

**AN OVERVIEW
OF
GEMSTONE SECTOR - PAKISTAN**



Small and Medium Enterprise Development Authority

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1 SWOT ANALYSIS

1.1 STRENGTHS

- ◆ Variety of gemstone resources
- ◆ High quality of gemstones
- ◆ Availability of low cost labour
- ◆ Ideal geographic location

1.2 WEAKNESSES

- ◆ Non recognition of gemstone as an industry by the government
- ◆ Lack of value addition
- ◆ Lack of marketing skills
- ◆ Lack of technical know-how
- ◆ Inconsistent supply of gemstones
- ◆ Smuggling/export of rough gemstones
- ◆ Ineffective legislative laws
- ◆ Lack of funds
- ◆ Imparting with obsolete methods and technologies

1.3 OPPORTUNITIES

- ◆ Availability of quality gemstones from Afghanistan
- ◆ Untapped international markets
- ◆ Availability of inexpensive trainers from India, Thailand & Sri Lanka

1.4 THREATS

- ◆ Competition from India, Thailand & China
- ◆ Established world markets-barrier to market entry
- ◆ Regulatory bottlenecks
- ◆ Lack of financial support from financial institutions

2 INTRODUCTION

Gemstones have been used as symbols of beauty, wealth and status since prehistoric times. Regardless of their long history gemstones have no single and precise definition that is generally accepted. According to Webster's dictionary, a gem is any jewel whether stone, pearl or the like, having value and beauty that are intrinsic and not derived from its setting, a precious or semi-precious stone cut and polished for ornament.

Gemstones have not only been a personal adornment for display of beauty and status especially of the affluent class but have also played an important role in the economies of many countries. Pakistan has huge deposits of fine varieties of gemstones, but despite of this it has unable to capture the international market. Pakistan's present official export of rough gemstones for the year 1997-98 is US \$4.8 million. Major export markets are USA, Hong Kong, Germany, U.K, France, UAE, India and Thailand.

Many of the developing countries are playing an important role in the supply side of the markets. Internationally, Thailand is the largest supplier of rough, cut and semi-cut gemstones followed by India, China and Hong Kong, which have become the centres for value addition. Countries having extensive exports of gemstones have gone through considerable efforts while coming to a steady platform. Investment friendly policies, marketing, joint ventures and unity of associations with government organizations towards one goal has lead them in the right direction.

Pakistan fortunately has wide variety of gemstones, but due to lack of realization of the importance of gemstones sector and the role they can play in the national development, it has not been able to exploit its full potential. It does not require massive investment or long lead time hence volume and quality could be increased if more systematic exploration and development is undertaken. The gemstone sector never grew as an industry for various reasons but it has a phenomenal potential to become a billion-dollar export business for Pakistan. Emerald of Mingora (Swat), Pink and Golden Topaz of Katlang (Mardan) and Aquamarine of Chitral and Nelam Valley are well known for their

colour and clarity. But unfortunately, after so many years Pakistan exports still stands with a share of only 0.31%.

Since 1978, gemstones business has been under the control of Gemstone Corporation of Pakistan (GEMCP), which was under the administrative control of Ministry of Petroleum & Natural Resources, responsible for exploration and mining of gemstones. Besides, it was also responsible for regulating and managing the business of gemstones, including auctioning and direct exports. But due to various reasons the all the mines were closed down, bringing the trade to its lowest level, and ultimately GEMCP was disbanded in 1993-94. It was only in the last three years the Emerald mines at Mingora and Gujjar Killi, Ruby mines at Hunza and Nanji Mali, Topaz mine in Mardan was auctioned to the private sector, due to which the exports had slightly picked up.

Some of the major factors influencing the growth of gemstone sector are: lack of appropriate skilled manpower, vested interest, illegal activity, regulatory framework, technical and managerial know-how and financial support.

3 MARKET ANALYSIS

3.1 INTERNATIONAL MARKET

The size and the scope of the world market for gemstones is difficult to estimate due to non-availability of data. This is mainly because the industry is in the informal sector, and most of the companies are family owned businesses. But despite of lack of proper data on exports and imports, there are indirect signs that the worldwide gemstones market is showing a declining trend since 1993.

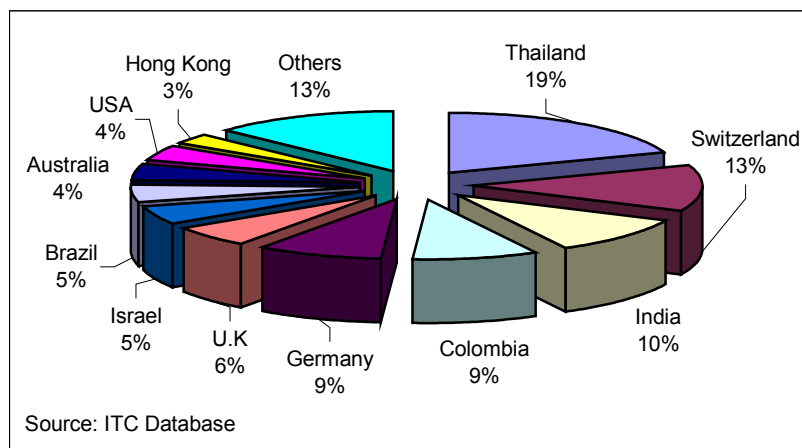
Table1: World Gemstone Exports Trend

	Export Trend				US \$ M
	1993	1994	1995	1996	1997
World	2,240	2,227	2,140	1,707	1,557
Thailand	449	450	422	398	303
Switzerland	493	393	237	226	195
India	86	116	153	142	157
Colombia	403	424	455	179	141
Germany	196	192	209	176	139
U.K	73	75	78	82	77
Israel	45	56	73	82	72
Brazil	33	40	50	43	90
Australia	74	93	92	97	69
USA	57	56	63	51	65
Hong Kong	65	61	50	45	44

Source: ITC Data

Sharp decline in the international trade of coloured gemstones during 1996 was due to the Asian economic crisis. Asia still being the hub of gemstones has strong influence on the world trade. There is a constant shift in the global trade of gemstones due to rapid change in the demand for shapes, cuts, colours and type of gemstone.

Figure 1: World's Top Gemstone Exporters-1997



The world trade for coloured gemstone was US \$1.56 billion in 1997, dominated by Thailand, Switzerland and India, having market shares of 21, 14 and 11 percents respectively.

Table 2: World Gemstone Import Trend

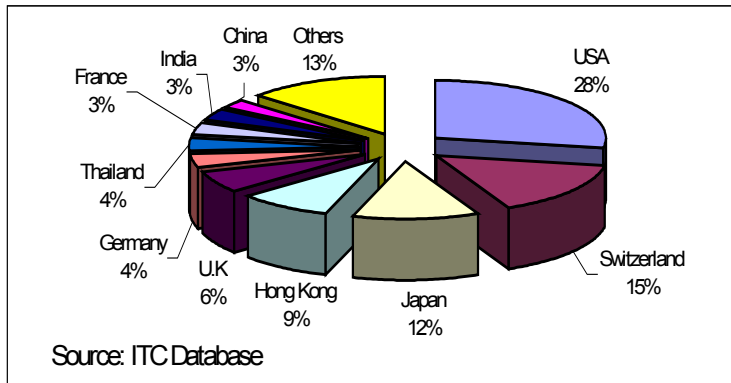
	Import Trend					US \$ M
	1993	1994	1995	1996	1997	
World	2,567	2,554	2,470	2,342	2,179	
USA	543	572	558	537	640	
Switzerland	458	441	302	326	353	
Japan	466	521	525	471	280	
Hong Kong	231	239	289	237	205	
U.K	78	57	62	68	138	
Germany	107	109	99	90	90	
Thailand	151	126	138	131	83	
France	130	104	93	84	78	
China	142	114	94	87	59	
India	47	49	54	75		

Source: ITC Data

Out of the total imports of US \$2.2 billion USA, Switzerland and Japan have the highest shares of 28, 15 and 12 percent respectively.

