B.S/B.Ed./ M.Sc. Level

Geography of Pakistan-II

Code No. 9353 / 8664/ 4656

Department of Pakistan Studies
Faculty of Social Sciences & Humanities
Allama Iqbal Open University, Islamabad
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Foreword

Allama Iqbal Open University has the honour to present various programmes from Metric to PhD. level for those who are deprived from regular education due to their compulsions. It is obviously your own institution that provides you the education facility at your doorstep.

Allama Iqbal Open University is the unique in Pakistan which provides education to all citizens; without any discrimination of age, gender, ethnicity, region or religion. It is no doubt that our beloved country had been facing numerous issues since its creation. The initial days were very tough for the newly state but with the blessings of Allah Almighty, it made progress day by day. However, due to conspiracy of external powers and some weaknesses of our leaders, the internal situation of East Pakistan rapidly changed, and the end was painful as we lost not only the land but also our Bengali brothers. After the war of 1971, the people and leaders of Pakistan were forced to rethink the future of the remaining country. Pakistan Studies was declared as compulsory subject up to degree level by the government of Pakistan after the dismemberment of East Pakistan. AIOU Islamabad proud to offer BS and MSc in Pakistan Studies for the learners from all corners of the country.

Pakistan Studies is the collection of many subjects including history, culture, economy, languages, international relations, politics and geography etc. The recent textbook ‘Geography of Pakistan-I’ is one of the books included in courses of MSc. / B.Ed. and BS. This is the very first version of the said course book and I am hopeful that it would fulfill the requirement of students who enrolled in BS and MSc as well as B. Ed level programmes.

I am pleased that Allama Iqbal Open University has committed the aim to provide the quality education to all at their door step. Now, a new course book Geography of Pakistan-II, for the students of BS/ MSc and B. Ed. is now available. The book in your hands is the latest course of Geography of Pakistan-II developed for you. Its units have been written and reviewed by the experts of the subject and I am hopeful after studying the book, you will acquire the authentic information and facts about the Geography of Pakistan.

May, 2020

Prof. Dr. Zia Ul-Qayyum
(Vice Chancellor)
Introduction

Allama Iqbal Open University Islamabad offers BS, B. Ed and M.Sc. Programmes with specialization in Pakistan Studies. The Department of Pakistan Studies has the honour of developing many courses for the university students from metric to M. Phil levels. This course is developed according to the requirements of Higher Education Commission of Pakistan. The course fulfills the needs of the students regarding their queries about Geography of Pakistan.

This course is the continuation of the Geography of Pakistan-I which was offered in the previous semester. It comprises nine units consists of three credit hours. The units of the course have been written and reviewed by the experts of the subject. Geography of Pakistan-II (Part-II of the course) is designed to introduce you about the Power energy resources, Industries, Transport, Trade, Population and Political Geography. Following are the brief details of the topics.

Power Energy Resources of Pakistan-I: Deals with coal and petroleum potentials of Pakistan. The coal deposits of Pakistan are available in all provinces. The most famous of them are: Khost-Shahrig-Harnai in Baluchistan, (ii) Thar in Sindh, and (iii) Salt Rang in Punjab. Moreover, Oil and Gas companies have also been working and various oil and gas fields are explored. The refineries are also performing their best in Pakistan.

Power Energy Resources of Pakistan-II: Deals with Hydel power, natural gas and nuclear power of the country, Pakistan major plants of Hydel power are Tarbela and Mangla. Natural gas has been discovered at several places in Pakistan. Karachi and Chashma Nuclear power plants in the country are famous.

Industry-I: Includes mostly cottage industry or small industrial unit in which the owner and his family members work and usually no hired labour is employed. Cloth, utensils, pottery, articles of wood, iron, brass, embroidery and knitwear are its products.

Industry-II: Among the light or small-scale industries of Pakistan are included Cotton industry, wool, Silk, Jute, Cement, Fertilizer, Leather, Glass, Oil products industry, Chemicals, Sugar, Biscuits and Tobacco. Sports goods, Surgical instruments and Carpets are largely the products of light industries in Pakistan.
**Industry-III:** Heavy or large-scale industry is one in which there is no limit to investment made and to the number of workers employed. The heavy engineering, Karachi Shipyard and Engineering works. Heavy Mechanical Complex is the example of large-scale industries in Pakistan.

**Transport:** In Pakistan there are four major modes of transport. They are; (i) Roads, (ii) Railway(iii) Water transport or shipping and (iv) Air Transport. Seaports like Karachi, Port Qasim and Gwadar are also sub-topics of this unit. Lahore, Faisalabad, Rawalpindi, Sialkot, Multan, Peshawar, Quetta and Hyderabad are the famous dry ports of Pakistan.

**Trade:** Trade in Pakistan has two types; internal and external or foreign trade. Major items of foreign trade are; raw cotton. Cotton-fabrics and skins, ring, wool, chrome, sports goods and cutlery. Import includes petroleum, petroleum products, machinery, manufacturing goods, minerals, fertilizers, edible oil, tea and foods. Trade relations with world countries like Asia, Europe, America, Africa, Middle East, China, Japan, Hong Kong, Sri Lanka, UK. And Canada are well established.

**Population of Pakistan:** In unit number 8 population structure, population growth rate and causes of population growth are included. Problems of population growth are also highlighted. Settlement covers a wide range of habitations hamlet, village, township, town, city metropolis and megalopolis.

**Political Geography:** Political geography means a country geographical situation and economic potential in the worlds. Pakistan’s position in South Asia is of unique character. In this unit you will study Pakistan geographical situation, economic potential and varied Physiography.

Dear students, I am hopeful that the course will be highly fruitful for those who wish to gain more information about Geography of Pakistan. I have tried my best to provide you authentic knowledge and vast information as you have to learn as non-formal students of Allama Iqbal Open University Islamabad. 

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*vi*
Objectives

This course is developed for the students of BS / B.Ed. / MSc. Pakistan Studies Programme offered by Allama Iqbal Open University Islamabad. The course comprises 9 units of 3 Credit-Hours as per H.E.C approved criteria. The aim is to provide brief introduction to the students regarding the Geography of Pakistan. The course is designed with the following objectives.

1. To have broad knowledge about the Power Resources of Pakistan
2. To have a clear idea of immediate neighbours of Pakistan.
3. To describe the features of Cottage Industries of Pakistan.
4. To explain the need and importance of Small-Scale Industries of Pakistan.
5. To highlight the benefits of Heavy Industries for the country.
6. To highlight different aspects of trade of Pakistan.
7. To identify the issues of population of Pakistan.
8. To point out the significance of Political Geography of the country.
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POWER ENERGY RESOURCES
OF PAKISTAN-I

Written by: Dr. Khalid Mahmood
Reviewed by: Dr. Altaf Ullah
# Contents

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Introduction

Power energy resources of Pakistan mean coal, petroleum, gas, hydro electricity, thermal power, solar power, biogas energy and nuclear power. All these resources are classified into two groups i.e., (i) Power resources-I (coal & petroleum) and (ii) power resources-II (gas, electricity and nuclear.) These resources are distributed in two parts. The first part is described in Unit-1, while the second part in Unit-2.

This unit deals with coal and petroleum potentials of Pakistan. There are many areas of the country famous for the coal deposits. They are Thar Coalfield, Lakhra Coalfield, Sonda-Jherruk Coalfield, Khost, Sharigh and Harnai coalfields, Mach Coalfield, Duki Coalfield, Salt Range Coalfield and Makarwal Coalfield. The coal resources of Pakistan are not enough for our necessities; therefore, we have to import coal from other countries of the world. Moreover, the quality of Pakistani coal is not so good. It is not very useful at commercial level but considered better to run power-generation plants.

Petroleum and Gas resources also contribute a vital role in the economic development of the country. In Pakistan, a number of petroleum companies have been exploring the Gas and Petroleum deposits from every corners of the country. Attock Oil Company, Pakistan Petroleum Limited, Mari Gas Company (Mari Petroleum Company Limited), Sui Southern Gas Company, Sui Northern Gas Company, Pakistan State Oil (PSO) and Shell Pakistan are the well known Oil and Gas Companies working in Pakistan. Moreover, the oil refineries have also a remarkable contribution in context of the economic development of Pakistan.

Objectives

After reading this chapter the students will be able to:

1. know the coal resources of Pakistan and the deposits of coal in various places of the country.

2. know about the petroleum resources and the oil fields of the country.

3. know about the famous petroleum refineries of Pakistan.
1.1. Coal Resources of Pakistan: Demand, Utilization, and Limitations

Pakistan is very rich in natural resources and the coal is one of these God-gifted resources of the country. According to the “Department of the Interior U.S. Geological Survey” in a report ‘National coal exploration plan’ (published in 1988) the local coal of Pakistan supplies about 7 percent of the commercial energy requirements of the country. The other sources of energy are local oil (40 percent) indigenous gas about 35 percent and hydropowers meet the needs about 17 percent. Almost two percent of the needs in energy sector are supplied mainly by non-commercial fuels which include fuel-wood or cow-dung.

The annual production of coal in Pakistan was estimated more than 2.3 million tons. The contribution is 7 percent of the energy sector in Pakistan. In compare, coal production in Pakistan was only about 350 thousand tons in 1947. It is a very interesting fact that it was the 50 percent contribution of the country's energy. But with the passage of time, the energy demands of energy rapidly increased parallel to the growth of population. The demand of coal was too increased in the country by the brick industry. Almost 80 to 90 percent of total coal was used in the brick industry. It was estimated in the report that the production would be increase 3 to 9 million tons by 2015.

In 2016, the production of coal was recorded more than 4.5 million tons (4,506,243.28 tons) and Pakistan stood at 34th in the world. Electricity, cement, bricks and steel mills are the demanding sectors of coal in Pakistan.

Coal in Pakistan is available in 23 different coal fields, areas, and occurrences. Some of the well-known coal fields have been exploited for more than 140 years. The total potential coal resources of Pakistan are estimated about 1,000 to more than 2,000 million tons while the recoverable reserves are almost 800 million tons.

The mines and mineral department has been working in Pakistan under the provincial governments in all provinces of the country. Pakistani coal is of low quality and the production is also very less. That is why; we need to import coal from other countries including South Africa, Indonesia, Afghanistan, Mozambique, Russia, USA, Colombia, Mexico, Canada and Iran.
In July 2017, The Supreme Court of Pakistan banned on coal handling at Karachi Port. After that the Pakistan International Bulk Terminal (PIBT) at Port Qasim is the single terminal which handles commercial imports of coal. However, the power plants have their own jetties to import the coal.

Some important and famous coal fields of Pakistan are briefly discussed in the following lines.

1.1.1. Coal Resources in Sindh:

In the province of Sindh, the coal was discovered in 1853. In 1948, the Burma Oil Company while in 1953, Pak Hunt International recorded the presence of coal at Lakhra during the drilling for oil. The commercial mining of coal in Lakhra was initiated by Habibullah Mines Ltd. in 1959. Sonda coal was discovered in 1980 while Thar coal in 1992 by (Geological Survey of Pakistan) GSP. The coal fields in Sindh province are located at Thar, Lakhra, Sonda-Jherruck, Meting- Jhimpir, Indus East and Badin.

**Thar Coalfield:** Thar coalfield is well known mining filed which is located in the south-east of Sindh. In 1991, the British Overseas Development Agency was drilling water wells with the coordination of Sindh Arid Zone Development Authority; the coal was found and reported under the sands of Thar. It is estimated that ‘The Thar coalfield’ has 175.5 million tons of coal resource potential while 9000 sq. kilometer area is covered. Almost 1,620 million tons of coal is estimated to be mineable.

**Lakhra Coalfield:** As we have discussed in the above lines that the coal was discovered in 1853 in Sindh. Some geologists investigated in the Lakhra. The inquiries were conducted by national and international organizations and the explorations were made at large-scale. The results of the tests showed that the coal discovered from Lakhra would be inappropriate for hard coke production because it was not powerful. However, the coal is proper for power generation sector. In 1978, Japan International Cooperative Agency (JICA) carried out the technical and financial feasibility studies. In 1981, the same agency issued the statement with positive results declaring with technical feasibility of 300 MW plant. However, it was also brought into light that the coal production cost would
be very high. Subsequently, the Government of Pakistan asked United States Agency for International Development (USAID) to review the studies on Lakhra coalfield. The government also requested regarding the feasibility of a coal-fired power station. The USAID completed its study by 1986 and recommended the JICA’s assessment. However, USAID proposed some modifications in design of the plant to make the cost lower than the estimated.

The Lakhra coalfield has been connected via road through the Indus Highway. The field has also a way through railway track near Khanot. The distance of this coalfield is almost 175 kilometer from Karachi while 50 kilo meters from Hyderabad. The important coal beds of this field are Dhanwari, Lailian and Kath. The layer of Lailian is determined throughout the area with the thickness of three meters. However, the average depth of the Lakhra coal seam is 1.5 meter. The Lakhra coalfield is of great importance for in respect of the coal resources.

**Sonda-Jherruk Coal (including Indus East and Meting-Jhimpir):** The Geological Survey of Pakistan (GSP) and United States Geological Survey (USGS) discovered the ‘Sond-Jherruk Coalfield including Indus East’ in 1981. During last few years the GSP drilled 80 wells in this location. It was almost an area of 1500 square kilometers. The data about drilling reveals that the coal bed is 6.2 meters thick. It is estimated that the total coal reserves in this field are almost 7,773 million tons. It is considered that out of these resources almost 147 million tons are mineable.

**1.1.2. Coal Resources in Baluchistan:**

In respect to area, Baluchistan is the largest province of Pakistan which is rich in the mineral resources. The coal fields in the Baluchistan are in a large number and located in the various districts of the province. The most famous and rich mines of coal are Sor-Range/Degari, Khost-Sharigh-Harnai-Ziara, Much and Duki. The overall coal reserves are estimated about 217 million tons but 32 million tons are considered mineable.

**Khost-Shahrig-Harnai Coalfields:** Khost, Shahrig and Harnai coalfields are the famous coal fields of Baluchistan which cover an area of 200 square kilo meters. These are three different coalfields but are connected to each other. These
are located in the Sibi District which is away 160 km from Quetta. Pakistan Railway has extended its railway track which runs along the coalfields. The same route is called as Sibi-Khost extension. The main purpose of the track is to provide cargo facility to the mines and mineral department. These coalfields are also connected by a road. The Coal beds in these fields are generally thin, ranging from 0.3 meter to 2.3 meters in thickness while dipping at 60 degrees. The coal of these fields is considered appropriate for power generation. Small power plants up to 50 MW can be set up, depended on coal produced from these three small coalfields.

**Sor Range-Daghari Coal Field:** The Sor-Range and Degari coalfields positioned about 12 kilometers south of Quetta city. These fields are extended south-east for a distance of 26 kilometers. Overall, the two coalfields covered the distance of almost 50 square kilometers. The northern part of the same filed is called as Sor-Range while the southern part is named as Degari. Quetta is the nearest railway station for the Sor Range mines and Spezand station for the Degari mines. This is one of the largest coal-producing fields of Balochistan. Sor-Range and Degari coalfields have been connected by a metalled road which surrounds the complete coalfield joining the Quetta-Sibi highway near Spezand. The coal dipped at angles of 45 to 50 degrees. The coalfield lies in an arid to semi-arid region with extreme temperature changes. The area has to experience heavy snowfall and rain during winter, but little rain during summer. The workers have to work in the mines during the hard seasons. In these fields, the thickness of coal-bed ranges from 0.3 m to 1.3 m. The total coal reserves of the fields are expected about 50 million tons. The coal is judged suitable for power generation. Small power plants up to 25 MW can be setup in each Sor-Range and Degari coalfield.

**Mach Coalfield:** Much is town in Baluchistan whit the Mach coalfield covers an area of 45 square kilometers near Mach town in the Bolan Pass. We can enjoy the Mach coal field on both sides of the railway line that connects Quetta with Karachi. Several coal seams are present in Mach, ranging its thickness from 0.3 m to 1.5 m. However, only three beds with an average thickness of 0.75 m are workable for commercial use. The quality of coal is not so good like other coalfields of the country; therefore, it is suitable for power generation. The coal reserves are predicted to be 23 million tons. Keeping in view the quality of this coal, small power plants up to 25 MW can be set up.
**Duki Coal:** The Duki Coalfield is situated in the district Loralai in the province of Balochistan. The said field is almost 320 kilometers east of Quetta. The Duki Coalfield has been connected through a metalled road. Almost 300 square kilometer area is covered by this field. The workable seam has a thickness of 0.5 m and is high explosive coal. It is estimated that the coalfield has almost 13 million tons coal reserves.
1.1.3. Coal Resources in Punjab:

The coal reserves are also available in the Punjab province but the quantity of the coal is very small as compared to Sindh and Baluchistan. The coal mines of Punjab are located in Salt rang and Makarwal.

**Salt Range Coalfield:** The Salt-Range is famous mountain ranges in the potohar valley. Sakesar is the highest peak of the Salt-Range. This coalfield covers an area of almost 260 square kilometer between Khushab, Dandot and Khewra which lies in the Sargodha and Jhelum Districts of Punjab province. The overall reserves of this field are almost 213 million tons. However, only 30 million tons of the total reserves are mineable. There are more than two coal seams present in the Salt-Range but, in most cases, only one is mineable which varies in thickness from 0.3 m to 1.5 m with an average thickness of 0.75 m. Small power plants of up to 80 MW can be set up, based on Salt-Range coal. The coal quality is Sub-bituminous and is suitable for power generation.

**Makarwal Coalfield:** The Makarwal coalfield is located in the Mianwali District of Punjab. It is located near Makarwal town and 13 km west of Kalabagh. The
famous city Mari is also nearby. The coalfield is associated with the Mari Indus-Bannu narrow gauge railway line. The coalfield covers an area of almost 75 kilometers. The coal occurs in the steeply dipping Hangu Formation and the thickness of its bed ranges from 0.5 to 2.0 m. It is reported that the coal resources are approximately 22 million tons and its quality is also reported to be Sub-bituminous.

1.1.4. Coal Resources in KP and Azad Kashmir:

The coalfields are not so far completely explored in Khyber Pakhtunkhwa. Its coal deposits are located in two areas, namely Hangu and Cherat. The coal in both areas is expected nearly 82 million tons and 9 million tons respectively. In this way the total coal resources of KP are estimated to be 91 million tons. The coal is classified as Sub-bituminous and its heating value ranges from 9,386 to 14,217 Btu/lb. It has low sulfur and low ash. The coal beds in Hangu area are up to 3.5 m thick whereas the coal beds in Cherat area are generally less than one meter in thickness.

On the other hand, in Azad Kashmir, the coal resources are found at Kotli where the coal is estimated 9 million tons only. The AJK coalfield (near Kotli) is almost 80 kilometers south-east of Islamabad. The coal beds in this field have an average thickness of 0.6 m. The overall coal resources of AJK are estimated at 0.06 million tons only. The coal is classified as Sub-bituminous and its heating value ranges from 7,336 to 12,338 Btu/lb.

(Picture: Status of miners in Punjab)
1.2. Petroleum Resources of Pakistan:

Pakistan is rich in natural resources and the deposits of oil and gas are the most important for our country. The main source of the petroleum products is crude oil. The natural gas in Pakistan is called “Sui Gas” as it was discovered from the place ‘Sui’ near district Dera Bugti at Baluchistan at the end of 1952. There are number of companies that work in Pakistan for the exploration of oil and gas resources. Some of the significant companies are:

1. Attock Oil Company
2. Pakistan Petroleum Limited
3. Mari Gas Company (Mari Petroleum Company Limited)
4. Sui Southern Gas Company
5. Sui Northern Gas Company
6. Pakistan State Oil (PSO)
7. Shell Pakistan
1.2.1. Attock Oil Company:

Attock Oil Company (AOC), informally called Attock Group was established on the first day of December in 1913. It was founded by Ghaith Pharaon and that is why the company also called Pharaon Group. It is the multinational company while its headquarter is situated at Manchester in England.

In Pakistan, it is working as a branch of an international company and its prime business is the drilling and exploration of the petroleum. It is the important to remember that the Pharaon family started the business in British India. The company succeeded to explorer the oil in 1915 in Attock district at Khaur (a small village). Subsequently, the company played a significant contribution regarding the exploration of oil and gas in Pakistan as the AOC converted the area of Potohar Plateau as the oil province. The Potohar Basin was considered as the sole oil producing basin in the country till the early 1970s. In 1978 the company extended its business and established the subsidiaries as Pakistan Oilfields Limited (POL) and Attock Refinery Limited (ARL). During the Musharaf era in 2004, the AOC capitalized 400 million US Dollars in Pakistan. The objective of this investment was to establish a power plant in Rawalpindi with the capacity of 150 MW. It also included a petroleum pipeline from Lahore to Peshawar. Now, the Attock Group has the following companies in Pakistan.

1. Pakistan Oilfields Limited
2. Attock Refinery Limited
3. National Refinery Limited
4. Attock Petroleum Limited

1.2.1.1. Pakistan Oilfields Limited (POL):

The Pakistan Oilfields Limited (POL) is a leading company which deals with the exploration of oil and gas. POL is a subsidiary of UK-based Attock Oil Company. POL was founded in 1950 at Attock but now its headquarter is located in Rawalpindi district. POL took over the business of AOL in 1978 regarding exploration and production.
The Pakistan Oilfields Limited has been manufacturing the LPG and marketing it as POLGAS which is the most famous brand in the region. The company also prepares Solvent Oil and Sulphur. The POL functions the network of pipelines which is used for the transportation of her own production and also for the carriage of crude oil to Attock Refinery Limited. The POL attained 25% share in National Refinery Limited in 2005. This is the matter of honour for the National Refinery as it is the sole refining compound in Pakistan which produces fuel and lube base oils.

**Exploration, Drilling & Production Activities:** In respect of exploration, the Pakistan Oilfields Limited holds great range of exploration. The company had a great deal in drilling and production. Currently, nine development and production fields are being run under the corporation. The fields included: Balkassar, Dhulian, Joyamair, Khaur, Meyal, Minwal, Pariwali, Pindori and Turkwal.

The Corporation has various cooperative projects with the following companies:

a. In the Central Potohar (Turkwal), Pindori, Kirthar and Ikhlas POL has been working with Attock Oil Company Limited.

b. In Pindori, Chak Naurang, Gurgalot and Jhal Magsi South, the company had agreements with the most famous exploration corporation Oil & Gas Development Company Limited (OGDCL).

c. The POL has tasks at Dhurnal, Ratana and Bhangali with the collaboration of Ocean Pakistan Limited.

d. In Adhi field the company has joint job with the Pakistan Petroleum Limited.

The POL is has the strong background in finance which had been granting a good profit to the shareholders. The company is working with the mission of exploration of petroleum resources from far areas of the country with honest team. In short, the corporation actively enjoys the opportunities within and outside Pakistan having long-term production goals.

**Marketing of LPG:** The marketing of LPG has a great scope in the country as Pakistan is under developed country where the connections of sui-gas (natural
gas) have not been provided yet in the remote areas. In the villages of Pakistan, the women use to burn timber to cook the food in their homes; however, the villagers of Pakistan are going towards LPG in replacement of woods. In this regard the POL has a remarkable network in the marketing of LPG as POLGAS. Pakistan Oilfields Limited has a large network of its distributors in all over the country except the province of Sindh. The company has a great role in the distribution of marketing with the following characteristics.

**Maintaining the Quality**: The company has been maintaining the quality control ensuring the consumers’ rights. The trust of consumers is the main target of the POL regarding the quality.

**Continuous Supply**: The POL is the producer of the LPG and due to the its own production the company keep maintenance of the continue supply. As compared to other marketing companies of the LPG the POL has vast capacity of the supply throughout Pakistan.

**Distribution Facilities**: The Pakistan Oilfields Limited has also strong network in respect of the LPG distribution. The Company assumes delivery of LPG to the distributors, in this way the availability of POLGAS remains certain to the LPG consumers.

**Competitive Stable Pricing**: The Pakistan Oilfield Limited (POL) has very efficient price control and that is why the consumers enjoy stable mechanism regarding price for POLGAS; however when the price of dollar fluctuates then the minimum change in LPG prices comes. Sometimes the seasonal changes also affect on the LPG prices in the country.

**Productivity of the Pakistan Oilfields Limited**:

The POL is rich in the productivity as well as in the marketing. The chief products of the company are as under:

**Crude Oil**: Crude oil is the main important source of the Petroleum which is an oily and combustible fluid which is found under the surface of earth. Pakistan is rich in the crude oil while POL explores the crude oil. The crude oil is consist on mixture of hydrocarbons, nitrogenous and Sulphurous. Thousands and millions of years ago the human beings, plants and animals buried under the layers of earth.
According to the scientists the buried remains converted into organic carbon and the petroleum after passing thousands years. Now the crude oil is extracted from the depth of the earth and after that processed in the refineries.

**Natural Gas:** Natural gas is also found under the surface of earth like petroleum. In different regions of the earth, the composition of the natural gas is diverse. However, the main element of the natural gas is methane that is almost 80 percent to 95 percent. The remaining compounds are ethane, propane, butane and other hydrocarbon compounds which are different in the composition.

Normally the resources of natural gas are located along with the petroleum deposits; however, the deposits of gas are also found independently. Natural gas is naturally stored in the sand, limestone and sandstone deposits. In 2019, the government of Pakistan tried to search the deposits of crude oil and natural gas under the surface of sea. The companies succeeded to explore the resources but failed to extract due to various issues.

**Transportation of Crude Oil:** Pakistan Oilfield Limited (POL) has the vast pipeline network in the region. Almost twenty eight thousand barrels of crude oil is pumped to the Attock Refinery (ARL) on daily basis. The transportation through pipeline network is more save and cheap than the transportation through roads.

**Future of POL:** POL’s progress has been a success story par excellence. The Company has been providing outstanding returns to its shareholders as well as contributing to the Pakistan’s economy. For the year ending June 30, 2007, POL earned a profit of Rs 6.3 billion, the highest ever profit in its history and the fifth consecutive year of record breaking results. For the same year, the total cash dividend payout to the shareholders reached Rs 2.96 billion, an increase of over 20% as compared to the previous year. During the year, the Company contributed Rs 5.6 billion to the national exchequer and saved foreign exchange for the country in excess of US $278 million.

1.2.1.2. **Attock Refinery Limited (ARL):**

The head office of the Attock Refinery Limited is located at Morgah in Rawalpindi. According to the financial results of the company the ARL is well
significant in her assets. Attock Refinery Limited is an adherent of Attock Group of Companies.

The incorporation of Attock Refinery Limited (ARL) was come into existence in November 1978 as a Private Limited Company or corporation. Its object was to take over the dealing of the Attock Oil Company Limited (AOC) relevant to crude oil refining as well as the transportation of refined petroleum products. In the following year, in June 1979, the ARL was changed into Public Limited Company. Moreover, the company is registered in the CDC, while its shares are trading in the Pakistan Stock Exchange (PSX).

The initiated capital of the ARL subscribed by the company was Rs 80 million which was invested by the Attock Oil Company (AOC), the Government of Pakistan, investment corporations and the general public. The company made progressed day by day and now the present paid-up capital of the Company is Rs. 1,066.163 million (till 2019). This is the matter of admiration for the company as it is the founder of crude oil refining in Pakistan. The company has 98 years excellent record of her success. The company has been working to compete the challenges for further achievements. When the ARL started its work it was a small company, it started the drilling on 22 January 1915 at Khaur. It was the first discovery of the Attock Refinery Limited while in February 1922, the deposits of oil discovered at Morgah. In 1937, the oil discovery at Dhulian was a great
success for the company. In 1968, the company succeeded to discover the deposits of oil at Meyal and Toot. The company carried on explorations and due to its response the company was able to produce crude oil production up-to 20,000 barrels per day (bpd) for the duration of 1970-78. The company achieved the ability of refinery in 1981.

Currently, Attock Refinery Limited has the crude oil capacity of 53,400 bpd. Moreover, it has the possessing capacity to process lightest to heaviest (10-65 API) crudes. The ARL is ISO 9001, ISO 14001, ISO/IEC 17025, OHSAS 18001 certified also. It is the first refinery in Pakistan which implemented the ISO 50001 (Energy Management System).

The company has started a number of welfare projects which are discussed in the following lines.

**Attock Hospital (Pvt.) Limited:** The ARL founded a healthcare centre at primary in 1930. The object of the foundation was to provide the facilities to the people of Morgah and the closed communities. In 1988, the centre was upgraded and the Attock Hospital (Pvt.) limited was established. The Attock Hospital has been providing the best health facilities to the clients. The hospital has the vision to be a leading institute regarding the provision of health services. The administration is committed to work together in inventive manners to bring the services in a respectful and responsible ways. The Attock Hospital provides the various services including Medicines, General Surgery, ENT, Gynecology, Pediatrics, Orthopedics, Dermatology, Neurology, Urology, Dentistry, Psychology, Ophthalmology and Physiotherapy. The OPD department of the hospital work from 8 a.m. to 8 p.m. The hospital also committed to provide indoor treatment as there is capacity of 50 patients. Moreover, the hospital also provides the emergency services during 24 hours.

**Attock Sahara Foundation (ASF):** Attock Sahara Foundation (ASF) is the welfare organization which was established in 1966. Its head office is located at Morgah in Rawalpindi. It is non-profit organization which has been serving for the community. The foundation is also registered with the Directorate of Social Welfare, Government of Punjab. The organization works for the welfare of under privileged people.
The National Cleaner Production Center (NCPC): The National Cleaner Production Center (NCPC) is the centre working under the Attock Refinery Ltd. The objective of the centre is to sponsor the cleaner production techniques. It provides the defensive environmental strategy to which is useful to reduce risk to environment as well as to human beings. It is the initiative taken by the company which is the exemplary in Pakistan.

Morgah Biodiversity Park (MBP): The Company has established a very beautiful park at Morgah. The Biodiversity Park was initially founded on 20 acres but later on 8 acres were added. Pakistan Museum of Natural History Islamabad provided assistance regarding the technical design and zoning of the park. The primary plan of this Park was designed and the park was maintained till the end of 2004. The Morgah Biodiversity Park has a nursery and botanical garden, a butterfly farm and a pond for local marine life and fisheries. More than 260 plant species are grown here which belong to the wilds of Potohar region. The birds are also propagating in the park including Peacock, Rock Pigeons & oh Geese are propagating here. The Park is situated at Morgah near to the Ayub National Park and any citizen can visit to this park.

1.2.1.3. National Refinery Limited

National Refinery Limited (NRL) is also a leading company which is working as a refinery in Pakistan. It was incorporated as a public limited company on 19 August 1963. Government of Pakistan got its control over the management under “the Economic Reforms Order, 1972”. In November 1998, it was decided by the Government of Pakistan that the National Refinery Limited will be administrated under the “Ministry of Petroleum & Natural Resources”.

During General Musharaf era, the policy of privatization was faster than the previous government; in this context, in June 2003, the NRL was also included in the privatization policy. Accordingly, it was proposed to transfer the power of management to the strategic investor through selling 51 percent share. Through the advertisement the government completed the process of bidding and finally Attock Group purchased the refinery in July 2005. The Attock Group took over its control on 7 July 2005 and the ‘National Refinery Limited’ started a new life towards the success.
**Major Activities of the NRL:** The National Refinery Limited is active in the field of manufacturing, production and sale of various petroleum items. The NRL comprises of three refineries included two lube refineries and one fuel refinery in Pakistan. The company founded First Lube Refinery in 1966 having the capacity of 3,970,500 barrels (per annum) of Crude Processing and 533,400 barrels (per annum) of Lube Base Oils. In 1985, the NRL founded the Second Lube Refinery having the capacity of 700,000 barrels (per annum) of Lube Base Oils. In June 2008, this refinery increased the capacity from 0.7 million to 805,000 barrels (per annum).

On the other hand, in 1977, the Fuel Refinery was founded which had the capacity of 11,385,000 barrels (per annum) of Crude processing. In 1990, the same refinery increased the capacity up-to 16,500,000 barrels (per annum) of Crude processing. In March 2017, the company increased the capacity up-to 17,490,000 barrels (per annum) of Crude processing.

In 1979, the company established BTX unit which had the capacity of 180,000 barrels (per annum) of BTX. The company founded UOP licensed Diesel Hydrotreater Unit in June 2017. The unit had the capacity to produce 29,765 BPSD of EURO II specification HSD according to the direction of Ministry of Petroleum. The Company got success to establish an Isomerization Unit in October 2017. This unit had the capacity to process 6,793 BPSD of light Naphtha into Isomerate. The company is hopeful that the said plant will fulfill the growing demand of Motor Spirit in Pakistan.

**Corporate Objectives & Development Strategy of NRL:** National Refinery Limited (NRL) is a company engaged with the petroleum refining and petrochemical complex. The company manufactures and supplies a wide range of fuel products, lubes, BTX and asphalts etc.

**Ongoing Projects of NRL:** The following projects are being run by the company:

**Two Stage Unit at Lube-I Refinery:** This project is planned to improve the crude oil processing capacity of Lube-I Refinery from 12,050 Barrel (per stream day)) to 17,000 Barrel (per stream day). This contract has been provided to M/s. HUALU and M/s. China National Chemical Engineering No. 6 (Construction Company of China).
Replacement of Fuel refinery and Utilities Control System with centralized Distributed Control Systems: This project will replace the existing running system of fuel refinery and utilities with ‘Distributed Control System’ (DCS). It will make certain the quality production, high-integrity process controls, process safeguarding and emergency shutdown etc. After the completion of project, it will get better the process control and monitoring of plant parameters as well s the availability of customized reports and log sheets, and also best possible human resource utilization. The project is granted to M/s Yokogawa.

New Sea Water Reverse Osmosis Plant: New Sea Water Reverse Osmosis Plant is planned to having the capacity of 250,000 US gallons (per day). This is planned to be procured and installed to fulfill the increased water requirement. This scheme has been granted to M/s Aquamatch of Turkey.

Completed Projects:

1. The Installation of Air Pre-Heater at fuel refinery is an energy saving and environmental friendly project which was completed in 2019. Through this project, greenhouse gases emissions and carbon foot prints are notably reduced. The project was concluded with the cost of Rs. 425 million.

2. The company completed the up-gradation of existing Turbo Generator Steam Turbine at power generation in 2017-18. Due to this project, the overall per unit cost of the internally generated electricity was reduced. This was completed by M/s Siemens Pakistan Engineering Co. Limited in December 2017.

Water Demineralization Plant: Water demineralization plant for Reverse Osmosis was successfully installed and commissioned in June 2018. This will help in overcoming the company’s water requirements by improving the quality of available water from Reverse Osmosis plants.

Implementation of DCS at Lube-I Refinery: Distributed Control System from YOKOGAWA has been installed at Lube-I refinery and all Lube-I refinery units are operating on new system.

Waste Heat Recovery Boiler: The waste heat recovery boiler was completed in early 2018. It is the project which has the planning for the utilization of the heat energy that is used to be vented to the atmosphere from the Diesel Generator.
Installation and Commissioning of used Diesel Generator of 8.2 MW: This project was completed during 2016-17. The company needed more energy due to exposure of the business; therefore, the company installed this project to meet the power requirements. The National Refinery Limited acquired Diesel Generator with the capacity of 8.2 MW.

Up-gradation of Existing Turbo Generator: The project was awarded to M/s Siemens Engineering Pakistan and has been successfully completed in September 2017. This will reduce the overall per unit cost of internally generated electricity.

The Products Manufactured at NRL:

- National Refinery Limited has been manufacturing the following products.
- Motor Gasoline (MOGAS)
- Kerosene (SKO)
- Jet A-1
- JP-8
- EURO II grade High Speed diesel Oil (HSD)
- Furnace Oil (F.O)
- Liquefied Petroleum Gas (LPG)
- Naphtha (For Export)
- Sulphur (by-product)

1.2.1.4. Attock Petroleum Limited (APL):

The Attock Petroleum Limited (APL) is Pakistan’s fourth Oil Marketing Company that availed the marketing license and initiated her operation in February 1998. APL is the sole oil marketing group in Pakistan which covers all
aspects of the Oil and Gas sector of Pakistan including exploration, production and refining of petroleum products.

The Attock Petroleum Limited is a young company in the field of oil marketing; however, it has well managed to maintain her presence in the market. The company has also sustained the reputation as a progressive as well as active organization in the country. It has focused on providing quality petroleum products and services in Pakistan.

APL has paid the market based competitive remuneration to the dedicated team of professionals which has enabled the company to make the growth rapidly. APL has been increasing the trust and confidence of the consumers. It has fulfilled the regional demands effectively.

Attock Petroleum Limited is dedicated to play her contribution in nation’s development through providing the quality products. The company makes available best services for the customers and stakeholders because the company has an extensive storage, transportation & retail outlet network at large level.

The company is different from the other companies as it has focused on marketing than the drilling and exploration. Attock Petroleum is proud to be synonymous with the future oriented outlook. It provides the advanced technology products and services and has no compromise on the standard or quality. The company has its own more than 600 outlets and offers a wide range of petroleum products to the customers.

APL has developed a large network of petrol pumps in far-flung areas of Pakistan. The company has been considerably playing her role in the development of country as well as the expansion of the petroleum sector in Pakistan. The company had contributed to expand the infrastructure for storage, handling and delivery of petroleum products to local and overseas markets.

In 2016, the Attock Petroleum gained second position when the company presented the Best Annual Corporate Report in the sector of fuel and energy. In 2014 and 2015, Pakistan Stock Exchange recognized the policies of APL and the company was listed in the top 25 companies of the country. The APL also achieved third position in the fuel and energy sector on the occasion of presentation of the best annual corporate report. It was the acknowledgment of the Company’s policy and practice regarding the transparency, disclosure of required
information and compliance with financial reporting standards, provisions of Companies Ordinance 1984 and listing regulations. The Attock Petroleum has number of awards in this context during previous years.

**Future Planning:** The Company has planned a number of future plans as APL has purchased its own land in Karachi near has been purchased at Port Qasim. APL aims to construct a Bulk Oil Terminal at the port. According to the company website information, the construction work will be start after getting essential approvals from regulatory authorities. This bulk terminal will helpful regarding the import and export of the petroleum products at its ease as well as would meet the demands of southern region of Pakistan. Moreover, the company also intends to increase the storage capacity at Rawalpindi and Machihe oil terminals. APL is also considering to set up the storage terminals at other strategic locations including Mehmood Kot near Multan, Gatti near Faisalabad and Shikarpur in Sindh.

**Products and Services:** APL has the following products and services in the country.

**Retail Network:** The Company has established its presence and reputation in the market as an active group in a short span of time. The Attock Petroleum Limited presents high quality fuels on its multi-fuel retail outlets. The company has more than 667 outlets of multi fuel relations all corners of the country. Many outlets of the company are under construction in the country. The outlets of APL sale the petrol, diesel and CNG to the customers. The outlets also provide other services such as tuck shops, car services and lubricants etc. The company has a great network of the retail sales in all over the country.

The company has partnership with various reputable organizations for development of multi-fuel retail outlets nationwide. APL has collaboration with Askari CNG, CAA, CDA and DHA through various arrangements. Attock Petroleum is a representation of reliability & consistency in the country. The corporation feels an honour due to its services in the market.

**Commercial Services:** Attock Petroleum supplies almost all types of fuels in the market including to manufacturing Industry, Armed Forces, Power Producers, Government and semi-government entities, FMCG Companies, Developmental Sector, agricultural customers etc. The oil product range of the APL is as follows:
a. **Premier Motor Gasoline:** It is a petroleum-derived liquid mixture and used as a fuel in internal combustion engines.

b. **High Speed Diesel:** High Speed Diesel is used in generators, cement factories, vehicles etc.

c. **Furnace Fuel Oil:** The Furnace Fuel oil is used as an industrial fuel such as power generation, boilers, furnaces, and air pre-heater and feedstock in fertilizer plants.

d. **Residual Furnace Fuel Oil:** It is special high viscosity residual oil requiring preheating. The company prepares for power plants.

e. **Kerosene Oil:** The Kerosene Oil is mostly used for illumination purposes in Pakistan. In past days, the kerosene oil was used in homes to burn the lamps and the burning of stoves. APL provides the high quality kerosene which is less smoky and has high heat content with gives better illumination.

f. **Light Diesel Oil:** Light Diesel is commonly used to run construction, petroleum drilling and other off road equipment’s; as well as to run a wide range of power generations.

g. **Jet Fuel:** Jet Fuel is a type of aviation fuel designed for use in aircraft powered by gas-turbine engines.

h. **Solvent Oil:** This is used to dissolve other substances during industrial processes. It is also used in the production of paint, print ink, and agricultural chemicals and for dyeing.

i. **Naphtha:** Naphtha is a flammable liquid mixtures of hydrocarbons i.e. a component of natural gas condensate or a distillation product.

j. **Mineral Turpentine Oil:** This is colorless petroleum solvent which is used as a solvent for textile printing, dry cleaning and metal degreasing, insecticidal formulations, polish manufacture, thinner, oil soluble and as a rust inhibitor.

k. **Cutback Asphalt:** It is manufactured by blending asphalt cement with a solvent. This is mostly used for prime coat, surface treatment and stock pile patching mixes etc.
l. **Polymer Modified Bitumen:** The basic use of Bitumen is in road construction. It is further treated with polymer which improves the consistency, reduces temperature susceptibility, improves stiffness and cohesion, improves flexibility, resilience and toughness.

m. **Jute Batching Oil:** It is largely used in the jute industry for making jute fiber pliable.

n. **Waxes:** These are commonly consumed in the industrially as the components of complex formulations, often for coatings. The main use of waxes is in the formulation of colorants for plastics of various types.

o. **Rubber Processing Oil:** Rubber processing oil is of two types (i) synthetic and (ii) natural. The both types are commercially used to produce the products from rubber bands to a toy to the giant tires for various vehicles including aircrafts.

p. **Lube Base Oils:** The base oils are used to manufacture products including lubricating greases, motor oil and metal processing fluids.

q. **Lubricant:** Various types of lubricants are being sold under APL brand name. Use of a lubricant is to reduce the overall system friction. The APL provides a wide range of lubricants according to the growing demands of the market. The company claims that APL lubricants help the vehicles of machinery through the following supports:

- Reduce friction, heat and wear
- Reduce operating and maintenance cost
- Improve power and extended equipment life

APL is continually producing new products to keep up with the ever changing demands of modern industry. The Attock Petroleum Ltd is a company which provides the guarantee of high quality products along with the reduced cost and consistent performance. If we look upon the history, the APL has become a major exporter of petroleum products to the other countries in a very short time.

1.2.2. **Pakistan Petroleum Limited (PPL):**

Pakistan Petroleum Limited (PPL) is one the leading companies in Pakistan. PPL head-office is located at PIDC House, Karachi. The company has the honour to
discover the natural gas from Pakistan at Sui near Dera-Bugti district in Baluchistan. In this way, PPL is considered as the pioneer of the natural gas industry in the country. The Pakistan Petroleum Limited remained a leader in the energy sector in Pakistan since the mid-1950s. Now PPL has become the chief supplier of the gas and more than 20 percent of the natural gas requirements fulfills in all over the country. The company also produces crude oil, Natural Liquid Gas (NLG) and Liquefied Petroleum Gas (LPG).

The company was initially established in June 1950 in Pakistan. At that time the “Burmah Oil Company” (BOC) of the United Kingdom was its main shareholder. The BOC was famous for the various tasks including exploration, prospecting, development and production of the resources of oil and natural gas. The BOC disinvested from the Exploration and Production sector in all over the world in September 1997. In Pakistan, the BOC sold its equity in PPL and the Government of Pakistan purchased the share. Carrying on the policy of privatization in future, in June 2004; the Government of Pakistan sold its share through the “initial public offer” (IPO).

In August 2009, 12 percent shares were granted to the PPL employees by the government. The Government of Pakistan carried on the process of privatization and sold her 5 percent shares of the company in 2014 through Secondary Public Offer. It was almost 3.55 percent of the total paid-up capital of the company. Recently, the Employees Empowerment Trust of Pakistan Petroleum Limited has around 7 percent shares of the total while 25 percent shares are belonged to private investors. 68 percent of total shares are divided between the government and the company.

In Pakistan, the PPL has been operating 13 production fields (till 2020) at Sui Gas Field in district Dera Bugti (Baluchistan), Adam, Adam West, Kandhkot, Zafir, Fazal, Adhi, Chachar, Mazarani, Shadadpur, Shahdadpur West, Shahdadpur East and Dhok Sultan. The company also has partnership with Qadirpur gas field which is the second largest gas field in Pakistan. The corporation is practicing an aggressive exploration agenda having the aim of enhancing the hydrocarbon recovery. PPL has 48 exploration assets together with its subsidiaries. Out of 48 the 28 are operated by PPL including in Iraq, Yemen and Pakistan.
The Pakistan Petroleum Limited developed a trust, reliable foundation and infrastructure regarding providing clean and safe energy. The company is certified for ISO 9001 Quality Management System, for ISO 14001 and OHSAS 18001 (Occupational Health and Safety Assessment Series).

The company has been playing a significant role as a responsible community to facilitate the citizens since the beginning. The company founded a Model school in Sui Gas Field in 1957. The school provides quality education to the offspring of employees as well as local communities. The company also provides health facilities to the employees, their families and other community in PPL Hospital which was established in Sui Gas Field. PPL also provides Corporate Donations to help the poor communities of urban areas.

(Picture: Sui Gas Field)

**Exploration:** If we look at the success of PPL in respect of exploration, Pakistan Petroleum Limited has a great number of achievements in this respect. PPL has strong investment in finance and human resources. The company invested in modern technology to achieve the desired outputs and minimize risks through well-coordinated teamwork by paying competitive salaries. The company has
wide strategic partnerships with national and foreign Exploration and Production companies.

According to the company website, during the previous five years, the corporation succeeded to find out 16 new discoveries in operated blocks. Out of these six are in Gambat South Block, two in Kotri Block, two in Hala Block, one each in Dhok Sultan Block, Hub Block, Shah Bandar Block, Karsal Block, Adhi and Margand Block. In this context the most recent discovery at Mor Gandh has opened Kalat Plateau sub-basin for exploration. This discovery would prove very useful for the company in future.

**Business:** Growth possibilities through new projects in oil, gas and mining of other minerals are also being evaluated. Similarly, possibility studies for special projects are being carried out to assess potential for future business expansion. The company operates thirteen producing fields; two of them are thoroughly owned by PPL itself including Sui Gas Field and Kandhkot. The others are included Adhi, Mazarani, Chachar, Adam, Adam West, Shahdadpur, Shahdadpur West, Shahdadpur East, Fazal and Dhok Sultan which are being run with partners.

The company produce one billion cubic feet equivalent (bcfe) of natural gas on daily basis from its own and the partner operated fields. This is almost 22 percent of the country’s total production. The chief clients of the company are Sui Southern Gas Company Limited (SSGCL), Sui Northern Gas Pipelines Limited (SNGPL) and Water and Power Development Authority in Pakistan. The company has strong financial record and has been paying a good dividend and bonus shares to its shareholders.

**1.2.3. Mari Gas Company Limited (Mari Petroleum Company Limited):**

The Mari Gas Field was initially possessed by “Pakistan Stanvac Petroleum Project”, a joint project formed in 1954 between Government of Pakistan and M/s Esso Eastern Incorporated, having 49% and 51% ownership interests, respectively. The first gas discovery was made by the Joint Venture in 1957 when the first Well in lower Kirthar. After ten years the production was started from the field 1967. Pakistan’s famous corporation, the Fauji Foundation purchased its
shares from the M/s Esso Eastern in 1983. Consequently, it was decided to set up a wholly owned Public Limited Company for the purpose of acquiring the assets and liabilities of the Project.

In 1984, Mari Gas Company Limited (MGCL) was incorporated with the Fauji Foundation (40%), OGDCL (20%) and the Government of Pakistan (40%) as its shareholders. The Mari Gas Company took over the assets, liabilities and operational control of Mari Gas Field and originated business in its personal name in 1985 under the Mari Gas Wellhead Price Agreement (Mari GPA).

In 1994, the Government of Pakistan deprived 50% of its share and the Company was listed on all the stock exchanges of Pakistan (now Pakistan Stock Exchange).

The Company operated only as a gas production company and was engaged in developing the already discovered Habib Rahi Reservoir in Mari Gas Field for supply of gas to new fertilizer plants. The Company pursued appraisal activities within its Mari D&P Lease area by drilling step out wells to determine the extent of Habib Rahi Reservoir.

The company attained a new landmark in 2001 after achieving the license for exploration of oil and gas, in addition to the production activities. Mari Gas Company Ltd. has appeared as a victorious in the field of exploration and production.

The initial business of the Company was to sale the natural gas from inherited field but it has grown herself to the exploration, production, and sale of oil and gas as well as other petroleum products from a number of fields in all provinces of the country. The Company changed its name from “Mari Gas Company Limited” to “Mari Petroleum Company Limited” (MPCL) in November 2012. The new name better reflects diverse business operations and expanded activities of the company. The Mari Petroleum Company Limited became a completely integrated Exploration and Production company in the Country since 2013.
The Government of Pakistan approved the extension of five years lease period in 2014. The company extended the development and production rights in the Lease Area till 2019. The extension has enabled Company to develop the recovery and production of natural gas, which is significantly needed in the Country.

Since its beginning, the Company had been working on a cost-plus fixed-return formula under Mari GPA 1985. Pursuant to consistent efforts by the Company management, a foremost landmark was achieved in November 2014, when the Economic Coordination Committee (ECC) of the Cabinet permitted dismantling of Mari GPA and its replacement with an international crude oil price linked market oriented formula. Dismantling of Mari GPA has allowed the Company to drive on commercial terms and become competitive to realize its full potential.

Mari Petroleum developed into the first Pakistani Exploration and Production Company to execute its incremental gas production project (Mari Field) in February 2016. Mari Field marked its Golden Jubilee on 22 December 2017. These were 50 years of careful operations and real professionalism as evidenced by uninterrupted supply of hydrocarbons to the Company’s downstream customers.
1.2.4. Sui Southern Gas Company (SSGC):

The Sui Southern Gas Company (SSGC) is a large scale public listed company. The SSGC is the most famous leading integrated gas Company of the country. The Government of Pakistan has a larger portion of shares in its ownership. The company is engaged in the business of transmission and distribution of natural gas besides installation of high pressure transmission and low pressure distribution systems.

The Sui Southern Gas Company Limited extends in the Balochistan and Sindh comprising over 3,614 KM of high pressure pipelines in the provinces. The company manages over 1200 towns for the distribution activities in these provinces. The company has a large number of regional offices to facilitate the customers. According to the company website the company sole almost 384,979 million cubic feet (MMCF) gas during fiscal year 2015-2016. The company did it through its industrial, commercial and domestic consumers in these provinces which is around 2.8 million. The SSGCL is proud to operate the meter manufacturing plan which is the only one in the country. In this respect, the company has the capacity to prepare 356,000 meters per year on single shift basis.

Moreover, the SSCGL has its own Board of Directors consist of 11 members. In this way the company is an autonomous body which has a number of workers. The government of Pakistan has the responsibility of appointing the Managing Director (MD) or Chief Executive (CE) of the company. The CE manages the overall business of the company.

In all over the world, the provision of utilities and establishment of commercial centres have prime importance in the development of countries. When we discuss the energy & power sector, the most inexpensive and reliable source is the natural gas which cannot be neglected to meet the daily requirements of the consumers. Not only the natural gas has been used on domestic level but also has contribution in the development of industrial and commercial sectors. Particularly, the role of natural gas is most important in the under developed countries like Pakistan where the consumers are unable to afford the use of oil and other power resources due to poverty. In this regard, the company has been playing a necessary role through its services.
On the other hand, the SSGCL has been working to meet the challenges of constant expansion of gas pipeline network with future better planning, development, management, analysis, maintenance and operation of the network.

The company has been managing the regions including Hyderabad Region, Islamabad, Karachi, Larkana, Nawabshah, Quetta and Sukkur. These regions control various offices in a large number to facilitate the consumers.

The head office of the company is located in Karachi. The company provides the facilities to its customers including online duplicate bill, provision of form for new connection on its website as well as the provision of list of its offices on the website.

1.2.5. **Sui Northern Gas Pipelines Company (SNGPL):**

The “Sui Northern Gas Pipelines Limited” (SNGPL) is a private limited company which was integrated in year 1963. In the following year, it was transformed into a public limited company in January 1964 under the Companies Act 1913. Currently, it is listed is Pakistan Stock Exchange (PSX) under the Companies Act 2017.
The SNGPL took over the existing Sui-Multan System from Pakistan industrial Development Corporation (PIDC). The system is almost 217 miles of 16 inch and 80 miles of 10 inch diameter pipelines. The company also assumed Dhulian-Rawalpindi-Wah system from Attock Oil Company Limited (AOCL) which is 82 miles of six inch diameter pipeline. The Company's commercial operations in two zones including Multan and Rawalpindi, serving a total number of 67 consumers centres and commenced by selling an average of 47 MMCFD gas.

