintenance | |
| Consumer Perception | |
| Any Other | |

| | |
|---|---|
| 2c. | **Reasons for Selection of Marble/Granite** |

| | |
|---|---|
| Aesthetics | |
| Quality | |
| Cost | |
| Supply Consistency/ Turnaround Time | |
| Regular Follow-up | |
| Ease of Procurement | |
| Lack of Awareness | |
| Any Other | |

| | |
|---|---|
| 3. | **DEMAND PREFERENCES - MARBLE AND GRANITE (COLOR /SIZE/PATTERN)** |
| 3a. | **Size and Thickness for Marble /Granite used**<br>a. 1x1x1/2<br>b. 2x2x(6/8)"<br>c. Cut to size |
| 3b. | Varieties Used : (Color/Size/Pattern) |
| | **Local Top 10 (2x2) Varieties** |
| 3c. | **Local Top 10 (1x1) Varieties** |
| 4. | **ISSUES WITH USAGE OF MARBLE** |
| | Cost<br>Maintenance Required<br>Uniform Pattern<br>Supply Consistency/ Turnaround Time<br>Regular Follow-up<br>Ease of Procurement<br>Quality<br>Lack of Awareness<br>Quality Consistency<br>Ease of Application<br>Any Other |
| 5. | **BUYING MECHANISM** |
| | Who do the builders/ developers buy from ?<br>Are there any middlemen?<br>Credit terms<br>Discounting<br>Number of Suppliers |
| 6. | Is information on Stone Application usefule for Builders and Developers ? |

# Appendix 2C Questionnaire for Exporters

| QUESTIONNAIRE - EXPORTERS | |
|---|---|
| 1. | EXPORTERS PROFILE<br><br>Exporters Profile:<br>Countries to which Exports have been made in the past two years :<br>Scale of Projects<br>Countries to whch Exports are curently being made<br>Name and Designation of the Interviewee: |
| 2. | **DEMAND PREFERENCES - MARBLE AND GRANITE (COLOR /SIZE/PATTERN)**<br><br>**Size and Thickness for Marble /Granite preferred**<br>a.<br>b.<br>c.<br><br>Varieties Used : (Color/Size/Pattern)<br><br>**International Top 10** |
| 3. | **ISSUES IN INCREASING EXPORTS OF MARBLE**<br><br>Quality<br>Cost<br>Uniform Pattern<br>Reliable Supplies<br>Any Other |
| 4. | Leading International Markets with estimates of export demand<br>Varieties Preferred<br>Value Additions Opportunities |

# Appendix 3 Applicants Evaluation Sheets

*Evaluation sheets are taken out form this report as those were confidential documents.*

# Appendix 4 World Marble and Granite Export Trends

($ in '000)

| HS Code | Exported Value 2008 | Exported Value 2009 | Exported Value 2010 | Exported Value 2011 | Exported Value 2012 |
|---|---|---|---|---|---|
| 6805 | 3,644,344 | 2,831,758 | 3,521,026 | 4,035,621 | 4,012,008 |
| 6804 | 3,616,562 | 2,555,155 | 3,381,822 | 4,032,296 | 3,967,790 |
| 6802 | 10,854,225 | 9,184,377 | 10,107,208 | 11,370,464 | 11,944,283 |
| 6801 | 2,588,583 | 408,043 | 428,468 | 522,880 | 440,336 |
| 2521 | 295,188 | 243,289 | 269,853 | 380,472 | 488,309 |
| 2522 | 798,249 | 697,781 | 790,955 | 977,187 | 1,006,521 |
| 2517 | 3,129,486 | 2,198,459 | 2,239,206 | 2,489,206 | 2,322,247 |
| 2516 | 1,711,943 | 1,345,303 | 1,505,840 | 1,804,641 | 1,867,892 |
| 2515 | 1,875,242 | 1,914,035 | 2,157,411 | 2,342,355 | 2,506,978 |
| **Total** | **28,513,822** | **21,378,200** | **24,401,789** | **27,955,122** | **28,556,364** |

Source : www.intracen.org

# Appendix 5 Pakistan Marble Granite Export Trends

$ in '000

| HS Code | Exported Value 2008 | Exported Value 2009 | Exported Value 2010 | Exported Value 2011 | Exported Value 2012 |
|---|---|---|---|---|---|
| 2515 | 14,047 | 16,479 | 26,419 | 40,328 | 45,019 |
| 2516 | 174 | 186 | 266 | 49 | 38 |
| 2517 | 1,165 | 550 | 591 | 489 | 991 |
| 2521 | 14 | 16 | 30 | 86 | 14 |
| 2522 | 2 | 23 | 13 | 11 | 8 |
| 6801 | 514 | 12 | 7 | - | - |
| 6802 | 11,044 | 9,351 | 10,715 | 11,738 | 15,942 |
| 6804 | 127 | 132 | 37 | 53 | 71 |
| 6805 | - | 50 | 104 | 36 | 109 |
| **Total** | **27,087** | **26,799** | **38,182** | **52,790** | **62,192** |

Source: www.intracen.org

# Appendix 6 Marble and Granite Production Estimates, 2012

| Cluster | No of Trucks Per Day | Weight Per Truck (MT) | No of Working days in a year | Yearly Production (Tons) |
|---|---|---|---|---|
| Buner | 100 | 40 | 250 | 1,000,000 |
| Lasbella | 50 | 40 | 250 | 500,000 |
| Khuzdar | 50 | 40 | 250 | 500,000 |
| Chaghai | 30 | 50 | 250 | 375,000 |
| FATA | 35 | 40 | 250 | 350,000 |
| Manshera | 20 | 30 | 250 | 150,000 |
| Mardan | 10 | 40 | 250 | 100,000 |
| Quetta | 10 | 40 | 180 | 72,000 |
| Loralai | 10 | 40 | 180 | 72,000 |
| Chitral | 15 | 25 | 150 | 56,250 |
| Dir | 10 | 30 | 150 | 45,000 |
| | | | Total | 3,220,250 |

Source : PASDEC

# 9. References

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