The disparity between export and the import figures, as shown in the above exhibits, is mainly due to misreporting and also gemstone data is not accounted for when used in jewellery.

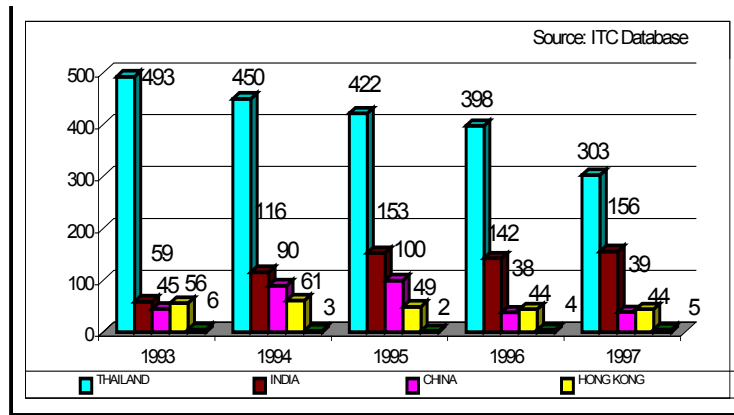
Figure 2: World' s Top Gemstone Importers 1997



Leading countries like Thailand, India and China are dependent on imported raw material, which mainly comes from countries like Myanmar, Russia, Brazil, Zambia, Zimbabwe, Australia and even Pakistan. Despite of this they have emerged as global giants, mainly due to support from their government and active participation of their Associations. The biggest advantage they have is the availability of skilled but inexpensive manpower. Also extensive efforts are concentrated towards marketing by promoting local companies to participate in the international exhibitions. Their governments also provides financial support to enable the local companies to exhibit their products in international fairs, which are regularly held in India, Thailand, America, Italy, etc. Their emphasis is also towards value addition, hence most of these countries have banned the export of rough gemstones. Besides, these countries have the comparative advantage due to available resources of certain varieties of gemstones. Due to these factors leading gem related training institutions such as Institutes like Gemological Institute of America (GIA), International Gemological Institute (IGI) and

many other at government and private level have established their institutes in these countries.

Figure 3: Top Asian Gemstone Exporting Countries



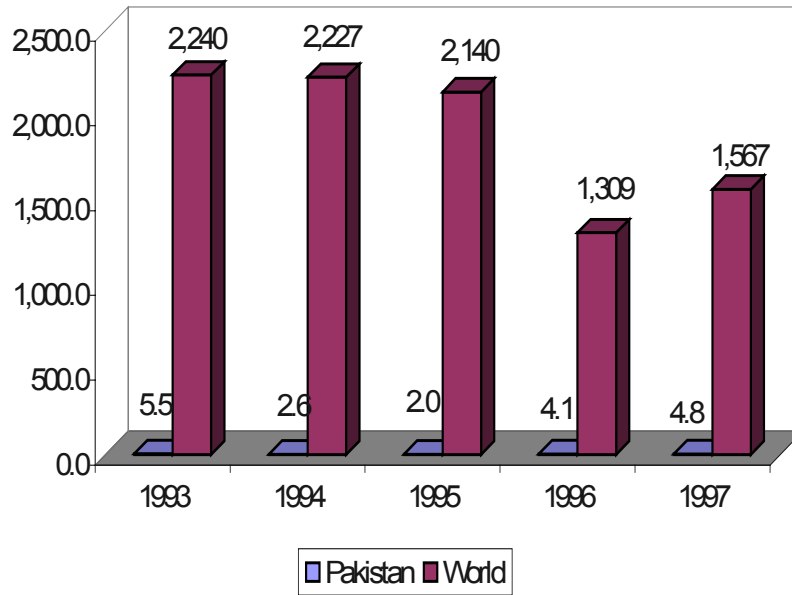
The above mentioned graph of top Asian gemstone exporting countries shows the dominance of Thailand as the largest exporting country, although showing a declining trend but still holds the biggest market share. It is also regarded as the hub of gemstones. India has also started emerging as the centre for value addition, and its exports has grown consistently and has attained its position as the world third largest exporter for coloured gemstones.

3.2 PAKISTAN OVERVIEW

Pakistan has emerged as the fifth frontier for the occurrence of gemstones on the world map but it has been unable to penetrate the international market. The gemstone sector never grew as an industry for various reasons but has a phenomenal potential to become billion-dollar export industry for Pakistan.

Despite huge reserves of all the major gemstones, Pakistan's market share is only 0.31% of the total exports worldwide. The exports have declined from US \$7.9 million in 1988-89 to US \$4.8 million in 1997-98, a staggering decrease of 40% over the last 10 years. Although unofficial export value is much higher than the available official export figures.

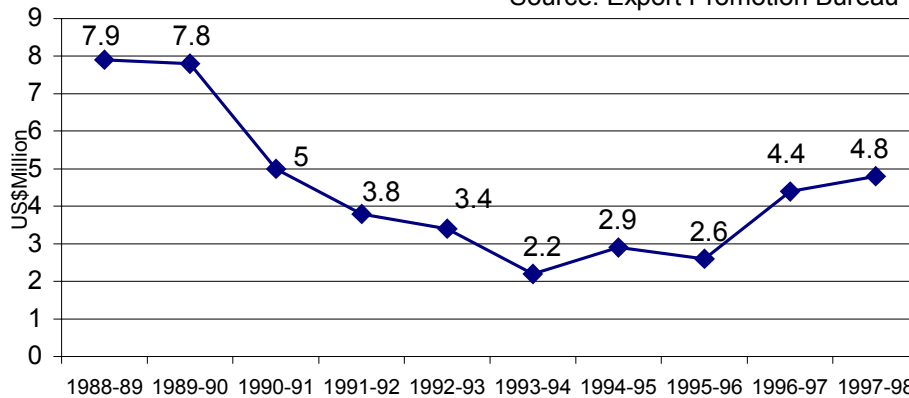
Figure 4: World Vs Pakistan Gemstone Exports



The graph below shows an irregular export trend of Pakistani gemstones. Since 1978,

Figure 5: Pakistan Exports Trend

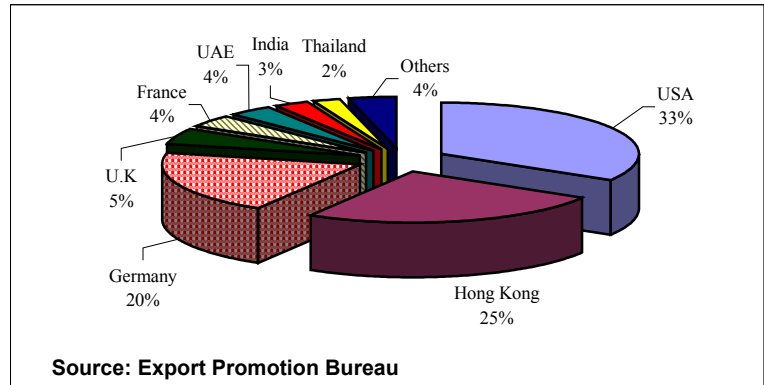
Source: Export Promotion Bureau



gemstones business has been under the control of Gemstone Corporation of Pakistan (GEMCP), which was under the administrative control of Ministry of Petroleum & Natural Resources, responsible for exploration and mining of gemstones. Besides, it was also responsible for regulating and managing the business of gemstones, including auctioning and direct exports. But due to various reasons the all the mines were closed down, bringing the trade to its lowest level, and ultimately GEMCP was disbanded in

1993-94. It was only in the last three years the Emerald mines at Mingora and Gujjar Killi, Ruby mines at Hunza and Nanji Mali, Topaz mine in Mardan was auctioned to the private sector, due to which the exports had slightly picked up.