In Pakistan, the SNGPL is the largest sui-gas company which has been providing the serving to its 6.5 million consumers. The company has covered the North Central Pakistan through widespread association in Punjab, Khyber Pakhtunkhwa and Azad Kashmir. The SNGPL is certified against ISO 14001:2015 & OHSAS 18001:2007 Standards. The company’s sites have been registered under the "SMART2" Program by Pakistan Environmental Protection Agency. Sui Northern Gas Pipelines Limited enjoys more than fifty years of its operational and maintenance experience regarding high-pressure gas transmission and distribution systems in the country. The company has extended her business in engineering, procurement and construction contractor to undertake the planning, designing and structure of pipelines, both for itself and with collaboration of other groups.
Sui Northern Gas Pipelines Limited had extended the transmission system from Sui Gas Field to Peshawar which comprised over 8,900 KM of Transmission System (Main lines & Loop lines). 4,458 main towns and villages of Punjab and KP have been covered through the distribution activities. The distribution activities are organized through 16 regional offices of the company with 122,325 KM of pipeline. SNGPL has more than 65 lac consumers including domestic, commercial, industry, fertilizer, power & cement sectors of the country. According to SNGPL website the company sold 597,056 MMCF gas during 2011-2012 to the consumers worth Rs. 216,652 million.

**Major Fields Supplying Gas to SNGPL:**

(Source: SNGPL website)
SNGPL GAS NETWORK (Region wise):

The following charts show about the gas network of SNGPL in different regions.

**Abbottabad Region:**

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**1.2.6. Pakistan State Oil (PSO):**

On 1st January 1974, the government of Pakistan took over and merged Pakistan National Oil (PNO) and Dawood Petroleum Limited (DPL) as Premiere Oil Company Limited (POCL). Just after the period of six months, on 3rd June 1974, Petroleum Storage Development Corporation (PSDC) came into being. After two years, the PSDC was then renamed as State Oil Company Limited (SOCL) on 23rd August 1976. on 15th September 1976, the ESSO undertakings were acquired and control was vested in SOCL. At the end of that year on 30th December 1976, the Premier Oil Company Limited and State Oil Company Limited were merges and the Pakistan State Oil (PSO) took birth.

Pakistan State Oil (PSO) is the Pakistan Oil Company owned by the state. It is Karachi-based (head office) Petroleum Corporation which has the business of
marketing and distribution of petroleum products. The company has a wide network of 3,689 petroleum filling stations. 189 outlets of the corporation deals with wholesale bulk customers while 3500 outlets of the company provides the services to public for retail.

PSO is the largest nation’s company in energy sector. Pakistan state Oil is connected in the marketing and distribution of various Pakistan Oilfield Limited products which include Motor Gasoline, High Speed Diesel, Furnace Oil, Jet Fuel, Kerosene, CNG, LPG, Petrochemicals and Lubricants. Moreover, the company also imports other products based on their demand patterns. Some of the functions are discussed below which are been performed by the company.

**Marketing & Distribution:** Pakistan State Oil has the largest circulation network in all over the country which includes 3,754 outlets. The company has 3,565 outlets to serve the Retail sector while 189 for the bulk customers.

**Storage:** The Company has the largest capacity of storage in the country. Pakistan State Oil’s infrastructure extended from Karachi to Gilgit (Northern Areas).

**Lubes Manufacturing & Sales:** Pakistan State Oil is also making progress rapidly in the field of lubricants. The company is going to enter in various new
sectors like automotive, Hi-street and industrial consumers through the provision of its various products.

**Acquisition of Products:** The Motor Gasoline and High Speed Diesel are mostly consumed by automotive sector. On the other hand, Furnace Oil is marked for power plant usage.

**Product Movement:** Pakistan State Oil uses three mechanisms for the movement of Pakistan Oil Limited products which include tank lorries (road), tank wagons (railways) and pipelines.

**Strategic Objectives**

1. Compliance with regulatory and legal requirements and assure ethical operations in all spheres of business

2. Focus on HR capital skill development and increased employee engagement for an effective and motivated entrepreneurial team

3. Optimize and ensure efficient supply chain and pursue long term supply arrangements.

4. Effective HSE compliance with steps taken to encourage use of fuels that reduce carbon footprint.

5. Increase market leadership and strategize measures to improve the bottom line.

6. Continue to create upstream synergy and evaluate diversification opportunities for growth.

7. Focus on responsible corporate citizenship with active CSR initiatives in health, education, community development and support for special persons.

In short, Pakistan State Oil has been successfully fuelling the needs of the country for the past 35 years. Being the most important company in the energy of the
country, the PSO has been patiently driving the wheels of the nation’s economy with concentrated focus on the Industrial Sector of Pakistan.

The company feels honor as it has been fuelling many strategic units of the country including defense, railway and the power sector. However today, PSO is more committed to fulfill the needs of the industrial customers. According to the company website, the function of Consumer Business Department is to provide top notch services to industrial customers and power projects in all over the country. Consumer Business Department is divided into 7 Divisions in South, Central & North regions with 7 Business Managers for the industrial sector. One Business Manager is reserved for the Power Projects in the central region. Consumer Business Department supplies the POL products to almost every single industry.

1.2.7. Shell Pakistan Limited:

Shell Pakistan Limited (shell) is a Pakistani oil and gas company which is a subsidiary of the Royal Dutch Shell, PLC and has been in South Asia for more than a century. In Pakistan it was founded in 1993. Shell’s flagship business in Pakistan is its own retail marketing network, Shell Pakistan Limited. Shell has interests in its business which include retail, lubricants and aviation. Shell Pakistan has a listed company in Pakistan Stock Exchange. The head office of Shell is located at Ch. Khaliquzzaman Road, Karachi, while its corporate office is situated at Diplomatic Enclave, G-5 Islamabad. The company has its regional offices at Lahore, Multan, Faisalabad, Peshawar. Moreover the company has its terminals in various cities including Bhakkar, Daulatpur (Nawabshah), kemari (Karachi), Machike (Sheikhupura Sargodha Road), Sahiwal, Multan, Tarru Jabba (Nowshera). Shell is considered as one of the leading energy companies of the world. The company has been playing a significant contribution to meet the world’s growing energy demand in responsible ways. Shell is included in the most recognized brands in Pakistan. The company is committed to play principal role in meeting the growing energy demands in Pakistan. Shell Pakistan is associated with Pak Arab Pipeline Company.
The strategy of the company is looking to reinforce the position as a leader in the oil and gas industry. The company wishes to meet the global energy demand in a responsible way. According to the website, the company has three strategic ambitions:

1. Increase in the energy transition
2. World-class investment case
3. Strong licence to operate

Moreover, Shell’s business is divided into four areas:

Upstream: Upstream is responsible for Shell’s Conventional Oil and Gas businesses around the world, Deep water and Shales. It explores for and extracts crude oil, natural gas and natural gas liquids.

Integrated Gas (including New Energies): Integrated Gas manages Shell’s manufacturing and distribution of LNG and gas-to-liquids products. It includes New Energies, invests in low-carbon energy such as biofuels, hydrogen, wind and solar power.
Downstream: The downstream business manages different Oil Products and Chemicals activities, including trading and marketing activities. Our oil products are sold around the world for domestic, industrial and transport use and our petrochemicals are used by industrial customers.

Projects & Technology: The projects & technology organisation of Shell manages the delivery of our major projects and drives research and innovation to develop new technology solutions.

Shell is the most famous lubricant supplier in the world which delivers market-leading lubricants to consumers in more than 100 countries of the world. Shell Lubricants brings world-class technological insights to its products, offering you the best formulations for your vehicle.

1.3 Self Assessment Questions:

1. Keeping in view the importance of Coal Resources of Pakistan; discuss its demand, utilization and Limitations.
2. Highlight the various coal resources of Punjab, Sindh and Balochistan.
3. Discuss the importance of KP, Azad Kashmir and Sindh in respect of coal resources.
4. What is the role of Oil Refineries in the economic development of Pakistan?
5. Discuss the production and distribution of natural gas in Pakistan.
6. Highlight the marketing companies which contribute regarding the marketing of Petroleum.

1.4 Bibliography

POWER ENERGY RESOURCES OF PAKISTAN-II

Written by: Mrs. Seema Saleem

Reviewed by: Dr. Altaf Ullah
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Introduction

Power resources play a significant role in economic development of any country. They facilitate in providing an initial push to the growth of production in all sectors of the economy. They enhance the living standard of an individual through the development of agricultural, industrial and transportation sectors. This Unit is focusing on Power resources in Pakistan. The Unit enlightens the students of Pakistan studies about the hydel power, natural gas and nuclear power of the country. In terms of natural gas, fortunately Pakistan is blessed with natural gas reserves but search for further gas fields continued and after the first discovery, 196 gas deposits have been found till now. Three major natural gas regions in Pakistan are: (i) East Central Balochistan and Upper Sindh (ii) Lower Sindh (iii) The Northern Region This Unit also discusses the importance of hydel power and hydel power plants in Pakistan. Hydel power is the top most used renewable power source as compared to thermal, solar, wind and others. Pakistan is blessed with significant water resources which if carefully exploited and utilized, can change the destiny of the country. Pakistan’s unexploited hydropower potential mainly lies in the mountainous region of north alongside the Indus River in the provinces of Khyber Pakhtunkhwa and Gilgit-Baltistan, also the Jhelum River in the provinces of Punjab and Azad Jammu and Kashmir. Pakistan’s major hydel power plants are Tarbela, Mangla, Warsak, Chashma and Ghazi Barotha. This unit also discussed the nuclear power potential of Pakistan. Nuclear power is environment friendly, clean and efficient way of power generation. Currently, there are five nuclear power plants operating in the country on two locations, one is Karachi Nuclear power plant (KANUPP) at Karachi and other is four units of Chashma Nuclear power plants (C-1, C-2, C-3, C-4) at Chashma (Mianwali District of Punjab Province). In the end this unit also discussed the major issues of the energy sector in Pakistan and how we can cope up with this issue in the long term. The author is optimistic about the future of our country to be prosperous and bright by the participation of the government in introducing new development projects and policies. Cheap and durable power projects should be established rather than expensive projects. If we want industrial progress then we have to shift our focus towards hydro, wind and solar energy rather than thermal due to the increasing prices of petroleum worldwide. Furthermore, we should also attract the foreign investors to our power projects so that in future we can be able to produce energy and fulfill our needs.
Objectives

After studying this Unit, the students will be able to:

1. know about the introduction and significance of Power resources;
2. know about the various energy sources in context of Pakistan;
3. know about the Natural gas reserves of the country
4. know about the Hydel power and its importance;
5. know about the Major Hydel Power Plants in Pakistan;
6. know about Nuclear Power, its importance and Nuclear Power Plants in Pakistan.
7. Know the Issues of Energy sector in Pakistan
2.1 Background of the Power Resources

Life without a power or energy is unimaginable; it has become one of the basic necessities of human life whether we have to transport goods from one place to another or to run machines. Previously, wood, coal, animals, water were used as a traditional means of energy but nowadays natural gas, nuclear energy, thermal power, hydroelectricity, wind power, solar and petroleum are the vital source of power. This is just because of the energy resources which make it feasible for a country to maintain its living standard or lifestyle.

Abundant power and energy resource is considered mandatory for the development and success in all domains of life. In today’s world, industrial development is a key to success, which is quite hard to achieve if a country has lack of natural resources. The reason behind is that it is generally more costly to import fuel than it is to produce it at home. Energy is a vital element on which this contemporary world depends. If we go back in the history, before the industrial revolution, there was a meagre consumption of energy in human society as obviously, animal power, human labor and basic natural resources like water, wind and fire what they could provide. The windmills or water-mills were used for very specific purposes e.g. grinding flour and biomass had been used for heating or to light a fire for cooking. However, after the industrial revolution, significant change has been seen in the usage of energy sources, hence the requirement has been double fold to meet the needs worldwide.

Power resources play a significant role in economic development of any country. They facilitate in providing an initial push to the growth of production in all sectors of the economy. They enhance the living standard of an individual through the development of agricultural, industrial and transportation sectors. Energy resources can be categorised as non-renewable and renewable sources. Renewable sources are those sources that can be regenerated like natural resources such as wind, solar, water, waves, biomass, and biofuels. Generally, renewable energy renders energy in four key areas: transportation, heating and cooling, off-grid rural energy services, air and water and electricity generation. The main advantage of renewable energy systems are that they are more efficient and cheaper as compared to non-renewable and their segment of total energy consumption is also increasing.
While on the other hand, non-renewable resources are those sources that cannot be regenerated, most of them are fossil fuel like coal, crude oil, natural gas etc., and they are commonly used to generate electricity and energy. The reserves of these sources are limited, that’s why the energy we got from these resources is derived from the reserves which have explored millions of years ago and are going to be vanished very rapidly. Ultimately, this will leads to an adverse effect on the cost of production.

### 2.2 Energy Resources of Pakistan

Energy resource and economic growth both share a strong bond, therefore Energy constitutes an important integral part of the economic order of Pakistan. Unfortunately, Pakistan is facing a serious energy crisis from the last few decades that is directly or indirectly affecting all sectors of the economy. God has blessed Pakistan with the huge reservoirs of natural resources but regrettably we don’t have enough resources to extract it and utilize it in an effective way. In addition, Pakistan is a sixth most populous country of the world as well as the largest consumer of gas in the region, these factors also creating a pressure on the government to find an alternative means of resources to fulfill the demands of the masses. Nevertheless, Pakistan has world’s sixth largest coal reserves in addition to a huge potential of renewable energy resources, although up till today only large hydroelectric projects and few solar and wind projects have utilized this potential.

However, if we peep into the past than we will see that Pakistan has always been an energy importer and rely heavily on fossil fuels. Oil is imported from the Middle East mainly Saudi Arabia, gas from Iran. In addition, Pakistan is consuming primary energy sources that are petroleum, natural gas and coal. Secondary energy sources are Liquefied National Gas (LNG), Liquefied Petroleum Gas (LPG) and nuclear energy. On the whole, oil prices are increasing rapidly throughout the world which is alternatively an economic burden on the foreign exchange reserves of Pakistan. Moreover, rising demand for uninterrupted power along with the rising oil prices working as a double edge sword as it is creating a further pressure on the fragile electricity grid of Pakistan.

Compressed Natural Gas (CNG) is the compressed form of natural gas in which it
is pressurized to 250 bar pressure. It consists of 85% methane and 10% of carbon dioxide and nitrogen. It is one of the cheap and environment friendly fossil fuel. It is widely used in all over Pakistan especially in transport sector because of its lower price as an alternative to petrol and diesel. It is quite famous in South America, South and Southeast Asia and in Iran. Among the top five countries in the world namely Iran, Pakistan, Argentina, Brazil, and India, Pakistan is on the second in the highest number of CNG powered vehicles.

LPG stands for liquefied natural gas and it consists of light hydrocarbons such as propane and butane. It is most commonly used because of its liquidity characteristic. Moreover, it is very safe and widely used in regions which do not have access to natural gas resources. Specifically, in European countries, it is used in heating for domestic purposes as well as for power generation and transport sector. In Pakistan, LPG is transported from one place to another in steel cylinders like in Gilgit for domestic use, which do not have any gas piped supplies.

LNG is liquefied natural gas which is cooled down through a process of compression, condensation, expansion and evaporation and then transforms into a liquefied form at -160 degree C. It consists of 85-99% methane which is least harmful, colourless, odourless and non-corrosive. In a country like Pakistan where there is a shortage of fuel resources, it is not always possible to import natural gas through gas pipelines because of the long distance between the countries. Therefore, the most economical and easiest way to send it through sea in LNG tankers. LNG is the most beneficial and cost effective solution of current energy problems of Pakistan.

Government of Pakistan is trying their best to fulfil the increasing energy requirements of the country. To ensure availability and sustainable supply of energy service, different projects have been initiated at provincial and national level. The Ministry of Energy is tasked with the development and expansion in the natural resources and capacity of delivering energy. The government has encouraged local and foreign investment in the generation, transmission and distribution supply chains of the delivery of service to fuel the economy.

### 2.3 Natural Gas

Natural gas is one of the fossil fuel energy source that is formed underneath the
surface of the earth. It is a combination of different chemical compounds such as methane, some hydrocarbon and non-hydrocarbon gases.

Natural gas can be found in different places that can be on land or offshore deep down beneath the ocean surface. Sometimes, natural gas found on a places where it is moved into a big spaces and cracks amongst layers of overlying rocks. Natural gas found in these sort of places is called **Conventional Natural Gas**. In addition, there are also some places where natural gas can be found in the small tiny spaces or pores inside some formations of sandstone, shale and other sort of sedimentary rock. This type of natural gas is called **Unconventional Natural Gas**. In some cases, deposits of natural gas are detected near oil deposits and this type of natural gas is called **Associated Natural Gas**. The deeper the deposits are, there would be more chances to have more natural gas than crude oil and these deepest deposits contains pure natural gas as it is formed under higher pressure and temperatures.

![Schematic geology of natural gas resources](source: Adapted from United States Geological Survey fact sheet 0113-07 (public domain))

Natural gas has been used for various purposes as it is comparatively more cheap and efficient source of energy. It is most widely used in heating and cooking at household level, the other uses are such as fueling vehicles, water heating, bake foods, industrial furnaces, even in electric power generation and air conditioners.

The demand of natural gas is rising very rapidly at industrial level as it is an important ingredient to make plastic, fabrics, pharmaceuticals etc. It has been used efficiently in chemical industries for producing synthetics. Furthermore, it
also plays a vital role in fertilizer industry as a fertilizer raw material in the form of urea and ammonia. Specifically, in cement and glass industry natural gas has been used for incineration and purity. Nowadays, use of natural gas in automobile industry is a recent development in which compressed natural gas has been used as a vehicle fuel instead of petrol, which is quite cheaper and environmental friendly than petroleum products.

2.3.1 Natural Gas Reserves in Pakistan

Natural gas found in Pakistan accidentally by Pakistan Petroleum Limited (PPL) in November 1952, while searching for oil deposits at the location of Sui (Sibi division) in Baluchistan. This is one of the largest gas fields of the world. These deposits in Sui cover an area of 190 sq per km.

Pakistan is blessed with natural gas reserves but search for further gas fields continued so after the first discovery, 196 gas deposits have been found till now. Out of which 49 gas deposits are associated natural gas while 174 are still in production and non-associated natural gas reserves. At this time, eight organizations are working and producing gas from various parts of Sindh, K.P., Baluchistan and Punjab provinces.

Pakistan ranks 29th in the world in gas reserves and has proven gas reserves of around 19 trillion cubic feet (Tcf) since 2017 which is equivalent to 12 times of its annual consumption. Pakistan’s annual consumption is increasing and ranks 21st in the world in gas consumption. Pakistan also imports 3% of natural gas to fulfill its domestic consumption. Therefore, apart from unproven reserves, it has about 12 years of gas left at current consumption level. As far as production is concerned, Pakistan ranks at 26th in the world in gas production after producing 1,454,978.00 million cubic feet (MMcf) of natural gas per year since 2015.


### 2.3.2 Natural Gas Fields in Provinces

In Pakistan, gas fields are distributed within the four provinces. The details are as follows:

I. **Sindh**

Sindh is the most important province among all in gas production and reserves. Major gas fields are: Bobi, Badhra, Bhit, Chandiyu, Dhamraki, Hakeem Dhao, Hundri, Mari, Lala jamali, Zarhgum, Kandhkot, Shah Dino, Mukdumpur, Golarchi, Rind, Jhabri, Chachar, Matli, Tando Ghulam Ali, Mehar, Jabo, Zaur.
Tando Allah Yar, Mazarani, Fateh Shah, Khanpur, Kandora, Usman, Miano, Umer, Sawan, Pasakhi, Bhukhari, Bhatti, Golarchi, Qadirpur, Mukhdumpur, Sari, Hamza, Norai Jagir, Kausar, Koli, Raj, Jabo, Rehmat, Mithrao, Zamzama, Zaur and Turk. These all gas fields are situated in the Badin region.

II. Punjab

In Punjab, all gas fields are situated in the districts of Chakwal, Jehlum, Rawalpindi and Attock. Dhodhak is located in D.G. Khan otherwise rest of the fields are in Potwar Plateau. Major gas fields are: Bhal Syedan, Bhangali, Dhullian, Pariwali, Nandpur, Bahu, Rodho, Sadkal, Ratana, Rajian, Chak Naurang, Toot, Kal, Turkwal, Dhodhak, Missakaswal, Fimkassar, Panjpir, Adhi, Dakahani, Pindori, Meyal and Dhumal.

III. K.P.

Recently, fields of natural gas is found in K.P and there are only eight gas fields have been found till now, these are: Nashpa, Manikhel, Manzalai, Mela, Chanda, Maramzai and Makori.

IV. Baluchistan

Natural gas was at first discover in Sui-Sibi division of Baluchistan. It has few gas fields and all are located in Sibi division, their names are: Uch, Loti, Jandran, Jhal magsi, Pirkoh, Zarghum South, Sui and Sui deep.

2.3.3 Sector Wise Natural Gas Consumption

Because of the shortage of other fuel resources in Pakistan, natural gas plays a significant role in the development of every field as it is cheap and a major source of energy. Natural gas fulfills almost 46 percent demand of Pakistan’s energy supplies. The demand-supply gap of natural gas is increasing rapidly as the production process of natural gas has been static from last 10 years at almost 4,000 million cubic feet per day. The gap between the supply and demand without the imported gas is expected to rise to the 4,600 MMCFD in FY 2022-23 and 6,700 MMCFD by the FY 2027-28.
Oil and Gas Regulatory Authority (OGRA) stated in its State of Industry Report 2017-18 that

“The possible gap can be bridged through enhancement in indigenous gas exploration and production through incentivizing this sector, import of interstate natural gas (through development of cross-country gas pipelines) and increased import of LNG,” it said.

Pakistan was self-sufficient in gas till 2005 but after that there were some factors which affected the demand and supply of natural gas such as rising the price of petroleum, lack of availability of alternative fuel, in addition government also supported and provided subsidies to the gas users in order to attract new consumers. Consequently, a significant increase in demand and consumption of gas by domestic and residential users due to the price differential with other fuel resources. According to the gas utility companies, during the last five years, on average more than 0.3 million gas users have been added up to the gas network.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Gas Consumption in MMCFD</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>865</td>
<td>28</td>
</tr>
<tr>
<td>Domestic</td>
<td>889</td>
<td>29</td>
</tr>
<tr>
<td>Commercial</td>
<td>84</td>
<td>3</td>
</tr>
<tr>
<td>Transport (CNG)</td>
<td>136</td>
<td>4</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>621</td>
<td>20</td>
</tr>
<tr>
<td>General Industry</td>
<td>485</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,080</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Ministry of Energy, Directorate General Gas

Domestic sector is the main consumer of natural gas during financial year 2018-19, consuming 29 percent followed by power sector 28 percent, fertilizer 20
percent, industrial sector 16 percent, transport 4 percent, and commercial sector having 3 percent share. In case of province wise gas consumption, Punjab is the leading province, its share was the highest with 50 percent, followed by Sindh 39 percent, Khyber Pakhtunkhwa 9 percent and Baluchistan 2 percent during this year.

According to OGRA:

“Due to rising demand from various sectors particularly power, domestic, fertilizer, captive power and industry the supplies are not sufficient enough to cater this demand. The demand-supply gap during FY 2017-18 was 1,447 MMCFD, this gap is expected to rise to 3,720 MMCFD by FY 2019-20”

2.4 Hydel Power

Hydel power is the cheapest source of energy and often known as the catalyst of economic development. It is generally used as a barometer to estimate the development of the country. As we all know that electricity demand is increasing rapidly all around the world, in that case the role of hydel power is very crucial because it is one of the major source of renewable energy. According to US Energy Information Association 2013, 93% demand of electricity will be increased in the next 30 years, it would be reached at 39 trillion kilowatt-hours till 2040. Construction of dams on the rivers, discharge of water from the reservoir to drive turbines are the most common method of hydel power generation. One of the main significance of hydroelectric power is that there is no need for each state to rely on international fuel source, it is purely a domestic and reliable source of energy which makes every country independent.

Hydel power is the top most used renewable power source as compared to thermal, solar, wind and others. The significance of hydel power industry is rising globally since the burning of fossil fuel is environmentally hazardous as it is responsible for greenhouse emissions in the atmosphere. China has the largest hydropower plants and holds the biggest electric power generation capacity in the world. After that Brazil, Canada, United States and Russia have some biggest hydel power installations in the world.
2.4.1 Hydel Power in Pakistan

Pakistan is blessed with significant water resources which if carefully exploited and utilized, can change the destiny of the country. Pakistan’s unexploited hydropower potential mainly lies in the mountainous region of north alongside the Indus River in the provinces of Khyber Pakhtunkhwa and Gilgit-Baltistan, also the Jhelum River in the provinces of Punjab and Azad Jammu and Kashmir. According to Pakistan’s Water and Power Development Authority (WAPDA), there is 60,000 MW of hydropower potential in the country out of which only 7,320 MW has been harnessed. One of the merit of hydropower is that it does not consume or spoil water to generate electricity even it leaves this vital useful resource for other purposes as well. Instead of electricity production, hydel power dams also perform other essential functions like irrigation services and prevention of flood.

Nowadays, Pakistan is facing serious energy crisis specifically an electricity crisis. Almost 51 million Pakistanis have lack of access to electricity, while on the other hand another 90 million suffers from power shortage and load shedding on a daily basis, having a serious impact on the economy (2017 Hydropower Status Report). During the previous years of 1960s, the main focus of the government was to generate electricity through hydropower generation and its share was 70% in electricity production but after that governmental changes occurred so as their policy. Nowadays, the share of hydropower in electricity generation shrank to 30% and focus shifted towards the fossil fuels which is environmental hazardous and effects the sustainable development of the country. A glimpse of different sources of electricity generation is given below in figure.

Figure: Share in Electricity Generation
Indus River, alone has a big potential of hydropower generation. The water quality and its flow is excellent and it contains approximately 75% of all hydropower potential in Pakistan. The figure given below shows the classification of hydel power potential in terms of rivers, basins and small hydel potential sites available in the country.

**Figure: Distribution of Hydropower Potential in Pakistan (WAPDA, 2013)**

### 2.4.2 Hydel Power Stations in Pakistan

After Independence in 1947, Pakistan had got only two power stations; one was in Renala that was constructed in 1925 with installed capacity of only 1 Megawatt, the other one was in Malakand that was constructed in 1938 with installed capacity of 20 Megawatt.

Nowadays, Pakistan has 22 hydel power stations with installed capacity of 7,030 MW. Out of these 22 hydel power stations, large ones are Tarbela, Ghazi Barotha, Mangla, Warsak and Chashma power project while others are small hydel power projects. Generally, all hydel power is being operated and produced by WAPDA. A brief summary of hydel power projects is given below:

**Tarbela Hydel Power Station**

Tarbela is a tremendous earth filled dam that is built on the Indus River under the Indus Water Treaty as a part of settlement. It is a multipurpose project, at first it was constructed for the purpose of supplying water for irrigation but after that it
also used for electricity generation. It is 485 feet high above river bed on the Indus River. The reservoir work completed in 1973 with the generation capacity of 3478 MW while the 14 power units completed from 1977 to 1993. In the beginning, water storage capacity was 9.4 MAF but after few years storage capacity decreased due to siltation and is now only 6.4 MAF.

**Mangla Hydel Power Station**

Mangla dam is another magnificent multipurpose hydel project. It is twelfths largest dam in the world with 380 ft height above river bed with gross storage capacity of 5.35 MAF. It is third largest hydel power generation station in Pakistan with installed capacity of 1000 MW. It has 10 hydel power generation units completed during 1967-94.

In summer, during the higher reservoir period, Mangla can generate even 1150 MW due to permissible overloading of 15% while the capacity reduces due to low reservoir level during the winter season to about 496 MW in the lean flow period.

**Ghazi Barotha Hydel Power Station**

Ghazi Barotha Hydropower Project is situated on the Indus river downward of Tarbela Dam in district Attock 92.7 km away from Islamabad. It is also one of the largest hydel power project in Pakistan with generation capacity of 1450 MW. The project was completed during the fiscal year 2003-2004. It is completely environmentally sustainable project and planned to meet the acute shortage of peak power demand in the country.

**Warsak Hydel Power Station**

Warsak Hydropower Project is situated on the Kabul river at about 30 km from Peshawar with installed capacity of 243 MW. It is fourth largest hydel power project built to provide water for irrigation and generation of electricity. The Project was financed by Canadian government completed under Colombo Plan in two phases.

**Chashma Hydel Power Station**

Chashma Hydel Power Station is located on the right side of the Chashma
Barrage. The barrage is on the Indus River near the village of Chashma in Mianwali District. Its reservoir also works as a regulatory storage for the releases from Tarbela. It is a low head Hydel power plant with a total capacity of 184 MW consisting of 08 Units each of 23 MW.

Apart from these hydel power stations mentioned above, there are a number of other small hydel power projects, which is contributing to overcome the shortfall of electricity in the country. Moreover, more than 60 units of micro hydel plants with total installed capacity of 10 MW or more have been accomplished in remote areas. Still there are a lot of hydel power potential in the northern areas of the country which needs to be explored in Azad Kashmir, Gilgit-Baltistan and K.P. We can utilize this electric power generation in the development of various sectors specifically in agriculture, industrial and manufacturing sector.

Table given next page shows the list of large hydel power projects that can be taken under consideration or under implementation till 2030

2.5 Nuclear Power

Nuclear power is environment friendly, clean and efficient way of power generation in which water boils to make steam which turn on the turbine to produce electricity. In nuclear power plants electricity produced by a process called fission in which low enriched uranium atoms splits in a nuclear reactor.

In case of sustainable development of a country, nuclear power provides various benefits for the environment because nuclear power plants do not combust any material therefore, they produce no more combustion by-product. Moreover, nuclear plants preserve the air quality and protect the climate change by not producing any greenhouse gases. In term of electricity generation, nuclear power plants can generate electricity continuously on a large scale for a long time without any interruption. Therefore, it is one of the efficient and reliable source of electricity generation. Nowadays, nuclear energy produces 12 % of the world electricity and since 2018, almost 30 countries around the globe are operating 450 nuclear reactors for electricity generation. The operation of nuclear power
Large Scale Hydropower projects of Pakistan that are under implementation or can be taken under consideration till 2030 (WAPDA, 2013)

<table>
<thead>
<tr>
<th>No</th>
<th>Name of Project</th>
<th>Installed Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Neelum Jhelum AJK</td>
<td>969</td>
</tr>
<tr>
<td>2</td>
<td>Diamar Basha -Diamar/Kohistan</td>
<td>4500</td>
</tr>
<tr>
<td>3</td>
<td>Bunji-Astore</td>
<td>7100</td>
</tr>
<tr>
<td>4</td>
<td>Dasu-Kolistan</td>
<td>4320</td>
</tr>
<tr>
<td>5</td>
<td>Terbela.4th Extension-Swabi</td>
<td>1400</td>
</tr>
<tr>
<td>6</td>
<td>Munda-Nuhamend Agency</td>
<td>740</td>
</tr>
<tr>
<td>7</td>
<td>Lower Spat-Gah Kohistan</td>
<td>496</td>
</tr>
<tr>
<td>8</td>
<td>Lower Panas Valley Kohistan</td>
<td>665</td>
</tr>
<tr>
<td>9</td>
<td>Patan</td>
<td>2800</td>
</tr>
<tr>
<td>10</td>
<td>Thakot</td>
<td>2800</td>
</tr>
<tr>
<td>11</td>
<td>Kheyal Kaawar –KPK</td>
<td>122</td>
</tr>
<tr>
<td>12</td>
<td>Golen Gol Project-KPK</td>
<td>106</td>
</tr>
<tr>
<td>13</td>
<td>Terbela.5th Extension Swabi</td>
<td>500</td>
</tr>
<tr>
<td>14</td>
<td>Akhori Dam- Punjab</td>
<td>600</td>
</tr>
<tr>
<td>15</td>
<td>Yulbu dan</td>
<td>2800</td>
</tr>
<tr>
<td>16</td>
<td>Shyuk (Yago) Project</td>
<td>520</td>
</tr>
<tr>
<td>17</td>
<td>Skardu Dam Project</td>
<td>1600</td>
</tr>
<tr>
<td>18</td>
<td>Tungus Hydropower Project</td>
<td>2200</td>
</tr>
<tr>
<td>19</td>
<td>Dudhniel Hydropower Project</td>
<td>960</td>
</tr>
<tr>
<td>20</td>
<td>Suki-Kinuri Hydropower Project</td>
<td>840</td>
</tr>
<tr>
<td>21</td>
<td>Kundal Siah Hydropower Project</td>
<td>700</td>
</tr>
<tr>
<td>22</td>
<td>Rajdhani Hydropower</td>
<td>132</td>
</tr>
<tr>
<td>23</td>
<td>Mahl Hydropower Project</td>
<td>600</td>
</tr>
<tr>
<td>24</td>
<td>Kala Bagh Dam</td>
<td>3800</td>
</tr>
</tbody>
</table>

Total: 41270
2.5.1 **Nuclear Power Plants in Pakistan**

To operate and work on the nuclear technology, it needs the qualified manpower, research and development and advance manufacturing facilities. Therefore, for the commissioning of nuclear technology, Pakistan Atomic Energy Commission was developed in 1955. President of Pakistan announced the Ordinance for PAEC and it was later approved by the National Assembly in 1965. The major functions of PAEC comprise extensive research work for the promotion of positive uses of nuclear energy in areas of agriculture, medicine & industry and the execution of development projects including NPPs for the electric power generation.

First time nuclear technology was introduced in Pakistan in 1971 by installing a plant named KANUPP in Karachi with Canadian aid. The installed capacity of that plant was 137 MW and it is safely and successfully functioning for more than 45 years.

Second nuclear power plant named CHASNUPP (Chashma Nuclear Power Plant) is located near Chashma Barrage district Mianwali. This power plant came into operation in September 2000. It was established with the help of China National Nuclear Cooperation (CNNC) with the planned generation capacity is 900 MW. While at present it has gross capacity of 325 MW.

Since 2011, third nuclear power plant with 325 MW is also functioning. It increased almost 75 % the level of electricity generation capacity through nuclear power from 2010. The details of existing and upcoming nuclear power plants are given below:

<table>
<thead>
<tr>
<th>Nuclear power reactors</th>
<th>Location</th>
<th>Net Capacity (Mwe)</th>
<th>Connected to grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHASNUPP-I</td>
<td>Chasma, Punjab Province</td>
<td>300</td>
<td>6/13/2000</td>
</tr>
<tr>
<td>CHASNUPP-II</td>
<td>Chasma, Punjab Province</td>
<td>300</td>
<td>40616</td>
</tr>
<tr>
<td>CHASNUPP-III</td>
<td>Chasma, Punjab Province</td>
<td>340</td>
<td>2016</td>
</tr>
<tr>
<td>CHASNUPP-IV</td>
<td>Chasma, Punjab Province</td>
<td>340</td>
<td>2017</td>
</tr>
<tr>
<td>CHASNUPP-V</td>
<td>Chasma, Punjab Province</td>
<td>1,000</td>
<td>2020</td>
</tr>
<tr>
<td>KANUPP-I</td>
<td>Karachi, Sirdh Province</td>
<td>90</td>
<td>18-Oct-71</td>
</tr>
<tr>
<td>KANUPP-II</td>
<td>Karachi, Sirdh Province</td>
<td>1,100</td>
<td>2020</td>
</tr>
<tr>
<td>KANUPP-III</td>
<td>Karachi, Sirdh Province</td>
<td>1,100</td>
<td>2020</td>
</tr>
<tr>
<td>Muzaffargarh Nuclear Power Complex</td>
<td>Muzaffargarh, Punjab</td>
<td>1,000</td>
<td>2020</td>
</tr>
</tbody>
</table>

Source: PAEC
Pakistan Atomic Energy Commission (PAEC) is the exclusive department in Pakistan that is involved in electricity generation through nuclear technology. Currently, there are five nuclear power plants operating in the country on two locations, one is Karachi Nuclear power plant (KANUPP) at Karachi and other is four units of Chashma Nuclear power plants (C-1, C-2, C-3, C-4) at Chashma (Mianwali District of Punjab Province). The gross capacity of these five nuclear power plants is 1,430 MW that issued almost 7,267 million units of electricity to the national grid during 1st July, 2018 to 31st March, 2019. These four units of Chashma are the best performing electricity generating plants in terms of availability and endurance in the country.

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity (MW)</th>
<th>Electricity sent to Grid (Million KWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross</td>
<td>Net</td>
</tr>
<tr>
<td>KANUPP</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>C-1</td>
<td>325</td>
<td>300</td>
</tr>
<tr>
<td>C-2</td>
<td>325</td>
<td>300</td>
</tr>
<tr>
<td>C-3</td>
<td>340</td>
<td>315</td>
</tr>
<tr>
<td>C-4</td>
<td>340</td>
<td>315</td>
</tr>
<tr>
<td>Total</td>
<td>1,430</td>
<td>1,320</td>
</tr>
</tbody>
</table>

Source: PAEC

### 2.6 Major Problems of the Energy Sector

Energy crisis is one of the major current issues that Pakistan is facing and it can be more serious in the future, if proper attention would not be given. According to National Electric Power Regulatory Authority, in its annual industry report states that almost 20 percent of villages are not linked with the grids and those who are connected statistically are facing power shortages so it is estimated that throughout the country approximately more than 144 million people do not have the reliable access to electricity. Moreover, majority of the population living in rural areas relies on traditional biomass for heating and cooking.

The main hurdle behind the rural electrification is the shortage of power generation and increasingly high distribution cost so the outcome is breakouts and load shedding. In addition, because of the low level of electricity demand or consumption in rural areas, the connection with the grid into these areas is not
merely economical and therefore not feasible. The generation of revenues from these areas would never be able to cover up the expenses or investment that distribution and utilities companies would do in rolling out the grid in these areas.

Another main issue on the part of government is the gap between the power generation and capacity for transmission which means there is a serious gap of 6,000 MW between the production and transmission of power. To cover up the gap, load shedding occurs in the whole country. In this case, financial constraint is also a big issue for the energy sector. In every budget, meagre amount of fund is allocated to energy sector which is not good enough to start any new project. The main reason behind this is the more focus of every government on non-development expenditure rather than development.

We should divert our attention to the renewable energy sources instead of non-renewable. The usage of fossil fuels as energy source is decreasing worldwide due to its harmful effects to the environment but unfortunately in our country still thermal is a major source of power generation. Most of all developed countries like America, China, Germany, even in India, are utilizing hydel power for power generation. Pakistan has a huge capacity of producing solar and wind energy. The total area of Germany is less than 50% of Pakistan, however it is generating 39,000 MW wind energy. Even the sunshine hours of Germany is 50% less than Pakistan but still producing 38,000 MW solar energy. Therefore, the question arises here that can’t we satisfy or fulfill our requirements of power by establishing the plants of solar, wind and hydropower??

Priorities should be change at government and individual level. Cheap and durable power projects should be established rather than expensive projects. If we want industrial progress then we have to shift our focus towards hydro, wind and solar energy rather than thermal due to the increasing prices of petroleum worldwide. Furthermore, we should also attract the foreign investors to our power projects so that in future we can be able to produce energy and fulfill our needs.

2.7 Self Assessment Questions

1. Keeping in view the importance of power resources; discuss the natural gas reserves of Pakistan.
2. Highlight the Sector wise Natural Gas Consumption in the country.

3. Pakistan depends on Hydel power and nothing other power in alternate for the country. Discuss.

4. Describe the Hydel Power Stations in Pakistan and their contribution in the power sector.

5. Highlight the need, importance and contributions of Nuclear Power Plants in Pakistan.

6. Evaluate the major problems faced by the energy sector in Pakistan.

2.8 Bibliography

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Industries-I

COTTAGE INDUSTRIES IN PAKISTAN

Written by: Mr. Azhar Liaquat
Reviewed by: Dr. Altaf Ullah
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Introduction

Pakistan is although an agricultural country; however, the industries cannot be neglected by the governments. In the various five year plans, the governments tried to focus in the industrial sector of Pakistan. The Cottage industries play a vital role to engage the poor people to provide employment to a large number of unemployed people.

This unit deals about the capacity of Pakistan’s cottage industries. In this unit the overall advantages have been discussed which include the provision of employment, increase in foreign reserves, enhancement in industrial product and development of backward areas. The cottage industries in Pakistan remained under pressure during different phases. Shortage of capital, lack of technology and shortage of storage places as well as the non-provision of loan facilities are the burning issues which have been discussed in the unit. The unit also reveals about the various types of cottage industries including Carpet industry, Textiles, Embroidery, Jewellery, Ceramics, Cutlery, Woodwork / Furniture and Sports goods Industry.

Objectives

After reading this chapter the students will be able to:

1. know the various types of cottage industries of Pakistan.
2. know the role of cottage industries in the economic development of the country.
3. know about the major issues faced by the cottage industries of Pakistan.
3.1 Cottage Industry

Cottage industry mostly includes very small industrial firms and units in which the owner and his family members work and usually no hired labour is employed. Blacksmiths, Goldsmiths, Brown sugar, Carpenter, under garments and potters produce many articles of everyday use with the help of low capital and generally labour-intensive method of production. Cloth, utensils, pottery, articles of wood, iron, brass, jewellery, embroidery and knitwear are its products.

There is shortage of capital and technical skills in Pakistan. It is not possible to establish heavy industries in this economic atmosphere. On the other hand, it is very easy to establish a large number of cottage industries in all over the country.

Following are the main advantages of cottage industries.

3.2 Advantages of Cottage Industries

Cottage industries are considered a backbone for the in the under developed countries. In the context of Pakistan, the benefits or advantages of the cottage industries are being discussed following lines.

**Increase in Employment:** Cottage industries also are an important source of employment, especially in rural areas and small cities. For farmers, operating a cottage industry out of the home can supplement the income raised from selling crops. In winter, when farming activities tend to abate, a cottage industry can create extra income. It is not possible to give Government jobs to all the unemployed people. So, cottage industries play paramount role for giving self-employment and employment to others jobless peoples.

**Increase in Industrial Product:** There are shortages of industrial manufactured goods in Pakistan. Pakistan spends a lot of precious foreign exchange reserves on the imports of different goods. Pakistan can increase supply of products by increasing number of cottage industries. In this way shortage gap would be bridged.

**Increase in Foreign Exchange Earnings:** Cottage industries help to raise the foreign exchange earnings of the country. In Pakistan, sports goods, carpets, embroidery work, under garments and cutlery sets are exported and cause big chunk of increase in foreign exchange reserves.
Use of Industrial Waste: Waste of large-scale industry can be used in the cottage industry. Remaining Cotton of textile industry, steel of iron industry, small pieces of leather industry and trash of sugar industry used in the cottage industry. In this way we can save a lot of capital.

Employment Opportunities for Women: Pakistani women work in cottage industry. This industrial sector is giving immense opportunities especially rural women for earning the bread and platform foreshowing capabilities of women. Generally, in the rural area, women do not like work with other men. So, cottage industry is a blessing for the women.

Increase in the Income of People: Boosting of cottage industries give helping hand to common man for the increment of his income. Increase in income of people raise living standard of the people and resultantly general prosperity in the society.

Inexpensive Production: Cottage industry generally adopts labour intensive way of production, so goods are produced inexpensively. In Pakistan, labour is cheap, consequently commodities are produced cheaply. People can buy more commodities and market expands.

Equitable Distribution of Income: Flourishing of cottage industries helps distribution of income on equitable basis. Because the income of common people increases. So, the yawning gap between the poor and the rich reduces substantially.

Development of Backward Areas: Strong foundation of cottage industry increases development of backward and undeveloped areas because economic activities, consumption pattern, investment, aggregate demand and income of people increases. So resultantly people prosper, and poverty alleviates.

Reduction of Population Pressure: Development of areas brings changes in the life pattern and mindset of the general masses. They understand importance of small and healthy family and proper training of their children. These factors reduce population pressure of the country.

Reduction in Urbanization: In fact, unemployed labour force is migrating to urban areas for getting employment opportunities. In this way problems of urban localities are increasing rapidly. Traffic congestion, inadequate potable drinking water, choked sewerage, environmental pollution and excessive construction have reshaped badly the very beauty of big cities. Stimulating of Cottage industry can resolve these problems of urbanization. People get jobs at their localities and earn
handsome income without going too far flung areas.

**Reduction of Regional Disparity:** By increasing the number of cottage industries regional disparities can be reduced. All flow of development and facilities would not go to big cities like Karachi, Lahore, Faisalabad and Rawalpindi. Because of promotion of cottage industries, people will get jobs at their doorstep. They will not come to search jobs in big cities.

**3.3 Major Issues of Cottage Industries in Pakistan**

Everybody recognizes the importance of cottage industry in Pakistan. The measures taken so far for the expansion of cottage industry have not been successful. From the very little contribution of cottage industry towards GDP, it is evident that there are many hurdles and impediments in the way of development of these industries. Lack of skilled manpower, lack of modern technology, lack of credit facilities, limited market. Intermediary exploitation, lack of capital, high cost, use of outdated machinery, lack of standardization, shortage of trained person, lack of technology, lack of marketing facilities, problem of electricity, short supply of raw material and lack of storing facilities and lack of credit facility are main problems facing the cottage industry. These are being discussed in the following lines.

**Lack of Capital:** The major problem in the expansion and growth of cottage industry is the shortage of capital. The artisans and craftsman need working capital to purchase raw material and machinery. They also need money to meet the consumption requirements of the family. But unfortunately, in Pakistan owners of cottage industries remains always in dire need of capital. They meet their consumption needs with great difficulty.

**High Cost:** The production cost of the goods produced in cottage industries is comparatively very high in Pakistan. They are, therefore, not able to compete with the manufactured goods on larger-scale industries in the open market. High cost reduces their profit margin and competency with bib players of the market.

**Use of Outdated Machinery:** Because of having lack of adequate capital, the owners of cottage industries are compelled to use outdated and obsolete machinery. So, the production is low, and quality of goods is inferior as compared to the big multi-national and domestic as well as imported industrial products.

**Lack of Standardization:** The goods produced on cottage industries scale lack proper standardization. The demand for sub-standard goods are low. People
do not like low standards commodities. So, these goods face the problem of demand and marketing both in the domestic and the external market.

**Intermediary Exploitation:** Cottage industries have been exploited by middleman. These middlemen get goods from craftsmen and artisans at cheap rates and sell these goods at higher rates in the market. Owners of cottage industries are financially weak and do not know modern marketing techniques. So, they must rely on services of middleman.

**Shortage of Trained Person:** The investors of cottage industry are mostly illiterate. They remain satisfied with the basic methods of production. New techniques of production demand both capital and skilled which are not in reach of cottage industries owners. Therefore, the growth of cottage industry has thus been handicapped and plummeted severely in Pakistan.

**Lack of Technology:** The investors and owners of cottage industry are mostly illiterate, unskilled and inefficient and do not understand importance and usefulness of new technology. They remain satisfied with the basic, obsolete and old methods of production. In this way, the growth a of cottage industry has remained slow down in Pakistan.

**Lack of Technical Training:** The cottage industry is in the private sector and has no proper patronage from government. The craftsman and artisans mostly inherit the knowledge and skills and the old method of production from their elders. The provisions of technical advice, training and technical facilities in the cottage industries are insufficient. They have no extra budget to train their concerned labour.

**Lack of Storing Facilities:** The cottage industry in Pakistan, particularly in villages, is lacking storage facilities, which affects the production badly. For making and developing storage capabilities, owners of cottages industries do not have capital. They don’t have money to construct warehouses and stores.

**Lack of Credit Facility:** The provision of credit facilities is lifeline for any type of industries, so it is true also in case of cottage industries. They need credit to meet the running expenses, to expand business and to purchase tools etc. No proper credit facility is available for cottage industry in the Pakistan. Banks hesitate for giving credit to cottage industry amid low level of business and weak ability to repay the loan with interest rate.

**Lack of Marketing Facilities:** The goods produced by cottage industries such as craftsman and artisans are generally sold in the local markets. Because of
low budget and financial resources, they are unable to advertise their products on mainstream print and electronic media. So, they are not able to establish their brands and win loyalty of customers. They lag behinds in increasing their demand despite maintaining good and acceptable qualities of products.

**Problem of Electricity:** There are many villages where electricity has not been provided. In both big and small cities, the supply of electricity is irregular and unplanned load shedding is very common in summer especially. The non-availability, inadequacy, failures and repeated variations in the electricity voltage delay and hamper the progress and growth of industry in the country. Cottage industries do not have ability to create its own electricity as big firms do.

**Short Supply of Raw Material:** Cottage industries in Pakistan are often faced with short supply of indigenous as well as imported raw material. Generally, owners of cottage industries cannot buy raw material in bulk and low rates. So, resultantly, they face high prices and shortage of raw material. On the other hand, the day to day wide fluctuations in the market prices of the raw material upset the market of the manufactured goods of cottage industry.

### 3.4 Types of Cottage Industries in Pakistan

There is a web of cottage industries in Pakistan. In pretty much every town, there are various such ventures relying on the size of the town and the interest for the items. The foundation of such industry is firmly identified with the accessibility of crude material customary abilities, climatic conditions and, in a few cases, the nearby specialization in the composed processing plant area. There is a huge assortment of crafted works accessible in Pakistan. They are tastefully satisfying things; however, they likewise serve the necessities of neighbourhood individuals.

A portion of these ventures produce significant fare things. As of late fares of non-cotton items have confronted expanding exchange hindrances as popular sentiment industrialized nations has communicated developing worry about child work, ecological problems and well-being measures. These worries are being tended to now.

#### 3.4.1 Carpets

The origin of Pakistani handmade carpet industry can be traced back to the 11th century with the arrival of the first Muslim conquerors, the Ghaznavis and then Ghouris. Later the Muslim Mughal kings imported weavers and setup carpet
making centers. Lahore, Multan, Hyderabad in Pakistan and Agra, Mirzapur and Jaipur in India became famous for their carpets. This profession has throughout been basically Muslim in character. These were Muslim kings who patronized it, and these were Muslim weavers who move knots into designs and earned name and fame beyond their own country. Some of the most exclusive carpets were created specifically during the Mughal reign, each carpet was different from the other, but infused with a common magic of color and designs. Some of the fine pieces of art of those days can be seen today at the Victoria and Albert Museum, London and in other museums in Europe and the United States.

After independence, the craft of hand knotted carpets remained relatively neglected for more than two decades. No significant attempt was made to revive this traditional craft that is labour-intensive and export-oriented, involving low capital investment. The real breakthrough came about in the 70's when there was a decline in production of carpets in Iran. The late 70's and 80's were the boom period for the Pakistan carpet industry. As a result of this boom, hundreds of new carpet manufacturing units came into existence. The total numbers of looms in the country are estimated in the range of 300,000-350,000 scattered all over the country and employing around 1 million-1.5 million people. As the industry is labour-intensive, manpower constitutes for more than 50% of the total cost of production. The types available in carpet market are: Mats, Rugs, Wall to wall carpets, Wall carpets.

Pakistani carpets have become renowned the world over for their exquisite design, subtle elegance, attractive colors and workmanship. An important factor in this growth has no doubt been the carpet weavers who have gradually grown as an artist, a creator who could weave poetry into their design and every knot they tie, giving a touch of aesthetic beauty to their creations. The carpet weavers' skills are their own and the design they evolve are from their mind to be translated into beautiful form with the help of wool and silk.

The technique of carpet weaving in Pakistan is largely influenced by Persian style. The main raw materials use in Pakistan for making handmade carpet is wool, silk and synthetic fibers.

In the cottage industries, the most important is the Carpet weaving and its centre are located almost all over the Pakistan. It is also significant in economic terms and they make valuable contribution in exports. Cotton is the raw material
required for this industry. They also employ women to produce fine hand-woven carpets and to produce wool silk or a mixture of the two, as the carpets are of great significance which generates equal economic opportunities for the destitute. It is valuable for gross domestic product of country.

The exports of carpet from Pakistan at this time is 137 million $ but it would likely to exceed $500 million mark if it was provided commerce and industry ministries support. Hand knotted carpets are one the major exports of Pakistan.

Now, the plight of Carpet Industry of Pakistan is turning into an abysmal story as the export value of the industry during the last decade till 2017, came down from $396 million to $136 million. India in comparison had an annual carpet export of $300 million which soared to $8 billion in 2016 Total production of Pakistan fell from 2,930,000 square meters to a mere 1,982,000 square metres.

From being one of the world’s largest producers and exporters of hand-knotted carpets, to being one of the five prime export-oriented sectors of the country under Generalised System of Preference (GSP) plus status from European Union (EU), the carpet industry has not yet found a way out to bolster their exports in international markets and to become a vital player in the foreign trade of Pakistan.

The non-exploration of new markets, acute shortage of electricity, shortage of skilled labour force and high mark-up rates are just few of the many reasons behind the current state of affairs of carpet industries.

When Pakistan got the GSP plus status, it was expected that it would double its exports to damaged business of cottage industry of carpets EU, but instead it saw a decline in exports. The past successive governments failed to come up with any conclusive strategy to deal with the issue, the establishment of a council meant to tackle the problems of the sector was not formulated either.

Pakistan was known to be a specialist of hand-made carpets. But the decision of Commerce Ministry to exclude the hand-made carpets from Free Trade Agreement (FTA) concession list and to include machine-made carpets proved to be a disaster for the industry, as it decreased the value of Pakistan’s hand-knotted carpets in the International market and severely .

Pakistan Carpet Manufacturers and Exporters Association, Chairman, Latif Malik, said that among other suggestions to the new government, Association would
press upon the need to mainstream women labour, so that women (formal and informal) workers might get employments at their doorstep.

A single piece of carpet requires six months to a year’s labour. Around 70 percent of work force of this sector comprises of women who make carpets at home. The Association suggested new government to allocate substantial amount from its Public Sector Development Programme.

Pakistan is one of the most innovative producers of new designs and varieties of carpets. The gains made in US market for 12 years are now beginning to give Pakistan an edge in EU if new government tries for sector’s uplift.

Exporters were on demand for early release of refunds, concessions and credit financing. The exports of carpet from Pakistan would likely to exceed $500 million mark if it was provided commerce and industry ministries support. Hand knotted carpets are one the major exports of Pakistan. Pakistani carpets are very well known around the world for their exquisite and creative designs, beautiful colour combinations and superior craftsmanship. United Kingdom, Denmark and France are buyers of hand knotted carpets valuing to more than $110 million. Pakistan’s exports to US in terms of quantity were more than 1685,100 square meter. China, Dubai and Germany were classic examples of well-organised international trade fairs, where businessmen from all over the world converged.

At this time the cottage industry of carpets is in serious need of the government’s help, which can provide it at least 3 percent collateral relief on carpet export.

Europe and South America are potential regions of carpet export. Foreign missions of Pakistan can play important role in bringing a turnaround by educating Pakistani carpet manufacturers and exporters about fast global-changing trends and giving awareness about latest techniques and technology being deployed by the developed world. Making all these changes would hopefully end the declining trend of exports of the industry and would help to improve its current dismal situation into something valuable for the foreign trade, employment and economy of Pakistan.

**3.4.2 Textiles**

Textiles are found throughout the country with a variety of design and techniques. The most famous among them are Khadar, Susi, Khes, Chunri, Boski, Karandi,
Shaal, and Ajrak. The designs are invariably brightly coloured with traditional emphasis on blue and red. In 2020, there are 430 small units which produce textile products. There are six primary sectors of the textile production in Pakistan: Spinning, Weaving, Processing, Printing, Garment manufacturing, Filament yarn manufacturing. A little bit explanation of these processes is as follow.

Spinning process is essentially the yarn giving from the drafting rollers goes through a string guide, cycle an traveller that is allowed to pivot around a ring, and afterward onto a cylinder or bobbin, which is carried on a shaft, the hub of which goes through a focal point of the ring. The shaft is driven (normally at a rakish speed that is either steady or changes just gradually) and the voyager is hauled around a ring by the circle of yarn going around it. In the event that the drafting rollers were stationary, the rakish speed of the explorer would be equivalent to that of the axle and every transformation of the shaft would make one turn of contort be embedded on the up and up of yarn between the roller nip and the voyager. In turning, in any case, the yarn is constantly giving from the rollers of the drafting framework and, under these conditions, the rakish speed of the voyager is not as much as that of the shaft by a sum that is only adequate to permit the yarn to be wound onto the bobbin at a similar rate as that at which it issues from the drafting rollers. Every unrest of the voyager currently embeds one transform of contort into the circle of yarn between the roller nip and the explorer at the same time, in balance, the quantity of turns of bend on the up and up of yarn stays consistent as wound yarn is going through the explorer at a comparing rate.

Weaving is a method of textile production in which two distinct sets of yarns or threads are interlaced at right angles to form a fabric or cloth. Other methods are knitting, crocheting, felting, and braiding or plaiting. The longitudinal threads are called the warp and the lateral threads are the weft or filling. (Weft is an old English word meaning "that which is woven") The method in which these threads are inter-woven affects the characteristics of the cloth. Cloth is usually woven on a loom, a device that holds the warp threads in place while filling threads are woven through them. A fabric band which meets this definition of cloth (warp threads with a weft thread winding between) can also be made using other methods, including tablet weaving, back strap loom, or other techniques without looms.

The way the warp and filling threads interlace with each other is called the weave.
The majority of woven products are created with one of three basic weaves: plain weave, satin weave, or twill. Woven cloth can be plain (in one colour or a simple pattern) or can be woven in decorative or artistic design.

Textile printing is the process of applying colour to fabric in definite patterns or designs. In properly printed fabrics the colour is bonded with the fibre, so as to resist washing and friction. Textile printing is related to dyeing but in dyeing properly the whole fabric is uniformly covered with one colour, whereas in printing one or more colours are applied to it in certain parts only, and in sharply defined patterns.

In printing, wooden blocks, stencils, engraved plates, rollers, or silk screens can be used to place colours on the fabric. Colourants used in printing contain dyes thickened to prevent the colour from spreading by capillary attraction beyond the limits of the pattern or design.

Clothing industry or piece of clothing industry outlines the sorts of exchange and industry along the creation and life chain of apparel and articles of clothing, beginning with the material business (makers of cotton, fleece, fur, and manufactured fibre), frivolity utilizing weaving, by means of the style business to design retailers up to exchange with recycled garments and material reusing. The delivering segments expand upon an abundance of garments innovation some of which, like the loom, the cotton gin and the sewing machine proclaimed industrialization not just of the past material assembling rehearses.

3.4.3 Embroidery

Embroidery is the craft of decorating fabric or other materials using a needle to apply thread or yarn. Embroidery may also incorporate other materials. Embroidery has developed to a fine art with distinctive regional designs and patterns. There are different embroidery patterns in Pakistan based on ethnic, regional, linguistic and traditional bases. Dupatta embroidery with utilising Shisha work. Pakistani Baloch Lady Traditional Balochi dresses Children in Quetta wearing local embroidery designs ‘Malookan’.

Shisha embroidery or mirror-work, is a type of embroidery which attaches small pieces of mirrors reflect metal to fabric. Mirror embroidery is spread throughout Asia, and today can be found in the traditional embroidery of the Pakistan,
India, Afghanistan, China, and Indonesia. In the Pakistani rural area this kind of embroidery is very common.

Gota embroidery or Gotapatti or gota work is a type of Pakistani embroidery that originated in Rajasthan, India. It uses the applique technique. Small pieces of zari ribbon are applied onto the fabric with the edges sewn down to create elaborate patterns. Gota embroidery is used extensively in Pakistani wedding and formal clothes.

Zardozi embroidery work is a type of embroidery in Pakistan, Iran, Azerbaijan, Iraq, Kuwait, Syria, Turkey, Central Asia, India, and Bangladesh. Zardozi comes from two Persian words: Zar or zarin meaning 'gold', and dozi meaning 'sewing'. Zardozi is a type of heavy and elaborate metal embroidery on a silk, satin, or velvet fabric base. Designs are often created using gold and silver threads and can incorporate pearls, beads, and precious stones. It is used as decoration for a wide range of applications, including clothes, household textiles, and animal trappings. Historically, it was used to adorn the walls of royal tents, scabbards, wall hangings and the paraphernalia of regal elephants and horses. Initially, the embroidery was done with pure silver wires and real gold leaves. However, today, craftsmen make use of a combination of copper wire, with a golden or silver polish, and silk thread.

A kurta embroidery (or sometimes kurti, for women) is a loose collarless shirt worn in many regions of Pakistan, India and Bangladesh and now also worn around the world. Tracing its roots to Central Asian nomadic tunics, or upper body garments, of the late-ancient- or early-medieval era, the kurta has evolved stylistically over the centuries, especially in South Asia, as a garment for everyday wear as well as for formal occasions.

The kurta is traditionally made of cotton or silk. It is worn plain or with embroidered decoration, such as chikan; and it can be loose or tight in the torso, typically falling either just above or somewhere below the knees of the wearer. The front and back of a traditional kurta are made of rectangular pieces, and its side-seams are left open at the bottom, up to varying lengths, to enable ease of movement. The sleeves of a traditional kurta fall to the wrist without narrowing, the ends hemmed but not cuffed; the kurta can be worn by both men and women; it is traditionally collarless, though standing collars are increasingly
popular; and it can be worn over ordinary pajamas, loose shalwars, churidars, or less traditionally over jeans.

Phulkari embroidery, the word Phulkari is the word of the Punjabi language. Phulkari literally means floral work as the entire cloth is embroidered and filled with flowers. It has a special place in the lives of Punjabis and continues to form an integral part of Punjabi marriage ceremonies. There is reference to Phulkari in ancient Hindu texts, folk legends, and literature of Punjab. In Harish charitra, the biography of the Emperor Harshavardhana (590-647 CE), the last ruler of great ancient Indian Vardhana empire, the seventh-century chronicler Bana wrote: "Some people were embroidering flowers and leaves on the cloth from the reverse side," which is a technical description of Phulkari embroidery. The word first appeared in Punjabi literature in the 18th century Waris Shah's version of Heer Ranjha (a legendary Punjabi tragic romance) which describes the wedding trousseau of the female protagonist Heer and lists various clothing items with Phulkari embroidery.

In its present form, Phulkari embroidery has been popular since the 15th century. The main characteristics of Phulkari embroidery are use of darn stitch on the wrong side of coarse cotton cloth with colored silken thread. Punjabi women created innumerable alluring and interesting designs and patterns by their skilful manipulation of the darn stitch. Simple and sparsely embroidered dupattas (long scarf), odhinis (oversized long scarf), and shawls, made for everyday use, were referred to as Phulkaris, whereas clothing items that covered the entire body, made for special and ceremonial occasions like weddings and birth of a son were called Baghs (large garden). In Phulkari embroidery ornaments the cloth, whereas in Bagh, it entirely covers the garment so that the base cloth is not visible.

Sadri embroidery also known as a Waskat or Bandi, is a vest-jacket worn by men in Pakistan and other countries of South Asia, while women sometimes wear a similar waistcoat known as a Koti. In Europe and America, the sadri became known as a Nehru vestkist which is generally worn by Indian Prime minister Jawaharlal Nehru.

3.4.5 Jewellery

Jewellery or jewellery consists of decorative items worn for personal adornment; such as brooches, rings, necklace sold and silversmiths are one of the largest
communities of craftsmen exist in every city of the Pakistan. Much of the jewellery made and sold in the cities is intricately fashioned and delicate.

The workmanship and specialty of fine quality gems fabricating are profoundly established in the conventional legacy and history of Pakistan. It was anyway in the Mughal time frame that the craftsman class of goldsmiths emerged to accomplish a particular status in the subcontinent. The most well-known among the different gems types that developed during the hours of the Mughals incorporate, Minakari, Kundan, Polki, and Nauratan, and so forth. By and by, metropolitan urban areas of Lahore and Karachi are the significant center points of gems and jewelry producing. There are in excess of thirty significant urban areas and almost 300 little urban areas/mandi towns where gems assembling and exchanging groups take into account local interest. What's more, there are at any rate 45,000 towns where diamond setters work as single shop, assembling and offering units to satisfy the need of country populace.

Pakistan is a nation with a populace of in excess of 150 million individuals and a rich convention of craftsmanship in adornments fabricating. Talented/semi-gifted work power is accessible at moderately lower rates, which offers a relative bit of leeway to the nation. Their ability upgrade through preparing would prompt more noteworthy seriousness.

Right now, Pakistan imports more than one hundred and twenty tons of gold for each annum, which makes it the eighth biggest purchaser of gold on the planet. In the year 2002, Pakistan traded diamonds and adornments worth US$32 million (which went down to US$28.2 million out of 2003). But the exports of jewellery in August 2019 were recorded at $1.071 million. On the other hand, the gems exports increased from $0.178 million in August 2015 to $0.249 million in August 2019, showing an increase of 39.89 percent Despite the fact that, the volume of fares of diamonds and gems from Pakistan is of no extraordinary hugeness in the absolute worldwide exchange of US$84.4 billion and much lower than India, which is our greatest provincial rival, however the development capability of fares in the part is gigantic.

Pakistan has been gifted with abundant resources of several precious and semi-precious gemstones, at present mostly found in Northern Areas and K.P. but with a huge future potential in Balochistan. Most important of the currently found stones are emeralds of Mingora (Swat), pink and golden topaz of Katlang
(Mardan) and aquamarine of Chitral and Neelam Valley. At present, there is no formal survey available to identify the geological resources of gemstones in the country. Furthermore, due to lack of realization of its importance as an industry, those who are engaged in the mining, cutting, polishing and trading of gemstones in Pakistan have not been able to exploit the full potential of this sector.

The principal gemstone mine in Pakistan was found in 1951, in the Haramosh Range in Gilgit. Be that as it may, it took no under 27 years for the foundation of Gemstones Corporation of Pakistan (GEMCP), under the managerial control of Ministry of Petroleum and Natural Resources, in 1978. GEMCP was answerable for investigating, mining, unloading and fares of gemstones. Inside 15 years of its foundation, GEMCP was disbanded in 1993-94 and private part was urged to put resources into the segment. The effect of privatization ends up being sure, as fares of gemstones have ascended from that point forward, but marginally. Variables including absence of proper aptitudes, personal stake, administrative bottlenecks, mechanical restriction, etc, have been liable for ruining the endeavours of new financial specialists to gain any huge ground right now.

**Gems & Jewellery Sector Strategy**

The methodology is a consolidated exertion of Gems and Jewellery Industry's partners, SMEDA (MOIP&SI) and J.E Austin Inc (USAID). It is just because that a working Strategy from mine-to-advertise has been created and depends on direct data from the various partners instead of depending on the auxiliary information accessible. The technique applied was concentrating the worth chain investigation and prescribing answers for the issues and structuring conceivable pilot ventures for sure fire usage. The main strategic initiatives of the Gems & Jewellery Strategy cover the following areas of intervention in the value chain:

- Recommendations for Geological Survey of the Baluchistan and K.P.
- Introduction of Modern Technology and Methods of Mining.
- Establishment of Gems Trading House/Bureau at Karachi, Peshawar and Quetta.
- Establishment of Cutting Centres in Peshawar, Karachi and Lahore.
- Developing Training Facilities in the Cutting, Gemmology, Designing and Manufacturing.
• Quality Control - Hallmarking and Assaying Facilities as well as Gem labs for Certification.
• Marketing and Branding Initiatives, i.e., domestic market trend surveys,
• Website development, policy/regulatory changes to improve enabling environment for exports, seminars and Exhibitions.
• Development of Infrastructure i.e. logistics, financial, services, insurance and MIS system.

The achievement of this technique would rely upon prompt usage of every one of its proposals at all purposes of the worth chain. This will require a SWOG facilitated aggregate exertion by all services and partners included. The SWOG is sure that inside the following 5 years the Pakistan Gems and Jewelry Industry can accomplish a quantum jump in send out profit and furthermore give work openings that will aid destitution easing.

3.4.5 Ceramics

Clay and terracotta pottery and utensils continue to be of great practical importance. Many of the designs of urns, pitchers, bowls, jugs, plates, and pots seen today are almost identical to those uncovered at archaeological sites around the country. Distinctive glazed blue tiles are used to decorate many of the great mosques in Pakistan.

Pasrur is famous for producing clay made utensils that is tumbling because as many units have been closed due to lack of incentives, government support and un-resolved problems being faced by the industry since long. The previous governments had failed to resolve the problems of the industry despite their promise with small manufacturers engaged with pottery industry.

Hundred years old pottery industry of the area had become stagnant due to rapid change in life style, modernization of industrial sector and lack of proper attention of the provincial government. It was observed during the visit of Pasrur that male and female workers were found busy in making clay made utensils on roadsides just for earning bread and butter.
Small businessmen engaged with pottery industry have appealed to the Punjab government to take immediate steps for the survival and to bringing it out from multifarious problems confronting by pottery industry of Pasrur.

Small manufacturers have expressed many times their views and said that they are working on roadsides just for earning bread and butter. They said under the prevailing circumstances there was a great need of government support for infusing new blood for the revival of this historic industry adding that we are far behind as compared to other industries functioning in and around Sialkot. We have the ability and skill to compete the market if Punjab government provides incentives and land for pottery industry.

It was observed that there was a great need of establishment of "Mini Industrial Estate" in Pasrur and provision of all basic facilities under one roof should be ensured to the local businessmen engaged with various industries including pottery industry.

Besides, special steps should also be taken for tracking the pottery industry on modern and scientific production lines because at present most of small pottery units were working with the traditional techniques and were functioning on roadsides and producing the cooking utensils and decoration pieces with great skill and dexterity.

The concerned government departments should formulate a special programme for the development old industries and under the programme soft loan facilities should be given small businessmen enabling them to modernize their workplaces as well as bringing them out economic constrains.

The timely action of the Punjab government would not only prevent the pottery and other industries functioning in remote rural and backward areas but also help in modernization of the industries as well as improve the economic conditions of the artisans.

The business community engaged with pottery industry was fully capable to improve the standard and quality of its pottery manufacturing in accordance with the international standard and at present the pottery industry was fulfilling the domestic demands despite of serious hurdles and hardships by using traditional techniques.
3.4.7 Cutlery:

Wazirabad is the city of cutlery industry in Pakistan. This industry is growing day by day and has share of 65 million US dollars in Export for 2010. High Quality Damascus Steel is manufactured in this city and 95% of Pakistan needs are produced here. The cutlery industry contributes 0.11% to the country's GDP and has a share of 0.25% and 6.5% in total exports and engineering exports respectively. The industry occupies the domestic market space (90 %+) and very few items of cutlery, kitchenware and blades are imported. Cutlery, in general, refers to all types of cutting instruments which may be used for industrial, commercial or domestic purposes. Cutlery products are generally classified into two categories namely kitchenware and non-kitchenware. Kitchenware Cutlery include spoons, forks, ladles, skimmers, cake-servers, fish-knives, butcher-knives, sugar tongs and similar kitchen or tableware. Non-kitchenware cutlery includes knives and cutting blades, for machines or for mechanical appliances, knives with cutting blades, serrated or not (including pruning knives), razors and razor blades, scissors, tailors' shears and similar shears, and blades thereof. other articles of cutlery (hair clippers, butchers' or kitchen cleavers, choppers and mincing knives, paper knives); manicure or pedicure sets and instruments (including nail files), swords, cutlasses, bayonets, lances and similar arms and parts thereof and scabbards and sheaths thereof. Located in the traditional metal workmanship triangle of Punjab, is the town of Wazirabad where the major part of the cutlery industry of Pakistan is clustered. However, some of the cutlery manufacturers are present in Sialkot, Lahore, Karachi and Dir (K.P.) also. One important segment of industry (shaving blades and disposable razors) is entirely situated outside Wazirabad.

The historical backdrop of metalworking in the region of Wazirabad goes back to the occasions when Alexander the Great attacked India however it was in the hour of British when the specialists of this region were perceived for their abilities in cutlery. In its initial days the town used to create arms and ammo for British Indian Army. During the World War II, the industry in and around Wazirabad, was producing arms and adornments like pikes, karpans, blades, knives, and so on for united powers. After the World War II, the market for war related items evaporated. Before long, a large portion of the Hindu agents left due to segment of India and with it a tremendous sub-mainland advertise was lost. This industry, along these lines, needed to experience rebuilding and broadening. The business
developed out of the emergencies with item enhancement and began fabricating cutlery, blades of different sorts, sharp edges, scissors, shears, knives, swords, reproductions of swords and blades for ornamental purposes and kitchenware. From that point onward, the industry has developed and has endured numerous up and down swings.

The business basically contains SMEs. There are more than 400 units straightforwardly connected with the assembling of various cutlery items out of which 15-20 units might be named medium. In excess of 150 cutlery producers are individuals from "Pakistan Cutlery and Stainless-Steel Utensils Manufacturers Association". The absolute introduced limit of the cutlery business is to the tune of 8 million pieces though the creation is 4.3 – 4.5 million pieces, as indicated by the previously mentioned affiliation. The immediate and circuitous work of this industry is assessed to be around 25,000.

The significant crude materials utilized by this industry incorporate tempered steel sheet, re-softened metals, metal sheets, densified wood, camel bones, steel wire and plastics. Among various evaluations of steel being utilized for cutlery is Damascus steel which yields best completion for the items. All the crude materials utilized by this industry, regardless of whether created locally or imported, are effectively accessible.

**Strengths, Weaknesses & Need Assessment and Opportunities**

After some time, the industry has developed, and the fundamental range of abilities is accessible requiring little to no effort however the range of abilities for higher worth expansion is inaccessible. The business additionally has adequate creation limit and essential innovations which are currently obsolete. The beneficial resources are likewise obsolete. The constrained item blend and assortments in items is additionally preventing the development of this industry. The makers likewise come up short on the information on potential new markets and their elements. Additionally, they have not yet had the option to build up their brands and are reliant on outsiders for showcasing. The inside clashes of the business and the merciless rivalry in costs are additionally unfavourably influencing the business. Moreover, the business additionally does not have the information about quality principles and confirmations and along these lines quality administration frameworks are practically non-existent. Despite the fact that there are a couple of organizations who are sufficiently enormous and have satisfactory administrative, specialized, monetary quality and adequate fare
direction and experience however greater part fall in SME and does not have these skills. Thrust item astute investigations of potential markets should be done so as to help and set up the exporters for wandering into new markets. Information dissemination about most recent assembling rehearses, innovations, the board practices and quality measures among the producers should be embraced to upgrade their intensity. Ranges of abilities both at specialized and administrative levels should be improved.

3.4.8 Woodwork/ Furniture

According to the World Trade Organization's statistics, Pakistan's exports of wooden furniture amounted to $51 million in 2011. The furniture industry in Pakistan has been expanding. Many new furniture companies are now joining the furniture industry. Our handmade furniture is in high demand by high-end customers. Pakistani furniture manufacturers have expertise in this area, due to the type of wood used namely 'sheesham' (rosewood) which adds to this furniture's demand. The leading wood-furniture-making areas of Pakistan are Chiniot, Gujrat, Peshawar, Swat, Lahore and Karachi. The Swat Valley and Chibiot are perhaps the most famous for its intricately carved architectural woodwork and furniture, although wood-carving is common throughout the northern mountains. A large amount of the Pakistan’s furniture demand is met by Chinioti furniture. Chiniot, a city in Pakistan, is acknowledged for producing beautifully carved wood furniture and handicrafts. According to the Bloomberg's report, which was distributed on November 21, 2019 Consumer spending expanded by a normal of 26%. It's not just that the Fast-moving shopper merchandise (FMCGs) organizations get profits by expanded purchaser spending; the furniture producers additionally advantage from it. Local furniture manufacturers are using internet to market their products. They also have started to use social media channels to market their business activities.

According to World Trade Organization's measurements, the wooden furniture fares of Pakistan allegedly added up to nearly $51 million in the schedule year (CY) 2011. Though, in 2009-2010 the furniture fares of Pakistan extended between $25 million to $30 million (barring undocumented fares of a surmised measure of $10 million). Notwithstanding, as indicated by the All Pakistan Furniture Exporters Association (APFEA) originator Mr. Turhan Baig Muhammad, these fares speak to an exceptionally little part of the absolute
furniture business of the nation. As indicated by him, the nearby furniture
advertises is very nearly multiple times more grounded than that of the fares.
Keeping this in see, the rough complete furniture offer of the nation is more than
$2.5 billion.

**Fears for the Furniture Industry of Pakistan**

All out-world exchange of furniture is evaluated to be $23.2 billion. Wood
furniture represents 77 percent, metal furniture 17 percent, and plastic furniture 6
percent of the aggregate. In 2010, the portion of Pakistan in the universal furniture
showcase is minor. Despite the fact that the nation invests heavily in having a past
filled with craftsmanship, it doesn't share a noteworthy situation in the global
wood furniture showcase. Household furniture industry is enduring in light of the
fact that furniture fares to Pakistan from some different nations have expanded,
while, the significant expense of furniture-production business is expanding issues
for the neighbourhood furniture makers. The costs of crude materials which
incorporate timber, shading paints, chipboard, clean materials, and froths have
expanded complex. Because of unchecked deforestation, timber creation of the
nation is additionally languishing.

Wood furniture industry of Pakistan is arranged as being little since old out of
date apparatus is utilized right now, is the explanation behind greater expense and
low yield. Conventional wood furniture in Pakistan is overwhelming and massive.
Pakistani furniture industry needs to go to light-weight and moveable furniture to
be traded to the world market where request is high to address the issues of
workplaces, shopping centers, structures and malls.

Pakistan furniture board of trustees urges the organization to bar furniture
imports. By and large, office furniture, bar stools, visitor seats are imported from
various countries and there is a huge enthusiasm for these things in Pakistan.
Pakistan needs to carry upgrades to its furniture industry to build the absolute
income produced from this industry. The nation doesn't need assets and aptitudes
with regards to assembling quality furnishings. Be that as it may, there is a need
to misuse these assets so as to grow the furniture business of Pakistan and
increment global exchange and outside trade pay from it. The market beyond
Pakistani fringes is considerably bigger the neighbourhood showcase.

**3.4.9 Sports Goods Industry**

The city of Sialkot has been a focal point of greatness for the creation of sports
merchandise for over 100 years. The principal record of assembling of sports merchandise in Sialkot can be followed back to 1883 with the items, for example, cricket bats, hockey sticks, polo sticks and so forth. In 1918, a football was added and was provided to British Army positioned at Singapore. Today the Sports Goods part of Sialkot is at its peak as it has procured a significant spot in global exchange of sports merchandise.

By and by the Sports Goods Industry of Sialkot is providing items to pretty much every nation of the world, straightforwardly or by implication. The items are generally made for global markets and have gotten overall acknowledgment due to the quality that goes into the choice of crude material, structure, producing procedures and conveyance to the clients. Some of the world-renowned brands who are sourcing a large portion of their supplies of sports goods from Sialkot are: Adidas, Nike, Puma, Select, Lotto, Umbro, Mitre, Micassa, Diadora, Wilsons and Decathlon.

Sports goods earn about 3.7% of our total exports. The main raw material for the sports goods industry included leather and mulberry wood that are available in Punjab, but also imported PVC. Football, hockey ball, hockey sticks, cricket bats and rackets are mostly manufactured by hand. The skilled workers are available in Sialkot and Lahore. In the industry large and medium size factories contract work out to small-scale and cottage concerns. The local sports goods manufacturing industry is one of the major sources of foreign exchange earnings of Pakistan. It is centralised in and around the city of Sialkot, where it has flourished as a cottage industry with most of its production by generations of skilled craftsmen. At the time of independence, this industry was in an infant stage with a nominal export of Rs. 0.82 million. The Government took immediate steps to develop this industry by providing loans and subsidies to the manufacturers and arrangements were made to market the manufactured goods. Since then, the industry has flourished locally and enjoys good reputation in the international markets as well mostly these goods are provided to Fatima Syed productions.

More than 200,000 people are directly employed in the sports goods sector exporting sports goods worth US$ 450 million annually from around 2,400 companies. Sialkot caters more than 70% of total world demand for hand-stitched inflatable soccer balls i.e. around 40 million balls annually worth US$ 210 million. During the peak season, which repeats after 4 years on the occasion of
FIFA World Cup, the production of inflatable balls exceeds 60 million per annum. These balls are produced by a workforce of around 60,000.

The sports goods sector also has a very strong international presence in the market. Before China’s massive entry into international trade a few years ago, Pakistan was the world’s largest exporter of gloves used by motor bikers, goalkeepers, baseball, boxing, shooting etc. Currently the exports value of gloves reaches to US$ 50 million per annum. Articles of sportswear exported include: Track suits, Football, Boxing, Cycling, Shorts, T-shirts, Wind Breakers, Judo/Karate Kits, Casual Wear and Stockings. In 2020 a skilled workforce of more than 11,000 employees is directly engaged in the production of sportswear and its exports value reaches to US$ 100 million per annum.

Production at present, there are more than 2000 units, mostly on small scale in operation with an installed capacity of Rs. 20 billion per annum. The units are operating on single-shift basis.

Pakistan produces a wide range of sports goods, accessories, games and athletic equipment generally following the British, American and German specifications.

The Government is also enforcing on a compulsory basis, minimum quality standards for sports goods manufacture. The Pakistan Standards Institute, a government agency, has devised specific standards for different types of sports goods. The important items being produced are tennis rackets, hockey sticks, hockey balls, polo sticks, cricket bats and balls, footballs and numerous goods used in both indoor as well out-door games.

At present, Pakistan's sports goods enjoy a world-wide recognition mainly because of the care that goes into their designing, manufacturing and selecting of the finest raw materials. The basic raw materials required to produce sports goods, are leather, wood, glue, nylon guts, rubber and chemicals. Out of these, leather and various kinds of wood are abundantly available in Pakistan. The industry annually utilises materials worth Rs. 8 billion including imported raw material.

The exports of this industry are one of the major foreign exchange earners for Pakistan and are, therefore, receiving full government backing in its development. It is estimated that more than 75 percent of the total production is exported every year.

In fact, the export demand has acted as the main stimulus for the rapid growth of
this industry because of care that goes into designing, manufacturing and selecting of raw materials. There are two factors which are responsible of this.

(i) Low price as compared to general price level
(ii) Durability plus good workmanship

Export of sports goods increased from $136 million in 1990-91 to $384 million in 1997-98 showing an average increase of 23 percent annum. The export market for sports goods is diversified. More and more countries are being added to the list of their imports. In 1990-91 there were in all 50 countries importing these goods from Pakistan. Thereafter, the list has continuously expanded so that during the 2018-19 period, Pakistan exported sports goods to 90 countries. However, the principal importing countries are Germany, USA, UK, France and Italy. Others were Spain, Netherlands, Hong Kong, Denmark, Canada, Belgium, Dubai and Chile.

In the international market, India, Japan, Taiwan and South Korea are the main competitors of Pakistan. They are supplying their products at lower prices. While India has an advantage of cheap labour and raw material Taiwan, Japan, and South Korea have semi-automotive and mechanised units and are always engaged in introducing cheap sports goods such as metal rackets and cricket bats etc.

In order to encourage the export of sports goods, the Government has taken many positive steps and has offered various incentives. Customs duty, sales tax and excise duty rebates on f.o.b. value of exported various types of sports goods are available.

Another incentive is that import of restricted and tanned raw materials are also allowed on cash licenses against export of sports goods.

This industry is facing severe competition from Taiwan, India and South Korea. Although the Government has provided various incentives and facilities to modernise and mechanise the industry, the opportunity has not been availed. The improvement in quality and consequently in exports earnings has been due to the improved availability for leather for manufacture of footballs which constitutes about 75 percent of the total sports exports. Keeping in view the trends during 1991-98 about 23 percent growth rate, improved quality available and competition faced in the international markets the future demand is expected to growth the rate of 8 percent during 2018-2023.
3.5  **Self Assessment Questions**

1. Keeping in view the importance of industries; discuss the cottage Industries of Pakistan.

2. Highlight the major advantages of the cottage industries for the development of poor countries.

3. Describe the major issues of cottage industries in Pakistan.

4. Highlight the need, importance and contributions of carpet industry of Pakistan.

5. Evaluate the role of textile industry and its contribution in the economy of the country.

6. Write a note in detail on any two of the following industries.

7. Embroidery, Jewellery, Ceramics, Cutlery, Woodwork / Furniture, Sports goods Industry

3.6  **Bibliography**


Industries-II

SMALL SCALE INDUSTRIES IN PAKISTAN

Written by: Mr. Azhar Liaquat
Reviewed by: Dr. Altaf Ullah
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**Introduction**

This is the continuation of the previous unit. In unit No. 3 we have read about the cottage industries of Pakistan and their various types. The present unit deals with the small scale in Pakistan. Like cottage industries, the small industries also have their own prestige and the contribution of this type of industries is remarkable. Pakistan is initially as agricultural sector but in fact the agricultural development of Pakistan is connected with the industrialization.

The agriculture sector of Pakistan connected with textile, pharmaceutical, sugar, fertilizers, vegetable oil and tobacco industries. In this unit, the role of cement industry is highlighted thoroughly as Pakistan is included in the list of cement exporters. The Sports and Surgical Instruments Industry has become the most popular industry of Pakistan. Pakistan exports the sports and surgical instruments to the other countries of the world and develops its foreign deposits. Leather and glass industries have also contributed well in the economic growth of Pakistan. Moreover, the small scale industries also had a responsible position regarding the provision of employment to a large number of workers.

**Objectives**

After reading this chapter the students will be able to:

1. know the various types of small scale industries of Pakistan.
2. know the position of small scale industries in the economic growth of Pakistan.
3. know about the contribution of various industries regarding the exports of the country.
4.1 Small Scale Industries

The word ‘industry’ is come from Latin word ‘industria’ which means the tendency to work persistently which is synonymous to the word ‘diligence’.

In the business terminology it means that the manufacturing and productive enterprises in a particular field, country, region or economy viewed collectively or one of these individually such as sugar industry, auto industry and cement industry.

According to Collins dictionary ‘Industry is the work and processes involved in collecting raw materials, and making them products in factories’.

On the other hand Cambridge dictionary defines the word Industry in these words: ‘The companies and activities involved in the process of producing goods for sale, especially in a factory or special area.’

In the words of Britannica Encyclopedia Industry is a group of productive enterprises or organization that produces or supply goods, services, or sources of income.

Actually many people think industry as the collective large scale manufacturing of goods in well organized plants with a high degree of automation and specialization and it is true also. If one surveys all definitions of industry in the Economics and business literature he will conclude that: ‘An industry is a group of manufacturers or businesses that produce particular and same kinds of goods or services.’ For example, textile industry spin, weave, fabricate and sell cloth. The tourism industry includes all the commercial aspects and facets of tourism as well as sugar industry and cement industry comprises of all the firms collectively which produces sugar and cement respectively.

In the economic development of any country industrial sector plays pivotal role. It is the industry of America, China and Japan which has made these countries no one, two and three economic power of the world respectively. Industrial sector plays paramount role in the provision of consumer goods, capital goods, strong defence weaponry, employment opportunities, self-reliance, high foreign reserves and higher quality of life.

Pakistan is the developing and agrarian country and its industrial sector is also in the developing phase. From its inception, Pakistan is striving hard to build strong industrial base. There are many types of small scale industries in Pakistan especially cloth industry, sugar industry, cement industry, pharmaceutical
industry, iron industry, vegetable oil industry, biscuits industry, carpet industry, chemicals or pharmaceutical industry, glass industry, fertilizer industry, tobacco industry, leather industry, sports industry and surgical instruments industry are largely small scale industries. Most of these industries are exports-oriented. Now we describe in detail important small-scale industries of Pakistan.

4.2 Sugar Industry

Sugar industry in Pakistan is as old as Pakistan itself mature. In 1947, at the moment of independence, there were only two sugar mills in Pakistan; one in the Punjab and other in the K.P. (presently KP). Most of the cane was processed into non-centrifugal sugar—gur and khandsary. Currently (in 2020) more than 90 sugar mills are operating in Pakistan providing job opportunities to more than three lac people and contributing more than Rs 20 billion to the government exchequer annually in the form of taxes.

Though sugar industry in Pakistan has always remained under criticism mainly on the grounds of earning huge profits through ‘cartel’ yet they are fulfilling sugar consumption needs of consumers and also contributing in foreign reserves by exporting excess production. The sugar industry is the country’s second largest agriculture-based business after textiles. Sugar in Pakistan is manufactured from cane and beet, although cane is the main and overwhelming raw material that is being used for making sugar. In Pakistan, there is about 10 lac hectares of land is used for production of cane and beet which produces more than five million tons of refined sugar annually. Punjab and Sindh are main sugarcane areas in which Punjab contribute 65 percent, Sindh 25 percent and K.P. contribute 10 percent of total area and production.

Sugarcane is the fourth largest cash crop grown in Pakistan which contributes to the agriculture economy the crop value of Rs. 98,292 million. Its share in the large-scale industry is 18% and 1.9% in GDP. Contribution of Sugar industry to the Government exchequer in Federal excise duty is 11.2%. Average yield of sugarcane is 44 tons against the world average of 60 tons per hectare. Pakistan’s sugar mills crushing capacity is 58 million tons of sugarcane capable to produce 5 million tons of refined sugar and 3 mill tons of molasses. The mills still have utilized capacity of 34%.
Pakistan Sugar Mills Association (PSMA) is representative body of all sugar mills of Pakistan. PSMA was registered in Nov 1964. Pakistan Sugar Mills Association plays a pivotal role in promoting the development and attaining utmost efficiency in the best interest of the sugar mills and sugar allied industries within the prescribed policy parameter of the Government of the Pakistan.

PSMA is pushing for a uniform sugarcane price policy in line with the cost of sugar production or to link the sugarcane price with the quality of sugarcane. PSMA has argued consistently that linking price with the quality would benefit both the mills and the farmers. The country’s sugar industry is dominated by political heavyweights—powerful politician sitting in the national and provincial assemblies own majority of the sugar mills.

Pakistan is ranked number nine in the world for the production of sugar. On the other hand, it is the 8th largest sugar consuming country in the world. Over the years, domestic sugar consumption has grown from 0.5 million metric tons in 1975 to 5.1 million metric tons in 2018 because of burgeoning population growth. The per capita consumption of refined sugar in Pakistan was estimated 26.65 kg in fiscal year 2017-2018. As there is no major substitute for refined sugar available so its demand is brittle. The processed food sector, which comprises of candy, ice-cream and beverages manufacturers accounts for almost 60 percent of total domestic sugar consumption. In Pakistan Annual total average production of sugar is 7 million tons. After approval of Economic Coordination Committee (ECC) Pakistan exports almost average 20000 tons of sugar in every year and earn 180 million $. But in July-May 2017-2018 Pakistan’s sugar exports hit a new peak of 1.359 million tons fetching $474m as compared to 302268 tons earning $158m in the same period last fiscal year 2016-2017. Sugar exports were made to African countries, the Middle East, Nepal, Myanmar and China.

### Pakistan Sugar Production

<table>
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<tr>
<th>Year</th>
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<th>Yield in Tons</th>
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Source: Pakistan Sugar Mills Association (PSMA)

This table is showing that sugarcane and sugar production in the previous five fiscal years. There are many factors which are influencing production of sugarcane and sugar and Pakistan is producing sugar below the existing capacity.

### 4.3 Cement Industry

Growth of cement industry is rightly considered a barometer for economic activity. In 1947, Pakistan had inherited 4 cement plants with a total capacity of 0.5 million tons. Some expansion took place in 1956-66 but could not keep pace with the economic development and the country had to resort to imports of cement in 1976-77 and continued to do so till 1994-95. The industry was privatized in 1990 which led to setting up of new plants. Although an oligopoly market, there exists fierce competition between members of the cartel today.

The industry comprises of 29 firms (19 units in the north and 10 units in the south), with the installed production capacity of 44.09 million tons. The north with installed production capacity of 35.18 million tons (80 percent) whiles the south with installed production capacity of 8.89 million tons (20 percent), compete for the domestic market of over 19 million tons. There are four foreign companies, three armed forces companies and 16 private companies listed in the stock exchanges. The industry is divided into two broad regions, the northern region and the southern region. The northern region has around 80 percent share in total cement dispatches while the units based in the southern region contributes 20 percent to the annual cement sales.

Cement industry is indeed a highly important segment of industrial sector that plays a pivotal role in the socio-economic development. Since cement is a specialized product, requiring sophisticated infrastructure and production location. Mostly of the cement industries in Pakistan are located near/within mountainous regions that are rich in clay, iron and mineral capacity. Cement
industries in Pakistan are currently operating at their maximum capacity due to the boom in commercial and industrial construction within Pakistan.

The cement sector is contributing above Rs 50 billion to the national exchequer in the form of taxes. In this way the sector is also serving the nation by providing job opportunities and presently more than 170,000 persons are employed directly or indirectly by the industry.

The industry had exported 7.716 million tons cement during the year 2007-08 and had earned $450 million, while is expected to export 11.00 million tons of cement during 2008-09 and earn approximately $700 million.

In Pakistan, there are 29 cement manufacturers that are playing a vital role in the building up the country’s economy and contribution towards growth and prosperity. After 2002-3, most of the cement manufacturers expanded their operations, and increased production. This sector has invested about $1.5 billion in capacity expansion over the last six years.

The operating capacity of cement in 1991 was 7 million tons, which increased to become 18 million tons by 2005-06 and by end of 2007 rose to above 37 million tones, and currently the production capacity is 44.07 million tons.

Cement production capacity in the north is 35.18 million tons (80 percent) while in the south it is only 8.89 million tons (20 percent). The cement manufacturers in 2007-08 added above eight million tons to the capacity and the total production was expected to exceed 45 million tons by the end of 2010. It may result in a supply glut of seven million tons in 2009 and 2010.

The cement industry of Pakistan entered the export markets a few years back, and has established its reputation as a good quality product. Deregulation after accession of Pakistan to WTO is expected to open the window of competition from cheaper markets. The recent acquisition of Chakwal Cement by an Egyptian giant, Orascom may be a beginning of such an entry in Pakistan by multinationals.

New avenues for export of cement are opening up for the indigenous industry as Sri Lanka has recently shown interest to import 30,000 tons cement from Pakistan every month. If the industry is able to avail the opportunity offered, it may secure a significant share of Sri Lanka market by supplying 360,000 tons of cement
annually. In 2007, 130,000 tons cement was exported to India. In 2007, the exports to Afghanistan, UAE and Iraq touched 2.13 million tons.

At present, the economies of major countries are facing recession, but Pakistan’s cement sector is still maintaining a healthy growth. Cement export to India has already slowed after imposition of duty by Indian authorities.

Another problem faced earlier by the Industry was the high taxation. The general sales tax (GST) was 186% higher than India. The impact of this tax and duty structure resulted in almost 40% increase in the cost of a cement bag (50 Kg). A bag in India earlier cost Rs. 160 as compared to Rs. 220 in Pakistan. In the budget of 2003-04, a duty cut of 25% was permitted to the cement sector with assurance from the cartel to pass on this benefit to the consumers. In 2006, the price of a bag went up to Rs. 430 however in 2007 it has stabilized at Rs. 315 per bag. In mid 2008, cement prices stabilized further at Rs. 220 per bag.

The Government has reduced central excise duty (CED) on cement in the budget for 2007-08 in order to boost construction activity. Local demand in the country for the year 2008-09 is expected to be around 20 million tons. Domestic demand is expected to grow at 13% Capacity growth rate (CAGR) during next five years. Certain factors will also affect the growth of cement industry as well. These are Strong GDP growth; higher GDP growth has positive impact on cement demand and cement demand growth rate was double the GDP growth rate in 2000s. Second is housing sector growth; housing projects consume roughly 40% of cement demand. In past low interest rates, post 9/11 remittances’ inflow, and real estate boom have helped housing sector growth. Now, currently, hike in interest rate and skyrocketing inflation has hampered the housing sector growth. Third factor is Government development expenditures; Government development expenditures count for one third of total cement consumption. Increase in PSDP – from Rs.80 bn in 1999 to Rs.750 bn in 2018. Infrastructure development in a region triggers private development projects having even positive impact on cement demand. Fourth factor is Earthquake Rehabilitation; earthquake losses of October 8th are estimated at $ 5.2 bn. Reconstruction has boosted construction material demand, reconstruction work had increased demand of 4mn tons during the period from 2006 to 2016. Another factor is announcement of large dams; construction of four large dams will generate demand of cement 3.7mn tons. Bhasha Daimer Dam, Munda Dam, Akhori Dam and Mohmand Dam.
4.3.1  Large Cement Manufacturer in Pakistan

Attock Cement Pakistan Limited, branded as Falcon Cement, is a Pakistani building materials company which is a subsidiary of Lebanese investment company Pharaon Investment Group Limited Holding S.A.L.. The company current capacity is 2400 tons per day. It was founded in 1981 by Ghaith Pharaon.

DG Cement is a Pakistani building materials company which is owned by Nishat Group. It is the largest cement manufacturer of Pakistan with a production capacity of 14,000 tons per day. The company has three active plants which are present in Khairpur, Chakwal, Dera Ghazi Khan and Hub, Balochistan. In 1992, Nishat Group acquired the company under privatization scheme. DG Khan Cement stand for Dera Ghazi Khan cement. This is due to fact that first plant was setup in southern Punjab city Dera Ghazi Khan.

Lucky Cement Limited (LCL) is the largest cement producer in Pakistan. Its shares are traded on the Karachi Stock Exchange, and are part of the KSE 100 Index. Its symbol in the KSE is 'LUCK'. The company's highest share price was PKR 1043.50, in May 2017 Lucky Cement is a part of one of the largest business groups in Pakistan, the Yunus Brothers Group. Lucky Cement Limited recorded its highest ever profit after tax of Rs 13.69 billion for the year ending 30 June 2018.

Maple Leaf Cement is a Pakistani building materials company which is owned by United Venture Holding. It is one of the largest Pakistani cement manufacturers and is based in Lahore, Pakistan. In 1992, United Venture Holding acquired the company under the privatization scheme. The Company involves in the business of grey cement producing; however, the Maple Leaf Cement Factory which is situated in Iskanderabad near Daud Khel at Mianwali district also produces white cement.
## Historical Analysis of Cement Production Capacity (Operational Units Data)

<table>
<thead>
<tr>
<th>July to June</th>
<th>Production Capacity (Mn. Tonnes)</th>
<th>% age Incr/(Dec)</th>
<th>Local Despatches (Mn. Tonnes)</th>
<th>% age Incr/(Dec)</th>
<th>Exports (Mn. Tonnes)</th>
<th>% age Incr/(Dec)</th>
<th>Total Despatches (Mn. Tonnes)</th>
<th>% age Incr/(Dec)</th>
<th>Capacity Utilization %</th>
<th>Surplus Capacity (Mn. Tonnes)</th>
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<tbody>
<tr>
<td>1990-1991</td>
<td>8.89</td>
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<td>0.00%</td>
<td>-</td>
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<td>7.29</td>
<td>0.00%</td>
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<td>5.79%</td>
<td>-</td>
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<td>7.71</td>
<td>5.79%</td>
<td>86.74%</td>
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<tr>
<td>1992-1993</td>
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<td>8.32</td>
<td>7.94%</td>
<td>-</td>
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<td>8.32</td>
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<td>-</td>
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<td>9.43</td>
<td>12.54%</td>
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<td>1999-2000</td>
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<td>13.66</td>
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<td>23.38%</td>
<td>3.23</td>
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<td>2016-2017</td>
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<td>40.32</td>
<td>3.71%</td>
<td>86.90%</td>
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</table>
### Statement of Installed Production Capacity

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Unit</th>
<th>Province</th>
<th>Operational Capacity 2018</th>
</tr>
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<td>Clinker</td>
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<tr>
<td></td>
<td></td>
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<td>Cement</td>
</tr>
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<td>1</td>
<td>Askari Cement Limited – Wah</td>
<td>Punjab</td>
<td>1,050,000</td>
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<tr>
<td>2</td>
<td>Askari Cement Limited – Nizampur</td>
<td>K.P.</td>
<td>1,500,000</td>
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<tr>
<td>3</td>
<td>Attock Cement Pakistan - Hub Chowki, Lasbela</td>
<td>Baluchistan</td>
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<td>4</td>
<td>Bestway Cement Limited – Hattar</td>
<td>K.P.</td>
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<tr>
<td>5</td>
<td>Bestway Cement Limited – Chakwal</td>
<td>Punjab</td>
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<td>6</td>
<td>Bestway Cement Limited – Farooqia</td>
<td>K.P.</td>
<td>2,835,000</td>
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<tr>
<td>7</td>
<td>Bestway Cement Limited – KalarKahar</td>
<td>Punjab</td>
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<td>Cherat Cement Company Limited-Nowshera</td>
<td>K.P.</td>
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<td>Dandot Cement Limited – Jehlum</td>
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<td>10</td>
<td>Dewan Hattar Cement Limited – Hattar</td>
<td>K.P.</td>
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<td><strong>59,427,250</strong></td>
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4.4 Pharmaceutical Industry

Pakistan has a very vibrant and forward looking Pharma Industry. At the time of independence in 1947, there was hardly any pharma industry in the country. Now in Pakistan there is huge development in pharma industrial sector after its independence in 1947.

Today Pakistan has about 759 pharmaceutical manufacturing units including those operated by 25 multinationals present in the country. The Pakistan Pharmaceutical Industry meets around 70% of the country’s demand of Finished Medicine. The domestic pharma market, in term of share market is almost evenly divided between the Nationals and the Multinationals.

The National pharma industry has shown a progressive growth over the years, particularly over the last one decade. The industry has invested substantially to upgrade itself in the last few years and today the majority industry is following Good Manufacturing Practices (GMP), in accordance with the domestic as well as international Guidance. Currently the industry has the capacity to manufacture a variety of product ranging from simple pills to sophisticated Biotech, Oncology and Value Added Generic compounds.

Although Pakistan’s pharmaceutical and healthcare sectors are expanding and evolving rapidly, about half the population has no access to modern medicines. Clearly this presents an opportunity, but much more work needs to be done by the government and industry’s stakeholders. The value of pharmaceuticals sold in 2018 exceeded US$2.4bn, which equates to per capita consumption of less than US$ 20 per year and value of medicines sold is expected to exceed US$4.2 B by 2022.

Pakistan is a developing pharmaceutical market, with a large population and economic progress evident, but per capita drug spending was rather low at around US$10.30 in 2018. Private spending accounts for 65% of total healthcare expenditure sourced through out-of pocket payments, international aid and religious or charitable institutions. Pharmaceutical spending accounts for less than 1% of the country’s GDP, comparable to levels in some neighboring countries but above that in some of the South Asian countries. The forecast period is likely to witness the marginal strengthening of the generics sector, albeit more in terms of volumes than values. The share of generics is also likely to increase further as major drugs come off-patent in the near term, to the likely benefit of the generics-
dominated local industry.

The Pakistan pharma industry is relatively young in the international markets with an export turnover of over US$ 100 Million as of 2007. Pakistan Pharma Industry boasts of quality producers and many units are approved by regulatory authorities all over the world. Like domestic market the sales in international market have gone almost double during last five years. The pharma industry is focusing to an Export Vision of USD 500 Million by 2013. In the meantime, exports are also likely to be boosted by new regional and global opportunities.

The Pakistan Pharmaceutical Industry is a success story, providing high quality essential drugs at affordable prices to Millions. Technologically, strong and self reliant National Pharmaceutical Industry is not only playing a key role in promoting and sustaining development in the vital field of medicine within the country, but is also well set to take on the international markets.

A mere look at the numbers suggests that Pakistan’s pharmaceutical industry represents a highly competitive environment in which 759 manufacturing units are competing for a share in the more than Rs. 300 billion market. This impression was confirmed during interviews with various stakeholders related the pharmaceutical industry. The industry may be highly competitive, but it also tends to mask the highly skewed distribution of earnings and market shares within this industry. The top 50 firms have 89 percent market share, while the top 100 have almost 97 percent of the market share. When it comes to market share comparison between MNCs and local firms, the distribution ratio is roughly 40:60 in favor of local firms, a reversal from the earlier trends whereby it was MNCs that used to hold the major share. But their gradual exodus has led to local firms capturing the larger share. A particular feature of the local companies is that only a few are listed on the stock market. This distribution of market share raises an intriguing question: if 97 percent of the market share is being captured by the top 100 firms, how do the remaining 659 manufacturing units survived. Converting the question into numbers, it implies that more than 600 pharmaceutical firms are competing for a meager share of Rs. 10 billion (or Rs. 0.016 billion per firm). It is hard to imagine that this much income would be a strong enough incentive for new entrants to enter the pharmaceutical market. Still there has been growth in the overall industry.

One reason for this is that many of these firms do not produce to cater to the local
demand. Rather, they produce drugs to export to neighboring countries like Afghanistan. This is especially believed to be true of firms operating in towns like Peshawar (Khyber Pakhtunkhwa) that is in proximity to the Afghan border (and established connections that spawn decades of trade) makes it easier to get medicines through the border. Given their comparative advantage, they also facilitate exports of drugs of pharmaceutical firms all over Pakistan that send their products to Afghanistan (and to other markets from there). Another theory to explain this is based on asymmetries in information and irrational exuberance on part of potential investors. It contends that potential investors are swayed by the top line (the annual earning percentages) of the industry, which gives them a faulty impression that the earning probabilities are same for all firms (while ignoring factors like skewed distribution of earnings, etc.). This leads them into the pharmaceutical industry, only to realize later that their estimates were wrong. Resultantly, their production capacities remain underutilized, and they only produce to the extent to just scrape. Some opine that these smaller firms survive on outsourcing by top firms and toll manufacturing. Others survive by selling expensive raw material used in the process of manufacturing drugs.