Figure 6: Major Buyers of Pakistani Gemstone



Pakistan's present official export of rough gemstones for the year 1997-98 is US\$4.8 million, with major markets being USA, Hong Kong, Germany and the United Kingdom having 33, 25 and 5 percent market shares respectively.

3.3 AVERAGE PRICES OF GEMSTONES

Table 3: Average Prices of Rough Gemstones

Stones	Price \$/Carat	Prices \$/kg
Emerald	150	750,000
Ruby	125	625,000
Peridot	20	100,000
Topaz	5	25,000
Aquamarine	10	50,000
Tourmaline	15	75,000
Garnet	0.02	100

3.4 INTERNATIONAL MARKETS OF GEMSTONES

3.4.1 EMERALD

Major markets for Emerald are USA, Southeast Asia and Japan.

3.4.2 RUBY

The markets for ruby are USA, Hong Kong, Canada, Singapore, Japan, Korea and the European Union.

3.4.3 PERIDOT

The major markets for Peridot are USA, European Union, Germany and Japan

3.4.4 TOPAZ

The major markets for topaz are USA, European Union and Japan.

3.4.5 TOURMALINE

The major markets for tourmaline are USA, Switzerland, Germany, Spain, France, Italy, United Kingdom and the Far East.

3.4.6 AQUAMARINE

The major market for Aquamarine is Japan. Medium to high quality aquamarine are saleable in Germany, Italy, Taiwan and different qualities were sold to the United States.

4 Pakistan's Gemstones Reserves

Pakistan is fortunate to be strategically located close to some of the major markets such as Thailand and Sri Lanka. Besides, it has one of the largest deposits of varieties of gemstones, which are highly priced and demanded gemstones like emerald and ruby. Important Gemstones found in Pakistan are:

Table 4: Location of Gemstone Mines

Stone	Characteristics	Location
Emerald	Sea green,	Mingora in Swat, Shamozi, Gujar Killi, Charbagh, Makhad
Ruby	Deep red	Hunza Valley of the Gilgit Agency. Azad Kashmir.
Topaz	Deep Orange, Pale yellow, pink, colourless, blue, violet coloured crystals.	Chitral, Gilgit agency, Kalam. Katlang Ardan, Ghindao Hills.
Aquamarine	Sky blue to sea green	Shirgar Valley of Baltistan, Chitral, Kaghan, Neelam Valley of Azad Kashmir.
Garnet	Blood red, purple, green	Dir, Swat, Quetta, Kalt division.
Lapis-lazuli	Brilliant blue colour with golden specks	N.W.F.P.
Jade	Red, brown, white, black.	Gilgit, North West Province.
Peridot	Yellowish green	Parla Sapat, Naran in Hazara Kohistan.
Tourmaline	Black, blue, green, pink, bright red, rare golden yellow,	Gilgit.

	bicolour, tourmaline.	
Zircon		Silai Patti, near Malakand.

Pakistan has a potential yield of 800 thousand carats of ruby, 875 thousand carats of emerald and 5 million carats of peridot, which lay unutilized.

4.1 ESTIMATED RESERVES

Table 5: Reserves

Country	Mines	Stone	Carats in millions
Pakistan	Mingora	Emerald	20-30
	Gujar Killi		20-30
	Shamazoi		20-30
Afghanistan	Pansher		30-60
Kashmir	Nangimali	Ruby	100-200
Afghanistan	Jagdalak		100-200
Pakistan	Dassu	Peridot	75-100

Source: Emerald Mining Company Report

4.2 AFGHANISTAN : AN OPPORTUNITY FOR PAKISTAN

Afghanistan has historically been well known for its lapis lazuli deposits. Significant amounts of fine emerald, tourmaline, kunzite, and some rubies have also been discovered in Afghanistan. Emerald comes primarily from the Panjshir Valley, northeast of Kabul. Large deposits of green, blue, and pink tourmaline, kunzite and some aquamarine are been mined from the Nuristan region, east of Panjshir. Smaller quantities of fine ruby have been found in the Sorobi region, located between Jalalabad and Kabul. Lesser amounts of garnet, amethyst, spinel, and morganite have also been found. Peshawar is the main export outlet of all Afghani gemstones, mostly in form of rough stones.

5 Gemstone Industry of Pakistan

The gemstone industry of Pakistan is in a dismal state with no elements of quality & standardization. The sector, which had initially attracted world attention, has been rendered dormant and unproductive due to lack of any effective government policies. It is difficult to comprehend that in the absence of any government policy such an important segment of the industry would contribute usefully towards the development of the economy. Some of the major problems of the industry are:

- ◆ Non recognition of gemstone sector as an industry by the government
- ◆ Lack of effective regulatory and institutional framework
- ◆ Imparting with obsolete methods and technologies
- ◆ Lack of proper infrastructure at mining sites
- ◆ Non availability of skilled labour
- ◆ No training institution
- ◆ Smuggling of gemstones
- ◆ No financial support
- ◆ Lack of marketing skills

5.1 MINING

Mining is an important but most primitive and unorganized segment of the gemstone industry. This is mainly due to the lack of proper infrastructure, poor mining laws, lack of technical know-how and most importantly due to non-availability of funds. The mining methods being presently employed by them bears high wastage of gems, mainly because of uncontrolled blasting with dynamite and the hammering processes to separate gem from the rock, which tends to damage the gemstone.

The present mining rules of Pakistan provides too much authority to the government mining agencies, which is being misused creating hurdles for the mine owners. This has lead to the closure of many private leased mines.

5.2 CUTTING AND POLISHING

Gem cutting and polishing exists on a very limited scale in Pakistan, which is mostly being done on individual basis or at a cottage level. Presently, there are approximately 30,000 people involved in this trade in Pakistan, amongst which most of them are exporters of rough gemstones. There are about 500 units involved in cutting and polishing, on average employing 3 persons per unit. Most of the gemstone dealers and processors are located in Peshawar, Lahore and Karachi. The cutting and polishing done in Namak Mandi in Peshawar and Suha Bazar of Lahore is of very low quality. It is all done manually using old and obsolete machines, which are locally developed. In Export Processing Zone (EPZ), Sadder Karachi, the cutting and polishing is being done on a very small scale but the standard is much higher.

Most of these skilled artisans involved in the gemstone business are descendants of Jaipur, Indian origin, who have migrated to Pakistan have set-up their shops/units in Karachi, Lahore and Peshawar. They train their children and grand children, and thus the expertise remained within the family. The skill level of these crafts man depends entirely on their experience. These local craftsmen are unaware of latest technologies and international accepted quality standards. The number of craftsman has started declining, as they were unable to cope with the technological advancement of the other developed countries. The younger generation, seeing no future in this trade has started opting for other lucrative professions. As a result the number of expertise in this field has been declining with the passage of time. Those who are still associated with this trade are unaware of international markets, nor they have the capacity to produce quality products to compete in the international market. This has resulted in low productivity and monotonous designs, which does not have any demand in the world market. Consequently 90% of our gem rocks are exported in the form of rough at throwaway prices thereby causing loss to the exchequer in the form of revenue from value added products.

5.3 MARKETING

Marketing has played an important role in the promotion of gemstones business in the leading gemstone exporting countries like India, Thailand and Sri Lanka. They were able to enhance exports through aggressive marketing efforts such as holding exhibitions in their country and also exhibiting their work in the international exhibitions. One of the major reasons for their growth in exports was due to strong government support. Private companies have also actively promoted their products through various modes such as by developing web sites, collaboration with international companies, etc. Unfortunately, gemstone trade has been a neglected sector in Pakistan. No efforts either from the government or on private basis has been made to enhance the growth of gemstone business. There is an absence of a price regulatory system where the prices of Pakistani stones could be ascertained. As most of our stones are smuggled out of the country and in rough form so the concept of branding has never evolved. Pakistan does not have any overseas marketing network, nor have any collaboration with international companies like International Coloured Stones Associations (ICA) or Gemology Institute of America (GIA) via which stones could be marketed. The Pakistani government has never given any assistance or incentives to the exporters to participate in the international fairs. Due to the political instability and the general law and order situation, no foreign collaboration or joint ventures have taken place. As more than 75 percent of our gemstone exports are done unofficially, thus the recognition of the origin of the gemstone gets lost. However, emeralds of Swat, Rubies and Sapphires of Kashmir are extremely famous throughout the world.

Marketing of gemstones is extremely important in order to create awareness. It is due to the lack of marketing efforts that Pakistan's potential of gemstones could not be advocated in the international market due to which the market share remained at low level. Internet is being widely used as mode for marketing, which is still at its infancy stage in Pakistan. Export Promotion Bureau (EPB) is in process of developing a website on gemstones. Moreover it is hardly being used by the private sector in the gemstone sector, as the people who are involved in this trade are mostly uneducated. Participating in exhibitions and fairs is most common marketing tool, which is still the most effective

medium of selling. Pakistan, as mentioned earlier, holds only one exhibition annually in Peshawar, which even does not meet the international standards, as such does not attract any international buyers.

5.4 TECHNOLOGY

Technology for extraction, handling and processing of gemstones is still being carried out on conventional methods. Uncontrolled blasting and open pit mining techniques are mostly used in mining of gemstones. No evaluation or prospecting of mines is done before they are leased out. In gemstone mining, due to the physical nature of gemstones and the ability to bear shock from the blast demands suitable mining methods. The mining technique to be employed depends upon the type of mineral deposit, geology of the gem-bearing rocks, infrastructure, equipment and the availability of labour. One way of enhancing technological level is through joint venture arrangements with international companies who specialize in this field. It also provides an opportunity as a source of regular supply of the gemstones.

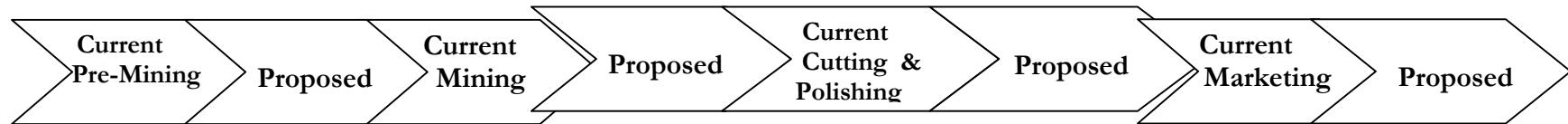
The different techniques used for gemstone mining is the use of other non- explosive techniques such as diamond wire cutting for gems embedded marble rocks, chemical wedge and hydraulic wedge may be employed in exploration and mining of the gem-bearing deposits. Other modern mining techniques such as driving short tunnels into the sides of hills (mining ruby, sapphire in Myanmar and emerald in Colombia.), open cast mining, using powerful water to loosen gem material from the overburden are commonly used in mining gemstones internationally. Underground mining method is also done in certain countries.

5.5 SKILLS

One of the major causes of lack of growth in gemstone sector is non-availability of skilled manpower. This is the main reason that rough gemstones are smuggled out of Pakistan and are sold at throw-away prices. The sub-standard cutting and polishing being done is totally for local consumption, which are mainly used in jewellery. The reason for not developing skills because there is no institute imparting with training in

gemstones in Pakistan. Many proposals and feasibilities for establishing training institutions have been carried out but none have been formalized. Even funds for the establishment of gemmology institutes in Peshawar has been approved but has not been implemented.

5.6 VALUE CHAIN ANALYSIS



Obsolete 1976 Mining Rules	Revision	Obsolete Mining Methods	Modernize Mining Methods	Obsolete Tools & Equipment	Semi-Automated Modern Machinery	Domestic Target Market	International Target Market
Poor Existing Mining Lease Laws	Revision	Inexperienced Management	Management Training	Low Quality Production	High Quality Production	Non Availability Of Lockers At Airports	Availability Of Lockers At Airports
Existing Mining Policy	Implementation	Untrained Labour	Training of Labor	Low Volume Production	High Volume Production	Local Gem Fairs	International Gems Fairs
Ineffective Legislation on Theft	Revision	Obsolete Machinery & Equipment	Modern Machinery & Equipment	High Cost Per Unit	Low Cost Per Unit	No Government Assistance	Government Assistance-EPB
Ineffective Existing Enforcement	Improve Law Enforcement	Manual Processing	Mechanized Processing	No Financial Support	Financial Support		

Laws							
		Inadequate Security	Improve Security				
		Low Volume Production	High Volume Production				
		High per cost unit	Low cost per unit				

6 Potential of Pakistan's Gemstones

There is no doubt that Pakistan has an enormous potential to increase its exports manifolds, and could become one of the major players in the billion dollar world market. Pakistan is fortunate to be strategically located close to some of the major markets such as Thailand and Sri Lanka. Besides, it has one of the largest deposits of varieties of gemstones, which are highly priced and demanded gemstones like emerald and ruby.

Emerald of Mingora, pink and golden topaz of Mardan and aquamarine are well known for their colour and clarity. Peshawar is the most important export outlet for gems. Recently, the war in Afghanistan has enhanced Peshawar's export business and helped preserve its importance as a gem trading market. Most precious stones, which were previously being exported from Kabul, are now believed to be going through Peshawar. In spite of the negative portrayal of the area in the world media, most rough gemstones of Pakistan and Afghanistan are traded in Peshawar by the international buyers, which are cut and polished overseas and are sold at enormous prices.

Estimated Reserves

Table 6: Estimated Reserves

Country	Mines	Stone	Carats in millions	US\$/Carat (Rough)	Value in US\$ Millions
Pakistan	Mingora	Emerald	20-30	10	600-900
	Gujar Killi		20-30	10	600-900
	Shaozai		20-30	10	600-900
Afghanistan	Pansher		30-60	20	600-1,200
Kashmir	Nangimali	Ruby	100-200	2	200-400
Afghanistan	Jagdalak		100-200	2	200-400
Pakistan	Dassu	Peridot	75-100	5	375-500

In Pakistan, *emerald deposits are in a 70- kilometre belt from Shamozaï to Alpuri Shangala area*. The main producing mines are located at Shamozaï, Mingora,

Charbagh and Makhand in the Swat district and Gujar Killi in the Shangla district. Swat has some of the finest emeralds, which could be compared with the Colombian emeralds. The reserves of Mingora are estimated between 1.6 million to 2.0 million carats of gem quality material as surface deposit extrapolated upto a depth of 90 metres. If underground mining is employed the deposit will easily exceed 20-30 million carats. The reserves of Shamazoi and Gujar killi are similar to that of Mingora. Thus a reserve estimate of 60 - 90 million carats for the swat area is possible.