MNCs are the leaders in the field of research as far as NCEs are concerned, and invest considerable capital in Research and Development (R&D). It is well recognized that this in turn has positive ‘spillover’ effects. For example, knowledge spillovers within an industry due to presence of leading firms tend to benefit all. The first MNC came to Pakistan in 1951. By 1954, the number had increased to 9. The numbers grew until 1990s, after which a decline started to set in. Their relative market share and their numbers have witnessed a gradual descent. The number of MNCs has now shrunk from 40 to 17, although industry insiders maintain that only 6 to 7 are actively engaged in producing drugs. Others have either divested away from manufacturing drugs or outsourced production or broken down their operations into smaller (local) units. One reason for this decline is that MNCs were either lax or could not keep up pace with local developments that affected their business. One such development was the increase in medical reps that resulted in more choice for the doctors in terms of prescribing medicine. The local firms, as they started to gain more market share, started offering competitive pay packages that resulted in human capital migrating to top local firms. Some observers, however, put it the other way around.

Local firms, they contend, were forced to offer good pay packages and other
incentives in order to be competitive. Also, the firms buying up operations of MNCs that left Pakistan had to maintain the same level of remuneration and compensation in order to achieve quality levels equivalent to that of MNCs. Another oft cited reason has to do with government regulation regarding pricing. The government, for many years, had been following the policy of ‘price freeze’, whereby prices of medicines remained frozen at a particular level for some time. The last prize freeze went into effect in 2001, and remained intact till 2013. This policy, among other things, meant that firms could not increase the price of their medicines despite substantial increase in the cost of production. For MNC’s, additional cost pressure comes in the form of maintaining a certain level of quality as per their own high standards. But given policies like centrally administered prices, this proved unsustainable since not only were there lesser Returns on Investment (ROI), but profit repatriation also suffered. This led the MNCs to look to other places like Bangladesh, where regulations are less stifling and cost of production is lower. Two other factors that are cited for the gradual decline of MNCs are the lack of Intellectual Property (IP) rights enforcement and tough competition from the local firms. The lax implementation of IP laws meant that generic substitutes and copies having different brand names printed on them appear quickly in the market, with little oversight. Moreover, local pharmaceutical manufacturers have improved leaps and bounds in terms of quality and variety in drug manufacturing, thereby giving a very tough time to the MNCs. These all combined to make life difficult for them, and explains to a large extent the decline in their presence over time. There are many within the industries who feel that this exodus needs to be halted and steps need to be taken to encourage the presence of MNCs in Pakistan. They offer certain advantages that local firms don’t. For example, MNCs have been known to train their staff in high quality institutions around the world, in turn having a positive effect upon human capacity and quality within the industry. Government Procurements by the government sector are a substantial part of the overall sale of drugs in Pakistan. Estimates suggest that in developing countries like Pakistan, at least one third of the population is dependent upon access to needed drugs through the government sector28, while the rest is provided by the private sector.

The National Drug Policy of 1997 promotes the use of medicines designated in the essential drugs list by giving mandate to government and semi-government health organizations to procure medicines in bulk. The policy seemed in
consonance with the populist aim of providing drugs at affordable prices to the public. During interviews, government officials were adamant in terming this policy a success by asserting that pharmaceutical companies sell to the government at lower prices compared to the one prevalent in the market29. Yet, this should not be surprising since this practice is prevalent all around the globe. No concise figures, though, are publicly available on the total percentage of the health budget spent on buying medicines for government run facilities, both at the federal and the provincial level. The National Health Account 2013-14 mentions the figure (federal plus provincial) as Rs. 362 million30, but this amount is portrayed as lump sum under the head ‘Medical products, Appliances and Equipment’ and gives no distribution of expenditures by category. Therefore, one cannot tell how much is spent on buying drugs. However, one source with knowledge of this issue put the figure at 15 percent of total health expenditure.

4.5 Iron Industry

For overall economic development of a country, a developed steel industry is very crucial. In the early stages of economic development, steel consumption is expected to increase at a faster rate because huge quantities of steel are required to build basic infrastructure, including bridges, dams, railways, and power generation, distribution and transmission projects, etc. Steel is also a principal raw material in the production of all kinds of machinery, equipment and vehicles. Pakistan is a developing economy with abundant potential to attain faster industrial growth. Pakistan has the 40th-highest iron ore production (193 thousand tonnes) in the world. The top 10 countries by iron ore production are: Australia, Brazil, China, India, Russia, South Africa, Ukraine, United States, Canada and Iran. However, sustainable industrial and economic growth depends on an assured supply of steel. Inadequate availability of steel acts as a natural drag on development efforts in almost all sectors of the economy. Therefore, planning for steel production should be a critical part of overall development planning in the country.

Presently Pakistan produces around six million metric tons of steel per year. This includes: raw products (iron ore and scrap); flat products (sheets and plates, used in the automotive sector); and long products (steel bars, wire rods, rails and structures used in infrastructure development and tubes and pipes). However, per
capita steel consumption in Pakistan is very low at 23.5 kilograms, against 58.6 kilograms in India, as well as the Asian average of 261.3 kilograms and the global average of 216.9 kilograms. The government’s increased focus on infrastructure has resulted in the initiation of a series of development projects during the last two years. These include foreign-funded projects, particularly those under the China-Pakistan Economic Corridor (CPEC) framework. Besides, this policy focus has also encouraged private firms to invest in various projects. Given the critical role of steel in the development of roads, railway, dams and power infrastructure, as well as the current pace of development projects being pursued in the country, the demand for steel and allied products is expected to increase significantly. In order to meet this higher demand without resorting to imports over the medium-to long-term, the country will need sizable investment in this industry in the coming years. Pakistan’s steel industry comprises a complete and a closely intertwined value chain – from pig iron furnaces to downstream sectors and end-user industries. However, steel production has not been very stable in the country. Part of the reason for this lack of dynamism is that the steel industry is extremely fragmented: there are at least 600 players in the industry, with no clear leaders that are able to provide vision and direction. Moreover, Pakistan’s steel industry is characterized by small plants, most of which are utilizing obsolete technology. In particular, most melting, re-rolling and fabricating firms have small-size plants compared to their competitors in steel exporting countries. Similarly, the use of outdated and energy inefficient technology raises these firms’ cost of production and results in output with low quality and varying standards. As a result, these products cannot compete with cheaper imports, particularly from India and China, where manufacturers enjoy benefits from economies of scale and more efficient production processes. The domestic industry therefore operates at only 60 percent of its installed capacity, despite strong local demand for steel products. This further raises the firms’ cost of production. Thus, not surprisingly, almost all segments of the value chain continue to remain heavily dependent on imports. Indeed, the healthy growth of 24.8 percent in steel production during FY15 was associated with a 34 percent increase in quantum imports of iron and steel scrap at a cost of US$ 2.6 billion.

Power shortage is also a big concern for local manufacturers; besides, the cost of electricity is also very high. These, coupled with the challenge of competing with low-cost imports, has compelled steel manufacturers to divert investment to self
electricity generation and dedicated feeders. From a long-term policy perspective, the local industry will need to acquire economies of scale and modern, efficient technology to become competitive. This is not to say that no large manufacturers currently exist in Pakistan: Pakistan Steel Mill (PSM), International Steel, Aisha Steel and Amreli Steel etc. are some large-scale domestic producers. But they require adequate policy support in order to smoothly run their operations.

Although the industry is far from exploiting its full market potential, some individual players have seen significant growth in the past few years. These include Agha Steel, which produced 150 thousand tons in 2017 and aims to double this capacity to 300 thousand tons in 2020; Amreli Steels which manufactured 180 thousand tons in 2017 and aims to reach half a million tons in 2020 and International Steel Limited, which produced 463 thousand tons in 2017 and aims to increase this capacity to a million tons in 2019. Steel production is highly energy intensive—energy constitutes 20 to 40 percent of total cost. Sophisticated energy management systems have led to reductions of about 60 percent in the energy required to produce a ton of crude steel. Since 1960, in most top steel producing countries are trying to achieve sophisticated energy management and they succeeded. However, in Pakistan, most of the domestic production units are about half as efficient in their energy consumption as international benchmarks.

A big challenge for Pakistan’s steel industry is Chinese imports. Pakistan has a free trade agreement with China, which ensures that finished goods are imported at concessional rates of duty. In 2015, China produced 823 million tons about 50 percent of world steel production and exported a record 100 million tons; Pakistan, being one of its largest importers, witnessed a sharp increase—of 22 percent— in steel imports from China during FY17.

PSM, despite having outdated technology, still holds the largest production capacity in the country. However, despite several bailout packages, the persistent administrative and financial constraints are keeping it far from becoming self-reliant. PSM’s sluggish performance has repercussions for the entire value chain: most of the small firms in steels melting and re-rolling rely on low quality scraps that come mainly from ship breaking. The resulting quality impacts output in the later stages of the value-added chain. Privatization would help restore PSM’s operations on a sustainable basis, and this would also have positive spillover on
the rest of the supply chain. In the private sector, two large-scale steel plants (International Steel and Aisha Steel utilizing efficient and internationally proven technology came online during the last five years.

Tuwairqi, the largest steel complex in Pakistan, could not start commercial operations, primarily due to gas pricing issues. As far as Aisha and International Steel are concerned, they have the potential to contribute to the industry with their large scale and modern technology, if adequate policy support is provided. In view of the significance of steel for other sectors of the economy, Pakistan needs a clear and consistent policy. Such a policy should identify segments in the steel chain that need protection at the initial stage; define and enforce quality and performance standards; and ensure fair competition in the market. This policy should also consider the level of protection available to steel manufacturers in Pakistan’s competitors, especially China and India. Here it is important to recall that due to ongoing public developmental spending, and the initiation of infrastructure projects under CPEC, steel consumption is likely to remain strong in coming years. If investment and domestic production in the country fails to keep pace, the additional demand for steel will have to be met by imports, putting additional burden on the country’s balance of payments.

PSMA (Pakistan Steel Melters Association) is a representative body of all steel melters and is a non-profit organization formed in 1996. Change it as "is a Trade Body set-up in 1978 to watch interests of the Steel Melters and to form a single platform where all melters gather and jointly fight for speedy resolution of their genuine problems with the government". Its current members are over 120 from all over Pakistan related to the steel melting process. The Association encourages direct contact between all its members to keep each member informed of global and domestic market trends and sees its primary roles as a forum to bring together the multitude of interests involved either directly or indirectly in the steel industry and growing the markets for intermediate steel products.

The PSMA supports the need for a viable, efficient and responsive domestic steel industry and has been focused in the past on ensuring Pakistan has a truly competitive market supply for all domestic users and converters of steel products by an active and competitive import sector of intermediate steel products for further value adding domestically. These imports generally have resulted in the domestic suppliers becoming more cost efficient producers of steel specializing in
those products they can produce at world competitive prices.

The PSMA openly promotes the economic growth of steel consumption in Pakistan and fully supports the importation of fairly priced intermediate steel products required by Pakistani steel users and consumers in the manufacturing, mining, commerce and rural sectors.

### 4.6 Industry of Vegetable Oil

Edible oil is Pakistan’s largest food import commodity, ranking second on the list after petroleum and its products, and fourth amongst the largest edible oil importers of the world. Its import bill jumped from US$ 615 million in 2006 to 2 billion $ and straight away to 4 billion in the year 2018 and 19 respectively. With a five percent increase in consumption and five percent price hike in global markets each year, it will jump above seven billion dollars in the year 2020-21. In a situation, where agriculture is claimed to be the backbone of the economy, having millions of acres of cultivable wastelands with a hard working farm force and professionals, and hundreds of researched success stories before our eyes, is deplorable.

According to the Pakistan Oilseed Development Board (PODB) an attached department of the Ministry of National Food Security & Research (MNFS&R) Government of Pakistan – working for the promotion of oilseed crops in the Islamabad Capital Territory (ICT) and federal areas- the total national consumption including 10 percent industrial use was 4.539 million tons against the domestic production of 0.684 million tons during the year 2017. Growing population, expanding urbanization, rising income levels, shifts in consumer taste from the home kitchen to restaurant, fast foods, coupled with limited availability of animal fats and most importantly its unwise or excessive use has increased the magnitude of imports to 40 million tons today, that was less than 0.5 million tons in the 1980s. The per capita consumption that was less than 2 kg in the year 1980, has now reached 19 kg per annum. With the demand increasing on a regular basis and the local edible oil sector almost nonfunctional, the imports will continue to increase and so will foreign exchange spending.

In 1995, activities of the GCP Seed Division and that of NODP were sustained
through the Pakistan Oilseed Development Board (PODB) that was constituted under the Ministry of Food & Agriculture after the completion of the project and privatization of the Ghee Corporation of Pakistan. PODB introduced Canola cultivation on marginal lands otherwise these lands were not ideal for other crops that were requiring more input such as water. Apart from working on seasonal oilseed crops, it also embarked upon perennial oil bearing trees like olives and oil-palm. Demonstrations on the cultivable wastelands of Khyber Pukhtunkhwa, Potohar and some parts of Balochistan are success stories of olive plantations in the country. Same is the case for oil-palm plantations on the costal belt of Sind and Balochistan as well. Though there are some mishaps and failures too, but that is a part of taking risks. The major oilseed crops in Pakistan include Sunflower, Canola, Rapeseed/Mustard and Cotton Seed. Total availability of Edible Oils during the year 2017-18 remained at 3.926 Million tons, of which local oil production contributed only 14 percent or 0.462 Million tons (462,000 M.Tons) and the vast gap was met out from imports. The import share of edible oils/oilseeds was 3.264 Million M.Tons or 86%, involving import bill of about US$ 2.710 Billion.

The import of Edible Oils per annum (Calendar year 2018) has risen to around 3.1 Million tons while the import of Oilseeds is around 3.0 Million tons as well per annum. With growing population, edible oil consumption is expected to rise by 3 to 5% on yearly basis making it an even more attractive market for foreign suppliers and local entrepreneurs.

As we know Pakistan is world’s fourth largest edible oil importer and its import bill is second to that for petroleum imports. In order to save the huge demands on foreign exchange for the import of vegetable oil, there is strong need to accelerate efforts in the agriculture sector to steadily increase the local production of oilseeds. Pakistan usually maintains sufficient stock of oils and fats to supply the country’s requirements for 6-8 weeks. Most of these stocks are stored at the Karachi ports of Keamari and Qasim. Some stocks of vegetable oils, particularly the seasonal oils, are maintained within the industry. A new seaport has been under construction over the last seven years at Gawadar with the expectations that new extraction, crushing and processing plants will start operating shortly. The Pakistani population on average gets 18–20% of calories from dietary oils with the total average intake of 2400 calories per day. Traditionally, the consumption of dietary oils in the country has been in the form of semi-solid fats, i.e. vanaspati.
Previously, the consumption of liquid cooking oil was small. However, over the last 10-15 years, there has been a shift in the consumption pattern from solid fats to liquid oils. Initially, it was slow and the liquid oil consumption has been around 10%. Lately, this has picked up momentum, particularly for the urban areas. In the year 2003, the national average for liquid oil consumption stood at 25% and semi-solid fat (Vanaspati) at 75%. Sector-wise in urban areas, the liquid oil consumption ratio stood at 40% and the balance 60% for semi-solid fats. Whereas for rural areas the ratio stood at 10% for liquid oils and 90% for semi-solid fats, this trend of shifting toward liquid oil consumption will continue in the future and may reach 50:50. Some of the factors behind this shift in consumption pattern are: Health and nutritional awareness among general public, Electronic and print media projection for liquid oils, Increasing local availability of sunflower and canola oils, Improved packing and safe transportation of liquid cooking oils for small towns and villages Pakistan’s refining industry. The infrastructure of the vegetable oil refining industry of Pakistan is relatively large and has excess installed refining capacity, most of which is based on traditional batch type processes of caustic soda refining. Therefore this industry is not efficient and ought to be upgraded through the introduction of modern refining and modification technologies. This will enable the industry to produce value-added functional oils and fats with better performance and profitability prospects.

Nationalization of industries in the 1970s had severely affected the vegetable oil industry. Then in the early 1990s, the government privatized the refining industry. The public sector of Ghee Corporation of Pakistan (GCP) has now been disbanded. The government, as a matter of policy, has also introduced and followed a stable import tariff regime. Consequently, the refining industry in the private sector has improved its working efficiency in a fair but competitive environment. The refining of crude palm oil has been encouraged through favorable import tariff on crude palm oil. This factor alone has encouraged the setting up of a physical refining industry in the country. Two physical refining units are already working whereas others are in the offing. With this trend, it is envisaged that within three years, Pakistan will have a crude palm oil refining capacity through physical means exceeding 1.5 MMT. The processing of refined vegetable oils into value-added functional fats is largely dependent on consumer needs, purchasing power and the development of allied food industry in the country. The future In view of the above discussion, the following scenario is
envisaged for the vegetable oil industry of Pakistan: domestic oilseeds production program is not going to make substantive headway. The only possibility is for the expansion of the sunflower crop. Canola may gradually substitute the traditional rape/ mustard crop. At the maximum, Pakistan may retain current self-sufficiency level at 25% for its vegetable oil needs; solvent extraction industry of Pakistan is poised for growth, which will result in an increased import of oilseeds. However, for long-term, sustained growth this industry ought to integrate and grow in tandem with the animal feed industry, vegetable oil refining industry is likely to face difficult times. Possibly, the inefficient and small units will close down. Only the big ones with higher volume turnover and established brands will remain in business. The physical refining industry will expand, particularly at the Port Qasim industrial area of Karachi. This development will be accompanied by the import of crude palm oil as replacement for RBD (refined bleached deodorized) palm oil products. Edible oil industry will import increasing quantities of palm oil to produce valueadded industrial and functional fats for local and export markets. Downstream palm oil processing joint venture projects will benefit the country. Pakistan and the neighboring markets offer scope and potential of investment for fractionation and fat splitting operations. Consumption pattern for dietary oils will further tilt towards liquid oils and might reach 50%. As the country’s economy improves the per capita consumption of edible oils is likely to increase further by 2–3 kg and it may reach 19–20 kg. Increasing awareness about health hazardous effects of trans fatty acids present in hydrogenated vegetable oil including vanaspati products will result the shift in consumption pattern to liquid cooking oils.

At present, there are more than 150 Ghee/Cooking Oil Manufacturing Units in the country. The problems being faced by Edible Oil Industry and suggestions to address those problems are discussed below:

i). High rates of Government duties and taxes on Edible Oil Industry. Custom Duties and Taxes at import stage are much higher than the levies in neighboring countries. There is need for the Government to consider reduction in the Duties and Taxes on this essential food item and encourage Vanaspati/Cooking Oil manufacturers to invest in Oilseed crops in Pakistan as well, so as to achieve self-sufficiency in Edible Oil in coming decades, which would also result in saving in heavy foreign exchange expenditure, being incurred on imports of Edible Oils.

ii). Imposition of Export Duty on Crude Palm Oil (CPO) by the Government of
Malaysia / Indonesia, due to which, the Refineries in Pakistan are not getting their raw material viz. CPO at workable and affordable price and as a result many Palm Oil Refineries are forced to stop their operation.

iii). Hindrance recently caused by Punjab Food Authority and discouraging use of Vanaspati Ghee. In this connection, it is pointed out that Vanaspati Ghee is not harmful to human health, as being misconstrued by some quarters. Quality Vanaspati Ghee is produced by taking all the precautions/measures at different manufacturing processes by leading Vanaspati Units in the country by meeting all international standards and the Product is not harmful for health and fit for human consumption, contrary to misconceptions in this respect.

iv). Higher cost of transportation of Edible Oils from Port Qasim Terminals to Industrial units throughout Pakistan. Because of rapidly increasing cost of Petroleum Products/Fuel, the transportation cost of Edible Oil is gradually increasing, due to which, Ghee Industry is badly suffering. The solution lies in transporting Edible Oil in bulk through railways, as was the case until about year 1995 (till nationalization period of Ghee Industry). Many Ghee Units in Punjab and K.P. have railway sidings and decanting facilities, besides almost all Ghee Mills are near railway stations. The availability of railway wagons for Edible Oil transportation will reduce the transportation cost as well as help in removing congestion at national highway/cities. Government may consider restoring the movement of Edible Oils through Railways on priority basis.

v). I would again emphasis that Edible Oil Industry in Pakistan should try to develop and encourage Oilseed cultivation in Pakistan. I would suggest that each industrial unit should establish Research and Development (R&D) department for this purpose and allocate part of their profit for cultivation of Oilseeds (Sunflower seeds, Rapeseed & Mustard, as well as Olives) in the country. The industry must take it seriously in order to minimize dependence on import of Edible Oils which is heavy burden on national exchequer, because Pakistan's imports are more than double its exports.

### 4.7 Sports and Surgical Instruments Industry

The city of Sialkot has been a centre of excellence for the production of sports goods for more than 100 years. The first record of manufacturing of sports goods
in Sialkot can be traced back to 1883 with the products such as cricket bats, hockey sticks, polo sticks etc. In 1918, a football was added and was supplied to British Army stationed at Singapore. Today the Sports Goods sector of Sialkot is at its climax as it has acquired an important place in international trade of sports goods.

Presently the Sports Goods Industry of Sialkot is supplying products to almost every country of the world, directly or indirectly. The products are mostly made for international markets and have received worldwide recognition because of the quality that goes into the selection of raw material, design, manufacturing processes and delivery to the customers.

Some of the world renowned brands who are sourcing a large portion of their supplies of sports goods from Sialkot are: Adidas, Nike, Puma, Select, Lotto, Umbro, Mitre, Micassa, Diadora, Wilsons and Decathlon.

More than 200,000 people are directly employed in the sports goods sector exporting sports goods worth US$ 450 millions annually from around 2,400 companies. Sialkot caters more than 70% of total world demand for hand-stitched inflatable soccer balls i.e. around 40 million balls annually worth US$ 210 million. During the peak season, which repeats after 4 years on the occasion of FIFA World Cup, the production of inflatable balls exceeds 60 million per annum. These balls are produced by a workforce of around 60,000.

Sports industry of Pakistan is actually famous for its quality work and the reason of this quality work is that most the sports items are handmade so it gives perfection to the product of sports and as these are mostly handmade so they can easily be made by the small scale industries that are situated in Sialkot. Due to this reason there is no particular brand that is famous or no particular manufacturer that is famous in the sports industry of Pakistan. As the work is of high quality so there is also no particular place where these sports goods are exported, any country can ask for the sports goods anytime. It is all according to the season and Pakistan is good at producing all seasonal sports items.

The sports goods sector also has a very strong international presence in the market. Before China’s massive entry into international trade a few years ago, Pakistan was the world’s largest exporter of gloves used by motor bikers, goalkeepers, baseball, boxing, shooting etc. Currently the exports value of gloves
reaches to US$ 50 million per annum. Articles of sportswear exported include are track suits, Football, Boxing, Cycling, Shorts, T-shirts, Wind Breakers, Judo/Karate Kits, Casual Wear and Stockings. Predawn Sports Manufacturer, Baraka textile, Boldica Sports, Goldpunch Enterprises, Magfa Sports, Pascual Field Sports and Wids Sports are big sports products companies

Today a skilled workforce of more than 10,000 employees is directly engaged in the production of sportswear and its exports value reaches to US$ 100 million per annum.

The Surgical Instruments Industry of Pakistan holds a history of more than 100 years, when some British doctors got their surgical instruments repaired from the skilled workers of Sialkot and that was the foundation of Sialkot Surgical Industry. The success in surgical instruments sector lies due to the technical expertise and skills of the people of Sialkot in mechanical engineering. The Surgical instruments Industry is also amongst the seven priority sectors (under light engineering head). The annual exports of Sialkot’s Surgical Instruments Industry are around US $ 180 Million out of its world market of over US$ 30 bn.

The Surgical Industry represents manufacturers and exporters of Surgical Instruments, Dental Instruments, Veterinary Instruments, Pedicure and Manicure Items, Tailor Scissors, Barber Saloon Scissors and Beauty Saloon instruments. About 1900 small and medium Surgical Units with labor force ranging from (10-500) are producing surgical instruments through the workforce of about 100,000. The industry is manufacturing and exporting both disposable and reusable instruments which constitute at 60% and 40% respectively of its total exports of surgical industry. About 80% of Sialkot’s surgical instruments are exported to United States, Germany, United Kingdom, France, Italy, Dubai, Japan, and Netherlands and 20% to rest of the world.

Jewelry Tools Sialkot, Bio Medical Instrument Sialkot, NN-Surgical Company Sialkot, Swantia Medical Daska, Westwood Surgical Sialkot, Hans Surgical Industry Sialkot and USU Traders Gujranwala are big names in the manufacturing and exporting of surgical instruments.

4.8 Fertilizer Industry

The fertilizer industry of Pakistan has huge potential and is well headed to getting
one of the greatest manure exporters in the locale in the coming years. Elements that are straightforwardly adding to these conjectures are the ongoing issuance of LNG regasification licenses and the foundation of new manure plants by unmistakable associations inside the nation.

Being principally an agrarian express, Pakistan's development is intensely reliant on the fertilizer industry. As indicated by agriculture experts, Pakistan's compost request has consistently stayed higher than its stockpile. In any case, with the headway of innovation and expanded number of players in the business, creation limit has expanded to more than 6 million tons for every year, which has reliably been outperforming the national interest in the course of the most recent couple of years. Besides, the utilization of compost has expanded complex due to uplifted mindfulness among ranchers that its use in great amount is productive for better returns and a critical increment in their salary as the ware is given them on financed rates.

In the principal half of 2018 alone, aggregate deals of urea expanded 45% to 1.63 million tons and DAP deals edged up 6% to 434,000 tons. Additionally, with the beginning of Kharif planting season, a further get sought after for urea can be predicted. Likewise, agreeable stock degrees of urea and DAP have improved evaluating power for neighborhood compost makers and subsequently, normal urea cost has expanded by 4.70% month-on-month. At present, global urea and DAP costs were floating around $240 and $385 per ton, separately, and are relied upon to stay consistent which, alongside expulsion of value top (Rs 1,400 for each pack) from urea, would give an additional bit of leeway to nearby makers.

Other than passing on the advantages of assessment motivations and gas endowment to ranchers, we should value that the manure business has consistently looked past benefit. Significant key players in the fertilizer industry have effectively been serving, teaching and engaging the cultivating network through important formative activities in organization with different government assistance and money related foundations. These ventures seek after an intricate way of thinking to impart their prosperity to the network around them, by satisfying their Corporate Social Responsibility (CSR) and contributing towards the prosperous development of the country.

These key players in Pakistan's manure industry spend liberally on improving the
human services and instructive offices in many denied locales. They introduce sustainable force ventures to diminish the vitality emergency and give help during significant catastrophes or debacles in the nation. While following customs of good-administration and straightforwardness just as paying all their assessments judiciously as they ingest the considerable piece of expenses or GIDC exacted on the business, they are contributing altogether in assisting with resuscitating the poor cultivating network. Above all, they have assumed a significant job in decreasing imports to spare valuable remote trade and improve nourishment security in the nation. At present, in Pakistan, there are six significant makers of composites which incorporate Fauji Fertilizer, Engro Fertilizer Company, Dawood Hercules, and Fatima Fertilizers. A little bit introduction of these fertilizer companies are as follows.

### 4.8.1 Fauji Fertilizer

FC was incorporated in 1978 as a private limited company. Basically this was the joint venture between Fauji foundation and HaldorTopsoe of Denmark. The initial capital of the company was 813.9 Million Rupees. The present share capital of the company stands at Rs. 3.0 Billion. FFC has Rs. 1.0 Billion stakes in the subsidiary Fauji Fertilizer Bin Qasim Limited (formerly FFC-Jordan Fertilizer Company Limited). The products of this company are as follows:

**Sona Urea**: most widely used fertilizer in the country. Fertilizer is white in color, free flowing, readily soluble in water and both contain 46% Nitrogen. Because of its high solubility, it is suitable for solution fertilizers.

**Sona DAP**: is the most concentrated phosphate fertilizer containing 46% P 205 and 18%Nitrogen. It is the widely used phosphoric fertilizer in the world as well as Pakistan. It an ideal fertilizer, to meet the initial requirement of most of the crops.

**Sona SOP**: This fertilizer is an important source of Potash, which is a quality nutrient for production of crops especially fruits and vegetables. Potash improves the resistance of the plants against pests, diseases and stresses like water.

### 4.8.2 Engro Chemicals Pakistan Ltd.

Engro Chemical Pakistan Limited is the second largest producer of Urea fertilizer in Pakistan. The company was incorporated in 1965 and was formerly Exxon
Chemical Pakistan Limited until 1991, when Exxon decided to divest their fertilizer business on a global basis and sold off its equity of 75% shares in our company. The Employees of Engro, in partnership with leading international and local financial institutions bought out Exxon’s equity and the company was renamed as Engro Chemical Pakistan Limited. Engro is a public limited company listed on Pakistan Stock Exchange (PSX). Engro Chemicals Pakistan Ltd offers these products; Engro urea, Engro Zorawar, Engro Phosphate, Engro NPZingro and Engro DAP Engro Zarkhez.

4.8.3 Fatima Fertilizer Company Limited

Fatima Fertilizers play a pivotal role in the development of agriculture sector. Fertilizer is proud to be the first and only green field project in Pakistan. This company’s fertilizer complex is a fully integrated facility, capable of producing intermediate and final products.

The Fatima Fertilizer Company Limited was incorporated on December 24, 2003, as a joint venture between two major business groups in Pakistan namely, Fatima Group and Arif Habib Group. The foundation stone of the company was laid on April 26, 2006 by the then Prime Minister of Pakistan. The construction of the Complex commenced in March 2007 and is housed on 950 acres of land.

It produces two intermediate products Ammonia and Nitric Acid and four final products Urea, Calcium Ammonium Nitrate (CAN), Nitro Phosphate (NP) and Nitrogen Phosphorous Potassium (NPK) at Sadiqabad and Rahim Yar Khan.

4.8.4 Dawood Hercules Chemicals Ltd

Dawood Hercules Chemicals Limited was incorporated as a public limited company on 17th April 1968, as a joint venture between Dawood Group of Industries and Hercules Inc. USA. It was the first private sector venture in Pakistan to receive a loan from the World Bank and was the largest ammonia/urea plant in country at that time. Initially the plant’s capacity was 345,000 metric tons of urea per annum. The plant was revamped in 1989 / 1991 to enhance the capacity to 445,500 metric tons of urea per annum. Also, it made the manufacturing facilities more energy efficient and environment friendly. Dawood Hercules has the privilege of becoming the first fertilizer manufacturing company to obtain ISO-9000:2000 certification. Dawood Hercules also won numerous
safety and excellence awards.

Chinese government is definitely searching for roads to enter Pakistan's farming and manure area. The Chinese state and banks are relied upon to give capital and advances to Chinese organizations keen on setting up adventures in Pakistan. There are gossipy tidbits that China is going to set up a manure plant that will deliver 800,000 tons for every year.

So as to keep the diagram of the manure business stable, the administration ought to and must dodge automatic choices relating to GIDC and GST, as it has shown previously. Throughout the years, this fundamental industry has been enduring because of these horrible approaches and choices. In this manner, the legislature ought to deliberately broaden more help for the compost division, empowering it to assume a progressively definitive job in national nourishment security. The legislature ought to speed up cure of income challenges brought about by huge sums buried in past due discounts and drowsy repayment of appropriation to the compost organizations.

4.9 Leather Industry

Leather industry is the second biggest industry in Pakistan however because of significant expenses of the completed merchandise, the cowhide business has been losing its global piece of the pie quickly. Famous since 3000 BC, and being among the greatest ventures of the world, transnational calfskin economy has outperformed yearly exchanging volume of $90 billion is as yet developing. However, Pakistan's commitment is winding down with the progression of time. Cowhide is for the most part utilized in assembling various products, running from day by day wear to furniture. Crude conceals are extricated from different creatures, including dairy animals, wild oxen, camels, sheep, goats, and crocodiles, which are additionally handled to fabricate completed merchandise.

There are around 800 tanneries in Pakistan, 213 members by and by recorded with Pakistan Tanners Association from everywhere throughout the nation are effectively occupied with assembling and completely outfitted towards advancing fare of value completed cowhide and calfskin items on present day design according to worldwide interest.
In view of late measurements, China acquires $10.9 billion every year from calfskin trades. India's yearly calfskin sends out sum to $3.05 billion. Pakistan, for the equivalent time span, is at $948 million. A provocative certainty uncovers that solitary three calfskin makers in Pakistan are individuals from the International Leather Working Group, while India and China have 88 and 76 separately.

Pakistan has remained far behind in the race of cowhide conveys. The calfskin division that was speaking to 10.41 percent of hard and fast charges, with the second greatest pledge to outside exchange of the country during 1990s, had a sinking share in conveys in 2009-10, recorded at 5.4 percent of complete admissions. It is so far stunning plunging with a negative improvement pace of 7.9 percent as per the Economic Survey of Pakistan for the present year. Starting at now, the bit of calfskin industry in Pakistan's admissions is 4.3 percent. If the declining design keeps its pace, Pakistan may lose a potential wellspring of pay. Commitment of kid work in different divisions of Pakistan's economy further crushed the business. FIFA quit bringing in cowhide sports products from Pakistan dependent on the doubt of work of youngsters in its calfskin industry. State authorities stayed unyielding on the more fragile contention of utilizing little hands for appropriate completing of the item structure. During the period July-December 2019, the country exported leather goods with a total value of 274.8 million US dollars compared to exports worth 247.4 million US dollars registered in the first semester of the preceding fiscal year.

### 4.9.1 Demand of Leather Products

Interest for calfskin items is fundamentally connected with urban populace development, salary rise, and the endeavors made in infiltrating the fare showcase. The calfskin business of Pakistan has been confronting a constant decrease in a lot of the global market. Calfskin tanning and cowhide items producing is work escalated and makes extraordinary damage the earth because of which the cowhide business is moving from the industrialized world to the creating nations like Pakistan, India, Bangladesh, Sri Lanka and Thailand. This gives a chance to Pakistan to underwrite right now extend its universal piece of the overall industry. Shockingly, tanned calfskin industry is confronting persistent decrease in the fares of completed cowhide. Continuously 2018, Pakistan's cowhide sends out declined by 14 percent over the most recent five years, coming
to USD 1 billion, as per Pakistan Tanners Association. This has been for the most part because of power emergencies and gas lack.

Pakistan's principle rivals in calfskin industry are Turkey and Bangladesh with Turkey being top in giving great quality cowhide items at modest cost. Be that as it may, because of climate changes and changing patterns for as far back as barely any years, with hotter winters, both Korea and Japan have diminished the volume of their imports of cowhide pieces of clothing while other South Asian nations where monetary standards were debased are selling calfskin articles of clothing less expensive than Pakistan. In this way, the area is losing significant fare orders from outside purchasers and clients, which is harming the remote trade of division. Additionally, when contrasted with cowhide results of other contending nations in the universal market, items in Pakistan are all the more expensive, bringing about lesser fare orders. The makers and exporters currently can't offer better and serious costs of completed calfskin, cowhide pieces of clothing, items and made-ups in the wake of high fuel costs, intruded on supply of power and gas, inaccessibility of fundamental crude materials just as troublesome peace circumstance in Pakistan. Pakistan has no cowhide industry advancement plan and because of this Pakistan has lost its piece of the pie to different nations, particularly to South Asian nations. All nations, including China, have recorded development in fares of calfskin items. The main nation falling back is Pakistan. With restricted creature populace, Italy additionally appreciates a 13 percent share in the worldwide market.

Absence of specialized staff and nonappearance of present-day foundation added fuel to fire. Pakistani cowhide makers bombed in enhancing item expansion, hence losing its offer in universal market, and leaving an open door for provincial contenders to offer their best. Power and gas taxes, carrying of live creatures to Afghanistan, and less motivating forces by government, are other extensive elements representing an emotional decrease in worldwide interest of nation's calfskin items.

As per the official measurements of the Pakistan Tanners Association, the nation is confronting a yearly loss of four billion rupees because of blunder and deficient conservation component for creature covers up at the event of Eid-ul-Azha alone. This misfortune significantly impacts supply side of the business. A Gallup Pakistan overview uncovers that 40 percent of Pakistanis who offer penance are
accustomed to giving creature covers up to different associations on the event of Eid-ul-Azha. Since gifts are not assessable, calfskin industry turns into a trifling supporter of the incomes. Previously, Pakistan’s leather industry had been the biggest exporter to Italy, China, the United States, England, and Germany. Despite its significant capacity for extraction and processing of leather, Pakistan has now mislaid its major import partners. Presently, China imports from Australia and the United States relies on India. Pakistan exports a small volume of leather products to the United Kingdom and Germany.

According to the Economic Survey of Pakistan, the Federal Board of Revenue is bearing an annual loss of around Rs 13 billion under the head ‘loss of sales tax due to exemptions in leather industry’. It suggests that Pakistan is in dire need of technically fluent policy makers who can reshape the destiny of leather business.

Unfortunately, Pakistan has failed in deploying innovation and technology in its leather industry. Animal hides pass through various processes of spraying, tanning, measuring and cutting. Pakistani leather manufacturers do not have solid machinery for stacking and ironing of leather. It seems that lack of attention to this industry is swallowing up a substantial resource.

Government must devise new plans for inspiring this vanishing yet creative industry. Pakistan's services of business, exchange and outside issues ought to haggle with Chinese authorities for arrangement of cowhide industry in the CPEC structure. Cowhide industry can be resuscitated with the assistance of China. With the service of outside issues at the cutting edge, Pakistan ought to send appointments to FIFA and other calfskin bringing in nations to cause them to comprehend that the act of youngster work has been abrogated.

Cowhide makers ought to be given endowments on acquisition of data sources. Supplanting of trite mechanical gear with the cutting edge one can assume an imperative job. Related government organizations need to build up a more grounded relationship with the Pakistan Tanners Association to chalk out and execute a shrewd arrangement, which might be named as the 'Calfskin Export and Acquisition Plan'.

On the off chance that the present government is truly keen on an exchange subordinate economy, cowhide industry is an open test offering a gigantic open
door for neighborhood and remote financial specialists. A vital structure to showcase Pakistan's calfskin products will prove to be fruitful.


There are two trade bodies of leather industry in Pakistan; one is Pakistan Leather Garments Manufacturers & Exporters Association (PLGMEA) and second is Pakistan Tanners Association.

PLGMEA was formed in November 2001 to protect, promote and develop the Pakistan Leather Garment Industry. During the last three years PLGMEA has been actively promoting the interest of its members regarding various trade, taxation and manpower related matters.

PLGMEA regularly collects and disseminates statistics & other Pertinent information for the Leather Garment Industry.

PLGMEA also carries out aggressive international marketing campaign for boosting the exports of Leather Garments mainly through participation in international exhibitions. PLGMEA regularly organizes pavilion for its members in following exhibitions.

1. To protect, promote and develop Pakistan Leather Garments Industry & Allied Industry.

2. To consider and deal with all questions and matters concerning the manufacture of Leather Garments & Allied industry, and the trade and commerce in Leather Garments, of its members and devise ways and means to overcome difficulties or problems arising therein.

3. To make representations to Federal or Provincial Governments, Local Bodies or any other bodies / departments on the grievances and demands on behalf of the members of the Association.

4. To collect, maintain and distribute or supply such statistics, data and other information necessary for the uplift of the tanning and Leather made-ups
Industry through letters, circulars, periodicals and press publicity.

5. To organize local or international Fairs & Exhibitions to help the manufacturers of Leather Garments and related products and to get benefit out of it.

6. To establish and promote contacts in foreign countries and develop trade relations with them in order to popularize the Leather Products of Pakistan.

7. To procure from and communicate with any organization, trade and industry in Pakistan or abroad such information as may seem conducive to the attainment of the objectives of the Association.

8. To setup Research Institute for the development of Leather Garments & allied trade & Industry including the use and production of indigenous materials to make the country, as far as possible, self-sufficient and to take measures for the development of the Leather Garment & allied industry and for boosting the exports.

9. To establish and run appropriate organization for inspecting and certifying the quality of Leather Garments & allied products intended for export.

10. To set up organization or organizations to render specific service to members or non-members on payment of such fees as may be decided from time to time.

Second trade union body, Pakistan Tanners Association, was established in late 1950s representing the leather industry and dealing with the members’ problems at Federal level. PTA is now functioning as a renowned trade body duly licensed by the Ministry of Commerce under Trade Organizations Ordinance/Rules 2007, registered with the Security & Exchange Commission of Pakistan and a bonafide member of the Federation of Pakistan Chambers of Commerce & Industry.

4.10 Glass Industry

Glass making process includes blending of a lot of silica sand with similarly littler measures of lime and soft drink debris, and different materials to give the glass exceptional characteristics by warming the blend in a heater until it transforms
into a syrupy mass. Be that as it may, it is an arduous procedure that requires explicit aptitudes during assembling process. 'Soft drink lime-glass' is the sort of glass for the most part utilized everywhere throughout the world including Pakistan. It is broadly utilized as plate and window glass, lights and so on. It contains about 72% silica, 15% sodium oxide, 9% calcium oxide (lime) and 4% of different fixings. The silica originates from sand, uncovered from underneath sandstone questions. Sodium oxide for the most part originates from soft drink debris produced using salt (just like the case with the nearby creation) however some additionally originates from sodium nitrate and sodium sulfate. Calcium oxide is typically gotten from limestone or dolomite (Pakistan has extremely huge stores of both). The soft drink lime glass has consistently been famous as it isn't just modest to fabricate yet in addition simple to soften, shape, however sensibly solid. The greater part of the nearby glass creation involves soft drink lime glass for the creation of 'potash-lead glass', 'borosilicate glass' and 'hued glass'.

**Potash Lead Glass**

It is commonly called ‘lead crystal glass’, made from sand, red lead, potassium carbonate and may also include some soda. It is widely used to manufacture the finest tableware and in certain cases, electrical products.

**Borosilicate Glass**

Borosilicate glass contains about 81 percent silica, only 4 percent lime or soda, 2 percent alumina and 13 percent boric oxide and is heat and shock resistant. It is used to make baking ware, glass pipelines and telescopic mirrors.

**Colored Glass**

Hued glass contains metals or certain metal mixes to give the glass a specific shading. For example, one piece of nickel oxide in 500 creates a tint that may go from yellow to purple contingent upon the base glass; one piece of cobalt oxide in 1000 gives a serious blue. The red shading is generally brought about by limited quantities of copper or gold, or mixes of selenium or cadmium. Thus, numerous different hues can be created in glass by including certain different synthetic concoctions. 4 The assembling units of glass industry in Pakistan are four decades old and they have constrained themselves to the creation of essential sorts of glass (strengthened glass, overlaid glass, toughened glass, covered, reflected glass and
so forth.) while the majority of interest for the quality items in the modern, business, development, and private divisions is filled by the imported partners. There is constrained interest for costly quality glass in nation which has confined glass division to set up significant expense glass units. The business has subsequently wanted to fabricate the cheap fundamental glass items which could be expended locally.

**Historical Glassware**

The history of glass making can be traced back to 3500 BC Asia in Mesopotamia. However, they may have been producing second rate copies of glass objects from Egypt, where this complex craft actually originated. Other archaeological evidence suggests that the first true glass was made in coastal north Syria, Mesopotamia or Egypt. Development of glass technology in India may have begun in 1730 BC. In ancient China, though, glass making seems to have had a late start compared to ceramics and metal work.

Ancient Greek glass amphora from the Hellenistic period, although some of this is likely to have been imported. The earliest known glass objects, of the mid third millennium BC. By the 15th century BC extensive glass production was occurring in Western Asia, Crete and Egypt and the Mycenaean Greek. Glass remained a luxury material and the disasters that overtook Late Bronze Age civilizations seem to have brought glass making to a halt.

In Chinese history, glass played a peripheral role in the arts and crafts, when compared to ceramics and metal work. The limited archaeological distribution and use of glass objects are evidence of the rarity of the material.

Chinese learned to manufacture glass comparably later than the Mesopotamians, Egyptians and Indians. Imported glass objects first reached China during the late spring and autumn periods.

Romans learned to manufacture glass later than Asians. Glass objects have been recovered across the Roman Empire in domestic, funerary and industrial sector

**Islamic World**

Islamic glass continued the achievements of pre-Islamic cultures, especially the Sasanian glass of Persia. The Arab poet AlBuhturi (820-897) described the clarity of such glass. Its color hides the glass as if it is standing in it without a container.
In the 8th century, the Persian-Arab chemist Jabir bin Hayyan Geber described 46 recipes for producing colored glass in Kitab al-Durra al-Maknuna.

The use of glass as a building material was heralded by The Crystal Palace of 1851, built by Joseph Paxton to house the Great Exhibition. The style of glassmaking changed by 1746 when the government passed the Glass Excise Bill, which taxed glass by weight; beginning in 1751 advertisements in a Boston newspaper made a reference to new fashion glass.

**American Production**

Glass making in America symbolized wealth. American glass factories were founded first in New York in 1732 and then in South Jersey by Caspar Wister in 1739.

**European Production Manufactures Across the Mid Colonies**

Glassworks such as the South Boston Crown Glass Company manufactured flint glass in South Boston. Another flint glass manufacturer, the New England Glass Company, was established in 1818. Glassmakers often worked for a number of companies; many split off to form their own glassworks. The glassmaking business could be risky; many glassworks closed after only a few years in business due to labor or financial troubles and the shop closed in 1869.

Color sorting makes a difference too. Glass manufacturers are limited in the amount of mixed color cullet called "3 mix" they can be used to manufacture new containers. Separating recycled container glass by cobbler allows the industry to ensure that new bottles match the color standards required by glass container customers. Over a ton of natural resources are saved for every ton of glass recycled. Energy costs drop about 2 to 3pc for every 10pc cullet used in the manufacturing process.

There were 46 glass manufacturing plants operating in 22 states. 16 companies operate 51 glass beneficiating facilities plants in 27 states. At the glass processing plants, recycled glass is further cleaned and sorted to spec, then resold to the glass container manufacturing companies for remitting into new food and beverage containers.

In 2013, 41.3pc of beer and soft drink bottles were recovered for recycling, according to the US EPA. Another 34.5pc of wine and liquor bottles and 15pc of
food and other glass jars were recycled. In total, 34pc of all glass containers were recycled, equivalent to taking 210,000 cars off the road each year.

**Container Glass**

Glass Container Markets Based on Shipment Values The container sector employs about 20,000 workers annually, with an average production wage of $19.4 per hour. Container plants are relatively large facilities, all 61 establishments open in 1997 reported 100 employees or more, with more than half reporting 250 to 500 employees.

Specialty glass also employs more people than any other sector, about 35,000 in 1999. A vast majority of these operations, about 400, are small plants having 20 or less employees. Demand for lighting products was expected to grow at a steady pace. One of the most important trends in the industry is the use of more efficient, higher cost lighting to replace traditional bulbs and tubes.

In the late 1800's Alexander Graham Bell first used sunlight to transmit voices without the use of copper wire. Use of glass fibers for data communications has progressed considerably over the last two decades driven by tremendous advances in fiber performance.

Demand for lighting products was expected to grow at a steady pace. One of the most important trends in the industry is the use of more efficient, higher cost lighting to replace traditional bulbs and tubes. Initiatives support energy conservation and new regulations will continue to drive this change, 1997.

Glass industry is efficient, productive and competitive. Pakistan is the significant exporter of Float glass, bottles, drinking glasses and dish sets utilized in kitchens and table products to the world. Pakistan's significant fares of glass items to the world for a long time 2007-2010 were 73.5 million. Top three fare goals are Afghanistan, Bangladesh and Tanzania with a fare esteem US $7 million, US $2 million and US $1.06 million individually during year 2010. Pakistan likewise sends out dishes’ items to the United Arab Emirates, Iran, South Africa, Philippines, Oman, Bangladesh, Belgium and different nations. Pakistan sent out glass results of worth US $ 15 million of every 2010 to the world. During that year, making it fifth biggest fare goal, Pakistan has sent out US $1.03 million worth of glass items to India.
Glass industry is efficient, productive and competitive. Glass industry is one of the few industries which are showing positive figures in the current economic crisis of Pakistan. Having a strong local market of seven to nine billion and also creating its presence in international market. Pakistani glass industry can be divided into four major divisions which are pharmaceuticals, food, beverages and construction. When an industry is emerging, the barriers to entry can be medium to low. On the other hand, for an established industry, the barriers to industry will be high to very high. Even with the continuously increasing product demand and growth of glass industry, still it is not an easy ground for the new entrants as it has got high setup costs associated with it. Glass industry is very much of an established industry meaning that the barriers to entry are high to very high because of the following reasons: Customers have little brand loyalty, products provided are not unique, switching costs are low, production process is easy to learn, access to inputs is easy, access to customers is easy, capital and technological requirements are high. Glass production involves two main methods, the float glass process that produces sheet glass, and blowing that produces bottles and other containers. Glass Container Production broadly, modern glass container factories are three-part operations: the batch house, the hot end the cold end.

**Batch Processing System**

Batch processing is one of the initial steps of the glass making process. The batch house simply houses the raw materials in large silos and holds anywhere from 15 ton of material. Some batch systems include material processing such as raw material screening sieve, drying, or pre-heating. The batch enters the furnace at the 'doghouse' or 'batch charger'. Different glass types, colors, desired quality, raw material purity, availability, and furnace design will affect the batch recipe.

**Hot End**

The hot end of a glassworks is where the molten glass is formed into glass products, beginning when the batch is fed into the furnace at a slow, controlled rate by the batch processing system, batch house. The furnaces are natural gas or fuel oil, fired, and operates at temperatures up to 1,575 °C (2,867 °F). The temperature is limited only by the quality of the furnace's superstructure material and by the glass composition. Types of furnaces used in container glass making include 'end-port' (end-fired), 'side-port', and oxy-fuel. Typically, furnace size is
classified by metric ton per day (MTPD) production capability.

There are currently two primary methods of making glass containers: the blow &
blow method for narrow neck containers only, and the press and blow method
used for jars and tapered narrow neck containers. After the forming process, some
containers, particularly those intended for alcoholic spirits, undergo a treatment to
improve the chemical resistance of the inside, called in, internal treatment or DE
alkalization.

**Annealing**

As glass cools, it shrinks and solidifies. Uneven cooling causes weak glass due to
stress. Even cooling is achieved by annealing. An annealing oven, known in the
industry as a Lehr) heats the container to about 580 °C (1,076 °F), and then cools
it, depending on the glass thickness, over a 20 to 60-minute period.

**Cold End**

The role of the cold end is to spray on a polyethylene coating for abrasion
resistance and increased lubricity, inspect the containers for defects, package the
containers for shipment and label the containers.

**Inspection Equipment**

Glass containers are 100pc inspected; automatic machines, or sometimes persons,
inspect every container for a variety of faults. Typical faults include small cracks
in the glass called checks and foreign inclusions called stones which are pieces of
the refractory brick lining of the melting furnace that break off and fall into the
pool of molten glass, or more commonly oversized silica granules, sand, that have
failed to melt and which subsequently are included in the final product. Curing is
referred to as a tear.

**Secondary Processing**

Sometimes container factories will offer services such as labeling. Unique to glass
is the Applied Ceramic Labeling process (ACL) Vodka Bottles have various
added services such as: Etching, absolute Citron, Coating Absolut Raspberry
Ruby Red and Applied Ceramic Labeling, absolute Blue, Pears, Red or Black.

**Packaging**

Glass containers are packaged in various ways. Popular in Europe are bulk pallets
with between 1000 and 4000 containers each.

**Coatings**

Glass containers typically receive two surface coatings, one at the hot end, just before annealing and one at the cold end just after annealing. At the hot end a very thin layer of tin (IV) oxide is applied either using a safe organic compound or inorganic stannic chloride.

**Ancillary Processes, Compressors and Cooling**

Furnaces, compressors and forming machine generate quantities of waste heat which is generally cooled by water. Hot glass which is not used in the forming machine is diverted and this diverted glass, called cullet, is generally cooled by water, and sometimes even processed and crushed in a, water bath arrangement. Often cooling requirements are shared over banks of cooling towers arranged to allow for backup during maintenance.

**Marketing**

Glass container manufacture in the developed world is a mature market business. World demand for flat glass was approximately 52 million ton in 2009. The United States, Europe and China account for 75pc of demand, with China's consumption having increased from 20pc in the early 1990s to 50pc. Glass container manufacture is also a geographical business; the product is heavy and large in volume and the major raw materials, sand, soda ash and limestone are generally readily available, therefore production facilities need to be located close to their markets.

**Lifecycle Impact**

Glass containers are wholly recyclable and the glass industries in many countries retain a policy, sometimes required by government regulations, to maintain a high price on cullet to ensure high return rates. Return rates of 95pc are not uncommon in the Nordic countries, Sweden, Norway, Denmark and Finland. Return rates of less than 50pc are usual in other countries.