Proper mine development at these points is likely to increase production manifold. Rough is mainly from 8 carats to 10 carats. Best quality crystals are from 3 carats to 5 carats. Polished stones below 1 carat have good colour and clarity while larger stones have a darker colour that is not attractive.

The gem quality material of out of the mine varies between 5% to 10%, which is considered excellent. **Therefore, there is a great potential for enhancing emerald production in Pakistan.** This can be done by increasing production from Mingora, Gujarkili and Shamozaï and by bringing new mines under production particularly of the Mimola and Mor Darra region (Barang) of Bajaur Agency. Attempts should also be made to discover potential emerald deposits in the 150 km long “*Emerald Belt*” between the Indus and the Mohammed Agency

A major deposit at Nagimali (Kashmir) has been partially developed with cooperation between the UN and the Azad Kashmir Mineral Industrial Development Corporation with estimated reserve potential of 200 million carats. The Kashmir rubies are known for their colour and quality and have an established international market. Hunza is another medium sized deposit, which is known to be the second other region in the world that has produced “blood red” ruby after Burma. Hunza ruby belt is reportedly 100 km long and only a small part have been explored. The prospects for developing larger and better gemstones is good, subject to further exploration.

Pink topaz of Katlang (Mardan) is a unique stone unparalleled in the world. Pink topaz is only found in Pakistan and Brazil but the rich coloured pink stone is found only in Pakistan. If aggressively promoted in the world market, this gemstone can prove to be a

great foreign exchange earner for the country. Presently explored deposit is small, but there is credible geological evidence for more deposits. This gemstone promises a real bright future for the gemstone industry of Pakistan.

Gem-quality Peridot was discovered in Pakistan in 1994 in the Kohistan district, with mineralization in a 20-square-kilometre area. This deposit has been exploited by the locals and also has an established international market. The reserves estimate about 75-100 million carats.

Table 7: Projected Yield of Gemstone

Stones	Est Kg/yr	Yield %	Finished Product Kg/yr	Int'l Price\$/kg	Value in \$ Mn	V.addition %
Emerald	500	35	175	750,000	131	80
Ruby	800	20	160	625,000	100	50-80
Peridot	7500	20	1,500	100,000	100	50-70
Topaz	5000	20	1,000	25,000	25	70
Aquamarine	2000	20	400	50,000	20	40-50
Tourmaline	2000	20	400	75,000	30	40-50
Garnet	500000	10	50,000	100	5	15-20

The existing gemstone mines and potential deposits could be developed in the next ten years to make Pakistan a major player in the world markets, comparable to Columbia, Brazil, Zimbabwe, Zambia and Kenya. The above table shows that by the development of new mines and activating the existing ones the above estimated targets per year are achievable. After sorting and cleaning, the yield of emerald, ruby, period, topaz, aquamarine, tourmaline and garnets is 35%, 20%, 20%, 20%, 20%, 20% and 10% respectively could be attained. This development would ensure a regular supply of rough gemstones to the cutting and polishing industry for value addition. The emerald occurrence is unique in terms of colour, clarity and hardness, which when cut and polished properly fetches very high price. Small size emeralds are primarily used by the watch industry and fine jewellery manufacturers in USA and Europe. The major

potential markets for Pakistan are USA, Hong Kong, Germany, U.K, France, UAE, India and Thailand.

Official and unofficial exports of gemstones from Pakistan, Kashmir, and Afghanistan are estimated to be around US\$ 20~25 million per annum during the last five years. Thus going towards value-addition and curbing the parallel exports Pakistan could benefit from this loss of revenue. There is a need to increase not only the quantity of gemstones but also the quality. This is one of the major causes where Pakistan has been unable to make any impact on the international market. This can be achieved by developing cutting and polishing industry in Pakistan.

7 Major Recommendations for Improving Gem Industry

1. Gem sector should be given the status of an industry.
2. Due to the existing mining rules and lease laws most of the mines are closed. The mining rules of 1976 and existing lease agreements for prospecting, exploration and mining need revision, which should protect and encourage private investors. A separate mining policy for gem industry needs to be formulated. (Attached in Annexure 1)
3. The legal and institutional set-up at the federal and provincial level require revamping in order to create a conducive environment for private sector to invest in gem sector. The district administration should effectively enforce law and order situation at the mines.
4. Due to lack of appropriate machinery and equipment the cutting and polishing industry has been unable to produce quality gems for exports. To make it affordable so that there is diffusion of modern technology in the industry, duty free import of machinery/equipment for gem mining, cutting and polishing and jewellery manufacturing should be allowed.
5. One of the main constraints is lack of skilled manpower, hence there is a need to establish training institutes imparting with training in both mining and processing areas. Funds (EDF funds) should be allocated for the establishment of training institutes at Peshawar and Karachi. Inexpensive master trainers should be invited from Thailand, and/or Sri Lanka.
6. EPB should strongly support and promote this sector through various promotional modes such as encouraging private companies to participate in the international exhibitions. EPB should share the cost with the participating private sector companies. Display centres for gems should also be established in various countries.
7. Concept proposal of Art and Trade Centre equipped with modern facilities for gems showrooms, lapidaries and offices of banks, airlines, customs, SMEDA,

EPB and trade associations for faster and convenient exports processing with adequate security arrangements has been agreed by government. The local gemstone industry is expected to get a major boost for value addition and exports enhancement, from the completion of this project.

8. An overriding factor affecting various components of the development plan will be the influence and participation of Afghans with raw material, entrepreneurial and technical skills.
9. Locker and safe deposit facilities for gemstones should be provided at the airport and in the airplanes so that security concerns of exporters are solved.
10. Establishments of gemstone exhibition/display centers in foreign target markets. Such centers can play a pivotal role in promoting awareness and demand of Pakistani gemstones, as well as keeping the local exporters updated with the latest international trends in the field of gems marketing.
11. Export of rough gemstone should be discouraged through various incentive measures, such as provision of export refinance facility, tax holiday to cut and polished gem exporter.
12. Facilitation and encouragement of E-commerce marketing of local gemstones. Proposals such as establishing an electronic exchange with listing of gemstones of local dealers, promotion of salient features of Pakistani gemstone resources on internet etc can be considered for export development of gemstones.
13. Capital financing should be provided to the investors for the gemstone mining and processing industry.
14. Joint venture arrangements should be encouraged both in the mining and processing industry.

8 Annexure-1 Proposal for Small Scale Mining

1. Government of NWFP may announce incentive package for local prospectors, promoters and miners who will be granted mining permit for the open area on first come first serve basis if the interested party/person provides authenticated proofs of occurrence of specified gemstones in that particular area. The provincial Government will lay down specific procedure to facilitate the investors in further exploration and mining.
2. Permit may be valid for three years with 2% royalty, which would be extendable for another term of two years with royalty terms up to 10%, based on the performance of the miner. All payments would be subject to deferred receipts of sale.
3. Entrepreneurs will be facilitated through SDA for advice and technical service in addition to the provision of basic machinery and equipment on nominal rent. Experts from private sector on the panel of DIMD will be available for the preparation of Geological Maps, delineation of Mineralized Zones and preparation of Mine Development Plan, if desired by the promoter.
4. There shall be no fee for granting permit. However, security deposits of Rs 50,000 will be levied payment.
5. Soft-term loans, up to Rs 500,000/- will be facilitated to the miner for machinery equipment and Rs 100,000 for development, after the mine is physically verified by the panel of Technical Experts.
6. The government of NWFP will develop mine geological maps for auction of lease within three years.
7. The mine auction after three years will give the first right of refusal to miner on the terms and conditions as suggested by the panel of experts.
8. If the mine owners/promoters want to bring external equity, the same will be facilitated through joint venture agreement within the first three years of no

additional cost. However, security amount will be increased by Rs 50,000 lump sum.

9. The provincial government through civil administration will provide all local facilitation and mine site security. Police check post may also be approved.
10. Royalty payments of 2% for the three years and 10% in next two years will provide local development funds.

PROPOSAL SENT TO THE MINERAL WING (ISLAMABAD)

SMEDA's specific comments on the proposed strategy of mining cutting, polishing and marketing of gemstones by Ministry of Petroleum and Natural Resources Islamabad (Mineral Wing) are as follows:

1. Production coming through mining is difficult to be documented in an atmosphere of distrust and fear. First of all mining operations are to be encouraged through more focused and transparent mining regulation coupled with stream lining functions of work and regulatory authority. Similarly, evolution of mechanism to persuade local communities and concerned civil administration departments to join hands for promotion and facilitation of legal mining is imperative.
2. Illegal mining is very difficult to be stopped until and unless the promising areas are thoroughly explored and deposits are evaluated leading to preparation of auctionable packages and readily given to private sector for exploitation through public ads. For registering and documenting small and undocumented deposits as suggested briefly by Mineral Wing, local investors and prospectors should be given formal lease with minimum hassle for at least three years preferably merely by registering a claim with local administration. Which should get gratis official technical support from development agencies alongwith recommendations for financial/banks support. During which period regular exploration and documentation is carried out with assurance for local prospector to gain from the eventual mining proceeds (or royalty) in addition to re-deploying the proceeds for mineral and social development in that area.

3. Reasons for closed gem mines are to be urgently analyzed for resolution and reactivation so as to minimize chances of trespassing. Provision and facilitation of all technical and administrative support has to be mandatory for all. Government of NWFP has taken very positive step in this direction and constituted a gem mining committee (copy enclosed) comprising of members from public and private sector organizations/associations (copy of notification and agenda for its first meeting is enclosed). This committee will work on the pertinent issues as per its TOR. It is recommended that Federal and other Provincial Governments should also constitute mining committees with private sector representation for the areas falling in their domain in lines with Government of NWFP notification.
4. Gem Mining Committee as proposed above is empowered to look into the matter of closed gem mines and work out the core issues in consultation with the licensing authority and leaseholder. The committee is required to submit its recommendations in stipulated period for an early resumption of mining activities including the support and intervention required from public sector. Delays could be avoided by holding the secretariat responsible for this. Similarly, cases pending in the court of law would also be taken up through request to the learned court for decision on priority basis so as to reactivate gem-mining activities in the larger public interest and reduce illegal mining. Additionally staff of the concerned Directorate and Inspectorate is required to be deputed to monitor activities of various mining companies under intimation to Gem Mining Committee on regular periodic basis.
5. Every lessee is required to submit a work plan for mining, leaseholders should be guided and supported in the implementation of approved plan through public sector organizations and/or authorized consultants. Public sector support or banking consortia can play a vital role for establishment of machinery pool in promising mineral areas for support to private sector in this regard.
6. Measures are required to be under taken to encourage the local investors and prospectors to adopt scientific mining methods in order to save valuable precious stones from damage.

7. Documentation and legalisation of gemstone exports can be encouraged by facilitating exporters similar to the way banks have been granted Rs 2 per \$ of funds transferred with positive results as being proposed by SMEDA
8. Amendments in the text of existing mining rules with specifically focused chapters on different minerals giving them more development rather than control particularly for gemstones would be carried out through GMC as per terms of reference of the committee. This similar approach may be adopted for other minerals also.
9. GSP and provincial organization like SDA/BDA/Punjab/AKMDC/LCDC doing similar or complementary work should coordinate with each other for the geo-data generation for gemstone bearing areas and commercialization of this data can bring about financial autonomy as well as substantial investment for the sector. While GSP has technical expertise and most of the data, a small amount of coordination and strengthening of SDA/BDA/Punjab/AKMDC/LCDC towards developing "alienated mining packages" could set the ball rolling.
10. Techno-commercial studies for evaluation of gemstone deposits could be carried out by private sector consultants and renowned technical experts in collaboration with GSP, PMDC & SDA etc, as identified by GMC and put up on web sites for promotion.
11. Notification of mineral bearing areas as proposed by SMEDA will help a lot in supplying and regulating the mining activities and socioeconomic development in the concerned areas.
12. Establishment of Gems and gemological Institute at Peshawar is under process. This institute will help to raise the Pakistan Industry through better identification and evaluation and improve our processing industry on scientific lines. Some similar support in Mingora for gem mining, identification and evaluation will be useful. This institute is needed to be affiliated with world-renowned institutions like GIA of USA or FGA of England etc.
13. Auction or lease criteria for the established and documented gem mines/deposits as suggested by ministry is expected to bear results. However, provision of

technical expertise and induction of relevant technology is to be optimised through panels of experts and machinery pool in the private sector. The panels need to be approved with appropriate checks by GMC (Representing mine owners association and regulatory authorities).

14. Starting Gems Sale Centres owned by provincial government are highly recommended and these should be able to accommodate a number of private showrooms as well in different cities like Islamabad, Lahore and Karachi. A complete plan for similar trade centre in Peshawar is annexed. These trade centres would also act as incubators for new lapidaries located with in or close by.
15. A focused and targeted effort for export promotion of gems is needed, most of which has been covered by GSP theme paper. However, it is recommended that working in tandem with EPB one could develop a private sector "Gem Export Council" (representing, miners, processor and more of exporters) guiding and holding accountable the efforts dedicated staff within or drawn from EPB.

9 Annexure–2 GEM CITY CONCEPT

After analyzing the present situation of Pakistan, the need of a Gem City becomes very necessary. To give Pakistan a right direction, a Gem City is the need of the hour. Functioning the Gem City properly would not only enhance exports but would also make Pakistan's name appear on the world map. Gem City would be a one-window operation where all facilities such as training, manufacturing, display, marketing, technological and export will be under one roof. The Gem city would not only be a one stop facility but would be a place where exporters and other interested people would get all the relevant information relating to the world gemstone field. Buyers as well as sellers would be able to interact with each other. People will not be reluctant to buy stones as all gemstones would be certified by the gem-testing laboratory to be set-up in the same vicinity. Being a hub for the gemstones entrepreneurs willing to start their own units will be able to easily get space on rental basis along with ample availability of skilled people coming out of the training school or the commercial unit. Display centers as well as manufacturing units for exporters to come give orders for cutting and polishing will not only promote the SME sector but would also enhance exports of the value added segment of gemstone. Besides all functions, the Gem City would be a great attraction for tourists and foreign agencies.

FUNDING OF THE GEM CITY

The proposed Gem City will be a government cum private centre. Being something new in Pakistan it would require funds for the first couple of years for it to run smoothly. Pakistan having lack of the technological know-how will require in the earlier phase to bring in teachers, machinery from abroad. In the latter phases more and more local teachers will be trained and spare parts and even new machinery could be produced by reverse engineering as the demand of gemstone processing will grow. For the working capital of this project following options could be taken into consideration:

1. Private investor
2. Export Development Fund (EDF)

3. Donor agencies

The lease of the land and the construction of the building, import of machinery and other fund for the running of different operations could be done by the EDF funds while the consultants could be brought in by the donor agencies.

TARGET AUDIENCE

The target audience for the Gem City will be

- Gem Professionals
- Gem lovers
- Jewellers
- Customs
- Government Officials
- Labours

The Gem City would benefit the gem lovers, gem professionals and jewellers in a way that people who cannot afford to go abroad would be able to avail the state-of art facility in Pakistan. Our customs and other government offices have no background in gemstones appraisal due to which they cannot judge the value to the gemstones being exported. Formal training could be provided to them so that under invoicing does not take place.