**Float Glass Processing**

Float glass is a sheet of glass made by floating molten glass on a bed of molten
metal, typically tin, lead and various low melting point alloys were used in the past. This method gives the sheet uniform thickness and very flat surfaces. Modern windows are made from float glass. Most float glass is soda lime glass, but relatively minor quantities of specialty borosilicate and flat panel display glass are also produced using after the British glass manufacturer Pilkington, who pioneered the technique, invented by Sir Alastair Pilkington, in the 1950s.

Environmental Impacts

As with all highly concentrated industries, glassworks suffer from moderately high local environmental impacts. Noise is created by the forming machines.

Glass making process involves mixing of large amounts of silica sand with comparatively smaller amounts of lime and soda ash and other materials to give the glass special qualities by heating the mixture in a furnace until it turns into a syrupy mass. However, it is a laborious process that requires specific skills during manufacturing process.

Soda-lime-glass the kind is of glass mostly used all over the world including Pakistan. It is widely used as plate and window glass, light bulbs etc. It contains about 72pc silica, 15pc sodium oxide, 9pc calcium oxide (lime) and 4pc of other ingredients. The silica comes from sand, dug out of sandstone queries. Sodium oxide usually comes from soda ash made from salt, as is the case with the local production, though some also comes from sodium nitrate and sodium sulphate. Calcium oxide is usually obtained from limestone or dolomite. Pakistan has very large deposits of both. The soda-lime glass has always been popular as it is not only inexpensive to manufacture but also easy to melt, shape, but reasonably strong. The bulk of the local glass production comprises soda-lime glass to produce potash-lead glass and colored glass.

The major glass making companies in Pakistan are include Ghani Glass, Ahmad Glass, Ghani Global Glass, Alfapen Pakistan, Harris Silicones Pvt Ltd, Shibaam Glass, Agha Safety Glass Co, Johar Safety Glass, Fatima Safety Glass, Prime Fiber Glass, AGI Ahmad Glass Industries Pvt Ltd, Bobaiya Art fancy cut glass company, AK Fiber Glass Co, Lakhani Glass Pvt Ltd, Baluchistan Glass Limited. These all glass manufacturing companies are located in Karachi. Ghani Glass, Brother Glass, Tariq Float Glass, Ahmad Glass Industries Pvt Ltd, Pak Fiberglass industries composite, Crystal pet bottles and Jars, Baluchistan Glass Ltd (Unit
III), Gunj Glass Works Ltd and Ali Glass industries (Pvt.) Ltd. These glass manufacturing companies are in Lahore.

Pakistan is the major exporter of Float glass, bottles, drinking glasses and glassware's used in kitchens and table wares to the world. Pakistan's major exports of glass products to the world from 2007-10. Top three export destinations are Afghanistan, Bangladesh and Tanzania with an export value US$7 million, US$2 million and US$1.06 million respectively during year 2010. Pakistan also exports glassware products to the UAE, Iran, South Africa, Philippines, Oman, Bangladesh, Belgium and other countries. Pakistan exported glass products of worth US$15 million in 2010 to the world. During the same year, making it fifth largest export destination, Pakistan has exported US$1.03 million worth of glass products to India in 2010.

High Cost of Raw Material, especially the price of Soda ash is a major cost in the raw material segment.

(HNG), the largest producer of glass containers in India reported 27pc growth in the Net Sales to Rs 511.36 crore during the quarter ended December 2011.

The per capita glass consumption in India is 1.2 kg, compared with 8 to 9 kg in developed countries and 30 to 35 kg in the US.

On the other hand, around 1.3 pounds glass waste is generated per person and per day in India, whereas it is 4.6 pounds in the US. Glass recycling was very high in developed countries at 70 to 80pc. In Denmark, 98pc of bottles are refillable and 98pc of those are returned to consumers. However, in India, only 40-45pc of the finished products comes for recycling and the rest goes for land filing.

The production capacity of glass products in Pakistan ranges between 100 ton to 200 ton per day. Out of the total units, around 73 percent are situated in Punjab, 19 percent in North West Frontier Province (K.P.), 5 percent in Sindh and 3 percent in Baluchistan. The gas supply in Punjab and K.P. has been severely disturbed in the last five years. It leaves the industry with no choice but to close down or reduce its production. Demand for glassware has shown a rising trend due to the increase in population and income among the buying segment of the population. The production of tableware stands at 30,000 ton annually while the demand has increased to 35,000 ton. Gap in demand and supply is met through
the import of high-quality glassware items that are currently not manufactured in the country.

Over the last twenty years the glass industry has been challenged with plant overcapacity, increasing foreign trade and imports, capital intensiveness, rising costs for environmental compliance, and cyclical and moderate growth prospects. The industry response has been mergers, acquisitions, restructuring, and expansion into new markets.

The industry responded with a range of innovative products that increased energy efficiency in buildings and automobiles. In short today's Glass Industry is efficient, productive and competitive.

4.11 Tobacco Industry

Though tobacco is grown on around 0.25% of total irrigated land of Pakistan, the crop plays an important role in Pakistan’s economy by generating income and employment in the tobacco farming, manufacturing, distribution and retailing. A work force of 350,000 is directly and indirectly employed in the tobacco industry, which generate annual income of around Rs.300 billion and a source of livelihood for 1.2 million people.

There are 75,000 tobacco growers producing tobacco all over Pakistan. Out of these more than 45,000 growers are located in Khyber Pakhtunkhwa producing 95% of Flue Cured Virginia over an area of 30,000 hectares in the districts of Swabi, Mardan, Charsadda, Buner and Mansehra. On average 80-85 million kg of FCV, which is the main ingredient of cigarettes, is produced by growers of these districts every year. The Sector is also one of the main contributors to the Government exchequer and sourced more than Rs.110 billion in Federal Excise Duty/ Sales Tax in FY 2018-19. The Federal Board of Revenue (FBR) has estimated collection of Rs150 billion from cigarettes industry during the current fiscal year 2019-20 against collection of Rs110 billion in the last fiscal year 2018-19. In 2015, about 59 million men aged 15-64 years smokers were living in Pakistan. This makes about 44 billion cigarettes smoked by men. Among women, 3.8% smoked daily, 1.1% smoked daily manufactured cigarettes, on average, 2.9 cigarettes per day.

There are various types of tobacco producing in the different parts of the country.
Flue Cured Virginia (F.C.V), Light Air-Cured Tobacco, Dark Sun Cured Rustica Tobacco (Black Leaf), Dark Air Cured Virginia Tobacco (DAC), Sun Cured Rustica Tobacco (White Patta) and Light Sun-Cured Virginia Tobacco are main types of tobacco in Pakistan.

PTC (Pakistan Tobacco Company) is the largest producer of cigarettes in Pakistan. Pakistan Tobacco Company Limited (PTC) is a subsidiary of the British American Tobacco (BAT). Pakistan Tobacco Company Limited was incorporated in 1947 immediately after partition of Indian Subcontinent, when it took over the business of the Imperial Tobacco Company of India which had been operational in the subcontinent since 1905. Latest this company annual report shows that over 94 percent of PAKT shareholding continues to rest with British American Tobacco (Investments) Limited, with the remaining shares held by a variety of investors, including investment companies, banks, insurance companies, mutual funds and the general public. The company manufactures and sells a number of cigarette brands, including Gold Leaf, Capstan, Dunhill, Benson & Hedges, Gold Flake and Embassy. PAKT is the market leader, commanding 71 percent of market share in the legitimate cigarette market as of 2018, as per the company. At number two is Philip Morris Pakistan Limited (PSX: PMPKL), with roughly 20 percent share of the organized cigarettes market. There is the most popular cigarettes brand name is Gold Leaf. In Pakistan Marlboro and B&H compete for the first place against Gold Leaf. Pakistani People are smoking Capstan, Dunhill, Morven, Embassy, Gold Flake, L&M and Red & White also.

Why do people Smoke? When a person uses tobacco, either by smoking cigarettes, using chewing tobacco or by using another form of tobacco, nicotine enters the body and activates nicotine receptors in the brain. They also say that smoking gives them a pleasurable feeling. Smoking relieves their nicotine withdrawal symptoms. But the effects of different types of smoking are very injurious to health and causes numerous diseases of mouth, lungs and heart.

During many years of working together, cigarettes creators have earned billions of dollars as benefit as well as have extended their 'activities'. The operational angles, other than building up new creation offices, additionally incorporate powerful extension. Professing to be one of the biggest citizen industries (comparable cases are made by the pharmaceutical business, soda pops industry, sugar industry, concrete industry and manure industry), the tobacco business has
outsmarted numerous opponents. It has profound entrances in bureaucratic and administering quarters. As of late, in 2019 in complete insubordination and lack of regard for the Framework Convention on Tobacco Control (FCTC), to which Pakistan is a signatory since 2004, a tobacco industry delegate "introduced" a check for Rs 5 million (a small detail within a bigger landscape) to the Prime Minister for dam reserves. The tobacco business wanted to trick the country once again and pull off the three-level tax assessment framework got place by the past government.

The tobacco business has opposed numerous laws previously, instances of which incorporate deferring the usage of SRO 22(KE)/2015. This mandate wanted the tobacco business to print the notice picture on 85 percent of each pack (front and back). Challenging every single standard guideline and strategic conventions, the then British High Commissioner Philip Barton, for the benefit of British American Tobacco (BAT), had met the Finance Minister of the time, Ishaq Dar, to campaign for a repudiation of this SRO on March 13, 2015.

Resultantly, a between clerical board of trustees was shaped, and the execution was postponed for more than two years before new SROs could be given. The case with this impact is as yet pending before the Islamabad High Court. Two SROs (SRO 127(KE)/2017 and SRO 128(KE)/2017) were given to manage the Graphic Health Warning (GHW) on the tobacco. These SROs committed the tobacco business, other than different measures, to put GHW on 50 percent of the pack beginning June 1, 2018, and on 60 percent of the pack beginning June 1, 2019. In accordance with these, another statute was given on January 22, 2019, to put the gangrene related wellbeing cautioning as demonstrated as follows:

It is essential that the tobacco business turns out more than 85 billion sticks each year for utilization in Pakistan. This implies a huge number of cigarette packs are devoted to decay the national wellbeing consistently. It further implies that the requests to print the GHW were passed in 2017 to be executed two years after the fact, for example in 2019. During the irregular time frame, numerous related SROs and conversations were clear updates for the business to get ready for the execution.

Be that as it may, lamentably, regardless of the slip by of practically a large portion of the long stretch of June 2019, the SRO has not been actualized. The
circumstance in Islamabad as of composing of this article is that 99 percent of the merchants (63 sellers were visited in various segments of Islamabad and Blue Area, while another 31 were visited in Rawalpindi) didn't have the foggiest idea whether the new GHW covering 69 percent of the pack and gangrene pictorial admonition, was expected to be accessible by June 1, 2019, or, that they MUST have the new pressed stock from the tobacco business. Their contention was to sell the old stock totally before purchasing the new stock from the business.

Tragically enough, the usage is the most fragile connection in the whole tobacco control system. The corrective activities are of a similar extent for a merchant, wholesalers and producers (Rs. 10,000 as fine). Intrinsically, there is unfairness in the origination of these punishments. While Rs10,000 may be a large amount for a street side vendor, it is a small pinch for the wholesaler, not to mention the manufacturer.

Road merchants have taken in a great deal from their supporters in the tobacco business. During the ongoing overview, these merchants were found submitting various offenses, for instance little stands outside Quaid-e-Azam college or the ones set up steps from NUML, Iqra and different colleges were discovered violating multiple laws by selling free cigarettes, offering free cigarettes to the minors and offering free cigarettes to the minors close to instructive offices. Many were found doing same with Gutka and Paan Parag (the most hurtful Indian snuck presents for Pakistani youth) etc. A fine of Rs 10,000 for such acts would be a delicate slap on the wrist. It is matter of concern that sometimes you see outside a shop written instruction that ‘the sale of citrates is prohibited to minor’, however, the sale boy in the same shop often remains a minor.

We are for the most part blamed for accusing 'others' for our indiscretions. This might be valid on account of tobacco control too. Be that as it may, when such wrongdoings have cross-fringe connects, the issues must be featured. After British High Commissioner's entryway meeting with Ishaq Dar, Dr Nicholas Hopkinson, a senior speaker in respiratory medication at Imperial College, London, stated, "Smoking is one of the main sources of death and sick wellbeing around the world. It is a disfavour that the UK government when it ought to show initiative in tobacco control, is rather helping the tobacco business in its endeavours to campaign governments in different nations."
By chance, Britain that spearheaded tobacco industry on this land and whose High Commissioner has a despicable record of campaigning for tobacco Industry in Pakistan has a plenty of hostile to smoking laws set up at home, remembering a boycott for showing tobacco in little shops, restriction on smoking in autos conveying kids travellers and selling cigarettes in plain bundling.

Likewise, India, which is a functioning accomplice in sneaking through Gutka and Pan Parag to Pakistan, has a law, which commits all cigarette packs to have 80 percent GHW, and smokeless items need to have a pictorial and literary admonition. One just asks why we don't see a similar admonition on the Gutka or Pan Parag being snuck from India to be sold in Pakistan.

4.12 Self Assessment Questions

1. Discuss the role of small scale industries in the development of underdeveloped countries like Pakistan.

2. Highlight the sugar industry and its major contribution regarding the small scale industries of Pakistan.

3. Describe the role of cement industry and iron industry in the construction sector of Pakistan.

4. Keeping in view the needs of agriculture sector of Pakistan; highlight the contribution of the fertilizer industry.

5. How sports and surgical instruments industry played a significant role in the economic growth of the country.

6. Describe the scope and need of glass industry? Discuss the major glass industries of Pakistan.

7. Evaluate the contribution of tobacco industry of Pakistan and how it contributes to increase the exports of the country.

8. Discuss the leather industry of Pakistan and its contributions in the small scale industries.
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20. Quintile MS 1st Quarter Report 2017


Industries-III

HEAVY OR LARGE-SCALE INDUSTRIES

Written by: Mr. Azhar Liaquat
Reviewed by: Dr. Altaf Ullah
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Introduction

This is the last unit about the industries which reveals the advantages and disadvantages of the Heavy Industries or Large Scale Industries of Pakistan. Heavy Industries play a significant role to provide the latest machinery to any country. This sector also grants a space to develop the economy through providing employment opportunities not only to the labourers but also the engineers. The technicians and engineers avail the opportunities to get practical work in this sector. Some disadvantages of the heavy industries are also being discussed in this unit as the sector of heavy industries depends on the foreign markets as well as foreigners’ investment. However, the large scale industries played a remarkable role in the industrial development of Pakistan.

The Heavy Industry Taxila had performed wonderful job through the manufacturing and rebuilding the war tanks and logistic vehicle. The Heavy Mechanical Complex (HMC) Taxila is considered as the Mother Engineering Industry in Pakistan. It has become a symbol of pride for Pakistan in the fields of Mechanical, Electrical, Instrumental and Chemical Engineering.

Moreover, Pakistan Suzuki Motor Company, Millat Tractors, Al-Ghazi Tractors, Indus Motors, Hino Pak, Ghandhara Nissan and Honda Cars are the leading examples of the large scale industries.

Objectives

After reading this unit, the students will be able to:

1. know the advantage and disadvantages of the heavy industries in Pakistan.
2. know the role and productions of the Heavy Industries Taxila and the Heavy Mechanical Complex (HMC) Taxila.
3. know about the leading companies of Pakistan in the sector of large scale industries.
5.1 Advantages of Heavy Industry

Heavy industry is one in which there is no limit to investment made and to the number of workers employed. The heavy engineering Karachi Shipyard and Engineering works. Machine Tool Factory, Heavy Mechanical Complex and Iron and steel plants are examples of large-scale industries in Pakistan. Large-scale industry plays crucial role in the economic growth and development of the country. The following are its chief advantages:

(i) Economy of Specialized and Up-to-date Machinery
(ii) Economy of Labour
(iii) Economies of Bulk buying and selling
(iv) Economies of Overhead Charges
(v) Economy in Rent
(vi) Experiments and Research
(vii) Advertisement and Salesmanship
(viii) Utilization of By-products
(ix) Facing Adversity
(x) Cheap Credit
(xi) Division of Labour

Economy of Specialized and Up-to-date Machinery

There is a huge extension for the utilization of apparatus which brings about lower costs. A huge maker can introduce a modern and costly apparatus. He can likewise have his own fixing plan. Specific apparatus can be utilized for each activity. The outcome is that creation is conservative. A little maker with a little market can't keep the hardware constantly working. Keeping it inert is uneconomical. An enormous maker can work it consistently and harvest the subsequent economies.
Economy of Labour

In a big concern, there is ample scope for division of labour. Specialized labour produces a larger output and of better quality. It is only in a large business that every person can be put on the job that he can best perform. The large-scale producer thus gets the best out of every person he employs.

Economies of Bulk Buying and Selling

While purchasing raw material and other accessories, a big business can secure especially favourable terms on account of its large custom. Whine selling its goods, it can attract customers by producing a greater variety and by ensuring prompt execution of orders. Even a small rate of profit results in larger sales and higher net profits in a large-scale business.

Economies of Overhead Charges

The expenses of administration and distribution per unit of production in a big business are much less. Interest, the pay bill, and other overhead charges are the same whether production is large or small. Thus, the same amount of expenditure being distributed over a larger output results in a lower cost per unit.

Economy in Rent

A large-scale producer makes a saving in rent too. If the same factory is made to produce a large quantity of goods, the same amount of rent is divided over a large output. This means that the cost per unit in respect of rent comes to a much smaller amount.

Experiments and Research

A large concern can afford to spend liberally on research and experiments. It is well known that, in the long run, these expenses more than repay. Successful research may lead to the discovery of a cheaper process. This may bring a large profit. Only a large-scale business can incur such expenditure.

Advertisement and Salesmanship

A big concern can afford to spend large amounts of money on advertisement and salesmanship. Ultimately, they do bear fruit. Also, the amount of money spent on
advertisement per unit comes to a low figure when production is on a large scale. The salesman can make a careful study of individual markets and thus acquire a hold on new markets or strengthen it on the old ones. Thus, a large-scale producer has a greater competitive strength.

**Utilization of By-products**

A big business will not have to throw away any of its by-products or waste products. It will be able to make an economical use of them. A small sugar factory must throw away the molasses, whereas a big concern can turn it into power-alcohol. By utilizing by-products, it can lower the cost of production.

**Facing Adversity**

A big business can show better resistance in times of adversity. It has much larger resources. Losses can be easily borne. A small concern will simply collapse under such a strain.

**Cheap Credit**

A large business can secure credit facilities at cheap rates. Its credit in the money market is high and the banks are only too willing to give advances to large businessman. Low cost of credit reduces cost of production.

**Division of Labour**

On large scale production a large number of labours is employed. So, rule of division of labour can be applied in the production process. In this way quality of production increases coupled with increment in the speed of the work. Resultantly per unit cost of production will reduce.

These are some of the advantages that a large-scale business has over a small-scale business. It can produce better goods at lower cost. But let us see the other side of heavy industry

### 5.2 Disadvantages of Large-scale Production:

Large-scale production is not without its disadvantages.

Some of these disadvantages are:
Less Supervision

A large-scale producer cannot pay full attention to every detail. Costs often rise on account of the dishonesty of employees or waste of material by them. This is due to the lack of supervision. Owing to laxity of control, costs of production will go up.

Individual Tastes Ignored

Large-scale production is a mass production or standardised production. Goods of uniform quality are turned out irrespective of the requirements of individual customers. Individual tastes are not, therefore, satisfied. This results in a loss of customers.

Absence of Personal Element

A large-scale business is generally managed by paid employees. The owner is usually absent. The sympathy and personal touch, which ought to exist between the master and the men, are missing. Frequent misunderstandings lead to strikes and lockouts. This is positively harmful to the business.

Possibility of Depression

Large-scale production may result in overproduction. Production may exceed demand and cause depression and unemployment. It is not always easy or profitable to dispose of a large output.

Dependence on Foreign Markets

A large-scale producer has generally to depend on foreign markets. The foreign markets may be cut off by war or some other upheaval. This makes the business risky.

Cut-throat Competition

Large-scale producers must fight for markets. There is wasteful competition which does no good to society or to businessmen. Many promising businesses are ruined.
International Complications and War

When the large-scale producers operate on an international scale, their interests clash either on the score of markets or of materials. These complications sometimes lead to armed conflicts. Many modern wars arose on account of scramble for materials and markets.

Less Adaptability

A large-scale producing unit finds it very difficult to switch on from one type of production to another. In a depression, small-scale firms move away from declining trades to flourishing ones easily. In this way they are able to avoid losses. This adaptability is lacking in a big business.

5.3 Heavy Industries Taxila (HIT)

HIT is Part of Pakistan’s premier Defence Industry which was established in early 70s with an objective of rebuilding the existing tanks. Over the last four decades it has evolved into a large Military Industrial base and currently involved in manufacturing and rebuild of hi-tech equipment like Tanks, APCs, Guns and other security related equipment including security vehicles. Presently it comprises of Six production units, an in-house development and component manufacturing facility and a leading Research and Development Centre.

Tremendous efforts are being undertaken to achieve the Motto, “Strength Through Self Reliance”, by investing in Human Resource and Infra Structural developments. We pay special attention to quality assurance and absorption of modern technology through innovation and robust Research and Development process.

We also take pride in our international collaboration with some of the leading countries around the globe.

Tank Al-Khalid, The Pride of Pakistan, is a flagship product of HIT which is recognized worldwide and forms the backbone of Pakistan Army’s mechanised force. In the defence product category besides Al-Khalid tank the product range of HIT is very comprehensive including, Al-Zarrar tank, APC Talha, Sakb battle
proven vehicle, Al Qaswa logistic vehicle, Al-Hadeed armoured recovery vehicle, 125 MM smooth bore tank gun and self-propelled gun. In the commercial product category there are Defender 110 Land Rover, ASV Mohafiz I, II, III B6 level and B7 level protection, Armoured Security Vehicle Protector B7 level protection, AGP (Armoured Guard Post) single and double man with Turret, Bullet proof Rostrum, Bullet proof screen, (BPJ) Bullet Proof Jacket NIJ Level III and level IV, and (BPV) Bullet proof Vest NIJ IIIA.

HIT produce some product on JV (Joint Venture) basis. These products include Armoured security vehicle Dragoon, Armoured Toyota land Cruiser Bullet Proof B6 level of protection. This vehicle is produced with the help of Toyota Motors. Ballistic Helmet PASGT and portable shelters which can be used for labor, general accommodation and offices. Besides production of these goods, heavy Industries Taxila gives commercial lab services such as Design Sec, Material Testing Lab, Material Casting Lab, Rapid Prototyping Lab, Mechanical System Lab, CNC Lab, Revers Engineering Lab, PCB Lab, LPKF Lab and SMT Lab

Objectives of HIT are summarized as:

- Manufacture, Rebuild, upgrade & develop Tanks, Tank Guns, APC’s & other related equipment.
- Utilize surplus capacity of factories to meet the requirements of civil sector & friendly countries.
- Undertake joint ventures & commercial activities with friendly countries and encourage transfer of technology.

5.4 Heavy Mechanical Complex (HMC) Taxila

Heavy Mechanical Complex (HMC) Taxila, rightly known as “Mother Engineering Industry” is serving the nation since more than four decades. HMC was principally entrusted the task of shifting the Pakistan’s consumer good industry to the capital & producer goods industry. It can be proudly said that HMC has made significant contributions in transforming the country into strong technological base through acquisition, assimilating the design and manufacturing techniques to produce capital engineering good’s concepts from the world with emphasis on optimum indigenization, phased deletion & to exploit Pakistan’s
tremendous capital engineering goods potential besides creating socioeconomic activities and saving hard earned foreign exchange.

The vision of HMC is very clear. Its vision is to undertake structural and financial reforms to transform HMC into a vibrant, self-sustained and modern business enterprise; a progressive manufacturing concern to support and develop country’s industrial and infrastructure growth.

HMC is the leading ‘Engineering Enterprise’ of Pakistan that shall have the capability to develop industrial sectors, through acquisition of technology and diversification.

Products of HMC are include sugar plants, cement plants, boilers, oil & gas processing plants, cranes, hydro power plants, overhead pedestrian bridges, steel structures and railway equipment. Production facilities of HMC are included design & engineering, fabrication, machining, forging, heat treatment, pattern shop, steel foundry, iron & non-ferrous foundry and hydraulic press.

Design & Engineering facilities are manned by qualified design personnel including engineers, experienced and trained abroad in their respective disciplines viz; Mechanical Engineering, Electrical & Instrumentation and Chemical Engineering. The design office is equipped with qualified engineers, licensed engineering software, computer aided designing, drafting facilities, modern record and retrieval systems, library of technical books and international standards and specifications and fully equipped computer lab.

Fabrication Shop of the HMC which is the biggest in the country that occupies a covered area of 22,000 sq. metres. The highest bay is 12 metres and has cranes ranging from 3 to 50 tons capacity. Fabrication equipment includes a 12-metre-long edge planner, a 3-roll bending machine which can roll steel plate up to 80mm. A 3000-ton Hydraulic Press manufactures truck chassis and a 1000-ton press makes dish ends and sophisticated welding equipment including Tig and Mig welding facilities.

The Machine Shop of HMC is one of the largest in the country which has over 115 machine tools including a plano-milling machine, size 1250 mm x 4500mm, A horizontal boring of 160mm spindle dia, a lathe 4 metre dia x 15
metre centre-to-centre distance and a gear hobbing machine capable of hobbing 4 metre dia gear up to 30 modules.

Forge Shop of the HMC caters for all the forging required for products. This shop is equipped with a 800 ton forging press apart from various other types of presses and a range of furnaces operated on natural gas. HMC also have the most sophisticated Heat Treatment Shop in the country which is capable of heat treating any type of steel to any desired quality. The heat treatment processes like annealing, normalising, hardening, tempering, surface hardening by flame and high frequency induction, carburising, nitriding and phosphating can successfully be handled.

Pattern Shop of HMC plays pivotal role to have suitable patterns. Everything in the foundry must start with a “pattern”. A pattern or tooling is a full-size model of the part you are trying to cast. It is very important to have suitable patterns, for the quality of the casting is influenced by the quality of the pattern. HMC in-house pattern shop works closely with the foundry to ensure that the proper patterns are built and maintained in order to meet customers’ requirements. The patternmakers of HMC have both the skill and vision to take apart from a blueprint and turn it into a physical part. Whether you need a prototype or production tooling, HMC has the capabilities to meet those needs.

Steel Foundry Shop of HMC Spread over an area of 28374 square meters. The largest and most modern unit in the country which is equipped with 2 x 15 tons & 1 x 3 tons electric arc furnaces incorporating a centrally controlled sand preparation and regeneration system. Melting facilities are very spectacular that supported with spectrometer to control the composition of molten steel in accordance with the international standards and specifications. Production Capabilities of Steel Foundry Shop of HMC are Castings 6500 tons per year Maximum Casting weight 32 tons ingots 38000 tons per year and maximum ingot weight 50 tons.

Iron & Non-Ferrous Foundry of HMC is the backbone of this complex it covers a total area of 11964 square meter that equipped with 3 hot blast cupolas, each having a capacity of 5 t/hr., high frequency induction furnaces and centrifugal casting machines. Non-ferrous foundry is located in a section of iron foundry and is equipped to produce castings in aluminium, copper & antimony-based alloys. The centrifugal
casting machines of this foundry have the capacity to produce flawless castings of cylinder liners and bushes up to 350 mm diameter. However, larger sizes can be manufactured through improved techniques. Production capabilities of this foundry are huge; iron castings 5000 tons per year, maximum casting weight is 28 tons, non-ferrous castings are 100 tons per year and maximum casting weight are 2 tons.

Quality Control in HMC

The striking feature of Heavy Mechanical Complex (HMC) is its very cohesive system of quality assurance and quality management and producing top quality products. HMC is also certified for its Quality Management System (QMS) (9001) since 1997, an era in which there were very few organizations opted for certification against this International Standard. Certification against the Quality Management Standard was reflection of HMC’s commitment towards provision of Quality Products. ISO Standards are subject to revision after some period to maintain their relevancy to the business. In this context, new Standard of QMS ISO 9001;2015 has been released in Sept 2015 and HMC very early has opted for alignment of its QMS to the requirements of new standard and once again was successfully certified against this standard in Feb 2016. To provide additional assurance to its customers, HMC is also authorized to use ASME Stamps “S”, “PP”, “U”, U2, “R” and “NB” on power boilers, pressure vessels manufactured in accordance with relevant ASME Codes since. HMC is also approved from Lloyds Register for the manufacturing of Fusion Welded Pressure Vessels up to maximum thickness of 70mm. These are very paramount achievements which have been attained by HMC in the spectrum of quality control and quality assurance.

These quality control procedure of HMC involves standard operating procedures for product verification are based on International Standards i.e. BSS, ASTM, JIS, DIN, AISI, SAE, ISO and GB etc. In order to conform to any standards/specification one must make certain Physical Measurements, i.e. mass, force, volume, length angle and currents etc, it is essential that a measurement should be made periodically traceable to some standard. HMC has established its Metrology Laboratory. The purpose of laid down quality control (QC) procedures and OA arrangements is doing a job right at the first time rather than rectifying it at a later stage. This approach pays dividends not only by increasing safety and reliability, but also by way of cost saving. Implementation of all those steps
described above results in quality achieved by complying the requirements of standards and codes.

5.5 Automotive Industry of Pakistan

In the early years (1950-1969) of Pakistan produced its first vehicle in 1953 at the National Motors plant in Karachi, according to the Ministry of Industries & Production. The plant was opened in conjunction with General Motors who arranged the facilities for the production of Vauxhall cars and Bedford trucks. Subsequently, buses, light trucks and cars would be assembled at the same plant. In the same year, Ford trucks partnered with Ali Automobiles where they introduced Ford Anglia, Ford pickups and the Ford Kombi. Exide Pakistan also began production of car batteries in 1953. Haroon Industries partnered with Dodge Motors in 1956.


In the time span of (1970–1989) major changes occurred in the automobile industry of Pakistan in the 1970s, in the Zulfiqar Ali Bhutto regime, saw nationalization of many companies. In 1972, the Pakistan Automobile Corporation (PACO) was formed. Many companies were bought out or merged into others. Wazir Ali Engineering was renamed to Sindh Engineering, Ali Autos to Awami Autos, Haroon Industries to Republic Motors, Ghandara Motors to National Motors, Hye Sons to Mack Trucks, Kandawala Industries to NayaDaur Motors, Jaffer Industries to Trailer Development Corporation and Rana Tractors to Millat Tractors. Dawood Yamaha introduced Yamaha motorcycles in 1974 and in the same year Beta Engineering started producing diesel engines. In 1976, Suzuki Motor Cycles launched by Sindh Engineering. Saif Nadeem Kawasaki launched Kawasaki motorcycles in 1977 while Suzuki Jeep was manufactured by NayaDaur Motors.

In any case, in the time of (1990–2009) procedure of deregulation or denationalization began and this industry was profoundly directed and denationalized until the mid-1990s. Following deregulation, the decade saw an immense blast in auto creation, as nationalization was surrendered for privatization. Japan procured the 40% portions of Pak Suzuki in 1991. In 1993, the Indus Motors Company started creation of Toyota Corollas. In 1994, the Pakistan Automotive Manufacturers Association framed, and Honda Atlas presented assembling of the Honda Civic. In 1995, the Engineering Development Board initiated the PAP appear. From 2001 to 2007, small assemblers and many bike importers started assembling replicas of the Honda CD70 with Chinese collaboration and established there Association with Founder Chairman of Mr. Muhammad Sabir Shaikh, Association of Pakistan Motorcycle Assemblers (APMA) in 2002, after 2003 annual production of motorcycles kept increasing, with auto sales making records year after year, reaching a peak of 195,688 sales in 2007, during this period Afzal Motors began local assembly of Daewoo buses and trucks under license from Daewoo Bus, South Korea and Tata Daewoo, thanks to rising car financing up to 70–80% by banks and low interest rates coupled with rising rural purchases.

From 2007 to 2009, the auto sector witnessed reduce sales amid high interest rates and yen appreciation against the rupee. In 2007, the automotive industry made up 2.8% of Pakistan's GDP and contributed 16% to the manufacturing sector. The 2000s also saw the introduction of dual fuel options to run both on petrol and CNG, which is more affordable and cheaper than petrol in the country.

5.6 Rapid Development and Growth Decade (From 2010 to date)

In 2010 the deals bounced back and started expanding once more. The automobile
business anticipated a developing interest in Pakistan and contributed over 20 billion (US$140 million) during this decade. Cruiser creation hit a record level in 2016–17, with 2.5 million units made. In 2015, the Auto Policy 2016-21 was presented, to help bait new automakers, which has customarily been commanded by Honda, Toyota and Suzuki. The vehicle business remains the second-biggest payer of aberrant assessments after the oil business in Pakistan. At present, there are 10 vehicles for each 1,000 individuals in Pakistan. This is perhaps the most minimal proportion among rising economies and particularly in South Asian locale, which itself talks about high capability of development.

In 2015, with the achievement introduction of CPEC (China Pakistan Economic Corridor), flood of capital development began, and numerous prestigious universal organizations began joint venture (JV) with Pakistani organizations. Rising per capita salary with changing segment appropriation and a foreseen deluge of 30 to 40 million youngsters in the financially dynamic workforce in the following decade will give a boost to the business to extend and develop. Toyota began neighbourhood get together of its car Corolla. Essentially, United Motors turned over, in 2018 first Pakistani privately amassed vehicle named "United Bravo" with the assistance of Chinese organization. Ghandhara Nissan began creation of Isuzu d-max in Pakistan. In the June 2019 Motor organization Road Prince began collecting of much-anticipated little vehicle "Prince Pearl" with the assistance of Chinese mammoth automaker organization DSFK.

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
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<tbody>
<tr>
<td>1994</td>
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<tr>
<td>1995</td>
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<td>1996</td>
<td>78,419</td>
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<td>46,761</td>
</tr>
<tr>
<td>2000</td>
<td>39,117</td>
</tr>
</tbody>
</table>
5.6.1 Foreign Automotive Dealers & Suppliers in Pakistan

In Pakistan the few dealers sell CBU (Completely Built Units) of renowned foreign brands of cars or light vehicles such as Audi, BMW, Chevrolet, Ferrari, Jaguar Land Rover, Mercedes Benz, Porsche and Rolls-Royce. Generally, dealers of these companies situated in Karachi, Lahore and Islamabad. Very higher prices of these brands attract low demand of these vehicles. Besides these, dealers of many foreign brands of motorbikes also have their footprints in the big cities e.g

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales</th>
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<tbody>
<tr>
<td>2001</td>
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<tr>
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<td>48,579</td>
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<td>2019</td>
<td>298,083</td>
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</tbody>
</table>

Source: Pakistan Automotive Manufacturers Association (PAMA)
motorbikes of Aprilia, Benelli, BMW, Motorrad, Harley-Davidson, Keeway and Moto Guzzi. In fact, motorbikes of these companies lie in the categories of heavy bikes so have very high price tag.

5.6.2 Motorcycle Production in Pakistan

Pakistan is the 5th largest motorcycle market in the world after China, India, Indonesia and Vietnam. Now, with 7,500 new motorcycles being sold every day. Pakistan is also the among the world's fastest growing two-wheeler markets. Prior to 2004, no one would ever think, Pakistan bike industry could prosper at such an over the top scale. In those years the market volume was beneath 0.1 million yearly units and there were just two organizations, Atlas Honda and Dawood Yamaha, working in the market. Suzuki and Qingqi had extremely little offer.

On account of an administration open strategy, new producers entered the market upheld by Chinese innovation, and the segment become vital to support the monetary improvement of Pakistan over the most recent 15 years, turning out to be – by a wide margin – the primary answer for singular versatility.

The accompanying elements assumed an essential job in this turn of events. One, modest yet dependable innovation from China. Second, Independent sourcing of innovation i.e motors from China and Body parts from nearby merchants. Third, constructing agents of Japanese brands needed to pay a major sum as sovereignty to their principals, while new constructing agents are sourcing everything autonomously. It has decreased bicycle cost. Fourth, overhead costs are little as the greater part of the organizations work in restricted territories. Fifth, financing and renting office is accessible at neighbourhood level. This encouraged lower-pay individuals to purchase a bicycle regardless of constrained assets.

Lately, Pakistani cruisers industry has been among the quickest in the World. Undoubtedly, the achievement of 1 million units has been hit just because just in the 2015 and now the market is as of now running towards the 2 million yearly deals. Following the over 1.4 million deals accomplished in the 2017, the market additionally blasted in the 2018, with a record of 1.9 million deals. In this way, deals went up to 6.6%, and scoring the new untouched record.
In any case, the deterioration of rupee, the expense increment and less money accessible for credit, punished the market since the finish of 2018, with cruisers cost further expanding demoralizing the interest and the market has taken a negative way.

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>106,797</td>
</tr>
<tr>
<td>1998</td>
<td>92,978</td>
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<td>2002</td>
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<td>2008</td>
<td>660,593</td>
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<td>2009</td>
<td>509,054</td>
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<td>2010</td>
<td>736,861</td>
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<td>2011</td>
<td>838,665</td>
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<td>828,576</td>
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<td>819,556</td>
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<td>2014</td>
<td>771,507</td>
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<tr>
<td>2015</td>
<td>1,131,196</td>
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<tr>
<td>2016</td>
<td>1,362,096</td>
</tr>
<tr>
<td>2017</td>
<td>1,632,965</td>
</tr>
<tr>
<td>2018</td>
<td>1,931,340</td>
</tr>
</tbody>
</table>

Source: Pakistan Automotive Manufacturers Association (PAMA)
Currently, there are both small and large 3,200 automotive manufacturing plants in the country, with an investment of 92 billion (US$650 million) producing 1.8 million motorcycles and 200,000 vehicles annually.

Bikes sales felt down 12% in the 2019, following quite a while of records. As indicated by information discharged by the Pakistan Association of Automotive Manufacturers, in the 2019 the new two/three-wheeler deals have been 1.67 million, down 12.0%.

5.6.3 Electric Vehicle Industry in Pakistan

The automobile sector of Pakistan is expected to undergo a drastic transformation over the next decade as the Pakistan Tehreek Insaf (PTI) government has approved the electric vehicle (EV) policy, paving the way for introducing such vehicles in the market of 220 million people. The current electric vehicle policy provides multiple incentives for electric vehicle manufacturers including a massive reduction in taxes from 43% to 11.25%.

Electric mobility is expanding at a rapid pace throughout the world. In 2018, the global electric car fleet expanded to 5.1 million, up 2 million from the previous year. According to latest data of the International Energy Agency (IEA), China remains the world’s largest electric car market, followed by Europe and the United States. Norway happens to be the global leader in terms of electric car market share. According to the electric vehicle policy, the demand for oil products will drop by millions of tonnes by the year 2030.

According to an auto industry experts and veterans, though taxes on electric vehicles were also lower earlier compared to oil-operated vehicles, it was not viable to start an electric vehicle business under the previous tax regime. Many auto firms want to enter the electric vehicle business in the country.

Total investment of only Rs2 billion will be needed to establish the electric vehicle plant with capacity to produce 20,000 vehicles annually on a double-shift basis. New plants are being established in Pakistan that will begin production in 2021. These plants would be a composite one – which would be
capable of producing electric bikes and vans as well in addition to the electric cars.

Plants for conventional cars are more expensive to establish as they cost around 10 times more than an electric vehicle car plant. Electric vehicle policy of incumbent government would be a turning point for the industry and would also help alleviate pressure on the country’s current account deficit by reducing the oil import bill.

The government has approved the policy draft prepared by the Ministry of Climate Change. The draft, however, had faced stiff resistance from the Ministry of Industries and the Engineering Development Board (EDB).

In fact, it is only a matter of time when Pakistanis will be able to drive electric vehicles in the country. There is an association of electric vehicle which is called Pakistan Electric Vehicles and Parts Manufacturers and Traders Association ((PEVPMTA). Many People of auto industry are opposing the electric vehicle policy of the current regime, but these people will be using and investing in it in the days to come.

5.6.4 Required Infrastructure for Electric Vehicles

Although electric vehicles are a good bet, the question of availability of electricity and electric infrastructure in Pakistan arises. Normally people think about cars when electric vehicles are mentioned but buses will be the main consumer of electricity. According to a study conducted by the National Transmission and Despatch Company (NTDC), the government plans to develop 120 new power projects by 2040 in a bid to add 74,448 megawatts of production capacity to the system. Most of this capacity will come from hydel, domestic coal and renewable sources including wind and solar.

In the year 2040, Pakistan’s energy demand is projected at 80,425MW while supply will stand at 98,091MW after the addition, according to the NTDC.

The current demand for energy in Pakistan stands at 26,270MW while the country generates surplus energy of 27,715MW with spare capacity of 17,600MW which remains to be utilized. As far as charging infrastructure for
electric vehicles is concerned, some companies are mulling over investing in this area of infrastructure.

Total Parco has shown willingness to set up charging infrastructure for electric vehicles in Pakistan, which has also established 400 electric stations in France. Total Parco is a major oil marketing company with 800 stations in Pakistan. In this regard, the parent company of Indus Motor has signed a contract with BYD of China, a giant in the electric vehicle market.

Actually, Japan only excels in fuel engines, but it did not pay attention to electric vehicles, which is why China has become the centre of attention for every country which wants to introduce electric vehicles to get rid of environmentally hazardous fossil fuel engines.

5.7 Shipbuilding Industry of Pakistan

In Pakistan, there is not numerous ventures of shipbuilding. Just a single fundamental industry of shipbuilding exists that is Karachi Shipyard and Engineering Works Limited (KS&EW). It was built up in mid-fifties as a task of Pakistan Industrial Development Corporation (PIDC) and was later consolidated as an open constrained organization in 1957 which is overseen by a Board of Directors and a Managing Director. The shipyard is spread across 71 acres of land and situated at west wharf in Karachi. It is outfitted with an enormous shipbuilding corridor, three square manufacture zones, three shipbuilding billets, two dry docks, a machine shop, a coarseness impacting and painting office, a 7881 tons limit transport lift and move framework and 13 stopping stations.

5.7.1 Services of KS&EW

The services of KS&EW include shipbuilding, ship repair, general engineering, material testing laboratory and shipyard training school.

Shipyard building comprises of specialized Shipbuilding Division builds a wide range of ships with high quality and reliability for national and international clients. They undertake all activities including complete construction and erection, painting and blasting, outfitting equipment tests and trials. Their focus is always on maintaining schedules and meeting the contractual targets. The
Construction work is carried out with full guarantee and in line with the standards of the world’s major classification societies, such as Lloyd’s Register for Shipping, Bureau Veritas, China Classification Society, etc. KS&EW Shipbuilding team comprises of Marine Engineers, Naval Architects, Production Engineers, Design and Project Management teams with extensive experience for construction of various types of ships. Since inception, they have built over 444 vessels of different types and sizes. The Shipbuilding Division is well equipped to build ships up to 26,000 DWT including Frigates, Fast Attack Crafts, Logistic Support Ships, Bulk carriers, Oil Tankers, Seagoing and Harbour Tugs, Dredgers, Hopper Barges, Passenger Ferries, Fishing Trawlers and special purpose crafts.

Ship repairing section has a comprehensive setup for repairing, rebuilding and overhauling of naval and commercial vessels with high quality and safety standards. It provides integral services through a highly qualified workforce with wide experience. KS&EW is well equipped with docks, cranes, as well as the best tools and machinery to undertake above and underwater repairs. Over 5000 vessels of national and international origin have been repaired so far. They regularly undertake steel renewal, major structure repairs, machinery overhauls and underwater repairs for Pakistan Navy, Pakistan Maritime Security Agency, Karachi Port Trust, Port Qasim Authority and several foreign clients.

In general engineering, Karachi Shipyard can rightly be called “the major heavy mechanical engineering industry of Pakistan”. Although Karachi Shipyard is mainly designed for shipbuilding, however, its role in support of industry and developmental engineering is prominent. It has a long record of service to industry and during slump in the shipbuilding industry, has promoted further diversification of its general engineering activities. Major areas of general engineering of business are sugar plants / machinery, overhead cranes (up to 100 tons capacity), industrial boilers and pressure vessels, cement plants, flood light and wind turbine towers, equipment for petroleum and petrochemical industry, drilling rigs, structures for power plants and barrage gates. Karachi Shipyard has extensive experience and expertise in manufacturing of boilers and pressure vessels in accordance with international quality standards. So far Karachi Shipyard has manufactured more than 100 boilers up to 80 tons per hour steam generating capacity.
Material Testing Laboratory is a well-equipped in-house laboratory available to carry out all types of chemical, physical and mechanical testing of metals, minerals, ores etc, with accuracy, reliability and customer’s satisfaction in accordance to the BS, ASTM and JIS methods or to any other classification rules as required by the customers. The laboratory is ISO 9001:2008 certified and has a good reputation for its expeditious test result all over Pakistan. Following test facilities are available at Karachi Shipyard Material Testing Laboratory. In the category of mechanical & physical tests there are Tensile Test, Bend Test, Re-Bend Test, Flattening Test, Impact Test / Charpy Test, Hardness Test (Brinell / Rockwell / Vicker), Investigation of Metals, Welder Qualification Test, Salt Spray Test / Surface Test, Thickness & Weight of Coating (Zinc / Tin), NDT: Ultrasonic / Dye Penetration / Radiography / Magna Particle Test, Pressure Test and Load Test. In the category of chemical tests there are Chemical Analysis of all kinds of metals (ferrous and non-ferrous) refractory, Purity Test and Analysis of Minerals / Ores etc. In the calibration of measuring instruments there are Measuring Tapes, Pressure Gauges, Vernier Callipers, Micrometres, Ampere Meters / Volt Meters / Clamp Meters, Lab Analytical Balances, Feeler Gauges and Dial Indicators, etc.

Shipyard Training School is another sign of KS&EW. To make Shipyard Training School a main Institution in this area, therefore contributing emphatically towards aptitude improvement of Pakistan Human Resource in accordance with the National Skilled Human Resource strategy. STS was set up in 1957 as Apprentice Training School for marine building apprenticeship (4 years) courses. In 1994 Sindh Board of Technical Education (SBTE) endorsed its professional courses and became Technical Training Center (TTC). The Institute was renamed as Shipyards Institute of Technology after connection with SBTE in 2004 for a long time Diploma of Associate Engineer (DAE) and short courses in electrical, mechanical and transport development advances. In 2017, the organization was renamed as Shipyard Training School. The organization has so far prepared in excess of 25,000 people in various exchanges.

The strategic Shipyards Training School is to help and make accessible assets that will educate, illustrate, and liberate National Human Resource to know their personality, seek after their fate, and change their locale.
The goal of shipyard preparing school is to serve our nation and modern segments using the maximum capacity and endeavour towards advancement of gifted human asset with the assistance of NAVTTC preparing projects and help that encourages mechanical parts to be kept an eye on with talented workforce to accomplish confidence and contribute towards thriving of the nation.

5.7.2 Projects of KS&EW

KS&EW has worked on many different sorts of projects both defence and commercial nature. In the 1990s KS&EW constructed two Agosta 90B submarines for the Pakistani Navy. These were built under a transfer of technology from DCNS, France. The technology was mostly related to construction of the pressure hull and out-fitting of the submarine. The third submarine, PNS Hamza, was constructed with MESMA AIP unit, while the first two (PNS Khalid and PNS Saad) will be retrofitted during their next overhauls with a "plug" containing a MESMA AIP unit. The submarine's hull will be cut, and the plug inserted. The second MESMA unit was shipped in June 2011A contract was signed on 22 January 2013 between the Ministry of Defence Production, Pakistan and STM, Turkey to construct a 17000-ton fleet tanker for the Pakistani Navy. The Kit of Material was provided by STM and the construction, outfitting took place at KS&EW. The construction of the vessel started on 27 November 2013 and it was launched on 19 August 2016. This is the largest warship built in Pakistan till date.

The next submarine project will see KS&EW jointly involved with Chinese company CSOC (China Shipbuilding & Offshore International Co. Ltd.) in the design and construction of 8 submarines equipped with air-independent propulsion (AIP). These will be designed to Pakistani specifications and four will be built at a CSOC shipyard in China, while four will be constructed by KS&EW. It is believed that little upgrading of facilities is required because much of the current infrastructure meets the requirements. The preliminary negotiations were reported to be completed in March 2011. It was earlier believed that the project would involve China's Type-041 Yuan class submarine, which had been mentioned by Admiral Noman Bashir, Chief of Naval Staff, several times since 2009. There are a few categories in which KS&EW has built different vessels namely merchant vessels, naval vessels, Mine Countermeasure Vessels and
Auxiliary Vessels. In Merchant Vessels, Al-Abbas - first one was built in 1967 for Muhammadi Steamship Company Limited. MV Lalazar - a 13,300 DWT Cargo Vessel was built for National Shipping Corporation, Pakistan. Delivered on 20th Nov 1974. MV Hetian - a 13,160 DWT Cargo Vessel was built for China National Machinery Import & Export Corporation, China, in 1978. MV Islamabad - MV Islamabad is the largest general cargo and container ship built at KS&EW with 17,200 DWT. The ship is in service with Pakistan National Shipping Corporation. You Ti 20 - a 17,000 TDW Bulk Carrier You Yi 20 was built in 1992 for China National Machinery Import & Export Corporation. In the naval vessel categories, there are frigates which includes

PNS Aslat of the F-22P Zulfiquar class frigate

Multi-Purpose Patrol craft

PNS Dehshat of the Azmat class missile boat

PNS Jurrat & PNS Quwwat of the Jurrat class missile boat

PNS Jalalat & PNS Shujaat of the Jalalat II class missile boat

PNS Larkana & PNS Rajshahi of the Larkana class Gunboat

Maritime Patrol Vessels (600 and 1500 tonnes displacement) for Pakistan Maritime Security Agency

Mine Countermeasure Vessels

PNS Mujahid of the Tripartite-class minehunter

Submarines

PNS Hamza & PNS Saad of Agosta 90B class submarine class

Auxiliary Vessels

PNS Moawin (A39)- 17,000 Tons Fleet Tanker

PNS Bhit Shah - Split-Hopper Barge

PNS Kalmat & PNS Gwader - Coastal Tankers
PNS Madadgar & PNS Rasadgar - Small Tanker Cum Utility Ship

These all above are different products of Karachi Shipyard & Engineering Works Limited.

5.8 Self Assessment Questions

1. Discuss the advantages of Heavy Industries in the development of third world countries like Pakistan.

2. Keeping in view the situation of Pakistan, highlight the disadvantages of Large-scale Production.

3. Write a brief note on the following.
   
   (i) Heavy Industries Taxila (HIT),
   
   (ii) Heavy Mechanical Complex (HMC) Taxila

4. Discuss the Automotive Industry of Pakistan in the context of heavy scale industries.

5. Keeping in view the foreign automotive dealers & suppliers in Pakistan discuss the following.
   
   (i) Motorcycle Production in Pakistan, (ii) Electric Vehicle Industry in Pakistan

6. Evaluate the role of Shipbuilding Industry in Pakistan.

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TRANSPORT

Written by: Mr. Arshad Iqbal Wani
Reviewed by: Dr. Altaf Ullah

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<td>6.6 Self Assessment Questions</td>
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<tr>
<td>6.7 Bibliography</td>
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</table>
Introduction

The transport system in Pakistan is a rich sector which includes Road Transport, Railway Network, Air transportation and Shipping. The most useful system for the public is road transport as the motorways and highways of Pakistan made the road traveling easier as well as comfortable. The infrastructure of road network is rich throughout Pakistan due to construction of highways and motorways. The launching of new branded bus services is highly expensive as compare to the railway but in public these have become very famous. On the other hand, the network of Pakistan railway is the oldest and cheapest in the country. The railway travel is considered more economic and safe than traveling by road.

Moreover, the trend of air traveling is also increasing in the country. It was considered better for foreign visit in past but now the public prefer air traveling within the country also for saving the time. A number of air corporations have been serving in Pakistan along with PIA.

This unit also reveals about the shipping services. Now we have Port Qasim, Karachi Port Trust and Gawadar Port for shipping. Although, Pakistan National Shipping Corporation (PNSC), unfortunately, could not improve its performance since the independence. However, the importance of shipping cannot be neglected at all.

Objectives

After reading this unit, the students will be able to:

1. understand the transport system of Pakistan.

2. know about the Road transport network as well as role of highways and motorways of the country.

3. Know about the Railway network and its impact on the economy of the country.

4. Know about the role of Air transport and Shipping and their contribution in the transport system of Pakistan.
6.1 Transport System of Pakistan

The word “transport or transportation” means the movement of goods and people from one place to another. This term is mainly derived from a Latin word “trans” which means across and “portare” means, to carry. From the beginning of history, humans have an urge to become mobile that leads to progress of human society. The history of this mobility or transportation is actually the history of civilization and mankind.