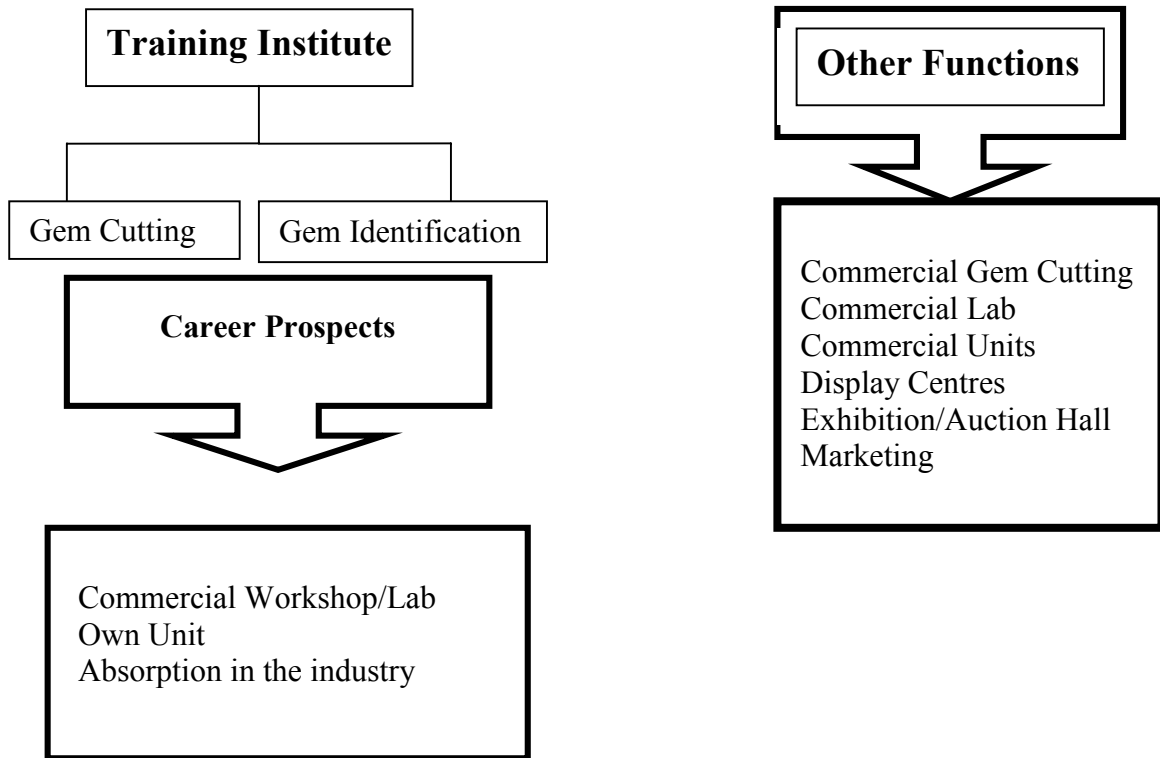
Location

The location for the Gem City is proposed to be Karachi. The following advantages make it most suitable:

Karachi is an established market for both gems and jewellery and therefore has lots of traders and miners coming in for the supply of gemstones. Having ample of semi-skilled people knowing the art of cutting and polishing also gives Karachi an edge over other cities. Other than the labours there are a lot of people who are graduates from the Gemological Institute of America. Being near the port it will be easy for the importation of imported machinery and gems if required. Other than a lot of advantages the drawback in Karachi is the lack of law and order in some areas, therefore it is necessity to choose an appropriate area which is near the city, has adequate security and easy access to transport.

The Gem City being a hub for the coloured gemstones is proposed to be some where inside the city rather than in far-fetched areas. Privately bought land in Karachi is fairly expensive, thus it is recommended to buy government land near the airport on a 30 years lease basis. This would automatically bring down the cost of this project. A 10-kannal area is proposed for the gem City. The government land in the Karachi city is under the Karachi Development Authority (KDA) and Malir Development Authority (MDA) caters for government land near the airport

GEM CITY LAYOUT



FACILITIES OF THE GEM CITY

Gem City as mentioned earlier would be a one-roof stop over, thus the working of this revolutionary idea will be as follows:

- Training Centre
- Manufacturing Centre
- Display Centre
- Marketing Centre

Training Centre

The training centre will be have two areas

1. Gems cutting and polishing institute
2. Gem testing institute

Gems Cutting and Polishing Institute

Gems cutting and polishing institute will be the centre where different courses regarding cutting and polishing will be catered to all level. The diploma course would be for people who want to learn in-dept the different sort of cuts, faceting, cabochon and polishing. Certificate courses would be for beginners to learn in general the basis of cutting and polishing along with learning with practical lab classes and videos. Short courses would cater for those who have gone through with the certificate or the diploma course. There will also be other technical and marketing short courses, which would teach the technicalities of the different machines and slight on the different markets and how gemstone marketing is done.

Cutting and polishing	Duration
Diploma courses Video Tape	1 years
Certificate Course (Beg) with video	3 ½ months
Short courses (adv) with video tape	
Sawing	15 days
Cutting	15 days
Polishing	15 days
Grinding	15 days

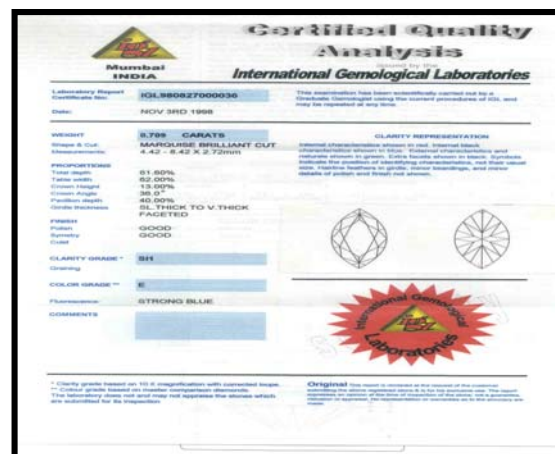
Cabochon	15 days
Engraving or Carving	15 days
Faceting	15 days

Technical Short Course	1 month
Marketing Short Course	1 month

Gem Testing Laboratory

The gem-testing laboratory will be a breakthrough in Pakistan's history. For the first time ever there will be a place where gem testing, certification and gem grading will be taught. The same level of courses will be taught as in the cutting institute. There will be also diploma courses, general certification courses for beginners and advance short courses. Videotapes will be an aid for students to grasp things quickly.

Gem Identification	Duration
Diploma Courses	1 year
Certificate Courses (General)	3- 1/2 months
Short Courses (Adv) with video tape	
Emerald Identification	15 days
Ruby Identification	15 days
Period Identification	15 days
Topaz Identification	15 days
Aquamarine & Tourmaline Identification	15 days
Coloured Stone Grading	15 days



The above certificates are of the Indian gems and jewellery institute and the International Gemological Institute.

A gem-testing laboratory has become a very essential part of the gemstone trade. Gemstone trading is not simple as it was. Earlier, the trade functioned purely on personal experiences and trust. Increased awareness about the types of gemstones available in the market, the advent of numerous entrepreneurs and the technological advances in the field of synthetics and gem enhancement has completely changed the traders' attitudes to business. Today, even an experienced jeweller has to be more careful while buying and selling stones. A gem testing laboratory in the Gem City will not only set a standard for comparison of quality and price but would also insure people for the money they are paying for gemstones. A certified gem from the laboratory would not only have a resale value but would also stop people from being cheated.