Pakistan is a developing country and like all other countries, advanced and sound transportation system is a foundation and base for progress. Better transportation system contributes to the prosperity and success of a nation and it is also an economic factor of production.

Role of Transportation

- Economic Development
- Social & Cultural Development
- Industrial Development

If we want to achieve a goal of sustainable economic development in Pakistan than it is not possible without a low cost and robust transport and logistics sector. Efficient and fast performance of transport sector is related with all trade activities especially with the enhanced export competitiveness. In the past various governments were aware about the importance of this sector and played their vital roles through a continuous process of reform and development supported by focused investments in all of its sub-sectors.

6.2 Road Network

Roads make a pivotal and critical contribution to economic growth and development and bring important economic and social benefits to society. Roads play a vital role in order to make a nation grow and develop. Moreover, providing access to employment, social development, health and education services, makes a road network decisive in fighting against privation and poverty. Roads open up more areas and stimulate economic and social development. For these reasons, road infrastructure is the most basic and important of all public assets.

National Highway Authority (NHA) is the main stakeholder which is playing a
pivotal role in improving the quality and length of Pakistan's road network, which entails in improving the quality and standard of life of the people apart from creating job opportunities. The National Highway Authority (NHA) was founded, in 1991, through an Act of the Parliament, for development, planning, repair, operation and maintenance of National Highways and Strategic Roads specially entrusted to NHA by the Federal Government or by a Provincial Government or other authority concerned. NHA is custodian and caretaker of 47 national highways, motorways, expressway and strategic routes having a total length of 12,731 kilometers. It is 4.8% of total national road network i.e. 263,775 kilometers, which crisscross the country and provide access and connectivity to major urban centers. These are not to be confused with provincial highways, which are provincial roads maintained by the respective provinces. However, National Highways carries 80% of commercial traffic and N-5 which is a Jugular vein of Pakistan, carries 65% of this load in Pakistan. On the basis of road network Pakistan ranks 21st position worldwide. All national highways in Pakistan are pre-fixed with the letter 'N' (for "National") followed by the unique numerical designation of the specific highway (with a hyphen in the middle), e.g. "N-5". Each numerical designation is separated by five numerals, i.e. N-5, N-10, N-15, etc. National Highways are distinct from 'Strategic Highways', which begin with the prefix 'S' and are owned, controlled and operated by the Ministry of Defense. Being custodian of Highway assets of Pakistan's road network, NHA is committed to provide safe, modern and efficient transportation system.

Administratively we can divide the roads of Pakistan into following broad categories:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Administration</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>District Roads</td>
<td>District Government</td>
<td>Providing access to villages and remote areas</td>
</tr>
<tr>
<td>Municipal &amp; Cantonment Roads</td>
<td>Municipal Government and army</td>
<td>Providing access to villages and remote areas</td>
</tr>
<tr>
<td>National Highways, Motorways &amp; Strategic Roads</td>
<td>National Highway Authority (NHA), Ministry of Communications</td>
<td>Representing the main transport corridors and providing inter-provincial linkages and connections to the neighboring countries</td>
</tr>
</tbody>
</table>
As the cornerstone of Highway network, National Highways functions as the backbone of Pakistan's transportation system, plays an important role in the development of micro and macro economy and also enhances the national integration by increasing the social and economic dependence among the Provinces. NHA's existing portfolio consists of 38 on-going projects with an allocation of Rs.176,636.80 million in PSDP 2018-19 out of which 66,700.00 million is the Foreign Exchange Component (FEC) and Rs.109,936.80 million is the local component. There are also 08 new schemes in PSDP 2018-19 with total estimated cost of Rs. 8,561.00 million.

### 6.2.1 National Highways of Pakistan

<table>
<thead>
<tr>
<th>No. of Highway</th>
<th>Route</th>
<th>Total length in Km.</th>
<th>Description</th>
<th>No. of Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-5</td>
<td>Karachi to Torkham</td>
<td>1819</td>
<td>Karachi-Hyderabad-Multan-Lahore-Gujranwala-Gujrat-Islamabad-Peshawar</td>
<td>06</td>
</tr>
<tr>
<td>N-10</td>
<td>Karachi-Gawadar (Makran Coastal Highway)</td>
<td>653</td>
<td>Omara-Pasni</td>
<td>02</td>
</tr>
<tr>
<td>N-15</td>
<td>Mansehra-Chilas</td>
<td>240</td>
<td>Mansehra-Balakot-Kaghan-Naran-Batakundi-Jalkhad-Besal-Babusar Pass-Chilas</td>
<td>02</td>
</tr>
<tr>
<td>N-25</td>
<td>Karachi-Chaman (RCD Highway)</td>
<td>813</td>
<td>Karachi-Bela-Khuzdar-Kalat-Quetta-Chaman</td>
<td>02</td>
</tr>
<tr>
<td>N-30</td>
<td>Basima-Khuzdar</td>
<td>110</td>
<td>Basima-Jiwa-Malki-Anjeeri-Khuzdar</td>
<td>02</td>
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<tr>
<td>------</td>
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<td>-------------------------------------------------------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>N-40</td>
<td>Quetta-Taftan</td>
<td>610</td>
<td>Quetta-Noukundi-Taftan</td>
<td>02</td>
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<tr>
<td>N-45</td>
<td>Nowshera-Chitral</td>
<td>309</td>
<td>Nowshera-Takht Bai-Malakand Pass-Temargara-Lower Dir-Upper Dir-Lowari Pass-Drosh-Ayun-Chitral</td>
<td>02</td>
</tr>
<tr>
<td>N-50</td>
<td>Kuchlack – Dera Ismail Khan</td>
<td>531</td>
<td>Kuchlack-Zhob-Tank-Dera Ismail Khan</td>
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<tr>
<td>N-55</td>
<td>Karachi-Peshawar</td>
<td>1264</td>
<td>Karachi-Kotri-Shikarpur-Sukkur-Dera Ghazi Khan-Kohat-Peshawar</td>
<td>06</td>
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<tr>
<td>N-65</td>
<td>Quetta-Sukkur</td>
<td>385</td>
<td>Quetta-Sibi-Sukkur</td>
<td>02</td>
</tr>
<tr>
<td>N-70</td>
<td>Qila SaifULLAH-Multan</td>
<td>447</td>
<td>Qila SaifULLAH-Loralai-Dera Ghazi Khan-Multan</td>
<td>02</td>
</tr>
<tr>
<td>N-75</td>
<td>Islamabad-Kohala</td>
<td>90</td>
<td>Islamabad-Murree-Birot-Aliot-Kohala</td>
<td>04</td>
</tr>
<tr>
<td>N-80</td>
<td>Islamabad-Kohat</td>
<td>146</td>
<td>Islamabad-Fatejang-Jand-Khushhal garh-Kohat</td>
<td>02</td>
</tr>
<tr>
<td>N-85</td>
<td>Hushab-Surab</td>
<td>487</td>
<td>Hushab-Surab</td>
<td>02</td>
</tr>
<tr>
<td>N-90</td>
<td>Khwazakhela-Besham</td>
<td>64</td>
<td>Khwazakhela-Alpuri-Shangla Pass-Besham</td>
<td>02</td>
</tr>
<tr>
<td>N-95</td>
<td>Chakdara-Kalam</td>
<td>135</td>
<td>Chakdara-Mingora-Madyan-Bahrain-Kalam</td>
<td>02</td>
</tr>
<tr>
<td>N-105</td>
<td>Larkana-Naudero-Lakh</td>
<td>61</td>
<td>Larkana-Naudero-Lakh</td>
<td>02</td>
</tr>
<tr>
<td>N-110</td>
<td>Gharo-Keti Bandar</td>
<td>90</td>
<td>Gharo-Keti Bandar</td>
<td>02</td>
</tr>
<tr>
<td>N-120</td>
<td>Hyderabad-Khorkharap</td>
<td>220</td>
<td>Hyderabad-Mirpur Khas-Umerkot-Islamgarh-Khorkharap</td>
<td>02</td>
</tr>
<tr>
<td>N-125</td>
<td>Taxila-Haripur</td>
<td>44</td>
<td>Taxila-Jaulian-Khanpur-Surajgali-Haripur</td>
<td>02</td>
</tr>
<tr>
<td>N-155</td>
<td>Larkana-Mohenjodaro</td>
<td>28</td>
<td>Larkana-Mohenjodaro</td>
<td>02</td>
</tr>
</tbody>
</table>
6.2.2 Strategic Highways of Pakistan

<table>
<thead>
<tr>
<th>No. of Highway</th>
<th>Route</th>
<th>Total length in Km.</th>
<th>Description</th>
<th>No. of Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-255</td>
<td>Larkana-Nasirabad</td>
<td>34</td>
<td>Larkana-Nasirabad</td>
<td>02</td>
</tr>
<tr>
<td>N-305</td>
<td>Sakrand-Nawabshah</td>
<td>35</td>
<td>Sakrand-Nawabshah</td>
<td>02</td>
</tr>
<tr>
<td>N-455</td>
<td>Larkana-Shahdadkot</td>
<td>50</td>
<td>Larkana-Shahdadkot</td>
<td>02</td>
</tr>
<tr>
<td>N-655</td>
<td>Ratodero-Naudero</td>
<td>18</td>
<td>Ratodero-Naudero</td>
<td>02</td>
</tr>
</tbody>
</table>

6.2.3 Motorways of Pakistan

Motorways of Pakistan are a network of high-speed, controlled-access, multiple-lane, highways which are operated, maintained and owned, federally by Pakistan's National Highway Authority. Currently 1860 km of motorways are operational as of 18 November 2019, while currently 2406 km are under construction. All motorways in Pakistan are pre-fixed with the letter 'M' (for "motorway") followed by the unique numerical designation of the specific highway (with a hyphen in the middle), e.g. "M-1".

Pakistan's motorways are an important part of Pakistan's "National Trade Corridor Project “which aims to link Pakistan's three Arabian Sea ports (Karachi Port, Port Bin Qasim and Gawadar Port) to the rest of the country through its national highways and motorways network and further north with Afghanistan, Central Asia and China. The project was planned in 1990. The China Pakistan Economic
Corridor project aims to link Gawadar Port and Kashgar (China) using Pakistani motorways, national highways, and expressways.

### Motorways of Pakistan (Length and Completion)

<table>
<thead>
<tr>
<th>No.</th>
<th>Route</th>
<th>Length (Km)</th>
<th>Lanes</th>
<th>Completion Year</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-1</td>
<td>Peshawar-Islamabad</td>
<td>155</td>
<td>06</td>
<td>2007</td>
<td>Operational</td>
</tr>
<tr>
<td>M-2</td>
<td>Islamabad-Lahore</td>
<td>367</td>
<td>06</td>
<td>1997</td>
<td>Operational</td>
</tr>
<tr>
<td>M-3</td>
<td>Lahore-Abdul Hakim</td>
<td>230</td>
<td>06</td>
<td>2019</td>
<td>Operational</td>
</tr>
<tr>
<td>M-4</td>
<td>Pindi Bhattian-Multan</td>
<td>309</td>
<td>04</td>
<td>2019</td>
<td>Operational</td>
</tr>
<tr>
<td>M-5</td>
<td>Multan-Sukkur</td>
<td>392</td>
<td>06</td>
<td>2019</td>
<td>Operational</td>
</tr>
<tr>
<td>M-6</td>
<td>Sukkur-Hyderabad</td>
<td>296</td>
<td>06</td>
<td></td>
<td>Planned</td>
</tr>
<tr>
<td>M-7</td>
<td>Dadu-Hub</td>
<td>270</td>
<td></td>
<td></td>
<td>Planned</td>
</tr>
<tr>
<td>M-8</td>
<td>Ratodero-Gawadar</td>
<td>892</td>
<td>02</td>
<td></td>
<td>Partially Operational Under Construction</td>
</tr>
<tr>
<td>M-9</td>
<td>Hyderabad-Karachi</td>
<td>136</td>
<td>06</td>
<td>2018</td>
<td>Operational</td>
</tr>
<tr>
<td>M-10</td>
<td>Karachi-Northern Bypass</td>
<td>57</td>
<td>02</td>
<td>2007</td>
<td>Operational</td>
</tr>
<tr>
<td>M-11</td>
<td>Kharian-Lahore</td>
<td>150</td>
<td>04</td>
<td>2020</td>
<td>Under Construction</td>
</tr>
<tr>
<td>M-14</td>
<td>Hakla-D.I. Khan</td>
<td>280</td>
<td>04</td>
<td>2020</td>
<td>Under Construction</td>
</tr>
<tr>
<td>Hazara Motorway</td>
<td>Hasanabdal-Thakot</td>
<td>180</td>
<td>02-06</td>
<td>2020</td>
<td>Partially Operational Under Construction</td>
</tr>
<tr>
<td>Swat Motorway</td>
<td>Nowshera-Chakdara</td>
<td>81</td>
<td>04</td>
<td>2020</td>
<td>Partially Operational</td>
</tr>
</tbody>
</table>
6.2.4 Expressways of Pakistan

Expressways of Pakistan are a network of multiple-lane, high-speed toll highways in Pakistan, which are owned, maintained and operated by various levels of government. All federal expressways are controlled by the National Highway Authority, while others are provincially and municipally controlled. Expressways are usually higher grades than national highways, but differ from motorways by having less access restrictions. All federal expressways are pre-fixed with the letter 'E' (for "expressway") followed by the unique numerical designation of the specific highway (with a hyphen in the middle).

<table>
<thead>
<tr>
<th>Name</th>
<th>Length (Km)</th>
<th>Lanes</th>
<th>Completion Year</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1 Expressway Peshawar–Torkham Expressway</td>
<td>65</td>
<td>04</td>
<td>2023</td>
<td>Proposed</td>
</tr>
<tr>
<td>E-2 Expressway Islamabad Expressway</td>
<td>28</td>
<td>10</td>
<td>2018</td>
<td>Partially Operational</td>
</tr>
<tr>
<td>E-3 Expressway Kot Sarwar–Hafizabad–Wazirabad Expressway</td>
<td>100</td>
<td>04</td>
<td>2020</td>
<td>Proposed</td>
</tr>
<tr>
<td>E-5 Expressway Khanewal–Lodhran Expressway</td>
<td>103</td>
<td>04</td>
<td>2019</td>
<td>Operational</td>
</tr>
<tr>
<td>E-6 Expressway Sukkur–Jacobabad Expressway</td>
<td>69</td>
<td>04</td>
<td>2020</td>
<td>Proposed</td>
</tr>
<tr>
<td>E-6/B Expressway Ratodero–Sehwan Expressway</td>
<td>200</td>
<td>04</td>
<td>2020</td>
<td>Proposed</td>
</tr>
<tr>
<td>E-75 Expressway Islamabad–Muzaffarabad Expressway</td>
<td>130</td>
<td>04</td>
<td>2017</td>
<td>Partially Operational Under</td>
</tr>
</tbody>
</table>
E-90 Expressway Besham–Khwazakhela Expressway | 66 | 04 | Proposed
---|---|---|---
Lahore–Nankana Sahib Expressway | 66 | 04 | Proposed
Peshawar Northern Bypass | 32 | 04 | 2013 Operational

### 6.2.5 Provincial Highways of Punjab

The Provincial Highways of Punjab consists of all public highways maintained by the province of Punjab. The Punjab Highway Department under the Department of Transportation maintains over 38,000 kilometers (24,000 mi) of roadways organized into various classifications which crisscross the province and provide access to major urban centres. These are not to be confused with national highways which are federal roads maintained by the Government of Pakistan and the National Highway Authority.

<table>
<thead>
<tr>
<th>Highway</th>
<th>Route</th>
<th>Length(Km)</th>
<th>Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chakwal Khushab Road</td>
<td>Chakwal – Khushab</td>
<td>104</td>
<td>02</td>
</tr>
<tr>
<td>Bhalwal-Gujrat Road</td>
<td>Bhalwal – Gujrat</td>
<td>135</td>
<td>02</td>
</tr>
<tr>
<td>Bhalwal-Sargodha Road</td>
<td>Bhalwal – Sargodha</td>
<td>35</td>
<td>02</td>
</tr>
<tr>
<td>Faisalabad–Chiniot Road</td>
<td>Faisalabad – Chiniot</td>
<td>23</td>
<td>02</td>
</tr>
<tr>
<td>Faisalabad–Shahkot–Sheikhupura Road</td>
<td>Faisalabad – Sheikhupura</td>
<td>23</td>
<td>02</td>
</tr>
<tr>
<td>Faisalabad-Sangla Hill Road</td>
<td>Faisalabad – Sangla Hill</td>
<td>50</td>
<td>02</td>
</tr>
<tr>
<td>Faisalabad-Samundri Road</td>
<td>Faisalabad – Samundri</td>
<td>43</td>
<td>02</td>
</tr>
<tr>
<td>Jalalpur–Gujrat Road</td>
<td>Jalalpur – Gujrat</td>
<td>194</td>
<td>02</td>
</tr>
<tr>
<td>Jhang–Chiniot Road</td>
<td>Jhang – Chiniot</td>
<td>194</td>
<td>02</td>
</tr>
<tr>
<td>Road Description</td>
<td>Origin – Destination</td>
<td>Distance</td>
<td>Year</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>------------------------------------</td>
<td>----------</td>
<td>------</td>
</tr>
<tr>
<td>Lahore-Jaranwala Road</td>
<td>Lahore – Jaranwala</td>
<td>98</td>
<td>02</td>
</tr>
<tr>
<td>Lahore–Kasur Road (Ferozepur Road)</td>
<td>Lahore – Kasur</td>
<td>66</td>
<td>02</td>
</tr>
<tr>
<td>Mandra Chakwal Road</td>
<td>Mandra – Chakwal</td>
<td>63</td>
<td>04</td>
</tr>
<tr>
<td>Nankana Sahib-Sangla Hill Road</td>
<td>Nankana Sahib – Sangla Hill</td>
<td>47</td>
<td>02</td>
</tr>
<tr>
<td>Sheikhupura–Hafizabad Road</td>
<td>Sheikhupura – Hafizabad</td>
<td>50</td>
<td>02</td>
</tr>
<tr>
<td>Sheikhupura–Sharaqpur Road</td>
<td>Sheikhupura – Sharaqpur</td>
<td>31</td>
<td>02</td>
</tr>
<tr>
<td>Sohawa Chakwal Road</td>
<td>Sohawa – Chakwal</td>
<td>70</td>
<td>04</td>
</tr>
<tr>
<td>Talagang-Chakwal Road</td>
<td>Talagang – Chakwal</td>
<td>45</td>
<td>02</td>
</tr>
<tr>
<td>Talagang–Mianwali Road</td>
<td>Talagang – Mianwali</td>
<td>101</td>
<td>02</td>
</tr>
<tr>
<td>Talagang–Fateh Jang Road</td>
<td>Talagang – Fateh Jang</td>
<td>85</td>
<td>02</td>
</tr>
</tbody>
</table>

Some other important highways of Punjab Province are:

1. Wazirabad–Sialkot Road
2. Wazirabad–Daska Road
3. Wazirabad–Chiniot–Jhang Road
4. Daska–Sambrial Road
5. Daska–Pasrur Road
6. Girot–Adhikot–Kaloor Kot Road
7. Narowal–Shakargarh Road
8. Gujrat–Phalia Road
9. Phalia–Kuthiala Sheikhan Road
10. Gujrat–Dinga–Mandi Bahauddin Road
11. Gujrat–Bhimber Road
12. Kharian–Dinga–Phalia Road
13. Kharian–Sabour Road
14. Mandi Bahauddin–Sarai Alamgir Road
15. Kasur–Raiwind–Manga Mandi Road
16. Kasur–Depalpur Road
17. Kasur Bypass
18. Chiniot–Sargodha–Khushab Road
19. Pindi Bhattian–Chiniot–Kamalpur Road
20. Jhang–Shorkot–Kabirwala Road
21. Jhang–Toba Tek Singh–Chichawatni Road
22. Shorkot City–Shorkot Cantonment Road
23. Mian Channu–Talamba Road
24. Rasool Barrage–Mandi–Malikwal–Bhera Road
25. Phallia–Bherowal–Warryam–Sial Morr–Ahmad Nagar Road
26. Sialkot–Pasar Road
27. Sialkot–Zafarwal–Narowal Road
28. Gujranwala–Pasar Road
29. Gujranwala–Hafizabad–Jalalpur Bhattian Road
30. Gujranwala–Alipur Chatha Road
31. Gujranwala–Farooqabad Road
32. Gujranwala–Sheikhupura Road
33. Gujranwala–Daska–Sialkot Road
34. Sagianwala Bypass
35. Bahawalnagar–Bhukan Road
36. Badian–Shakargarh Road
37. Lahore–Raiwind Road
38. Lahore–Wagah Road
39. Lahore–Barki Road
40. Raiwind–Pattoki Road
41. Shahdara–Narang Mandi Road
42. Sheikhupura–Muridke–Narowal Road
43. Kamoke–Qila Dildar Singh–Alipur Chatha Road.

### 6.2.6 Provincial Highways of Sindh

The Provincial Highways of Sindh consists of all public highways maintained by the province of Sindh. The Sindh Highways Department under the Works & Services Department maintains over 4,800 kilometers (3,000 mi) of roadways organized into various classifications which crisscross the province and provide access to major urban centers.
<table>
<thead>
<tr>
<th>Highway</th>
<th>Course</th>
<th>Length(km)</th>
<th>Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>S01-005</td>
<td>Jhangara – Unnamed village</td>
<td>28</td>
<td>02</td>
</tr>
<tr>
<td>S01-019</td>
<td>Jhangara – Unnamed village</td>
<td>25</td>
<td>02</td>
</tr>
<tr>
<td>S01-060</td>
<td>Jhangara – Bhit</td>
<td>30</td>
<td>02</td>
</tr>
<tr>
<td>S01-098</td>
<td>Jhangara – Chhini</td>
<td>40</td>
<td>02</td>
</tr>
<tr>
<td>S01-025</td>
<td>Goth Band Manchar – Goth Talpur</td>
<td>20</td>
<td>02</td>
</tr>
<tr>
<td>S01-095</td>
<td>Sann – Ranikot</td>
<td>20</td>
<td>02</td>
</tr>
<tr>
<td>S31</td>
<td>Nawabshah – Kumb</td>
<td>131</td>
<td>02</td>
</tr>
</tbody>
</table>

6.2.7 Provincial Highways of Khyber Pakhtunkhwa

The Provincial Highways of Khyber Pakhtunkhwa consists of all public highways maintained by the province of Khyber Pakhtunkhwa. The Pakhtunkhwa Highways Authority under the Department of Transportation maintains over 2,388 kilometers (1,484 mi) of roadways organized into various classifications which crisscross the province and provide access to major urban centres. All provincial highways in Khyber Pakhtunkhwa are pre-fixed with the letter 'S' followed by the unique numerical designation of the specific highway (with a hyphen in the middle), i.e. S-1, S-2, S-3, etc.

<table>
<thead>
<tr>
<th>Highway</th>
<th>Route</th>
<th>Length(Km)</th>
<th>Route</th>
<th>Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>Peshawar-Taxila</td>
<td>194</td>
<td>Peshawar-Charsadda–Mardan-Swabi-Topi-Ghazi-Sirikut-Panian-Haripur-Hattar</td>
<td>02</td>
</tr>
<tr>
<td>S-1/A</td>
<td>Naguman-Pir Qilla</td>
<td>17</td>
<td>Naguman-Shabqadar-Pir Qilla</td>
<td>02</td>
</tr>
<tr>
<td>S-1/B</td>
<td>Mardan Ring Road</td>
<td>34</td>
<td>Mardan City</td>
<td>02</td>
</tr>
<tr>
<td>S-2</td>
<td>Chitral-Shandur</td>
<td>172</td>
<td>Chitral-Booni-Mastuj-Laspur-Shandur</td>
<td>02</td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
<td>-----</td>
<td>------------------------------------</td>
<td>----</td>
</tr>
<tr>
<td>S-3/B</td>
<td>Chakdara-Dheri</td>
<td>80</td>
<td>Chakdara-Shamoza-Kabal-Kanju-Matta-Dheri</td>
<td>02</td>
</tr>
<tr>
<td>S-4</td>
<td>Timergara-Peshawar</td>
<td>169</td>
<td>Timergara-Munda-Khar-Nawagai-Ghullanai-Pir Qilla-Peshawar</td>
<td>02</td>
</tr>
<tr>
<td>S-4/A</td>
<td>Munda-Chokiatan</td>
<td>97</td>
<td>Munda-Samarbagh-Shahi-Chokiatan</td>
<td>02</td>
</tr>
<tr>
<td>S-5</td>
<td>Shah Maqsood-Abbottabad</td>
<td>117</td>
<td>Shah Maqsood-Lora-Ghora Gali-Barrian-Nathiagali</td>
<td>02</td>
</tr>
<tr>
<td>S-5/A</td>
<td>Kuza Gali-Khanapur</td>
<td>07</td>
<td>Kuza Gali-Ayubia-Khanaspur</td>
<td>02</td>
</tr>
<tr>
<td>S-6</td>
<td>Swabi-Khushalgarh</td>
<td>123</td>
<td>Swabi-Jehangira-Khairabad-Nizampur-Khushalgarh</td>
<td>02</td>
</tr>
<tr>
<td>S-6/A</td>
<td>Nowshera-Nizampur</td>
<td>35</td>
<td>Nowshera-Manki-Nizampur</td>
<td>02</td>
</tr>
<tr>
<td>S-7</td>
<td>Kohat-Parachinar</td>
<td>194</td>
<td>Kohat-Hangu-Thall-Chapari-Parachinar</td>
<td>02</td>
</tr>
<tr>
<td>S-8</td>
<td>Thall-Darya Khan</td>
<td>66</td>
<td>Thall-Mir Ali-Isha-Razmak-Khirgi-Tank-Dera Ismail Khan-Darya Khan</td>
<td>02</td>
</tr>
<tr>
<td>S-8/A</td>
<td>Giloti-Mastan</td>
<td>146</td>
<td>Giloti-Hatala-Kulachi-Mastan</td>
<td>02</td>
</tr>
<tr>
<td>S-9</td>
<td>Nowshera-Shergarh</td>
<td>73</td>
<td>Nowshera-Charsaada-Umerzai-Harichand-Kulachi-Shergarh</td>
<td>02</td>
</tr>
<tr>
<td>S-10</td>
<td>Shahbazgarhi-Barikot</td>
<td>103</td>
<td>Shahbazgarhi-Rustam-Ambila-Daggar-Karakar</td>
<td>02</td>
</tr>
<tr>
<td>S-10/A</td>
<td>Swarai-Puran</td>
<td>65</td>
<td>Swarai-Dewana Baba-Batar-Sarqilla-Chowga-Puran</td>
<td>02</td>
</tr>
<tr>
<td>S-11</td>
<td>Tajazai-Dera Ismail Khan</td>
<td>155</td>
<td>Tajazai-Lakki-Daratang-Chashma-Dera Ismail Khan</td>
<td>02</td>
</tr>
<tr>
<td>S-11/A</td>
<td>Indus Highway-Bannu</td>
<td>36</td>
<td></td>
<td>02</td>
</tr>
<tr>
<td>S-11/B</td>
<td>Indus Highway-Paharkhel</td>
<td>19</td>
<td></td>
<td>02</td>
</tr>
<tr>
<td>S-12</td>
<td>Mansehra-Haripur</td>
<td>167</td>
<td>Mansehra-Darband-Chappar-Haripur</td>
<td>02</td>
</tr>
<tr>
<td>S-13</td>
<td>Karak-Shakardara</td>
<td>42</td>
<td>Karak-Sabirabad-Shakardara</td>
<td>02</td>
</tr>
</tbody>
</table>
### 6.2.8 Provincial Highways of Gilgit-Baltistan

The Provincial Highways of Gilgit-Baltistan consists of all public highways maintained by Gilgit-Baltistan government. It maintains over 715 kilometers (444 mi) of roadways organized into various classifications.

<table>
<thead>
<tr>
<th>Highway</th>
<th>Route</th>
<th>Length (Km)</th>
<th>Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khaplu–Gayari Road</td>
<td>Khaplu – Gayari</td>
<td>88</td>
<td>01</td>
</tr>
<tr>
<td>Sakisa–Gyong La Road</td>
<td>Sakisa – Gyong La</td>
<td>24</td>
<td>01</td>
</tr>
<tr>
<td>Skardu–Khaplu</td>
<td>Skardu – Khaplu</td>
<td>96</td>
<td>02</td>
</tr>
<tr>
<td>Skardu–Kargil Road</td>
<td>Skardu – Kharmang</td>
<td>126</td>
<td>01</td>
</tr>
<tr>
<td>Skardu–Shigar Road</td>
<td>Skardu – Shigar</td>
<td>35</td>
<td>02</td>
</tr>
<tr>
<td>Gilgit–Nomal–Naltar Road</td>
<td>Gilgit – Nomal - Naltar Lake</td>
<td>55</td>
<td>02</td>
</tr>
<tr>
<td>Gilgit–Shandur Road</td>
<td>Gilgit – Shandur</td>
<td>212</td>
<td>02</td>
</tr>
<tr>
<td>Gahkuch–Ishkoman Road</td>
<td>Gahkuch – Ishkoman</td>
<td>48</td>
<td>01</td>
</tr>
<tr>
<td>Karambar River Road</td>
<td>Ishkoman – Karambar Glacier</td>
<td>33</td>
<td>01</td>
</tr>
<tr>
<td>Ganish–Nagar–Hispar Road</td>
<td>Ganish – Hispar</td>
<td>39</td>
<td>01</td>
</tr>
<tr>
<td>Nagar–Hoppar Road</td>
<td>Nagar – Hopar</td>
<td>13</td>
<td>01</td>
</tr>
<tr>
<td>Sas Valley Road</td>
<td>Murtazaabad – Nagar Khas</td>
<td>16</td>
<td>01</td>
</tr>
</tbody>
</table>
### 6.2.8.1 Length of Roads

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total (Km)</th>
<th>High Type (Km)</th>
<th>Low Type (Km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>249,972</td>
<td>144,652</td>
<td>105,320</td>
</tr>
<tr>
<td>2001-02</td>
<td>251,661</td>
<td>148,877</td>
<td>102,784</td>
</tr>
<tr>
<td>2002-03</td>
<td>252,168</td>
<td>153,225</td>
<td>98,943</td>
</tr>
<tr>
<td>2003-04</td>
<td>256,070</td>
<td>158,543</td>
<td>97,527</td>
</tr>
<tr>
<td>2004-05</td>
<td>258,214</td>
<td>162,841</td>
<td>95,373</td>
</tr>
<tr>
<td>2005-06</td>
<td>259,121</td>
<td>167,530</td>
<td>91,491</td>
</tr>
<tr>
<td>2006-07</td>
<td>259,157</td>
<td>172,827</td>
<td>86,370</td>
</tr>
<tr>
<td>2007-08</td>
<td>259,038</td>
<td>175,000</td>
<td>84,038</td>
</tr>
<tr>
<td>2008-09</td>
<td>260,200</td>
<td>177,060</td>
<td>83,140</td>
</tr>
<tr>
<td>2009-10</td>
<td>260,040</td>
<td>180,190</td>
<td>79,850</td>
</tr>
<tr>
<td>2010-11</td>
<td>259,463</td>
<td>180,866</td>
<td>78,597</td>
</tr>
<tr>
<td>2011-12</td>
<td>261,595</td>
<td>181,940</td>
<td>79,655</td>
</tr>
<tr>
<td>2012-13</td>
<td>263,415</td>
<td>182,900</td>
<td>80,515</td>
</tr>
<tr>
<td>2013-14</td>
<td>263,755</td>
<td>184,120</td>
<td>79,635</td>
</tr>
<tr>
<td>2014-15</td>
<td>265,404</td>
<td>188,430</td>
<td>76,974</td>
</tr>
<tr>
<td>2015-16</td>
<td>265,905</td>
<td>190,355</td>
<td>75,550</td>
</tr>
<tr>
<td>2016-17</td>
<td>267,002</td>
<td>193,871</td>
<td>73,131</td>
</tr>
<tr>
<td>2017-18</td>
<td>268,935</td>
<td>197,452</td>
<td>71,483</td>
</tr>
<tr>
<td>2018-19 P</td>
<td>270,971</td>
<td>201,100</td>
<td>69,872</td>
</tr>
</tbody>
</table>

E : Estimated  P: Provisional Data  Source: National Transport Research Centre
6.3 Railway Network
Pakistan Railway is a single major mode of transport in public sector contributing to economic growth and providing national integration. Pakistan Railways
comprises of total 470 locomotives (458 Diesel Engine and 12 Steam Engines) for 7,791 kilometers length of route. During FY 2019 (July-February), gross earnings grew by 10.3 percent and amounted to Rs 34,0661 million against Rs 30891.1 million during the same period last year. During the period July-February FY 2019, number of passengers carried increased to 39.9 million against 35.9 million during the same period last year, which posted a growth of 11.0 percent. Likewise passenger traffic Km (million), freight carried tones million, and Freight tons Km (million) grew by 11.9 percent, 2.9 percent and 7.8 percent, respectively.

In 2014 the Ministry of Railways launched Pakistan Railways Vision 2026, which seeks to increase the company's share of the transportation sector from 04 to 20 percent with the 886.68 billion (US$6.3 billion) China–Pakistan Economic Corridor rail upgrade. The plan includes development and improvement of existing rail infrastructure, new locomotives, increase in average train speed, improved on-time performance and expansion of passenger service. The first phase of the project was completed in 2017, and the second phase is scheduled for completion by 2021. Pakistan Railways is an active member of the International Union of Railways. In the 2018/19 financial year, Pakistan Railways served 70 million passengers.

At present Pakistan Railways owns 11,881 kilometers (7,383 mi) of track. 80% of the tracks are around 80 to 90 years old. All are 1,676 mm (5 ft 6 in) (broad gauge), except for some industrial lines. The broad-gauge track axle load limit is 22.86 tones, except for the Rohri-Chaman Line (limit 17.78 tones) and Quetta-Taftan Line (limit 17.27 tones). The maximum speed on most lines is 120 kilometers per hour (75 mph), but upgraded sections of the Karachi-Peshawar Line allow speeds up to 130 kilometers per hour (81 mph). Work is in progress to upgrade all main lines to 160 kilometers per hour (99 mph).

### 6.3.1 Earning of Pakistan Railway

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Earning (Rs in millions)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-09</td>
<td>23160</td>
<td>-----</td>
</tr>
<tr>
<td>2009-10</td>
<td>21,886</td>
<td>-5.5</td>
</tr>
<tr>
<td>Year</td>
<td>Passenger Traffic Km (million)</td>
<td>Freight Tons Kms (million)</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>2010-11</td>
<td>18,740</td>
<td>5.0</td>
</tr>
<tr>
<td>2011-12</td>
<td>15,444</td>
<td>5.6</td>
</tr>
<tr>
<td>2012-13</td>
<td>18,070.55</td>
<td>8.4</td>
</tr>
<tr>
<td>2013-14</td>
<td>22,800.22</td>
<td>5.2</td>
</tr>
<tr>
<td>2014-15</td>
<td>31,924</td>
<td>5.3</td>
</tr>
<tr>
<td>2015-16</td>
<td>36,581.87</td>
<td>8.4</td>
</tr>
<tr>
<td>2016-17</td>
<td>40,064.95</td>
<td>5.2</td>
</tr>
<tr>
<td>2017-18</td>
<td>49,569.68</td>
<td>30.891.16</td>
</tr>
<tr>
<td>2018-19</td>
<td>34,066.12</td>
<td>34.066.12</td>
</tr>
</tbody>
</table>

Source: Ministry of Railways (Pakistan Economic Survey 2018-19)
6.3.2 History of Pakistan’s Railway:

During the British rule in Indian Sub-Continent various companies were working to establish railway network in Punjab and Sindh. In the beginning the country's railway system was initially a patchwork of local railway lines operated by small, private companies, which includes the Punjab Railway, Scinde Railway, Delhi Railway and Indus Flotilla. In 1870, the all four companies combined to form the Scinde, Punjab & Delhi Railway. Several other railway lines were soon built, including, Punjab Northern State Railway, Sind–Sagar Railway, Sind–Pishin State Railway, Kandahar State Railway, The Indus Valley State Railway, Trans–Baluchistan Railway and Kandahar State Railway. These six companies merged with the Scinde, Punjab & Delhi Railway to form the North Western State Railway in 1880. Between 1880 and 1947, the North Western State Railway expanded throughout Punjab and Sindh.

After partition in 1947, most infrastructure of the North Western State Railway was in Pakistani land and was renamed as the Pakistan Western Railway whereas in Eastern Bengal, the part of the Assam Bengal Railway in Pakistani land was renamed as the Pakistan Eastern Railway. On the whole Pakistan got 8,122 kilometers (5,047 mi) of the North Western State Railway; 6,880 kilometers (4,280 mi) was 1,676 mm (5 ft 6 in), 506 kilometers (314 mi) was metre gauge, and 736 kilometers (457 mi) was 762 mm (2 ft 6 in) narrow gauge.

From 1950 to 1955, the Mashriq-Maghreb Express operated from Koh-e-Taftan in West Pakistan to Chittagong in East Pakistan, using Indian tracks. In 1954, a branch line was extended from the Karachi–Peshawar Railway Line to Mardan and Charsadda. Two years later, the Jacobabad-Kashmore metre-gauge line was changed to 1,676 mm (5 ft 6 in) broad gauge. The Kot Adu-Kashmore section of the Kotri–Attock Railway Line was built from 1969 to 1973, providing an alternate route from Karachi to northern parts of Pakistan. In 1974, Pakistan Western Railways was renamed as Pakistan Railways. In February 2006, the 126-kilometre (78 mi) Hyderabad–Khorkharapar Branch Line was converted to 1,676 mm (5 ft 6 in). All narrow-gauge tracks in the country were converted to 1,676 mm (5 ft 6 in) or dismantled during 2000s. On 8 January 2016, the Lodhran–Raiwind Branch Line double-rail project was completed.
6.3.3 Railway Lines of Pakistan:

The Railway lines of Pakistan can be divided into following main categories:

(a) Main Lines

Main lines are those railway lines which are running from north to south or east to west through the entire length of Pakistan. These lines join all the major cities. They have strategic importance. There are 04 main lines and one proposed main line in Pakistan:

<table>
<thead>
<tr>
<th>Description</th>
<th>Established</th>
<th>Length</th>
<th>Stations</th>
<th>Travel time</th>
<th>Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Main Line-1) Karachi–Peshawar Line</td>
<td>1881</td>
<td>1,687 km (1,048 mi)</td>
<td>184</td>
<td>22 hrs</td>
<td>1,676 mm (5 ft 6 in) (broad gauge)</td>
</tr>
</tbody>
</table>

Major stations:
1. Karachi City
2. Karachi Cantonment
3. Kotri Junction
4. Hyderabad Junction
5. Nawabshah Junction
6. Rohri Junction
7. Khanpur Junction
8. Lodhran Junction
9. Multan Cantonment
10. Multan City
11. Khanewal Junction
12. Lahore Cantonment
13. Lahore Junction
14. Shahdara Bagh Junction
15. Wazirabad Junction
16. Lala Musa Junction
17. Jhelum
18. Rawalpindi  
19. Taxila Junction  
20. Hasan Abdal  
21. Attock City  
22. Nowshera Junction  
23. Peshawar City  
24. Peshawar Cantonment

<table>
<thead>
<tr>
<th>(Main Line-2)</th>
<th>1916</th>
<th>1,519 km (944 mi)</th>
<th>112</th>
<th>10 hrs</th>
<th>1,676 mm (5 ft 6 in) broad gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kotri–Attock Line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Major stations**

1. Kotri Junction  
2. Jamshoro  
3. Petaro  
4. Sehwan Sharif  
5. Dadu  
6. Mohenjodaro  
7. Larkana Junction  
8. Habib Kot Junction  
9. Jacobabad Junction  
10. Kandkot  
11. Kashmore  
12. Rajanpur  
13. Dera Ghazi Khan  
14. Layyah  
15. Bhakkar  
16. Kundian Junction  
17. Mianwali  
18. Daud Khel Junction  
19. Jand Junction  
20. Basal Junction  
21. Attock City Junction

<table>
<thead>
<tr>
<th>(Main Line-3)</th>
<th>1906</th>
<th>296 km (184 mi)</th>
<th>40</th>
<th>10 hrs</th>
<th>1,676 mm (5 ft 6 in) broad gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rohri–Chaman Line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Major stations**

1. Rohri Junction  
2. Sukkur  
3. 8. Spezand Junction  
4. 9. Quetta  
5. 10. Kuchlak

199
5. Dera Murad Jamali  13. Chaman
7. Mach

<table>
<thead>
<tr>
<th>(Main Line-4)</th>
<th>Quetta–Taftan Line</th>
<th>1902</th>
<th>163 km (101 mi)</th>
<th>06</th>
<th>4.5 hrs</th>
<th>Mixed gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major stations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Quetta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Spezand Junction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Nushki</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Ahmedwal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Dalbandin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Nokundi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Koh-e-Taftan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Boundary Pillar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Mirjaveh (Iran)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Zahedan (Iran)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Main Line-5): is a proposed line which will continue from Taxila to Khunjerab pass, the border between China and Pakistan. It is a part of China-Pakistan Economic Corridor (CPEC). Small part of this line still exists from Taxila to Havelian city. Towards north Havelian is the last railway station of Pakistan. Pakistan awarded a Rs.72 million (US$1.2 million) contract to an international consortium to conduct a feasibility study for establishing a rail link with China to improve trade between the countries. The study will cover a 750-kilometre (470 mi) section between Havelian and the 4,730-metre-high (15,520 ft) Khunjerab Pass over Mansehra District and the Karakoram Highway.

(b) Branch Lines
Branch lines are offshoots from major lines. They are emerging from main junctions to join various small urban centers. Important branch lines are:
1. Hyderabad–Badin Branch Line
2. Hyderabad–Khorkharapar Branch Line
3. Bahawalnagar–Fort Abbas Branch Line
4. Samasata–Amruka Branch Line
5. Shershah–Kot Addu Branch Line
6. Lodhran–Khanewal Chord Line
7. Lodhran–Raiwind Branch Line  
8. Khanewal–Wazirabad Branch Line  
9. Shorkot–Sheikhupura Branch Line  
10. Shorkot–Lalamusa Branch Line  
11. Jand–Kohat Branch Line  
12. Bannu–Tank Branch Line  
13. Daud Khel–Lakki Marwat Branch Line  
14. Malakwal–Khushab Branch Line  
15. Sangla Hill–Kundian Branch Line  
16. Lahore–Wagah Branch Line  
17. Shahdara Bagh–Sangla Hill Branch Line  
18. Shahdara Bagh–Chak Amru Branch Line  
19. Wazirabad–Narowal Branch Line  

(c) Tourist & Heritage Lines
These are small lines which are built on various tourist places or to improve tourism in the country. Some important are:
   1. Changa Manga Forestry Railway  
   2. Dandot Light Railway  
   3. Khewra Salt Mines Railway  
   4. Khyber Pass Railway  
   5. Larkana–Jacobabad Light Railway  
   6. Mardan–Charsadda Branch Line  
   7. Mirpur Khas–Nawabshah Railway  
   8. Nowshera–Dargai Branch Line

In future Government of Pakistan is planning to expand the railway network and in this regard various new lines are proposed to build in various parts of the country. Some important proposed lines are:
   1. Karachi–Gawadar Railway Line (Makran Coastal Railway)  
   2. Mandra–Bhaun Railway  
   3. Gawadar–Mastung Branch Line  
   4. Basima–Jacobabad Branch Line  
   5. Zhob Valley Railway  
   6. Islamabad–Muzaffarabad Branch Line  
6.4 Air Transport

Pakistan International Airlines Corporation (PIAC) came into existence in 1955 as Public Sector organization. However, in April 2016 it was converted from a statutory organization to a company governed by Companies Act 1984, through Pakistan International Airlines Limited (PIAL conversion) Act 2016. At present PIA is passing through a dire financial state. However, the government is very keen to make itself-reliant. Efforts are underway to improve the financial health of the corporation by reducing its losses through various means and modes. Stringent action is being taken against corruption and mismanagement. According to Economic Survey of Pakistan 2018-19 the statistical performance of Pakistan International Airline is as under:

6.4.1 PIA Performance

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Units</th>
<th>Year 2015</th>
<th>Year 2016</th>
<th>Year 2017</th>
<th>Year 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIA Fleet</td>
<td>No. of Planes</td>
<td>38</td>
<td>38</td>
<td>36</td>
<td>32</td>
</tr>
<tr>
<td>Route</td>
<td>Kms</td>
<td>367,251</td>
<td>382,057</td>
<td>360,937</td>
<td>323,303</td>
</tr>
<tr>
<td>Available Seat</td>
<td>million Kms</td>
<td>16,666</td>
<td>19,196</td>
<td>19,108</td>
<td>18,081</td>
</tr>
<tr>
<td>Passenger Load Factor</td>
<td>In %</td>
<td>70.3</td>
<td>71.6</td>
<td>73.20</td>
<td>77.3</td>
</tr>
<tr>
<td>Revenue Flown</td>
<td>000 Kms</td>
<td>67,630</td>
<td>79,842</td>
<td>75,207</td>
<td>70,089</td>
</tr>
<tr>
<td>Revenue Hours Flown</td>
<td>Hours</td>
<td>111,455</td>
<td>131,838</td>
<td>122,081</td>
<td>110,050</td>
</tr>
<tr>
<td>Revenue Passengers Carried</td>
<td>000 Nos.</td>
<td>4,393</td>
<td>5,487</td>
<td>5,342</td>
<td>5,203</td>
</tr>
<tr>
<td>Revenue Passengers</td>
<td>million Kms</td>
<td>11,711</td>
<td>13,751</td>
<td>13,988</td>
<td>13,975</td>
</tr>
<tr>
<td>Revenue Tonne</td>
<td>million Kms</td>
<td>1,191</td>
<td>1,375</td>
<td>1,469</td>
<td>1,472</td>
</tr>
<tr>
<td>Revenue Load Factor</td>
<td>In %</td>
<td>48.9</td>
<td>49.2</td>
<td>55.2</td>
<td>58.4</td>
</tr>
<tr>
<td>Operating Revenue **</td>
<td>Rs million</td>
<td>91.269</td>
<td>89,842</td>
<td>-</td>
<td>100,051</td>
</tr>
<tr>
<td>Operating Expenses **</td>
<td>Rs million</td>
<td>121.222</td>
<td>125,961</td>
<td>-</td>
<td>170,447</td>
</tr>
</tbody>
</table>
As of December 2019, the Pakistan International Airlines fleet consists of the following aircraft:

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>In service</th>
<th>Passengers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Airbus A320-200</td>
<td>12</td>
<td>__</td>
</tr>
<tr>
<td></td>
<td></td>
<td>__</td>
</tr>
<tr>
<td>ATR 42-500</td>
<td>03</td>
<td>__</td>
</tr>
<tr>
<td>ATR 72-500</td>
<td>03</td>
<td>__</td>
</tr>
<tr>
<td>Boeing 777-200ER</td>
<td>06</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Boeing 777-200LR</td>
<td>02</td>
<td>35</td>
</tr>
<tr>
<td>Boeing 777-300ER</td>
<td>04</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

Despite financial constraints and tough and uneven competitive environment, PIAACL gave a stable performance during 2018. To reduce losses, PIA had to take measures like route rationalization and suspended its loss making routes. PIA is in the process of its Strategic Business Plan 2019-23 to improve its performance:

I. Launching of profitable new routes like, Lahore-Muscat, Islamabad-Doha, Lahore-Bangkok-Kualalalmpur and Silakot-Sharjha. These routes are proving very profitable and economically sustainable.

II. More additional routes have been started which include,, Peshawar-Sharjha, Peshawar-Al Ain, Sialkot-Paris-Barcelona and Multan-Sharjha.

III. Increasing frequencies and capacity on profitable routes like Jeddah and Medina moreover closure of loss making routes like Kuwait, Mumbai,
New York, Salalah (Oman)

IV. Halting of all unnecessary office expenditures and extra allowances given on additional assignments to officials.

V. Stoppage of overtime allowances in all cadres along with checking and monitoring of flights by senior officials.

VI. Punctuality and increasing regularity of flights by assigning target to be achieved 90%.

VII. Training of crew, improvement in flight services, and regular monitoring. Introduction of executive economy class on European and Gulf sectors which are attracting more customers.

VIII. Rationalization of fares according to market demand thus helping in increase of seat factor.

IX. By better planning in engineering, flight operation and ground handling departments, delays of flights have been cut down significantly.

X. Special attention on cargo business with rationalization of cargo fares, monitoring of performance, and more effective liaison with all stakeholders.

XI. There is a strong need to inquire about the air accidents in PIA’s flights due to increasing plane crashes due to various reasons. Recently, in the end of May 2020, a passenger carrying plane crashed near Model Colony of Karachi which caused the death of almost one hundred human lives.

6.4.2 Airports in Pakistan
At present 139 airports are operating in Pakistan. These airports broadly fall into following 3 categories:

<table>
<thead>
<tr>
<th>International Airports</th>
<th>Domestic Airports</th>
<th>Military Airports</th>
</tr>
</thead>
</table>

The names of International Airports of Pakistan are:

1. Islamabad International Airport
2. Karachi Jinnah International Airport
3. Lahore Allama Iqbal International Airport
4. Dera Ghazi Khan International Airport
5. Faisalabad International Airport

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6. Gwadar International Airport
7. Multan International Airport
8. Peshawar Bacha Khan International Airport
9. Quetta International Airport
10. Shaikh Zayed International Airport Rahim Yar Khan
11. Sialkot International Airport
12. Turbat International Airport.

The names of Domestic Airports of Pakistan are:
1. Gujrat Airport
2. Hyderabad Airport
3. Maai Bakhtawar Airport Islamkot
4. Jacobabad Airport
5. Jiwani Airport
6. Kadanwari Airport
7. Khuzdar Airport
8. Walton Airport Lahore
9. Mangla Airport
10. Mohenjodaro Airport Larkana
11. Sibi Airport
12. Sindhri Airport
13. Skardu Airport
14. Sui Airport
15. Sukkur Begum Nusrat Bhutto Airport
16. Tarbela Dam Airport
17. Zhob Airport
18. Muzaffarabad Airport
19. Nawabshah Airport
20. Ormara Airport
21. Panjgur Airport
22. Parachinar Airport

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23. Pasni Airport  
24. Rawalakot Airport  
25. Sawan Airport  
26. Saidu Sharif Airport  
27. Sehwan Sharif Airport  
28. Chashma Airport  
29. Chilas Airport  
30. Chitral Airport  
31. Dalbandin Airport  
32. Dera Ismail Khan Airport  
33. Bahawalpur Airport

The Names of Military Airports of Pakistan are:
1. Jacobabad Airbase  
2. Gurha Salim Airport Jhelum  
3. PAF Base Lahore  
4. Minhas Airbase Kamra Attock  
5. Faisal Airbase Karachi  
6. Masroor Airbase Karachi  
7. Kohat Airbase  
8. Mianwali Airbase  
9. Murid Airbase  
10. Peshawar Airbase  
11. PAF Base Nur Khan Rawalpindi  
12. Dhamial Army Airbase Rawalpindi  
13. Samungli Airbase Quetta  
14. Rahwali Army Airfield Gujranwala  
15. Risalpur Airbase  
16. Mushaf Airbase Sargodha  
17. Rafiqui Airbase Shorkot  
18. Sialkot Cantonment Airport  
6.5 Shipping

After the independence Pakistan got a very weak shipping base with only four old ships that have only 18000 tonnes of deadweight capacity. At that time all imported goods were transported on foreign ships which were putting an additional burden on Pakistan’s foreign exchange reserves. The Pakistan Merchant Navy was formed in 1947 by the Government of Pakistan and were authorized to flag the ships and also ensured that the vessels was sea worthy.

In 1963, the National Shipping Ordinance was formulated and National Shipping Corporation (NSC) was established which procured its first used ship, M.V. Rupsa in 1965. The national fleet comprised some 53 vessels which were owned by 10 private shipping companies. The national fleet grew to 71 vessels before the separation of East Pakistan and its emergence as Bangladesh in 1971, when the number declined to 57 vessels after the separation.

On 1st January 1974, President of Pakistan Zulfiqar Ali Bhutto nationalized National Shipping Corporation (NSC) and Pakistan Shipping Corporation (PSC) and other private shipping companies. Nine private shipping companies with a total of 26 ships were nationalized. The national fleet strength increased to 51 vessels including 26 ships under the management of nine nationalized companies and 25 ships with the state-owned NSC. In 1977, 14 ships were inducted in the Pakistan Shipping Corporation (PSC) during the Fifth Five-Year Plan. Two years later, NSC and PSC were merged to form the Pakistan National Shipping Corporation (PNSC) which still remains the sole state-owned shipping corporation.