The people coming out from the institutions would have three career prospects:

1. The students would either set-up their own units or
2. Get hired by the commercial workshops and laboratory or
3. Get absorbed in the industry

Manufacturing Centre

The manufacturing centre of the Gem City would constitute of a commercial workshop owned by the Gem City itself. Cutting and polishing will be done on a regular basis for export purposes and for specific orders from other exporters. A lapidary of 10 people would be established in the beginning. A commercial gem-testing lab would also be a part of the manufacturing centre where by charging on a per caratage basis gems would be tested and certified. Other than these self owned workshops there will also be rental space for people who wish to start their own small set-up for cutting and polishing.

As an approximation:

Per carat charge for cutting and polishing:

Precious stones Rs.75/carat

Semi-precious stones	Rs. 35/carat
Gem identification	Rs. 350/carat
Rent per shop	Rs. 300 /sq ft

Detailed financial calculations will be in the other section

Display Centre

The display centre will constitute of shops given to individuals on rental basis for the display of gems, jewellery and machine manufacturers involved in the gemstone business. They will also be an exhibition cum auction hall where regular exhibitions on small as well as large scale would be held.

Marketing

Marketing is one of the most important departments of the Gem City. Gemstone is such a field where extensive marketing is necessary. The marketing department of the Gem City would not only handle clients, and conduct proper research of the global scenario and trends but would also be responsible for extensive advertisement of the Gem City itself. Being a new venture in Pakistan unless and until proper marketing via Internet and other media is not done people around the world would not be able to become aware of it. It is due to the marketing department that Pakistan and its potential and credibility in the gemstone field would be recognized and acknowledged.

Machines

The Gem City being a state of art set-up will need a mixture of manual and semi-automatic machines. This mixture is important for the up-gradation of the skill level of the labour. Manual machines will be required in the institution during the learning phase. The commercial workshop should have both, the manual as well as semi-automatic machinery. In the later stage once this industry gets started would there be a need for automatic machines.

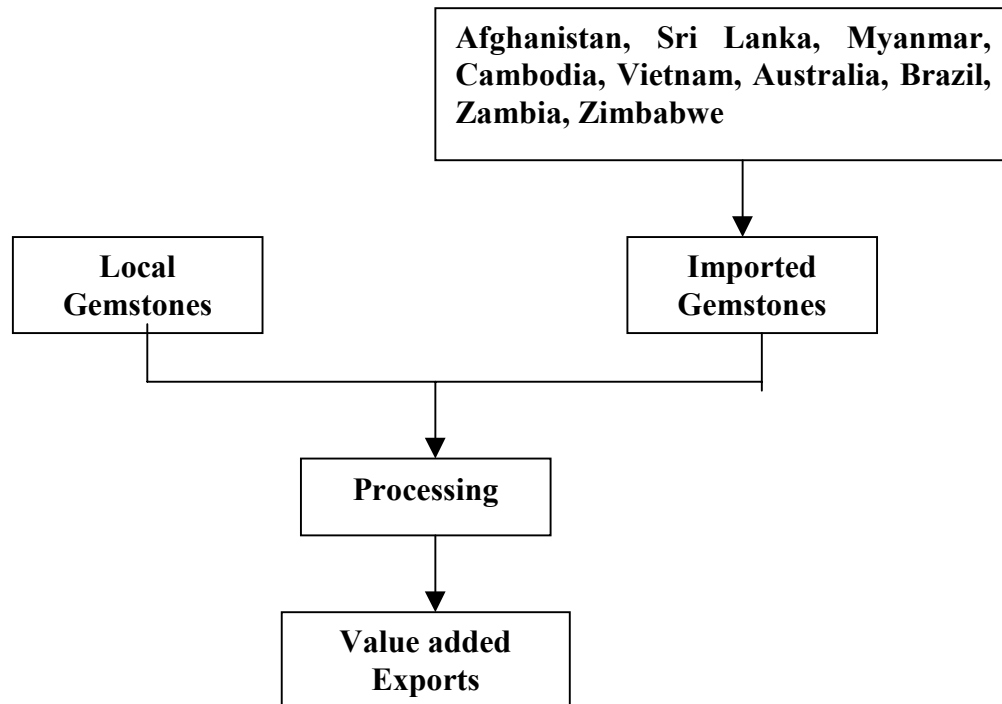
Consultants/Instructors

The Gem City being a revolutionary venture in Pakistan would in the beginning need consultants who would come for a month or two and regulate the working of the Gem

City. The foreign machinery manufacturers who will install machinery in the Gem City would send in their consultants who would formulate a course outline and teach the technical aspect of the machines as well as the cutting and polishing of different stones. These consultants would in a month or two train a couple of people who have background in the gemstone field and the trained people then would decimate information further. Latter on if felt necessary good cutters could be brought in from India and Sri Lanka till the time the people get familiarize with the machines and the international demands.

Supply of Gemstone

The supply of gemstones is one of the most crucial parts, which has to be organized. As mentioned earlier that there is an inconsistent supply of gemstones from the mines. To properly regulate the production of the Gem City it is necessary to



organize the mining sector and have regular traders who would consistently supply gemstones. Other than our local supply the import of gemstones should be allowed. Most of the countries import gemstones from various countries. As Pakistan is located in such a feasible location thus importing gemstones from Afghanistan, Russia, Vietnam, Myanmar, Sri Lanka and China. The flourishing value addition sector in the Gem City would compensate for the dollars spent on imports. The gemstones to be processed in the Gem City would constitute of emeralds, ruby,

topaz, tourmaline, aquamarine and peridot. All these above-mentioned stones are easily available in Pakistan in sufficient amount.

ORGANIZATION OF MANAGEMENT

The management structure of the Gem City will be as follows:

Board of Directors

The Gem City would have 10 people as the board of directors. They will be 4 from the government and 6 from the private sector.

Managing Director

The managing director of the Gem City will be the owner of the Gem City. He will also be in the board of directors and responsible for making all strategic decisions in coordination with heads of all departments. The Gem City project if funded by the EDF and from donor agencies could then have a private or a government person as the managing director.

Training Centre

The training centre would include a principal/dean who will be responsible for all the functions taking place in the training centre. Under him will be 1 incharge for the testing institute and 1 for the cutting and polishing institute. In the beginning these incharge would be the consultants would come for a short while to train the other teachers. Under both the incharges will be three teachers each. They will also be two lab assistants, one for the gem testing and the other for the cutting and polishing. There will other incharge for the technical, computer, library and admissions. The technical and the computer incharge will have assistants under them.

Business Development Centre

The business centre would also have a business development head responsible for all marketing activities. The incharge for both the gem cutting and gem testing will report to the head of the business centre. Under them will be 10 cutters and 5 testers. There will also be a person responsible for the different auctions taking place in the Gem City. The marketing side in the business development centre will have

relationship manager who will be responsible for the corporate clients. Under him will be marketing officers who will take care of the rented shops and units, research and development, advertisements etc.

Finance and Planning

The finance and planning department head will be responsible for the financial as well as planning ahead the budgeting of the Gem City. Under him will be an incharge for purchasing and one to handle accounts. The purchasing incharge will further have a purchasing officer and an inventory officer who would check the quantity of stones coming in and out of the store room. Under the accounts incharge will be accounts officers and a cashier.

Human Resource and Admin

The human resource and admin department's head as the name says will be responsible for the hiring and firing as well as handling the different administration operations. Under him will be personnel assistants and an admin incharge. The driver, electrician, photocopier, plumber/janitorial staff, security guards and the receptionist/operator all will be the responsibility of the admin incharge. The security guards and the janitorial staff will be outsourced while the rest will be permanent members of the Gem City.