Later other nationalized companies were also merged into a single company as the Pakistan National Shipping Corporation, incorporated under the provisions of the Pakistan National Shipping Corporation Ordinance of 1979 and the Companies Ordinance of 1984, respectively. The total fleet strength increased to 60 ships with the induction of 14 vessels in the late 1970s and early 1980s. PNSC enjoyed a complete monopoly till the early 1990s when the shipping sector was deregulated by the Nawaz Sharif government.

PNSC has achieved substantial growth in revenue of 35 percent (from Rs.1,272 million to Rs.1,717 million) in managed bulk carrier segment and growth of 28 percent (from Rs.3,001 million to Rs.3,833 million) in liquid cargo segment.
through its managed vessels. The present government encouraged the use of alternative energy, which is cost effective, and environment friendly as compared to furnace oil. Restrictions were imposed on import of furnace oil resulting in energy shift towards inexpensive Liquefied Natural Gas (LNG), which hampered the operational revenue of PNSC through foreign flag tankers chartering with a decline of 71 percent (from Rs.1,690 million to Rs.491 million). Likewise, there is a decline of 7 percent (from Rs.1,410 million to Rs.1,317 million) in slot charter segment, which is also primarily due to the reduction in the import of public sector cargoes. Cumulatively, PNSC achieved a turnover of Rs.7,478 million (including Rs.1,928 million from PNSC) as compared to Rs.7,522 million (including Rs. 3,249 million from PNSC) for the corresponding period last year. Fleet Direct operating expenses decreased to Rs. 5,500 million (including Rs.1,104 million from PNSC) from Rs.5,747 million (including Rs.1,738 million from PNSC), thereby resulting in gross profit of Rs.1,852 million as against Rs.1,656 million for the same period last year. Despite of some adverse factors, PNSC profitability has increased by 61 percent with profit after tax of Rs.1,402 million during this period against Rs.872 million in the same period last year ensuring the best utilization of resources. Earnings per share for the PNSC increased to Rs.10.62 against Rs.6.60 in previous corresponding period. Two LR-1 tankers are added in PNSC's managed fleet namely "M.T. Bolan" and "M.T. Khairpur". These additions have increased the PNSC's managed fleet deadweight tonnage to 831,711 tons, which is largest in the history. The new inductions of oil tankers in managed fleet not only cater the demand of Motor Gasoline transportation but also impart modern technological advancements on board. These inductions will also curtail reliance on foreign-chartered vessels for oil transportation, to encounter the existing and foreseeable external challenges, and to gear up for current and future economic challenge.

<table>
<thead>
<tr>
<th>Financial Performance</th>
<th>(Rupees in 000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial Results</strong></td>
<td>July 18-March 19</td>
</tr>
<tr>
<td><strong>Revenue</strong></td>
<td>7,478,425</td>
</tr>
<tr>
<td><strong>Expenses</strong></td>
<td>(5,626,795)</td>
</tr>
<tr>
<td><strong>Gross Profit</strong></td>
<td>1,851,630</td>
</tr>
<tr>
<td><strong>Other Income</strong></td>
<td>1,052,091</td>
</tr>
<tr>
<td><strong>Administrative, Other Expenses &amp; Finance Cost</strong></td>
<td>(1,338,544)</td>
</tr>
<tr>
<td><strong>Profit before Tax</strong></td>
<td>1,565,177</td>
</tr>
</tbody>
</table>
6.5.1 Port Qasim Authority:

In 1973, Port Qasim Authority was established to develop a new port to serve Pakistan Steel and to handle general cargo operations. The port began to operate in 1980. It was especially established for bulk handling of the massive imports of raw materials for steel production by the Pakistan Steel Mill of Pakistan. In addition to the future economic demands and strategic needs, this port was also meant to relieve congestion at the only seaport Karachi Port of the country. The total area of the port comprises 3,520 acres (14.2 km²) with an adjacent 8,700 acres (35 km²) industrial estate. Port Qasim has been divided into three main zones as following:

<table>
<thead>
<tr>
<th>Zone</th>
<th>Total Area (Acres)</th>
<th>Area Reserved for Port Services (Acres)</th>
<th>Area Reserved for Industrial Use (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Western Industrial Zone (NWIZ)</td>
<td>2,920</td>
<td>904</td>
<td>2,016</td>
</tr>
<tr>
<td>South Western Industrial Zone (SWIZ)</td>
<td>1,000</td>
<td>125.5</td>
<td>874.5</td>
</tr>
<tr>
<td>Eastern Industrial Zone (EIZ)</td>
<td>8,300</td>
<td>2,490</td>
<td>5,810</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12,200</strong></td>
<td><strong>3,519.5</strong></td>
<td><strong>8,700</strong></td>
</tr>
</tbody>
</table>

The Port Qasim Authority achieved good results in the first nine months of the year posted a total growth of 12.6 percent in total traffic. The port operational performance during FY 2018-19 (July- March) stood at 36.580 million tonnes, showing an increase of 12.6 percent over the corresponding period of last nine months of 2017-18. The growth of 12.6 percent in total traffic during the financial year 2018-19 is attributed in Coal, LNG, Chemicals, Cement, Palm oil and Mogas (Motor Gas). Out of 36.580 million tons of total traffic, dry bulk cargo/break bulk cargo was 13.696 million tons (37.4 percent) liquid cargo was 11.852 million tons (32.4 percent), and containerized cargo was 11.032 million tons (30.2 percent). Port handled 0.797 million TEUs of container traffic during this year, showing an increase of 7.8 percent over the same period of last year container handling of 0.739 million TEUs. In terms of imports and exports, imports accounted for 85.5 percent and exports 14.5 percent of total trade.

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**Imports:** The volume of import cargo during July-March 2018-19 stood at 31.293 million tons, as against the 27.342 million tons handled during corresponding period last year, showing an increase of 14.4 percent.

**Exports:** The export cargo handled 5.287 million tons during first nine months of financial year 2018-19, as compared to 5.127 million tons handled during corresponding period 2017-18, showing a substantial increase of 3.7 percent, export cargo comprised 4.229 million tons (80 percent) containerized traffic, 0.995 million tons (20 percent) non-containerized cargo. Statistical data indicates that the third quarter of fiscal year is the highest quarter of financial year 2018-19, reaching over 13.127 million tons, while average cargo handling remained at the port at 12.193 million tons per quarter during July-March.

**Gawadar Port:** The Gwadar Port is a deep-sea port situated on the Arabian Sea at Gwadar in Balochistan. The port features prominently in the China–Pakistan Economic Corridor (CPEC) plan, and is considered to be a link between the Belt and Road Initiative and the Maritime Silk Road projects. It is about 120 kilometers (75 mi) southwest of Turbat, and 639 kilometers from Karachi through Makran Coastal highway.

Gwadar’s potential to be a deep water sea port was first identified in 1954, while the city was still under Omani control. Plans for construction of the port were not realized until 2007, when the port was inaugurated by Parvez Musharraf after four years of construction, at a cost of $248 million. In 2015, it was announced that the city and port would be further developed under CPEC at a cost of $1.62 billion, with the aim of linking northern Pakistan and western China to the deep water seaport. The port will also be the site of a floating liquefied natural gas facility that will be built as part of the larger $2.5 billion Gwadar-Nawabshah segment of the Iran–Pakistan gas pipeline project. Construction began in June 2016 on the Gwadar Special Economic Zone, which is being built on 2,292 acre site adjacent to Gwadar's port. In late 2015, the port was officially leased to China for 43 years, until 2059.

Gwadar Port became formally operational on 14 November 2016, when it was inaugurated by Pakistan's Prime Minister Muhammad Nawaz Sharif; the first convoy was seen off by the then Pakistan's Chief of Army Staff, General Raheel Sharif.
Under the China-Pakistan Economic Corridor plan, the state-owned China Overseas Port Holding Company (COPHC) will expand Gwadar Port with construction of nine new multipurpose berths on 3.2 kilometers of seafront to the east of the existing multipurpose berths. COPHC will also build cargo terminals in the 12 kilometers of land to the north and northwest of the site along the shoreline of the Demi Zirr bay. In total, COPHC has awarded $1.02 billion worth of contracts for expansion of the port. In addition to construction of nine berths and cargo terminals, plans for expanded port infrastructure also include several projects that will be financed by loans extended by Chinese state owned banks. The Gwadar Port dredging project will deepen approach channels to a depth of 14 meters from the current 11.5-meter depth, at a cost of $27 million. Dredging will enable docking of larger ships with a deadweight tonnage of up to 70,000 at Gwadar Port, while current capacity permits a maximum 20,000 DWT. Future plans call for dredging of the harbor to a depth of 20 meters to allow for docking of larger vessels.

The construction of Free Zone Phase-I has been completed with all infrastructures, including power, water, road, telecommunication, waste treatment; drainage systems are now in operation. More than 30 enterprises, involving the fields of banks, insurance, financial leasing, hotels, warehouses, fishery products processing, edible oil processing, pipe, furniture manufacturing, electric vehicle assembly, trade and logistics, have already been registered.

Gwadar Port has handled last year around 7.156 Metric Ton cargos from 53 ships. The Chinese Operator is working on increasing the number of ship calls at the port. Two ship-liners (COSCO & Sino-Trans) are calling regularly at the port. From 7th March, 2018 weekly container service has been started by COSCO.

<table>
<thead>
<tr>
<th>Trade/Cargo Data from March 2018 to February 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Cargo</strong></td>
</tr>
<tr>
<td>7,156 Metric Ton</td>
</tr>
<tr>
<td><strong>Total Import</strong></td>
</tr>
<tr>
<td>375.482 Metric Ton</td>
</tr>
<tr>
<td><strong>Total Export</strong></td>
</tr>
<tr>
<td>3401.105 Metric Ton</td>
</tr>
</tbody>
</table>

**Dry Ports:** A dry port is an inland intermodal terminal which is directly
connected by road or rail to a seaport and operating as a centre for the transshipment of sea cargo to inland destinations. In addition to their role in cargo transshipment, dry ports may also include facilities for storage and consolidation of goods, maintenance for road or rail cargo carriers and customs clearance services. The location of these facilities at a dry port relieves competition for storage and customs space at the seaport itself. These ports can speed the flow of cargo between ships and major land transportation networks, creating a more central distribution point. These ports can improve the movement of imports and exports, moving the time-consuming sorting and processing of containers inland, away from congested seaports.

In Pakistan following dry ports are operating in different provinces:

<table>
<thead>
<tr>
<th>Punjab</th>
<th>KP</th>
<th>Sindh</th>
<th>Baluchistan</th>
<th>ICT</th>
<th>Gilgit-Baltistan</th>
<th>Azad Kashmir</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faisalabad Dry Port</td>
<td>Torkham Border Terminal</td>
<td>Karachi Dry Port</td>
<td>Chaman Border Terminal</td>
<td>Islamabad Dry Port</td>
<td>Gilgit Dry Port</td>
<td>Muzaffarabad Dry Port</td>
</tr>
<tr>
<td>Lahore Dry Port</td>
<td>Azakhel Dry Port</td>
<td>Karachi NLC Dry Port</td>
<td>Quetta Dry Port</td>
<td>Quetta NLC Dry Port</td>
<td>Sost Dry Port</td>
<td></td>
</tr>
<tr>
<td>Lahore NLC Dry Port</td>
<td>Havelian Dry Port</td>
<td>Karachi NLC Dry Port</td>
<td>Taftan Border Terminal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multan Dry Port</td>
<td>Peshawar Dry Port</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rawalpindi Dry Port</td>
<td>Jamrud Dry Port</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sialkot Dry Port</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sialkot International Container Terminal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wagha Border Terminal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.5.2 Pakistan National Shipping Corporation (PNSC)

A brief statistical analysis of Pakistan National Shipping Corporation from 2000-2019 is as under:

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>No. of Vessels</th>
<th>Dead W. Tonnes</th>
<th>Gross Earning (Rs. Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>14</td>
<td>243,802</td>
<td>5,458.7</td>
</tr>
<tr>
<td>2001-02</td>
<td>14</td>
<td>243,749</td>
<td>4,555.5</td>
</tr>
<tr>
<td>2002-03</td>
<td>13</td>
<td>229,579</td>
<td>5,405.0</td>
</tr>
<tr>
<td>2003-04</td>
<td>14</td>
<td>469,931</td>
<td>6,881.9</td>
</tr>
<tr>
<td>2004-05</td>
<td>14</td>
<td>570,466</td>
<td>7,860.0</td>
</tr>
<tr>
<td>2005-06</td>
<td>15</td>
<td>636,182</td>
<td>7,924.6</td>
</tr>
<tr>
<td>2006-07</td>
<td>14</td>
<td>636,821</td>
<td>9,089.1</td>
</tr>
<tr>
<td>2007-08</td>
<td>14</td>
<td>636,821</td>
<td>10,753.5</td>
</tr>
<tr>
<td>2008-09</td>
<td>14</td>
<td>477,238</td>
<td>11,474.0</td>
</tr>
<tr>
<td>2009-10</td>
<td>10</td>
<td>633,273</td>
<td>8,738.8</td>
</tr>
<tr>
<td>2010-11</td>
<td>11</td>
<td>646,666</td>
<td>9,293.0</td>
</tr>
<tr>
<td>2011-12</td>
<td>09</td>
<td>610,167</td>
<td>8,875.3</td>
</tr>
<tr>
<td>2012-13</td>
<td>09</td>
<td>610,167</td>
<td>12,252.9</td>
</tr>
<tr>
<td>2013-14</td>
<td>09</td>
<td>642,207</td>
<td>15,726.5</td>
</tr>
<tr>
<td>2014-15</td>
<td>09</td>
<td>681,806</td>
<td>15,536.3</td>
</tr>
<tr>
<td>2015-16</td>
<td>09</td>
<td>681,806 *</td>
<td>12,543.0</td>
</tr>
<tr>
<td>2016-17</td>
<td>09</td>
<td>681,806</td>
<td>12,477.0</td>
</tr>
</tbody>
</table>
### 6.6 Self Assessment Questions

1. Highlight the road network transport system with reference to the national highways, strategic highways and motorway of Pakistan.

2. Describe the role of various provincial highways of the country.

3. Pakistan railway has a larger network of transportation; discuss its contribution in context of public facilitation.

4. Highlight the contribution of air transport system in Pakistan with reference to Pakistan International Airlines.

5. Describe the scope and contribution of shipping in Pakistan. Also describe the role of Pakistan National Shipping Corporation (PNSC).

### 6.7 Bibliography


TRADE

Written by: Mr. Arshad Iqbal Wani
Reviewed by: Dr. Altaf Ullah
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<tr>
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<td>236</td>
</tr>
</tbody>
</table>
**Introduction**

This unit highlights the contribution of trade in the economy of Pakistan. Pakistan is making progress in industries and agriculture sectors. The extra production is used to export in various countries of the world. Cement, salt, cotton, rice, mangoes, sports goods, surgical instruments and other included in the major exports of Pakistan.

In the same way Pakistan also has to import many things from the foreign countries. Iron, steel, vehicles, various types of chemicals, medicines, computers and other electrical equipments are the main imports of Pakistan. Pakistan spent a lot of foreign deposits in lieu of these imports.

The Government of Pakistan has also signed various trade agreements with different countries of the world. These agreements proved helpful in imports and exports of the country.

**Objectives**

After reading this unit, the students will be able to:

1. know the need and importance of trade as well as the trade of Pakistan around the world.

2. know about the major imports and exports of Pakistan and their effects on the economy of the country.

3. know about the famous trade agreements of Pakistan with the other countries.
7.1 Trade of Pakistan

Countries often trade with other countries when they do not have enough resources, or capacity to meet their own needs and wants. By exploiting and developing their domestic scarce resources, countries can produce a surplus, and trade this for the resources they need for their own people.

Evidences of trading over long distances dates back to at least 9,000 years, whereas long distance trade probably goes back much further to the domestication of pack animals and the invention of ships. Today, international trade plays a key role in the economy of the globe and is responsible for much of the prosperity and development of the modern industrialized world.

Pakistan has bilateral and multilateral trade agreements with many countries and international organizations. Currently Pakistan is a member of the World Trade Organization (WTO), part of the South Asian Free Trade Area agreement (SAFTAA) and the China–Pakistan Free Trade Agreement (CPFTA). Fluctuating world demand for its exports, local political uncertainty, and the impact of occasional droughts on its agricultural production have all contributed to variability in Pakistan's trade deficit.

Pakistan witnessed the highest export of US$ 25.1 billion in 2013-14. On 12 December 2013, the European Union granted GSP Plus status to Pakistan until 2017, which enabled it to export 20% of its good with 0 tariff and 70 percent at preferential rates to the EU market. This status was given after the European Parliament passed the resolution by 406-186 votes However, in subsequent years exports have declined considerably. This declined started from financial year 2014-15 when an international commodity slump set in. This was compounded by structural supply side constraints including energy shortages, high input costs and an overvalued exchange rate. From financial year 2014 to 2016, exports declined by 12.4 percent. Exports growth trend over this period was similar to the world trade growth patterns. In FY2018, global economic changes like increased oil prices (60.06 $/brl), trade protectionism and regional frictions affected many developed and developing economies including Pakistan. However, in Pakistan this situation was aggravated due to insufficient foreign exchange reserves together with increased import bills, deteriorating trade balance and stagnant remittances. During financial year 2018, Pakistan’s exports picked up and reached
to US$ 24.7 billion showing a growth of 12.57 percent over previous year FY 2017. Imports on the other hand also increased by 16.25 percent and touched the highest figure of US$ 56.6 billion. As a result the trade deficit widened to US$ 31.8 billion which was the highest since last ten years.

Like all other countries, trade of Pakistan is divided into two broad categories of Exports and Imports.

### 7.2 Exports of Pakistan

Every government in Pakistan focuses on making the exports a driver of sustainable economic growth. It is an endeavor to improve competitiveness and efficiency of the industry especially export-oriented sector and import substituting production, reducing structural anomalies and improving trade by increasing institutional efficiencies and reducing cost of doing business.

The export target for FY2019 was set at US$ 28 billion. Exports registered a decline of 0.1 percent growth during July-April FY2019. As per Pakistan Bureau of Statistics data, exports during July-April FY2019 reached to US$ 19.17 billion as compared to US$ 19.19 in July-April FY2018. A slowdown in economic growth in the EU, along with spillovers from US-China trade tensions, led to subdued performance in exports. Textile sector remained the most vulnerable sector in these global headwinds.

In 2017 Pakistan exported $24.8B, making it the 68th largest exporter in the world. During the last five years the exports of Pakistan have decreased at an annualized rate of -0.2%, from $25.1B in 2012 to $24.8B in 2017. The most recent exports are led by House Linens which represent 13.4% of the total exports of Pakistan, followed by Non-Knit Men's Suits, which account for 7.65%. Following are the top products that Pakistan exports.

**Rice:**

Pakistan exports the high quality rice to Oman, UAE, Kenya, Thailand, Jordan and many other countries. Pakistan produces the best quality basmati rice. This year Pakistan has exported 2.59 million metric tons of rice in total which has the value of 1.224 billion US$. Export of rice is showing improvement in trade which
is very good for our countries economy. The members of REAP (Rice Exporters Association of Pakistan) are working aggressively to increase the export of rice.

**MAJOR EXPORTS**

1. Raw cotton, Textile products and Cotton yarn.
2. Rice.
3. Leather and leather products.
4. Carpets and rugs, Tents.
5. Synthetic textiles.
6. Surgical instruments.
7. Sports goods.
8. Readymade garments.
9. Vegetable, fruit and fish.

**Mangoes:**

Pakistan produces 110 kinds of mangoes including Chaunsa, Sindhri, Langra, Daschri, Anwar Ratool, Saroli, Toota Pari, Fajri, Neelum, Almas, Sanwal, and Desi. Mango is the 2nd largest fruit crop and 2nd major exported fruit in Pakistan. Pakistan mainly exports mangoes to Iran, China, the Middle East, Japan, Hong Kong, and Germany. Pakistan is the 5th largest mango producer in the world.

**Kinnow:**

Pakistan export fresh Kinnows of the best quality around the world. It has exported 370,000 metric tons of Kinnow this year. This is the highest export volume recorded that generated $222 million for the country. Pakistan exports best quality kinnows to Russia, Philippine, Iran, Sri-Lanka, Indonesia, Singapore, Saudi Arabia, Canada, Bangladesh, Malaysia, and the UAE.
Cotton:

Cotton Fiber, Spun Cotton, and Raw Cotton are exported as the top cash crop of Pakistan. Pakistan also exports cotton products like cotton yarn, readymade garments, knitwear, cotton cloths, bed wear, and towels. Pakistan export cotton to China, Germany, USA, UK, France, Russia, Italy, Spain, Canada, Brazil, Australia, Netherlands and many other countries. Pakistan exported about 33,683 metric tons of raw cotton worth $55.551 million during the period of 8 months from July 2017 to February 2018. According to Pakistan Bureau of Statistics, the country exported about 332,325 metric tons of cotton yarn worth $859.716 million during the same 8 month period and also exported textile products worth of $8.793 billion during the same period.

Surgical Instruments:

Pakistan has 3600 firms, more than 150,000 workers engaged in manufacturing of Surgical Instruments of the highest quality for export. Companies produce surgical, dental instruments and wide range of other specialist precision tools made from the finest raw material and highest standards. Pakistan exported $221.298 million worth of surgical and medical instruments in the first seven months of the current financial year. Pakistan exports surgical instruments to USA, UK, Germany, Brazil, France, Australia and Russia.

Leather Goods:

Leather goods are among the top export products of Pakistan which include bags, jackets, pants, shoes, and other daily wear products. Major importers of leather goods from Pakistan are Russia, Italy, France, Canada, UK, USA, Spain, Netherlands, Australia, and Brazil. Pakistan exported around $478.85 million worth of leather goods during the 11 months of current financial years.

Furniture:

Pakistan offers the highest quality furniture import around the globe. Built in Punjab and exported through Karachi. Pakistan’s major furniture importers are UK, Germany, Spain, Italy, and the USA. China has shown interest in making a furniture manufacturing units in the joint venture in Pakistan. The main focus of
the venture is to promote furniture trade between both countries, and China is also focusing on opening Pakistani furniture outlets in Guangzhou. Pakistan exports $8 million to $12 million worth of furniture annually.

**Footballs:**

Pakistan has provided best quality footballs to the world especially in FIFA world cup matches. This year Pakistan manufactured top quality football named Telstar for the FIFA world cup held in Russia. In 2014 football named Brazuca was manufactured for FIFA world cup in Brazil. Before that, Pakistan has provided hand stitched football for all the world cups from 1990 to 2010. According to Pakistan Bureau of Statics the country has manufactured and supplied 37.28 million footballs worth $153.018 million to the foreign countries.

**Seafood:**

Pakistan exports fresh and healthy shrimps and prawns to various countries. It has exported $264.18 million worth of fish in the foreign market during the first eight months of 2017 to 2018. The European Union members’ states and China are the biggest importers of seafood from Pakistan.

<table>
<thead>
<tr>
<th>Pakistan Exports By Country</th>
<th>Value</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$3.80B</td>
<td>2018</td>
</tr>
<tr>
<td>China</td>
<td>$1.82B</td>
<td>2018</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>$1.73B</td>
<td>2018</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>$1.35B</td>
<td>2018</td>
</tr>
<tr>
<td>Germany</td>
<td>$1.31B</td>
<td>2018</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>$983.58M</td>
<td>2018</td>
</tr>
<tr>
<td>Netherlands</td>
<td>$942.80M</td>
<td>2018</td>
</tr>
<tr>
<td>Spain</td>
<td>$922.90M</td>
<td>2018</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>$783.82M</td>
<td>2018</td>
</tr>
<tr>
<td>Italy</td>
<td>$771.59M</td>
<td>2018</td>
</tr>
<tr>
<td>Country</td>
<td>Imports (M)</td>
<td>Year</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
<td>------</td>
</tr>
<tr>
<td>Belgium</td>
<td>$666.43M</td>
<td>2018</td>
</tr>
<tr>
<td>France</td>
<td>$446.83M</td>
<td>2018</td>
</tr>
<tr>
<td>India</td>
<td>$383.05M</td>
<td>2018</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>$354.53M</td>
<td>2018</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>$316.32M</td>
<td>2018</td>
</tr>
<tr>
<td>Indonesia</td>
<td>$302.90M</td>
<td>2018</td>
</tr>
<tr>
<td>Turkey</td>
<td>$302.76M</td>
<td>2018</td>
</tr>
<tr>
<td>South Korea</td>
<td>$297.02M</td>
<td>2018</td>
</tr>
<tr>
<td>Vietnam</td>
<td>$282.25M</td>
<td>2018</td>
</tr>
<tr>
<td>Kenya</td>
<td>$277.09M</td>
<td>2018</td>
</tr>
<tr>
<td>Canada</td>
<td>$271.42M</td>
<td>2018</td>
</tr>
<tr>
<td>Australia</td>
<td>$246.37M</td>
<td>2018</td>
</tr>
<tr>
<td>Poland</td>
<td>$234.83M</td>
<td>2018</td>
</tr>
<tr>
<td>Thailand</td>
<td>$225.50M</td>
<td>2018</td>
</tr>
<tr>
<td>Japan</td>
<td>$216.01M</td>
<td>2018</td>
</tr>
</tbody>
</table>

### 7.3 Imports of Pakistan

Import target for FY2019 was set to US$ 56.5 billion. As per PBS data, imports stood at US$ 45.471 billion in July-April FY2019 as compared to US$ 49.360 billion in the same period last year showing a decline of 7.9 percent. The reduction in imports is due to decrease in imports of furnace oil, machinery & electric equipment, palm oil and textiles. Current scenario of declining imports shows that imports will be according to the estimates. With the falling global demand, weakening consumer and business sentiment among the major economies, trade tensions and economic stabilization measures at home, the imports are expected to be further decrease. Additionally, the government has launched import substitution drive that will be instrumental in reducing pressure on current account. The Finance Supplementary (Second Amendment) Act, 2019
particularly offered tariff concessions to those industries that can offer import substitution. It lowered tariffs on the raw materials and intermediate goods that can help local firms in meeting local demand that is currently being fulfilled by the foreign firms.

Given Pakistan’s population of 207.9 million people, its total $60.3 billion in 2018 imports translates to an estimated $290 in yearly product demand from every person in the South Asian country. From a continental perspective, suppliers in Asia provide almost three-quarters (73.7%) of total Pakistani imported goods. Smaller percentages originate from Europe (11.9%), North America (6%), Africa (5.3%), Latin America (1.2%) excluding Mexico but including the Caribbean, then Oceania (0.7%) led by Australia.

The following product groups represent the highest dollar value in Pakistan’s import purchases during 2018. Also shown is the percentage share each product category represents in terms of overall imports into Pakistan.
Mineral fuels including oil: US$17.1 billion (28.4% of total imports)
Machinery including computers: $6.3 billion (10.4%)
Electrical machinery, equipment: $4.3 billion (7.2%)
Iron, steel: $3.7 billion (6.1%)
Organic chemicals: $2.8 billion (4.6%)
Vehicles: $2.6 billion (4.3%)
Plastics, plastic articles: $2.5 billion (4.1%)
Animal/vegetable fats, oils, waxes: $2.1 billion (3.5%)
Oil seeds: $1.5 billion (2.4%)
Cotton: $1.3 billion (2.1%)

Pakistan’s top 10 imports accounted for 73.2% of the overall value of its product purchases from other countries. Top import destinations of Pakistan are China, Japan, USA, India, and Indonesia. Pakistan import number of goods from different countries that are:

**Top 10 Pakistan Imports from China**

- Electronic equipment
- Plastic
- Iron and steel
- Iron and steel products
- Machines, engines and pumps
- Rubber
- Fertilizers
- Organic chemicals
- Manmade filaments
- Manmade staple fibers

**Top 10 Pakistan Imports from Japan**

- Vehicles
- Ships and boats
- Electronics
- Machines, engines, and pumps
- Iron and steel
- Iron or steel products
- Plastic
- Books, newspapers, pictures
- Organic chemical
- Medical and technical equipment

**Top 10 Pakistan Imports from the US**

- Cotton
- Electronic equipment
- Iron and steel
- Medical and technical equipment
- Other textiles and worn clothing
- Vehicles
- Machines, engines, and pumps
- Books, newspapers, and pictures
- Organic chemicals
- Other chemical goods

**Top 10 Pakistan Imports from the UK**

- Iron and steel
- Lead
- Electronics
- Machines, engines, and pumps
- Other chemical goods
- Organic chemicals

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- Other textile and worn clothing
- Manmade staple fibers
- Books, newspapers, and pictures
- Medical and technical equipment

**Top 10 Pakistan Imports from India**

- Cotton
- Manmade staple fibers
- Food waste and animal fodder
- Tanning and dyeing extracts
- Organic chemicals
- Other chemical goods
- Plastics
- Vegetables
- Oilseed
- Coffee, tea, and spices

**Top 10 Pakistan Imports from Indonesia**

- Oil
- Animal/vegetable fats and oils
- Manmade staple fibers
- Fruits and nuts
- Coffee, tea, and spices
- Paper
- Rubber
- Other chemical goods
- Vehicles
- Wood pulp
Top 10 Pakistan Imports from Russia

- Iron and steel
- Fertilizers
- Vegetables
- Cereals
- Paper
- Rubber
- Copper
- Machines, engines, and pumps
- Organic chemicals
- Salt, sulfur, stone, and cement

Top 10 Pakistan Imports from Germany

- Tanning and dyeing extracts
- Pharmaceuticals
- Machines, engines, pumps
- Electronic equipment
- Organic chemicals
- Books, newspapers, and pictures
- Iron and steel
- Medical and technical equipment
- Other chemical goods
- Oil

Top 10 Pakistan Imports from Australia

- Oil
- Oilseed
- Animal/vegetable fats and oils
- Live animals
- Vegetables
- Fertilizers
- Paper
- Cotton
- Iron and steel
- Aluminum

**Top 10 Pakistan Imports from Canada**

- Vegetables
- Paper
- Wood
- Nickel
- Iron and steel
- Wood pulp
- Electronic equipment
- Machines, engines, and pumps
- Other textiles and worn clothing
- Medical and technical equipment

Imported cotton had the fastest-growing increase in value among the top 10 import categories, up by 32.9% from 2017 to 2018. In second place for expanding import purchases was the mineral fuels including oil category, up by 24.9%. Pakistani imports of organic chemicals delivered the third-fastest acceleration up by 16.5%.

Imports during Jul-Apr FY2019 declined by 4.9 percent while worker’s remittances increased by 8.45 percent. This proved to be a major support to the current account balance which improved by 26.9 percent during the period. However, exports remained a source of concern as they declined during Jul-Apr.
FY2019. There is a continuous increase in the flows of credit to private sector in manufacturing and export oriented industry which is a welcome development in terms of business activities. However, the downside risk of the impact of continuous rise in policy rate and global slowdown in trade activities may influence the exports.

7.4 Trade Agreements of Pakistan

Pakistan has trade relation with many countries in this regard Government of Pakistan has signed many trade agreements with different countries some important of them are as under:

1. Afghanistan–Pakistan Transit Trade Agreement: The Afghanistan–Pakistan Transit Trade Agreement (also known as APTTA) is a bilateral trade agreement signed in 2010 by Pakistan and Afghanistan that calls for greater facilitation in the movement of goods amongst the two countries.

2. China–Pakistan Free Trade Agreement: The China–Pakistan Free Trade Agreement is a major free trade agreement signed between the People's Republic of China and Pakistan. It was concluded in 2006 and entered into effect
in July 2007. Trade volume due to agreement between the two states was $13 billion in 2013, and reached to $20 billion by 2017 when both countries signed 51 agreements and Memorandums of Understanding (MoUs) for cooperation in different fields. China had been contributing significantly to Pakistan’s imports even before the FTA was signed and has seen considerable improvement in its ranking after the FTA was implemented in 2007. By 2012, it was the source for 15% of Pakistan’s overall imports from the world as compared to 9.8% in 2006. A Second Phase agreement is currently being negotiated between China and Pakistan. The second phase will lower tariffs further as well as normalize various trade procedures.

On April 9, the 11th meeting of the 2nd phase of negotiation of China-Pakistan FTA was held in Beijing. Vice Minister of Commerce and deputy China international trade representative Wang Shouwen met with the delegations led by Pakistan’s Secretary of Ministry of Commerce Sukhera and Secretary of Ministry of Finance Dagha respectively. The two sides conducted in-depth consultations on issues such as tariff reduction of goods trade, investment, and customs cooperation, and made positive progress.

3. South Korea-Pakistan Free Trade Agreement: is a proposed free trade agreement between Pakistan and South Korea. The free trade agreement was proposed by Pakistani Minister for Commerce Khurram Dastgir Khan to Seoul in 2015. Both the countries agreed to conduct research studies on its feasibility, which were completed in 2016. On September 22, 2016, Republic of Korea Ambassador Dr Dong-gu Suh and Commerce Minister Khurram Dastgir Khan announced that the two sides have agreed to push forward the agreement process in light of positive feasibility.

4. Turkey-Pakistan Free Trade Agreement: (also known as Pakistan-Turkey FTA) is an under-negotiation free trade agreement between Pakistan and Turkey. The decision to initiate negotiations for a comprehensive bilateral FTA covering trade in goods, services and investment was taken at the 4th Session of the High Level Strategic Cooperation Council (HLSCC) in Islamabad in February 2015. The FTA negotiations began in Ankara in October 2015. During negotiations held between August 29–31 in Islamabad, both countries agreed to eliminate 85% of tariffs. The FTA is projected to increase bilateral trade to $5
billion between the years 2016 and 2019 and then to $10 billion by 2022. The free trade agreement between the two countries was expected to be signed before the end of 2016. The Turkish Industrialists' and Businessmen's Association and Karachi Chamber of Commerce & Industry have supported the FTA.

5. South Asian Free Trade Area (SAFTA): is an agreement reached on January 6, 2004, at the 12th SAARC summit in Islamabad, Pakistan. It created a free trade area of 1.6 billion people in Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka to reduce customs duties of all traded goods to zero by the year 2016. The SAFTA agreement came into force on January 1, 2006, and is operational following the ratification of the agreement by the seven governments. SAFTA required the developing countries in South Asia (India, Pakistan and Sri Lanka) to bring their duties down to 20 percent in the first phase of the two-year period ending in 2007. In the final five-year phase ending in 2012, the 20 percent duty was reduced to zero in a series of annual cuts. The least developed nations in South Asia (Nepal, Bhutan, Bangladesh, Afghanistan and Maldives) had an additional three years to reduce tariffs to zero. India and Pakistan ratified the treaty in 2009, whereas Afghanistan as the 8th member state of the SAARC ratified the SAFTA protocol on 4 May 2011.

7.5 Balance of Payment

Pakistan's payments problems have been chronic since the 1970s, with the cost of oil imports primarily responsible for the trade imbalance. The growth of exports and of remittances from Pakistani’s working abroad (mostly in the Middle East) helped Pakistan to keep the payments deficit in check. Since the oil sector boom began subsiding in the early 1980s, however, remittances declined. Remittances from overseas workers peaked at $2.9 billion in 1982/83, and then dropped to $1.4 billion by 1997/98 and $1 billion from 1999 to 2001. This trend especially accelerated during the Gulf War, when nearly 80,000 Pakistanis in Kuwait and Iraq lost their jobs. Only about 25% of these jobs had been regained a year after the end of the conflict. Increased imports and softer demand for Pakistan's textiles and apparel in major markets also caused the current account deficit to further increase. The balance of payments position weakened in 1995/96 as imports grew by 16% and exports by only 6%. The rupee was devalued by 11% during 1995 and 1996 to encourage exports. Nevertheless, foreign reserves fell to around $800
million by mid-1997. By 2000, foreign debt equaled 100% of GDP. The government took steps in the early 2000s to liberalize and deregulate the exchange and payments regime. Pakistan moved to a dual exchange rate system in 2000. An increase in liquid foreign exchange reserves in 2001 was due in part to outright purchases from the kerb market and inflows from international financial institutions. Export growth in 2000/01 was primarily due to higher exports of primary commodities such as rice, raw cotton, and fish, and other manufactures such as leather, carpets, sporting goods, and surgical instruments. Imports increased in 2000/01 primarily due to higher imports of petroleum and petroleum products, and machinery. The US Central Intelligence Agency (CIA) reports that in 2001 the purchasing power parity of Pakistan's exports was $8.8 billion while imports totaled $9.2 billion resulting in a trade deficit of $399.9 million. The International Monetary Fund (IMF) reports that in 2001 Pakistan had exports of goods totaling $9.13 billion and imports totaling $9.74 billion. The services credit totaled $1.46 billion and debit $2.33 billion.

The latest value for Current account balance (BoP, current US$) in Pakistan was ($19,191,340,000) as of 2018. Over the past 42 years, the value for this indicator has fluctuated between $3,854,000,000 in 2002 and ($19,191,340,000) in 2018.

### 7.6 Self Assessment Questions

1. Discuss the contribution of trade in Pakistan.
2. What are the major exports of Pakistan? Describe the role of our exports in the economy of Pakistan.
3. What are the important imports of Pakistan? How these imports are effecting our economy?
4. Highlight the important trade agreements of Pakistan.
5. Describe the Balance of Payment in the trade of Pakistan.
7.7 Bibliography

POPULATION OF PAKISTAN

Written by: Mr. Kashif Raza
Reviewed by: Dr. Altaf Ullah

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Introduction

The study of population has become an interesting subject in all over the world. The highly increasing population is of course a challenge for developed and underdeveloped countries. Pakistan is the sixth country in the ranking in respect of world populated states. Various issues of the country in response to the over population has been described in this unit. The unit reveals about the demographical characteristics and problems being faced by our country.

Demography or population study as a subject to teach on various levels is a priority of developed nations unlike Pakistan where basic data even not available to probe out serious concerns effectively. Moreover, population structure of Pakistan as birth rates, death rate, literacy rate etc. enable to understand the nature of population exist in our country.

In the same way, social problems associated with demography like high growth rate, migration, settlement and urbanization that are deep rooted in Pakistan have also been discussed in the unit. This unit will be helpful for our students to understand these serious issues and measures which need to be take.

The unit includes one topic related to demographic structure of Pakistan with current figures. The other discussion is pertinent to the population growth as a social problem of Pakistan with suggested solutions. At the end of the unit, the issue of urbanization and its impact on Pakistan society has been discussed.

Objectives

After reading this unit, the students will be able to:

1. know the demographic study as well as the demographical characteristics and problems faced by our country.
2. know about population structure of Pakistan and understand the nature of population exist in our country.
3. know about the issue of urbanization and its impact on the economy of Pakistan.
8.1 Population of Pakistan

Man is a social animal and cannot live in isolation. He corporates, co-ordinate and create a certain atmosphere in society to live in.

The behavior of society depends upon characteristics modes and nature of population found in certain areas or a patch of land.

What is Population?

The collection of peoples and races is called the population that lives in village, town, city, regions or a country.

What is Demography?

Demography is statistical study of the human population and its characteristics as size, structure, distribution, birth, migration, aging, death, gender, ethnicity, education, family perspectives, disabilities, income, wealth, profession etc. Demography helps the government to understand and deal with population issues. It also helps to monitor social change, structure and social progress across in a society.

8.2 Population Structure of Pakistan

Population structure refers to various perspectives of population ecology like population pyramids, Age, class structure, density distribution, population growth, size genetics and ecology. Pakistan is a multi-ethnic and diverse Society have a historical migration history since thousand years ago. Human groups used to migrate from different sides of the world and habitat here permanently, that is why the demography of Pakistan bears Complex structure and diversification.

8.2.1 Social Classes Pyramid in Pakistan

Social class measures through standard of living which an individual has in society. Social classes classified into three categories,

Upper class
Middle class
Lower class
In Pakistani society pyramid all three classes are found which discuss following.

**Upper Class**

This class has a high level of income and lives in a clean and hygienic atmosphere that composes only 2% of the population and bears 60 to 65% of the country. Highest official's businessman, top level leadership belongs to this class. The class apparently exploits others classes and considered as center of authority.

Feudal and Industrialist are permanently figure in this class. They are mill honor and business tycoons in Pakistan and influences in decision making and legislation.

**Middle Class**

This class lives hand to mouth and financially lower as compared to upper class they are mostly employee or have small or medium size business. This class have high mobility and longs to reach at upper class. Their population composes 28% out of total population of Pakistan.

**Lower Class**

This is exploited class having low standard of living and deprival of education and health facilities. Social mobility is found lower in this class. They often dare not to switch over their status and accept their pity life style. They are either unemployed or have very ordinary job. This class composes 70% of total Population of Pakistan.

### 8.2.2 Population Age Structure of Pakistan

The age structure of Pakistan is mentions as below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Age</th>
<th>Percentage of age Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>0-14 years</td>
<td>35.27 %</td>
</tr>
<tr>
<td></td>
<td>15-64 years</td>
<td>60.42 %</td>
</tr>
<tr>
<td></td>
<td>65 years- more</td>
<td>04.31 %</td>
</tr>
</tbody>
</table>
According to Pakistan Bureau of statistics 2017,

Number of men: 106,499,322  
Number of women: 101,314,780  

Percentage of women: 51.00%  
Percentage of men: 48.76%  
Percentage of transgender: 0.24%  

Demographically male and female gender is almost equal in ratio. This balanced gender percentage is helpful for marriage spouse as it is one male for a female. Unfortunately, female gender takes less part in economic activities owing to traditional boundings and limitations.  

If we observe age wise population distribution it reveals that most of the population is pure working class while a number of population is knock the door of adult age-group and ready to contribute in upcoming days.

8.2.3 Density Distribution in Pakistan

The density of population is mid-year population divided by land area in square kilometers.

- Pakistan 2020 population speculates 220,892,340 People at mid-year according to UN data.
- Pakistan consists 2.83% of total world population the population.
- The population density of Pakistan is 275 kilometer square in 2018.
- Urban population in Pakistan is 36.9%.
- Rural population ratio is 63.1%.
- Rate of urbanization is 2.53%.

Major populated cities of Pakistan are:

- Karachi is 15.74 million,  
- Lahore 12.18 million  
- Faisalabad 3.38 million
Rawalpindi 2.19 million
Gujranwala 1.05 million.

The least populated areas of Pakistan Cholistan, Tharparkar, Chaghi, Noshki, Tribal areas of K.P Skurdu, Northern areas etc.

8.2.4 Population Growth of Pakistan

Population growth is increasing number of population in a given time period. During 1998-2017, the average population growth stood at 2.4 while in 2017 the growth rate of country population is 2.10.

Birth rate of Pakistan: 29.8%
Death rate of Pakistan: 7.5%
Life Expectancy: 67.7%
Fertility Rate: 2.68%
Infant Mortality Rate: 53.8%

Pakistan Population is equivalent to 2.83% of the total world population. Pakistan is sixth most populous country in the world. Its Population growth is highest in South-Asian Countries.

The Higher Growth rate have many reason is failure of family planning and reluctance in using contraceptives. Till 2,000 Government was running family planning program successfully but after 2017, Government again felt the significance of family planning projects and include the program in its prior agenda.

Pakistan facing critical situation regarding population growth. India, Bangladesh and other South-Asian countries having less than 1.5 growth rate as compare to Pakistan having 2.0% approx. If the condition not been controversial, the doubling population will be 10 years till 2050 and Pakistan would be trapped in unsolvable social problem.

8.2.5 Population Size of Pakistan

Population size is the number of individual living in given land area. By
population size it is to understand that how much density is increasing or decreasing in particular area and what reasons could be involved being specific phenomenon apparently takes place there.

More population size means more density and less population size shows less density. The population size of different units of Pakistan is being stated under:

**Sindh:**

Occupation Land area: 17.7%
Population Share: 24.3%

Karachi shares 28.72% of total Sindh.

**Punjab:**

Area of Punjab: 205,345 square Kilometer.
Sharing Percentage: 54.08%
High population sized areas: Lahore, Multan, Gujranwala, Sialkot, Rawalpindi and Faisalabad etc.

**K.P:**

Population per square kilometer: 26,360 million
Percentage occupation: 13.4%
Density and high population sized area: Peshawar: 11.38%
Swat 7.09%
Mardan: 8.23%
Mansehra: 6.50%, etc.

**Balochistan:**

Land area: 3,47,190 Sq. km
Total population: 10.160 million
Population Share: 5.19 %
Populated areas: Quetta, Qila-Abdallah, Jaffarabad, Nasir Abad.

In Balochistan the density of population is 12 persons per sq.km while in Punjab the density is 536 persons per sq.km.

**Islamabad:**

<table>
<thead>
<tr>
<th>Land</th>
<th>906 square kilometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>1.015 million</td>
</tr>
</tbody>
</table>

**8.2.6 Population Genetics of Pakistan**

The Genetics of Pakistan is very complex and diversified. It is admiration of European, Central Asian and South Asia gene groups migration and cross-racial marriages or habitat cause Complex Genetics of Pakistan. The genetically history of Pakistan links with Indus Civilization which is 5000 years old and responsible of multi-ethnic culture and Civilization roots in Pakistan.

Pakistan genetically split into 11 groups are Baloch, Burohi, Burusho, Hazara, Kalash, Kashmiri, Makrani, Parsi, Pashtoon, Punjabi and Sindhi.

**Baloch:**

They are Iranian region in Pakistan Baloch are living in Balochistan province. Their population in Pakistan is 6,800,000.

50% Baloch are living in Balochistan 40% in Sindh and 10% dwells in Punjab.

**Burohi:**

About 2.2 million Burohi are living in Balochistan. They are found near Bolan pass in Balochistan.

Their Ethenic group is Dravidians. Burohis are also found in Iran and Afganistan.

**Burusho:**

These People lives in Hunza, Nagar, Chitrail, Gilgit, Baltistan. Total Population of Burusho people is 87,000. Ethnically they are Kashmiri origin and speak Buroshki and Khawer.
Hazara:
Their origin is central Afghanistan. About 900,000 peoples are living in Pakistan. They are found in North Eastern part of Pakistan. They speak Hindko language.

Kalash:
Their origin is Indo-Arians and also famous as waigali speak Kalash language. They are found in Chitral district of K.P. bears unique culture and tradition. They are non Belivers (Kafir).

Kashmiri:
They belong to Indo-Arians ethnic group and live in occupied and independent Kashmir in Pakistan of Himalayan range. Their population is 7 million approximately. The language of Kashmiri are Mirpuri and Kashmiri.

Mukrani:
Mukrani peoples are found in Balochistan near coastal areas and famous as Sheedies. Their origin is East-Africa and entered in this land before 1200 B.C. Most of them are Fisherman.

Parsi:
It is an ethno religious group living in Pakistan, migrated from Prussia during Muslim triumph of Iran. Parsi are small community having just 1,092 of population in Pakistan. Their languages are English, Gujrati, Urdu and Hindi.

Pashtoon:
Pashtoon or Pakhtoonis Iranian Ethnic group. Its origin is central Asia with population of 50 million in Pakistan. They are found near Hindukush range mostly and few are dwells in Balochistan and Karachi. They live in Tribes.

Punjabi:
Punjabis live in Punjab Province specially in central Punjab. They are Indo-Arians. 125 million Punjabi speak Punjabi language. Their language and genetic families are indo- Europeans, Indo-Iranian and Indo-Arians. Ancient civilization Harappa and Taxila are also found in Punjab.

Sindhi:
It is Indo-Iranian lingual group speaks Sindhi and lives in Sindh province. About
25 million peoples are related to this genetically and ethnical group bear rich culture. The Sindhi ethnic group is deep rooted and about 500 years old as Moin-jo-Daro discovery exhibits whole story of its rich civilization.

8.2.7 Population Ecology

Population Ecology means interaction and behaviour of population with environment. Pakistan has plenty of resources but simultaneously bears issue of over population. It is very difficult to manage resources according to population for example Pakistan could manage 50% need electricity for its population that creates resistance and deforestation among population.

Let see the following trend of:

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Wheat</th>
<th>Enrg</th>
<th>Petr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>114</td>
<td>16.0</td>
<td>28.0</td>
<td>10.0</td>
</tr>
<tr>
<td>2020</td>
<td>308</td>
<td>45.4</td>
<td>323.1</td>
<td>115</td>
</tr>
</tbody>
</table>

Pakistan has only 4.5 of forest. Most of the forests have been cut down due to over-population. This put negative impact upon environment & Human health.

Female in the ecology system & population is very important. During pregnancy woman facing tension, Social pressure, anaemia and other problems.

Its impact come after birth among new born babies that contain chronic diseases since birth and not been supportive economic stuff for society. Over-population also create population which is harmful for environment. It is necessary to start awareness program regarding population ecology.

8.3 High Growth Rate of Pakistan

When Pakistan came into being, the population of Pakistan was 33 million and ranked14 in the world but today the population increases 210 million and rank 6, means deceases 8 no. down shows extreme high growth ratio as it was 70 years ago.
The population growth now 1.9 percent, it would be doubled just after 37 years if it growth with the same ratio.

8.3.1 Causes of High Population Growth in Pakistan

Population growth contains various major reasons that is going to be discussed below:

- **Economic Problem**
  In developing countries like Pakistan, it seems very difficult to manage domestic budget by a single earner so, the people believes that more children could share in domestic earning to resolve economic issues.

- **Illiteracy**
  Due to lack of education, most of people not aware of significance of population management and demerits of overpopulation phenomenon. Peoples believe that children are mercy of Allah so people constitute big family with more children.

- **Family Planning**
  Family planning projects and program initiated four decays back but not being effective for religious interpretation against family management and illiteracy. Most of people have reservation using contraceptives in the country.

- **Early Marriage**
  Early Marriages cause high growth rate, people get married during age of 16 to 22 and it is called productive age and chances of fertility remains high in this age group.

- **Polygamy**
  In rural areas practice of polygamy is usual. A man gets marry with more than one woman, this is another reason of high growth with overall family of a man.

- **Lack of Re-Creational Facilities**
  Lack of re-creational facilities also cause high growth rate. The couple spent most of the time with each other cause expansion of family.

- **Women’s Obedience**
  In rural areas particularly and generally in whole country, Women are obedient. If
the man wishes for more children women have no other option to put her head off in front of Husband demand.

- **Government Negligence**
  Governments do not give priority to demographic issues of country and population planning even censes not being conducted in time period of 10 years. So, Government have not been able to see clear picture about society dilemma and concerns like high population rate, a menace in Pakistan. Government should take necessary arrangements to solve the issues of demography.

**Fertility Treatment**

Due to technical advancement in Fertility field an overage woman could give birth if she is treated by trained and qualified physician.

- **Imbalanced between crude birth rate and crude death rate**
  There is un-favourable imbalance between crude birth rate and crude death rate. Birth ratio in Pakistan is higher than death ratio, is responsible of high growth rate in Pakistan.

8.3.2 Problem of High Growth Rate in Pakistan:

Higher growth rate is itself not a problem but it is a serious concern for under developed countries such as Pakistan. It shapes as an issue when over population puts pressure upon environment, resources, economic development and social infra-structure of a country. Most of the less developed countries are victim of high growth rate factor such as Pakistan where over population is a thorn in the way of prosperity.

Here, major effects of high growth rate in Pakistan mentioned:

- **Dependency**
  High birth rate needs less expectancy of life and high rate of dependency. un productive population creates negative impression upon economic growth. In Pakistan numbers of earners are less than non-earners that cause economic declines. To cop up the situation, families have no option but to practiced child labor. Child labor in rural society is occur upon economy of the country.
• **Lack of Investment**  
Despite persistent investment apparently, economic decline is increasing frequently because population is increasing with high rate as compare to investment ratio. Increasing population ratio is minimizing investment rate which means low capital formation. In the latest report, current account recorded a deficit of 661.0 USD MN. in December 2019.

• **Effect upon per capita income**  
When numbers of earners are less beside the dependence, problems of per capita income emerge in the country what Pakistan is facing. Despite running economic activities per capita income is going and drifting towards lower side because either part population graph is going higher in the country. The GDP per capita income of Pakistan is 1,338 USD ranks 147 in the World.

• **Unemployment**  
The developing country like Pakistan not capable to channelize such a big population to be employed. As a result, a big human resource is being wasted. The unemployment rate is 5.79 seems higher. The present Government started “RozgarInsaf Program” to reduce un employment in the country. It is necessary to let the program carry on by other Government to achieve the target.

• **Food Problem**  
Higher growth rate demands plenty of food production. Pakistan is an agricultural country and a big exporter of food item but not been able to meet the demand of such a big population of the country. Food problem also cause quality human productivity problem. Healthy worker works more hard than weaker and ill workers. Food problem is reducing human capability in our country. Children, Women and senior citizen much needed healthy food to survive but deprive in Pakistan to avail this opportunity. About 50 to 60 % population complains to have substandard food stuff to eat.

• **Wages Problem**  
Pakistan is suffering disguised and under employed stuff. Due to un employment, people are compelled to work upon low wages that create job dis-satisfaction among masses. According to the Daily Dawn, June 10. 2016:” Thousands of application with Master Degree applied for gardeners and door attendant in
department of education in Chakwal.” This is the worst example of under employment trend in the country.

• **Poverty Problem**
High population cause poverty issue in society, Low per capita income, unemployment, lack of investment are the factors of high population growth forced citizen to live below the poverty line. In our country 40 percent people lives below the poverty belt and a big amount of individual, not living in suitable residential circumstance. Governments are failed to prepare and execute successful plan to reduce poverty in the country.

• **Lack of Labor Force**
Demographically, birth rate in Pakistan is higher than death rate that produces declining in working age group in future so the problem of labor force will emerge in upcoming days and the country as Pakistan cannot afford import of labor like gulf countries, had resources to manage the problem of labor force by import of workers from South-Asian region. Pakistan must solve this issue before it appears as monster.

• **Pressure on Social Structure**
High Population growth is damaging and hitting infra structure of big cities like Karachi, Lahore etc. Over population and migration mismanage the Government plan regarding Infra structure of Metropolitan Cities. Big Cities like Karachi, Lahore Faisalabad facing problems of imbalanced and de-shaped infra structure that must be negotiated by Government through strong planning and management.

• **Environmental Issues**
Over population is the beauty of nature. Forest are being cut down that is allowing global warming in the country. Disease like Heart attack, Corona and Kango causes sudden death. Tourism industry effecting by this issue. Pollution rate is taking off continuously. Present Government initiated “Green Pakistan” campaign to minimize environmental problem. The problem also being responsible of high death rate. Pakistan is second ranked country contain Hepatitis A, B and C. Industrialization is another major cause of pollution and unhygienic environment reasons for poor health of citizens. Theses all issues must needed government intention for seeking solution.
• **Low Agriculture Growth**
Land has limited to work upon. On the other hand, over population leads unemployment and under employment problem in rural areas so, people migrates in urban sector which shakes the balance of urban societies. Same Phenomenon could be seen and observed in Pakistan for example Karachi, is consist of 20 million people where most of population comes from other rural areas to quit job in agriculture sector and to find job in any other sector in big cities like Karachi.

• **Poor Standard of Living**
High population growth rate of country causes poor standard of living. Overall social problems like clothing, food, housing, crime, low and order and pollution are going stronger and deeper. Economic Indicators are also not in favor of Pakistan. Inflation rate is 13.07 percent, balance of trade is -319722, current account -6. 61etc. The economic indicator shows that overall population of Pakistan is un-prosperous and unhappy and their standard of living is extremely low.

Pakistan has two ways to fight against the problem of high population growth rate menace. First, meet the resources through economic planning and second, control population and adjust it according available resources. Unfortunately, not either option is prior in government view. If problems not been addressed Pakistan survival would be on stack on coming future.

### 8.4 Settlements in Pakistan
Settlement is a palace that was un-habitat but people continuously habituated and form a community. The community could be hamlet, village, town, City Like Metropolis and megalopolis. When Pakistan came into being, a strong administrative setup was constituted to settle the people into smooth way.

#### 8.4.1 Administrative Setup of Pakistan
The administrative setup of Pakistan is written as below.

i. Pakistan is a federal state. The federal unit of Pakistan is Islamabad which directly governed by Federal Government.
ii. Pakistan consist of four provincial units namely Sindh, Punjab, K.P. and Baluchistan.

iii. Pakistan has administrative unit Gilgit and Baltistan.

iv. FANA (Federal Administration of Northern Areas) is a separate regulatory unit working in Northern areas like Naran, Kaghan and Shugran etc. while FATA has been amalgamated in K.P. (in May 2018 through 25th constitutional amendments)

v. Kashmir is a separate independent part of Pakistan having separate Prime Minister to govern the Kashmir territory.

vi. Every Provincial unit is divided into divisions. Divisions split into districts and District sub divided into Tehsil.

vii. At present Pakistan divided into 28 divisions, 124 Districts and 48938 villages.

Further detail describes under:

- **Punjab:**
  9 Divisions, 36 Districts, 146 Tehsils.

- **Sindh:**
  6 Divisions, 29 Districts, 137 Tehsils.

- **KP:**
  7 Divisions, 26 Districts, 70 Tehsils.

- **Baluchistan:**
  7 Divisions, 32 Districts, 136 Tehsils.

- **Islamabad:**
  0 Divisions, 1 Districts, 1 Tehsils.

- **Kashmir:**
  3 Divisions, 10 Districts, 32 Tehsils.

- **Gilgit and Baltistan:**
  3 Divisions, 10 Districts, 23 Tehsils.
Settlement is not balanced in Pakistan. Baluchistan is the largest province but have least population and Punjab is the densest province contrary to Baluchistan. People often not prefer to settle in Baluchistan because living environment is not sufficient as Punjab has.

**Urban and Rural Settlement**

Urban and rural settlement defines under:

**Urban Settlement**
- Urban population in Pakistan average 36.67 percent in 2018.
- Population density per square kilometer is 275.
- 44.5 percent people of urban areas settles in urban slums.
- Refugee population that settled, constituted 14,04,019 peoples

**Rural Settlement**
- According to 2018 census, rural population is 63.33%. This percentage was 75% in 1998 census.
- Poverty ratio at national poverty line 24.3%
- Refugee population settlers are 1,32,259 persons.
- Suicide mortality rate is 2.9%, little increase in previous years.

Facts and figure shows that 1/3 population used to live in rural areas two decays ago, now decline 12 % and settles in urban areas exhibits urbanization tendency in the country.

**Co-relation between Migration and Settlement**
Before start migration, it is inevitable to understand why the study of migration is compulsory regarding settlement.

In fact, the co-relation between both terms mentioned under. migration and settlement are co related with each other and without study of migration is not understandable. When people moves to his permanent place it is migration and where they settle in permanently after leaving his native place is settlement.
Migration
The movement of individual to other land having intention to settle new place is called migration.

Sociologically, migration is a natural process. People migrate for various purposes.

Examples of Migration
Historical migration relates with Pakistan culture and heritage are four:

- Migration of Medina.
- Migration of sub-continent.
- History of Afghan refugee.
- Migration after split of East Pakistan.

- Migration of Medina:
In 622 AD Holy Prophet after receiving threat, left Makkah with his companion Hazrat Abu Bakr (R.A.T.A) and migrated to Medina. All Muslim followed Holy Prophet and reached Medina where Holy Prophet established and exemplary Islamic society what present Prime Minister Imran Khan wishes to reform Pakistan on the same Medina pattern.

- Migration of sub-continents:
When Pakistan came into being, Muslims living in Hindu majority areas, moved and settled in his own newly Islamic country Pakistan. These peoples are known as “Mahajir” means migrants.

- Afghan Refugee:
25 December 1979, USSR invaded in Afghanistan, it was obvious that USSR will not stop there and enter in Pakistan. Pakistan showed sympathy with Afghan jihadies to stop penetration of USSR in Afghanistan.

Most of Afghans migrated to Pakistan for the time being but permanently settled here. Now they are NIC holder and living in our country as Pakistani.
• **Migration after split of East Pakistan:**

Under frame work of Pak-India conflict 1971, “Mukti-Bahinies” were killing non-Bengalis especially permanent dwellers of East Pakistan (Beharies) and urged them to leave the land of Bengal. As a result, a large community of Beharies migrated Pakistan and settled here in various cities of West Pakistan. Their mother language is Urdu and most of Baharies living in Karachi. The Majority areas of Beharies community are settled in Orangi and Behar colony situated in Karachi.

8.5 **Factors of Migration:**

Influx of people or human mobility is an issue for Pakistan because this movement is responsible of producing imbalance of population.

There are two factors of migration; the first is push factor and the other is pull factor.

• **Push Factor**

This factor compels an individual to leave the area for so many reasons. He often does not feel satisfy with his standard of living even some time could not be able to meet basic need.

Rural to urban migration is example of push factor.

• **Pull Factor**

At times, individual feels satisfy living in his native place but wishes to be more prosperous and happier. For this purpose, he seeks the suitable place where he could grab better economic opportunity, so, he migrated on that area which suits to him.

Migration from Urban slams to develop Urban areas, or migration to abroad is the example of pull factors.

In Pakistan, People migrates European and Gulf State from even develops cities of Pakistan Like Karachi, Lahore and Islamabad.

**The Causes of Migration**

The causes of Migration are these:
• Poor Living

When individual thinks, where he is living, there is no proper life facilities available, he migrates elsewhere. The cause may be environmental, social and economic. In our country, most of people migrate to seek better life opportunities.

• Static Economical Activities

When population grows more but economical activities do not enhance, people start leaving the native place to get better and charming job opportunity to any other place. In our country population is rising. Due to the worst situation of law and order, investors are reluctant to invest so, economical activities are falling down and internal or external migration phenomenon taking place rapidly.

• Violence and Conflict

On some occasions, a country faces violence and conflicts on religious, ethnic and racial basis. Each group abuses others and prejudices dominate around. This unrest becomes motivational factor for a person to leave the place to survive and settle any other peaceful geographical land.

For example, Australia provided asylum to Hazara Quetta Pakistani community on sectorial killing.

• Accessibility

Sometime only accessibility factor cause migration for an individual. This happen under the pull factor, for example a blood relative or a very close friend of yours who is a settler abroad, offers you to join there. You consider it a golden chance and you certainly migrate upon his sponsorship offer. Many Pakistani are living as a settler in various countries such as America, Canada and UAE upon this sponsorship opportunity.

8.6 Types of Migration

Before we discuss types of migration, keep two terms in your mind,

Immigrant

A person who comes to live permanently in a foreign country called immigrant.
Emigrant
A person who leaves his own country to settle permanently in any other country is called emigrant.

The types of migration are written under:

- **National Migration**
  National Migration means people mobilizes within limits of the country as rural to rural, urban to rural, rural to urban, city to city, town to town and province to province etc.

- **International Migration**
  International Migration refers to migrates out of the country limitation. It means that when an individual move to another country to settle permanently is called international migration. There are three types of international migration.
    
  I. **Legal Migration**
  When an emigrant completes all legal procedure and enters in the country with both countries consents is called legal migration. After completion of his living tenure he could be an identity card holder of that county.

  II. **Illegal Migration**
  Illegal migration means migration without permission of both countries for example Kalbhoshan Yadeu is caught in Pakistan as spy or Indian fisherman often over cross naval limitations and enter in Pakistan illegally and return back by Pakistan Government.

  III. **Refugee**
  The migration which takes place neither through documents or embassy nor illegal but an emigrant enters only for getting shelter and immigrant country accept his responsibility so, emigrant will be called refugee for example Afghan refugee used to come in Pakistan during 1979 to 1988 and now they are settler.

8.7. **Settlements**
After migration individual settles into other place, this mobility is settlement. In the following, the definition of settlement will be mentioned,
“When a small group or individual displaces and lives into other place in organized and civilized way is called settlement.”

Another definition is “A place typically one which has previously been inhabitant where people establish a community is called settlement.”

When Pakistan establish Mahajirs as a Muslim group of sub continents left India and became habitat and settler of Pakistan, lived into organized newly build colonies where they were not previously been inhabitant.

8.7.1 Trends of Settlement

Settlement has various trends as Urban to Urban settlement and Urban to Rural settlement.

I Metropolitans
Most of People living in rural areas migrate from there and settle into urban societies. In this way small cities transfers into big cities. These cities become densely populated and then called “Metropolis” cities where life facilities are accessible for a resident. These sort of mega city could be called “Metropolitan cities.

II Metropolitan Cities of Pakistan
Metropolitan cities of Pakistan are:

Karachi, Lahore, Faisalabad, Islamabad, Rawalpindi, Gujranwala, Multan, Peshawar, Sargodha, Sialkot, Bahawalpur, Quetta, Hyderabad etc.

Trends of migration in Pakistan is to move towards Metropolitan cites even settlers of big cities also migrates and try to resettle in mega cities for example in Karachi not only villagers but city dwellers are settled permanently. Here people comes from even big cities like Sukkar, Khairpur, Wazirabad, Gujrat etc.

III Urbanization
Due to migration trends towards urban areas, Urbanization is taking place rapidly. The question arise what is urbanization?

The definition of Urbanization mentioned below:
When population of people grow, the population of place may spill over from this place to its nearby develop areas and adapt and living style of newly settle place is called urbanization.

Pakistan has the highest ratio of urbanization in South Asia. According to 2017 census 36.4% peoples living in urban areas. This percentage was 32.5% in 1998, shows high growth of urbanization process. It could access 40 % in 2025 If it did not stop.

Urban areas generate 55 % of total GDP of Pakistan. Most of people settle in big cities for job opportunity and economic activities that is why Urbanization percentage remains higher in less developed countries like Pakistan.

IV Megalopolis

The highest rate of Urbanization formulates megalopolis. The definition of megalopolis defines under:

“It is defining as a groups of two or more roughly adjacent metropolitan areas which may be merged of separated into a continuous urban region.”

In Pakistan, Karachi is a Megalopolis city having 6 district Municipal Corporation. Its total population is 24 Million approximately.

8.7.2 Merits and De-merits of Settlements

When an individual pass through the process of settlement, he often faces some advantages and disadvantages during whole process. Merits and demerits of settlement now being mention under:

I Merits of settlements

The merits of settlements are these

i. People get sufficient life facilities as food, shelter, Electricity, Transport what they could not have in previous area that he left.

ii. Individual could accommodate anywhere in big cities according to their purchasing power. In Karachi and Lahore accommodation is available from lacs to billion rupees.
iii. Big Cities have massive economics activities. So, private sectors provide plenty of jobs to individuals. One could not remain jobless for along span of time.

iv. Basic social needs specially health and education are available in big cities. Private and government schools for serving human beings in developed areas.

v. Recreational facilities are accessible in cities like Parks, Museum, Cinemas and theaters etc. Where people could refresh their minds.

vi. A raw and unskilled worker could enhance his abilities in mega cities under the experience and trained person to utilize his skills for earning money.

vii. Most of metropolitan or megalopolis are multi ethnic and multi cultured cities so, a settler may have better chance to interact different people that may help to reduce his narrow minded tendency.

viii. A settler could utilize his agriculture skills in urban sectors through working in agro based industrial sector.

II Demerits of Settlements
When settlement ratio grows higher, the cities mismanage and merits of settlement changes into demerits. Due to over urbanization many issues emerges for an immigrant or settler that mention under:

i. As people flows towards mega city to settle, pollution starts and various after effect like deforestation, water impurities, CO2 filled air pollution, negative climate change, soil erosion and other unpleasant environmental problems occur that makes the life uncomfortable for settler and other people who are living in that area.

ii. Settler faces energy crises, production of energy does not fulfill the demands and load shedding duration increases time to time. Though government initiated new projects and some are in pipeline but still 30 percent energy demand is meet less.

iii. Settlers also faces transportation problem. Congestion of roads, late arrival at offices and other places, accidents, price hike of private trasports,
pollution through vehicles are common problem in urban cities of Pakistan.

iv. People do not able to get facilities like water a basic need of human. In some areas mega cities like Karachi, Lahore, Peshawar. Duration of water supply by water supply authorities prolongs a month or so.

v. Settler faces sewerage problem as well. Big cities need strong infrastructure for solid waste management. The sewerage system and solid waste management system in Karachi has already been collapsed and Lahore is on the way to follow the same.

vi. Usage and availability of fresh water is now a big problem for urban settler. People have to buy disposable fresh bottles having substandard quality. In big cities deficiency of vitamin D is common among individuals after 50 to 55 years of age and stomach disorder issue is also increasing in urbanized cities.

vii. Execution and preparation of plan in metropolitan cities is a hard task because these cities contain knitted, linked and complex system seems untouchable. That is why government of urbanized and over populated cities manage these dense areas on automatic and spontaneous basis. The restructure plan of any metropolitan and megalopolitan cities is very much time consuming.

viii. Big trees and greeneries often not found in big cities. Houses have been built due to the shortage of land after cutting trees and gardens that effects negatively on human health. In 2013, heat stroke causes death of hundreds of people in Karachi. Shortage of oxygen was declaring the major reason of this menace. Government of Sindh and federal both imported trees from abroad to minimize the attack of heat stroke specially for Karachi and generally for other cities.

ix. It is impossible to watch mega city and its dwellers activities. Crime level is increasing in big cities due to insufficient monitoring system. Anti-social elements are easily being operated their destructive activities in mega cities of Pakistan. Street crime, murder, sect base killing, target killing and other criminal incident are daily reported in police stations of urbanized cities.
8.7.3. Management of Settlement Problems

Settlement problems could be managed through these recommended steps:

I Provision of Jobs

If job space increases with the help and cooperation of private sector, influx of population could be stopped and urbanization pace could be made slow and controllable.

II Better Infrastructure

Over population and excessive settling towards urban areas disturbs and overburdens the infrastructure of urban societies. Constant monitoring and better planning could save the infrastructure of urbanized cities.

III Equal Distribution of Resources

If government utilize distributes and allocate resources in both urban and rural areas equally and people get job opportunity in their native areas, people would avoid migration and stick upon their native lands.

IV Discouragement of Quota System

If jobs and resources provide every corner of Pakistan, the need of quota system automatically will be finished up and people will not motivate and compel to settle any other place for job.

V Streamlining of Peace Process

Despite economic reasons people migrates for life survival as well. If jobs are available but law and order is not up to the mark, the process of brain drain will take place and people migrate elsewhere. So it is necessary to maintain law and order and to continue peace process so that people remain in their native place and get bread and butter respectably.
8.8  **Self Assessment Questions:**

1. Highlight the population structure, social classes pyramid, density distribution and population growth of Pakistan.

2. In the light of high growth rate of Pakistan, describe the causes and problems of high growth rate in Pakistan.

3. Elaborate the factors and various types of migration in Pakistan.

4. Keeping in view the trends of settlement, describe the merits and de-merits of settlements. Also discuss the management of settlement problems.

8.9  **Bibliography**


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**Introduction**

This unit deals with the Political Geography. The Political Geography has become the most important subject in the fields of politics and geography. Pakistan is of the great importance for the super powers due to its strategic location. The location of Pakistan has been interesting for the super powers in past, especially during the cold war and also during the war of Afghanistan when Soviet invaded.

It is the last unit of this book which develops the interest in various important strategies of Pakistan. North and Western Mountains of Pakistan included the Karakorum Mountains, the Hindu Kush Mountains and the Himalayas which provides a great protection to Pakistan from the attacks of the enemies. On the other hand, the Potwar plateau is of great importance as it is full of natural resources. The Indus Plain of Pakistan is useful for growing almost all types of crops. Moreover, the Climate of Pakistan is the God gifted which provides us five seasons.

Due to strategic location and its resources Pakistan has a lot of economic potential, if the governments able to utilize the resources in proper way. Pakistan is enrich in mineral resources including coal, petroleum, salt, gold and other precious metallic and non-metallic minerals. Besides the Hydel and thermal energy, our beloved county can utilize the solar energy as well.

**Objectives**

After reading this unit, the students will be able to:

1. know the location of Pakistan and its geo-strategic position.
2. know about the land and climate of the country.
3. know about the various natural resources of Pakistan.
9.1 Location of Pakistan

Pakistan came into existence as an independent country on August 14, 1947. The official name of the state is Islamic republic of Pakistan with Islamabad as its capital. The total area of Pakistan is 7,96,095 sq km.

Pakistan has a common boundary with Chines territory of Sinkiang in NORTH and NORTH EAST. The total length of this boundary is 370 miles.

Similarly in the north west of Pakistan, a narrow arm of Wakhan (Afghanistan) separate Pakistan from central Asian countries. On the western side, Pakistan has a boundary with Afghanistan which consists of low dry hills called Durand Line (1400 miles). This boundary is demarcated in 1897.

Two important roads link Pakistan with Afghanistan, one links Peshawar with Kabul through Khyber Pass and the other one links Quetta with Kandahar via the Khojak pass.

In the South West, Pakistan has a common boundary with Iran. It is about 520 miles long.

Arabian Sea makes southern boundary with Pakistan. The coastal length is up to 600 mile.

India lies at the eastern side of Pakistan making boundary with Punjab and Rajistan. The boundary length of India and Pakistan is about 1000 miles.
Absolute Location of Pakistan

Longitudinally, Pakistan is not greatly; consequently it is likely to have only one standard time for the entire country. The standard time of Pakistan is 5 hours forward of Greenwich Mean Time (+5). In Pakistan we have 75° E longitude which is considered standard for calculating the local time of Pakistan. Latitudinally, Pakistan lies between 24° N to 37° NORTH LATITUDE and 61° E to 75.5° EAST LONGITUDE.

9.2 Physiography of Pakistan

The experts of the Geography divided Pakistan in the following categories according to its Physiographic conditions.

1. North and western mountains
2. Plateau
3. Plains
4. Desert
5. Coastal area
6. Delta

9.2.1 North and Western Mountains

The north western mountains can further be categorized which are being discussed in the following lines.

9.2.1.1 The Karakorum Mountains

The Karakoram is the gigantic and very big mountain. All the year round these mountain remains snow covered because precipitation always fall in the form of snow that has given birth to big glacier too. The average altitude (height) of this mountain is 6100 meters.
**Boundary:** Tibet makes the eastern boundary while Hunza and Gilgit River make the western boundary of Karakorum ranges. In the south river Indus makes the southern boundary.

**Peaks:** It is a range of towering peaks. The highest peak of this range is K2 (8611m) that is considers the second succeeding Highest Peak after Mount Everest (8848 m). More than 20 other peaks can be found here having altitude upto 8000 meters.

Glaciers: Glaciers instigate from the top of the mountains; several of them are very long. Some important glaciers are Siachen (72 KM) Baifo (62.5 KM) Hisper Baltoro, And Batura are the Important Glaciers of these ranges having length from 72 km to 7 km.

**Passes:** The mountains are very difficult to cross even the passes are very high. Two important passes are mentionable that connect Pakistan with chin A. Khunjerab pass which connect Pakistan (Gilgit) with china through Karakurram high way B. Karakurram pass which connect Kashmir with china. These are very high mountains even the passes are located at very high altitude and many Japanese, Pakistanis and European have lost their lives in an effort to conquer these hostile peaks.

**9.2.1.2 The Hindu Kush Mountains**

It is the prolongation of Karakurram Mountains; however the water separating the hunza and Gilgit River is taken as the boundary. The Hindu Kush Mountain outspreads westward into Afghanistan.

**Boundary:** THE Hindu Kush Mountain ranges westward into Afghanistan. In the north it unites with the Pamir plateau its southern boundary is hard to define but the Ghizer River, a tributary of Indus is considered as the southern boundary.

**Peaks:** The Hindu Kush ranges are challenging, some peaks are higher than 5000 meter in elevation. TIRCIH MIR is highest peak of this range with 7690 meter. NOSHAQ is another important peak of this series of mountain.
Passes: The passes in these ranges are quite difficult to cross. Barogil pass connect Pakistan with wakhan in Afghanistan, similarly Dorah and sherashing also lies in the middle of Pakistan and Afghanistan at different places.

Glaciers: A numeral important glacier are there in Hindu Kush series, for example Sakiz Jarab (30.4 km) and Tirchmir (22.4 km) are amongst the most imperative. Similarly, Kohistan, Swat and Dir series are at South of Hindu Kush Mountain lies three sub parallel series of ranges which run from north to south.

These mountains are separated by different river that is flowing among these like, Kohistan Mountain lies between river Indus and Swat River, Swat Mountain lies between river swat and Panjokora while Dir Mountain lies between panjkora and river kunar. Movement in these mountains is very difficult, so Dir and chitral can only be connect through Lowari pass but Lowari pass mostly remain closed during the winter season because of too much snowfall.

9.2.1.3 The Himalayas

They are extended from Assam (India) in the East toward west of Pakistan. The northern limit is marked by river Indus. Its average height is up to 6000m. It comprises a series of mountains.

The Great Himalayas: As the name shows, these are the highest mountain of these series, lying right from Indus River in the north and western edge is also obvious by Indus River. Nanga Parbat (8126 m) is the highest peak of these ranges. The bedstead of lovely Lake Saifulmaluk in upper kaghan valley is positioning in great Himalayas.

Glaciers: The longest glaciers are Rupal S (17.6 km) tailed by Rupal N (16 km).

Passes:Babusar pass is a very important pass in these ranges that connect northern area (Gilgit) with district Mansehra.

The Lesser Himalayas or Pir Panjal Mountain

Lesser Himalayas located south of great Himalayas. It is also called Pir-Panjal Mountain in Kashmir. In Pakistan these hills found in Batagram, Mansehra,
Abbottabad, and in northern Rawalpindi district. Some hills station in Pakistan like GhoraGali, Murree, Nathiagali are located in lesser Himalayas.

**Sub Himalayas or Shiwalik Mountain:** These are the southernmost mountain of Himalayas. They are very low in altitude (600-1200 m).

**Koh e Safed Mountain:** Kabul River makes the boundary between mountainous north and koh e safed. The average heights of these mountains are 3600 meter. Sikeram is the highest peak (4760 meter) of these range mostly covered with snow.

**Khyber pass** the most important one connecting Peshawar with Kabul in Afghanistan. Similarly Peshawar valley is the largest one which is drained by river kabul and its tributaries river swat. Safedkoh ranges merge with kohat hills in the east.

**Waziristan Hills:** Located south of safedkoh with height ranging from 1500-3000 meter. Razmakis one of the highly rich in mineral one located in these ranges. These mountains are the natural barrier between Pakistan and Afghanistan. Its southern boundary limit by Gomel River.

**9.2.1.4 The Sulaiman and Kirther Mountain**

These are the long series of mountains laying between Baluchistan plateau on the west and Indus plain on the east. These extend south from River Gomel up to the Arabian Sea having a total length of 850 km. they consist of limestone, sandstone, and shale and can be divided into Sulaiman Mountain, the Quetta Syntasxis, Zarghunknot and Kirther Mountains.

From the south of Waziristan southward the Sulaiman Mountain run for a distance of 400 KM. Takht-i-Sulaiman is the highest peak of this range (3487 meter).

The Sulaiman Mountains merge further into marri bugti hills in the south. Similarly these marribugi hills keep journey ahead and merge into quettasynntasxis and zarghunknot. These are lengthy mountain (190 km) having highest peak in Baluchistan called LOE SAR (3583 M).
Similarly to its south, these mountains merge into Kirther Mountain, which run southward to the Arabian Sea.

{Peshawar valley, Bannu valley and Kohat valley are the result of river Kabul, river Kurram and Kohat River respectively.}

9.2.2 Plateau

There are two plateaus (Table land) in Pakistan.

9.2.2.1 Potwar Plateau and Salt Range

Potwar plateau and salt range are located south of sub Himalayas and in between river Jhelum on the east and river Indus on the west. On the north it I bounded by Kala Chitta ranges and Margilla hills and southern boundary is marked by salt ranges themselves. It is an area of 18000 sq km.

The Soan River and its tributaries have developed gullies and it is typical bad land.

The salt range is a feature of great geological interest and its present a complex geological sequence from early time. Salt ranges rises to an average height of 750-900m. They extend from Jehlum River in the east and run southward ward along the twisting path to Kalabagh where they cross the Indus River and enter into Bannu district.

Sakesar (1527m) is the highest peak of this region, similarly a number of lake dot the region like Uchali, Khabeki, Kallar Kahar and this is rich in mineral zone like salt, gypsum, limestone and coal et.

9.2.2.2 The Baluchistan Plateau

This plateau occupies an extensive area mostly cover with hills and mountain. It is located west of the Kirther Mountain. Several basins are lying between these hills and mountain including the small Quetta basin. Similarly Toba Kakar, Raskh, Chagai, and Maran Coastal Ranges are the important ranges of Baluchistan plateau.
This region is a true desert, an area of inland drainage and dry lakes, the largest of which is human e mash khel (87 km long and 35km wide).

{A valley is the lower part in the land, between two higher parts which might be hills or mountain OR Low area between hills often with a river running through it.}

## 9.2.3 Indus Plain

The Indus plain occupies a large area to the east and south of western highlands. They were formed by the alluvium laid down by river Indus and its tributaries. The Indus plain slope from North to South. In the north, they rises to about 300 meter and drop to 75 meter near Panjnad.

Indus is a mighty stream having total length up to 1800 miles from its source of origin (Lake Mansarwar) to its mouth. During its journey, its make several feature during his Erosion, transportation, and depositional stages. The Indus plain is divided into following.

### Upper Indus Palin

The Upper Indus plain is the land of Jehlum, Ravi, Sutlej, Chinab And Indus with average height from 400 meter 1200 meter. This is almost plain area with micro relief. River area form meander, flood plain and interflows or bars.

The upper Indus plain can be divided into four doabs.

1. Sindh Sagar Doab or Thal desert (between river Indus and Jhelum)
2. The Chaj Doab (also called Jach Doab) (Between Jhelum And Chenab)
3. Rechna doab (Between Chenab And Ravi)
4. Bari doab (Between Ravi And Sutlej)

### Lower Indus Plain

The lower Indus plain or Sindh plain is almost flat with average gradient of one
meter in ten kilometer. The Sindh plain is divided into Kachi Sibi Plain, the Sindh plain and Indus Delta.

9.2.4 Deserts

South eastern desert spread over an extensive area in eastern Bahawalpur division, Ghotki, sukkur, khairpur, sanghar, Mirpurkhas and Tharparkar district.

In Punjab this is known as Cholistan Or Rohi while in sindh it is called Pat Or Thar.

The desert is covered with sand dunes rising up to 150 meter. This is a true desert area with less rain fall and water is crying need of this area.

The desert is spread from Pakistan to India; in India the same is called Nara while in Pakistan it is famous as Rohi or Cholistan in Punjab and Thar in Sindh. In Punjab, the desert covers the areas of Bahawalpur, Bahawalnagar, Rahim Yar Khan and surroundings of Sadiq Abad and other localities. In Sindh the famous district Thar parker is situated in the same desert where hundreds of children and adult dies every year due to shortage of food and water.

Another larger desert is Thall which is situated in the Punjab and covers the areas of Mianwali (partially), Khushab, Noor poor, Bhakkar, Layyah and Muzaffar Garh. The desert of Thall has been irrigated thoroughly and the residents of the area have not to face issues like the residents of Thar.

9.2.5 Delta

The Indus River has built a large number of deltas at its mouth. Indus delta is the seventh largest delta of the world started from Thatta. Before the construction of barrages and canals, the Indus and its tributaries were carrying 300 million tones of sediments per year into the sea and the delta were growing at a rate of 34.4 meter per year. Today, although the discharge of the Indus has greatly decreased.

{The Runn of Kutch stretches out immediately to the east of deltaic plain. It’s a marshy area covered with mud flows and divided by narrow winding creeks. The Runn of kutch is 21672 sq km area, the western portion (780 sq km) area belong to Pakistan while the remaining belong to India.}
Coastal Areas: The Pakistani coast is 700 KM long, of which 500 KM falls under Makran coast, extending from Karachi in the east to Jiwani in the west. Over the entire Makran coast is fairly straight with no marked indentation.

9.3 Climate of Pakistan

In much of Pakistan, the climate is tropical or subtropical, semi-arid or desert, but in the north there are also: an area near the mountains which is quite rainy, a cold mountainous area, and a frigid area on the peaks of the Himalayas. In the cold half of the year, from late autumn to early spring, the north is reached by weather fronts of Mediterranean origin, which cause rainfall in the lowlands and snowfall in the mountains. In spring (ie March and April), the clash between air masses can cause thunderstorms and strong winds. In summer, from July to mid September, the country is reached by an offshoot of the Indian monsoon, but in most of the country it is not able to bring heavy rains, while it doesn't arrive at all in the western part. However, the warmest months are those that precede the monsoon, especially June, which is very hot in plains and hills, and up to quite high altitudes.

The monsoon has an irregular pattern: during some years, it may have an unusual force, generating floods, while in other years, it doesn't even arrive. Rivers may overflow even at a great distance from the area where the heaviest rainfall occurred, which typically happen in the north. So, the great valley of the Indus and its tributaries may also be affected by widespread flooding in the southern area, where normally it doesn't rain much. The cycle called ENSO can affect the monsoon's performance: in La Niña years, rainfall is heavier than normal, while El Niño brings drought.

Mountains

In the mountainous areas of the north and west, the climate is continental, with a wide temperature range between winter and summer, and often also between night and day. The temperature naturally decreases with altitude. The northern area (zone 1 on the map), as well as being the coldest at equal altitude, is more prone to cold fronts brought by the westerly winds of the middle latitudes from December to May. But not all areas receive a lot of precipitation: it depends on
slopes. The southern side (the mountains north of Peshawar and Islamabad) is much more rainy than the northern one.

Kashmir

In Kashmir, in the northernmost valleys of Khyber-Pakhtunkhwa and in the region of Gilgit-Baltistan, yearly rainfall is at desert levels, below 250 millimeters (10 inches). Anyway, at higher altitudes, snowfalls quite frequently occur in winter, and above 4,500 meters (14,800 ft), vast glaciers are found, but the fact that the trekking season runs from April to October shows how this area is sheltered from the monsoon rains, although we cannot exclude some showers or thunderstorms, and maybe snowfalls on the highest peaks.

In Pakistan, there are two mountain ranges, the Karakoram and the Hindu Kush, that host some of the highest peaks on the planet, starting with K2, the second highest mountain in the world with its 8,611 meters (28,251 ft). The highest peak of the Hindu Kush is Tirich Mir, 7,708 meters (25,289 ft) high.

Skardu

Skardu, located at 2,200 meters (7,200 ft) above sea level, is the starting point for climbing K2 and other peaks above 8,000 meters (26,200 ft); the climate here is arid continental, with an average ranging from -2.5 °C (27.5 °F) in January to 24
°C (75 °F) in July, when the average maximum reaches 32 °C (90 °F). Here are the average temperatures of Skardu.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
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<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min (°C)</td>
<td>-8</td>
<td>-6</td>
<td>2</td>
<td>7</td>
<td>10</td>
<td>13</td>
<td>16</td>
<td>16</td>
<td>11</td>
<td>-2</td>
<td>-6</td>
<td></td>
</tr>
<tr>
<td>Max (°C)</td>
<td>3</td>
<td>6</td>
<td>12</td>
<td>19</td>
<td>23</td>
<td>29</td>
<td>32</td>
<td>31</td>
<td>27</td>
<td>20</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Min (°F)</td>
<td>27</td>
<td>41</td>
<td>51</td>
<td>66</td>
<td>70</td>
<td>75</td>
<td>80</td>
<td>80</td>
<td>77</td>
<td>73</td>
<td>77</td>
<td>58</td>
</tr>
<tr>
<td>Max (°F)</td>
<td>90</td>
<td>94</td>
<td>97</td>
<td>108</td>
<td>112</td>
<td>113</td>
<td>115</td>
<td>115</td>
<td>114</td>
<td>111</td>
<td>111</td>
<td>101</td>
</tr>
</tbody>
</table>

Precipitation in Skardu amounts to 250 mm (10 in) per year, with a relative maximum between winter and spring. Here is the average precipitation.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
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<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prec.(mm)</td>
<td>30</td>
<td>25</td>
<td>35</td>
<td>30</td>
<td>25</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>15</td>
<td>215</td>
</tr>
<tr>
<td>Prec.(in)</td>
<td>1.2</td>
<td>1.0</td>
<td>1.4</td>
<td>1.2</td>
<td>1.0</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.2</td>
<td>0.2</td>
<td>0.6</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Expeditions to K2 are typically organized between the second half of July and early August. K2 and other peaks over 8,000 meters (26,200 ft) have a polar climate throughout the year, with strong winds that increase the sensation of cold. On the southern side of the mountains, in the province of Khyber-Pakhtunkhwa (formerly North-West Frontier Province), the rains are plentiful, both those of winter and spring, which are caused by western disturbances, and those of the monsoon period, which are even heavier. Therefore, annual rainfall can exceed 1,500 mm (60 in) in the district of Abbottabad. The Ayubia National Park is definitely green and rainy.

In the south-western part of Pakistan, there are other mountain ranges (zone 2), such as the Chagai Hills and the Sulaiman Mountains; weather fronts in winter pass less frequently over this area, and the summer monsoon barely affects them as well. The result is a semi-desert climate, cold in winter, at least at night and above a certain altitude, while summer is hot even at relatively high altitudes. The plateau of Baluchistan (or Balochistan) has an arid continental climate as well, cold in winter and hot in summer.
In Quetta, 1,600 meters (5,250 feet) above sea level, the monthly average temperature ranges from 4 °C (39 °F) in January to 28 °C (82 °F) in July. Here, the summer monsoon produces little effects, with only sporadic rains. From December to March, the temperature at night usually drops below freezing (0 °C or 32 °F), but during the day it normally exceeds 10 °C (50 °F). Sometimes it can snow in winter, and intense frosts may occur at night, even as low as -15 °C (5 °F). On the other hand, in the summer months, the temperature can reach 40 °C (104 °F) despite the altitude. Here, the best months, in order to avoid the weather extremes, are April and October. Here are the average temperature.
Plains and Hills

In the northern part of the Indo-Gangetic plain (zone A), corresponding to the region of Punjab (or Panjab), the "five rivers land", the climate is sub-tropical, with a mild and relatively rainy winter (when, however, nights are cold), followed by a very hot period from mid-April through June, when the temperature can reach 46/47 °C (115/117 °F), and a sweltering summer, with some rain brought by the monsoon from July to September. In spring, especially in March, tornadoes may occasionally occur because of the clash between different air masses. Before the monsoon, in May and June, a very hot wind blows, the *Loo*, which can bring dust storms as well as the rapid dehydration in animals and humans, and the desiccation of vegetation. Scattered thunderstorms may occur, causing ephemeral decreases in temperature. The monsoon arrives between late June and early July, but it's not as intense as in other regions of India, and it's characterized by periods of bad weather alternating with long weeks with intense heat and drought. However, the rains, though rare, can be violent and concentrated in few hours or even in few minutes, and when they last a few days, rivers may overflow. In
winter, in Punjab (but also in northern Sindh), mists and fogs often form.

**Peshawar**

In Peshawar, in the northwestern region of *Khyber Pakhtunkhwa*, the monthly average temperature ranges from 11 °C (52 °F) in January to 33 °C (91 °F) in June, with highs around 40 °C (104 °F). In July, August and September, the daytime temperature drops a little, to around 35/38 °C (95/100 °F), but at the cost of an increase in humidity. In winter, between December and February, the temperature is mild during the day, with highs around 18/20 °C (64/68 °F), but it often gets cold at night, when the temperature can drop to around freezing. Here are the average temperatures.
In Lahore, a large metropolis in Punjab, the climate is similar to that of Peshawar, but owing to the more southern position, the winter is a bit milder: the average ranges from 13 °C (55.5 °F) in January to 33.5 °C (92.5 °F) in June. Lying more to the east, the city is more exposed to the monsoon, in fact, it receives 510 mm (20 in) of rain per year, including 150 mm (6 in) in July and 130 mm (5.1 in) in August.

In Peshawar, although the rains may be heavier during some years: in the rainiest August ever, rainfall amounted to 450 mm (17.7 in). Here is the average precipitation.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
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</tr>
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<tbody>
<tr>
<td>Min (°C)</td>
<td>4</td>
<td>6</td>
<td>11</td>
<td>16</td>
<td>21</td>
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<td>5</td>
</tr>
<tr>
<td>Max (°C)</td>
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<td>20</td>
<td>24</td>
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<td>38</td>
<td>36</td>
<td>35</td>
<td>31</td>
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<td>20</td>
</tr>
<tr>
<td>Min (°F)</td>
<td>39</td>
<td>63</td>
<td>73</td>
<td>86</td>
<td>97</td>
<td>104</td>
<td>100</td>
<td>97</td>
<td>95</td>
<td>88</td>
<td>79</td>
<td>68</td>
</tr>
<tr>
<td>Max (°F)</td>
<td>64</td>
<td>68</td>
<td>75</td>
<td>86</td>
<td>97</td>
<td>104</td>
<td>100</td>
<td>97</td>
<td>95</td>
<td>88</td>
<td>79</td>
<td>68</td>
</tr>
</tbody>
</table>

In an average year, 410 mm (16 in) of rain fall. In winter and spring, some rains may occur, with a maximum in March of 75 mm (3 in), while the summer monsoon brings a maximum of only 70 mm (2.8 in) per month in August, although the rains may be heavier during some years: in the rainiest August ever, rainfall amounted to 450 mm (17.7 in). Here is the average precipitation.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prec.(mm)</td>
<td>30</td>
<td>45</td>
<td>75</td>
<td>50</td>
<td>25</td>
<td>8</td>
<td>45</td>
<td>70</td>
<td>22</td>
<td>11</td>
<td>13</td>
<td>25</td>
<td>412</td>
</tr>
<tr>
<td>Prec.(in)</td>
<td>1.2</td>
<td>1.8</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0.3</td>
<td>1.8</td>
<td>2.8</td>
<td>0.9</td>
<td>0.4</td>
<td>0.5</td>
<td>1</td>
<td>16.2</td>
</tr>
<tr>
<td>Days</td>
<td>5</td>
<td>7</td>
<td>11</td>
<td>10</td>
<td>7</td>
<td>4</td>
<td>8</td>
<td>9</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>77</td>
</tr>
</tbody>
</table>

The sun in Peshawar shines quite often even in winter, it reaches a maximum in May and June, and then the sunshine hours decrease a little because of the monsoon.
Islamabad

The capital of Pakistan, Islamabad, and the neighboring city of Rawalpindi, are located at 500 meters (1,600 feet) above sea level, and are a bit cooler, and also much more rainy, since they are located at the foot of the mountains; in fact, they receive 1,250 mm (49 in) of rain per year, including more than 250 mm (10 in) per month in July and August. Here is the average precipitation in Islamabad.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prec (mm)</td>
<td>2.6</td>
<td>3.7</td>
<td>4.3</td>
<td>3.1</td>
<td>2.2</td>
<td>5.1</td>
<td>10.8</td>
<td>11.4</td>
<td>3.9</td>
<td>1.4</td>
<td>1.8</td>
<td>4.9</td>
<td>19.2</td>
</tr>
<tr>
<td>Days</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>8</td>
<td>16</td>
<td>16</td>
<td>9</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>100</td>
</tr>
</tbody>
</table>

The average temperature in January is 10.2°C (50°F), and light frosts may sometimes occur at night. In summer, the rains lower the daytime temperatures more than in other cities, to 25/35°C (77/95°F) in July and August, but moisture becomes high. Here are the average temperatures.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min (°C)</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>21</td>
<td>14</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Max (°C)</td>
<td>18</td>
<td>19</td>
<td>24</td>
<td>30</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>34</td>
<td>31</td>
<td>25</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td>Min (°F)</td>
<td>86</td>
<td>68</td>
<td>75</td>
<td>86</td>
<td>95</td>
<td>102</td>
<td>95</td>
<td>93</td>
<td>88</td>
<td>77</td>
<td>88</td>
<td>68</td>
</tr>
</tbody>
</table>

Despite the more intense rains, the sunshine pattern in Islamabad is the same as in Peshawar, so the sun often shines even in summer.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>
Jacobabad

In Jacobabad, in the Sindh Province, only 110 mm (4.3 in) of rain fall per year, the majority of which occurring in July and August. Here is the average precipitation.

<table>
<thead>
<tr>
<th>Month</th>
<th>Prec.(mm)</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>3</td>
<td>0.1</td>
</tr>
<tr>
<td>Feb</td>
<td>7</td>
<td>0.3</td>
</tr>
<tr>
<td>Mar</td>
<td>10</td>
<td>0.4</td>
</tr>
<tr>
<td>Apr</td>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>May</td>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>Jun</td>
<td>5</td>
<td>0.2</td>
</tr>
<tr>
<td>Jul</td>
<td>37</td>
<td>1.5</td>
</tr>
<tr>
<td>Aug</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td>Sep</td>
<td>11</td>
<td>0.4</td>
</tr>
<tr>
<td>Oct</td>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>Nov</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Dec</td>
<td>4</td>
<td>4.3</td>
</tr>
<tr>
<td>Year</td>
<td>110</td>
<td></td>
</tr>
</tbody>
</table>

In Jacobabad, winter is definitely mild, in fact, the average in January is 14 °C (57 °F), but with significant differences between day and night, so nights can be cold. On the other hand, in May and June, the daytime temperatures are around 45 °C (113 °F), but sometimes they can reach as high as 50-52 °C (122-126 °F); these values make Jacobabad one of the hottest cities in the world. The weakness of the monsoon in this area is evidenced by the fact that the maximum temperature remains around 42 °C (108 °F) in July and 40 °C (104 °F) in August, so it doesn’t drop by much. Here are the average temperatures in Jacobabad.

<table>
<thead>
<tr>
<th>Month</th>
<th>Min (°C)</th>
<th>Max (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td>Feb</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>Mar</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>Apr</td>
<td>21</td>
<td>37</td>
</tr>
<tr>
<td>May</td>
<td>26</td>
<td>44</td>
</tr>
<tr>
<td>Jun</td>
<td>29</td>
<td>45</td>
</tr>
<tr>
<td>Jul</td>
<td>29</td>
<td>42</td>
</tr>
<tr>
<td>Aug</td>
<td>27</td>
<td>40</td>
</tr>
<tr>
<td>Sep</td>
<td>25</td>
<td>39</td>
</tr>
<tr>
<td>Oct</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>Nov</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>Dec</td>
<td>7</td>
<td>24</td>
</tr>
</tbody>
</table>

At the latitudes of Jacobabad, whose weather fronts in winter pass very rarely, the sun shines regularly even in this season.

<table>
<thead>
<tr>
<th>Month</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>8</td>
</tr>
<tr>
<td>Feb</td>
<td>8</td>
</tr>
<tr>
<td>Mar</td>
<td>8</td>
</tr>
<tr>
<td>Apr</td>
<td>9</td>
</tr>
<tr>
<td>May</td>
<td>9</td>
</tr>
<tr>
<td>Jun</td>
<td>8</td>
</tr>
<tr>
<td>Jul</td>
<td>9</td>
</tr>
<tr>
<td>Aug</td>
<td>8</td>
</tr>
<tr>
<td>Sep</td>
<td>9</td>
</tr>
<tr>
<td>Oct</td>
<td>9</td>
</tr>
<tr>
<td>Nov</td>
<td>9</td>
</tr>
<tr>
<td>Dec</td>
<td>8</td>
</tr>
</tbody>
</table>

In this area, the ruins of *Mohenjo-daro*, one of the oldest cities in the world, are found.
Hyderabad

More to the south, in Hyderabad, in the Sindh province, the winter temperatures are even milder, while in summer, they are a little lower because of the proximity to the sea. Precipitation is still low, and amounts to 180 mm (7 in) per year, with a maximum of 60 mm (2.4 in) per month in July and August. Here are the average temperatures.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min (°C)</td>
<td>11</td>
<td>14</td>
<td>19</td>
<td>23</td>
<td>26</td>
<td>28</td>
<td>28</td>
<td>27</td>
<td>25</td>
<td>22</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Max (°C)</td>
<td>25</td>
<td>28</td>
<td>34</td>
<td>39</td>
<td>42</td>
<td>40</td>
<td>37</td>
<td>36</td>
<td>37</td>
<td>37</td>
<td>32</td>
<td>26</td>
</tr>
<tr>
<td>Min (°F)</td>
<td>52</td>
<td>57</td>
<td>66</td>
<td>73</td>
<td>79</td>
<td>82</td>
<td>82</td>
<td>81</td>
<td>77</td>
<td>72</td>
<td>63</td>
<td>55</td>
</tr>
<tr>
<td>Max (°F)</td>
<td>77</td>
<td>82</td>
<td>93</td>
<td>102</td>
<td>108</td>
<td>104</td>
<td>99</td>
<td>97</td>
<td>99</td>
<td>99</td>
<td>90</td>
<td>79</td>
</tr>
</tbody>
</table>

In Hyderabad, and in southern Pakistan in general, the sky is almost always clear in winter, while from June to August, the hours of sunshine decrease a little.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

In the south-west, at the lowest altitudes of the plateau of Baluchistan (zone C), the climate is subtropical desert. Winter is mild, although sometimes at night it get cold, while summer is definitely hot. At around 800/1,000 meters (2,600/3,300 feet) above sea level, the average maximum temperatures in summer are around 40 °C (104 °F). Only in the south, there are some inland valleys around sea level: in Turbat, in the Kech River Valley, the average maximum in June is 44 °C (111 °F), which drops to 40 °C (104 °F) in July. This is a slight effect of the monsoon, which, however, brings very few rains: only 110 mm (4.3 in) per year, of which 25 mm (1 in) in July.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min (°C)</td>
<td>11</td>
<td>12</td>
<td>16</td>
<td>21</td>
<td>26</td>
<td>28</td>
<td>27</td>
<td>26</td>
<td>24</td>
<td>20</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Max (°C)</td>
<td>25</td>
<td>27</td>
<td>33</td>
<td>38</td>
<td>43</td>
<td>44</td>
<td>40</td>
<td>40</td>
<td>39</td>
<td>38</td>
<td>32</td>
<td>27</td>
</tr>
<tr>
<td>Min (°F)</td>
<td>52</td>
<td>54</td>
<td>61</td>
<td>70</td>
<td>79</td>
<td>82</td>
<td>81</td>
<td>79</td>
<td>75</td>
<td>68</td>
<td>61</td>
<td>54</td>
</tr>
<tr>
<td>Max (°F)</td>
<td>77</td>
<td>81</td>
<td>91</td>
<td>100</td>
<td>109</td>
<td>111</td>
<td>104</td>
<td>104</td>
<td>102</td>
<td>100</td>
<td>90</td>
<td>81</td>
</tr>
</tbody>
</table>
In the far south, along the coast of the Arabian Sea (zone D) the climate is tropical, since winter becomes milder, there is also one a reduced temperature range between winter and summer. Rainfall is at desert or semi-desert levels; it is lower, about 100 mm (4 in) per year in the western sector (i.e. the coastal region of Balochistan called Makran), which receives little rainfall from the summer monsoon (but in return it receives some rare rains in winter), while it is slightly more abundant, about 200 mm (8 in) per year, at the mouth of the Indus River, where the rains basically occur only from June to September.

**Karachi**

In Karachi, the megalopolis at the mouth of the Indus, the average temperature ranges from 18.5 °C (65.5 °F) in January to 31 °C (88 °F) in June. Here, winter is pleasant and sunny (although it can sometimes be cold during the night). In the months preceding the monsoon, there can be scorchingly hot days, with peaks of 42/44 °C (108/111 °F), but it’s more common for the temperature to remain about 35 °C (95 °F), though with a high humidity. Here are the average temperatures.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min (°C)</td>
<td>11</td>
<td>13</td>
<td>18</td>
<td>22</td>
<td>26</td>
<td>28</td>
<td>27</td>
<td>26</td>
<td>25</td>
<td>22</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>Max (°C)</td>
<td>26</td>
<td>27</td>
<td>31</td>
<td>34</td>
<td>35</td>
<td>35</td>
<td>33</td>
<td>32</td>
<td>32</td>
<td>34</td>
<td>32</td>
<td>27</td>
</tr>
<tr>
<td>Min (°F)</td>
<td>52</td>
<td>55</td>
<td>64</td>
<td>72</td>
<td>79</td>
<td>82</td>
<td>81</td>
<td>79</td>
<td>77</td>
<td>72</td>
<td>63</td>
<td>54</td>
</tr>
<tr>
<td>Max (°F)</td>
<td>79</td>
<td>81</td>
<td>88</td>
<td>93</td>
<td>93</td>
<td>95</td>
<td>95</td>
<td>91</td>
<td>90</td>
<td>90</td>
<td>93</td>
<td>90</td>
</tr>
</tbody>
</table>

From June to September, the monsoon season, it doesn’t rain a lot: about 160 mm (6.3 in), including 80 mm (3.2 in) in July, but here too, this season can be very rainy during certain years. In July and August, the weather is often cloudy and the heat is sweltering, especially in the interior of the city, while coastal districts receive a fairly steady breeze from the sea. Here is the average precipitation.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prec.(mm)</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>5</td>
<td>0</td>
<td>7</td>
<td>80</td>
<td>55</td>
<td>20</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>203</td>
</tr>
<tr>
<td>Prec.(in)</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
<td>0.2</td>
<td>0</td>
<td>0.3</td>
<td>3.1</td>
<td>2.2</td>
<td>0.8</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
<td>8</td>
</tr>
<tr>
<td>Days</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>
Although the rains in Karachi are not abundant, the sky in the monsoon period is often cloudy, especially in July and August; in winter, on the other hand, the sky is almost always clear.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

The temperature of the Arabian Sea is warm enough for swimming all year round, while it becomes very warm in summer. Here are the average sea temperatures near Karachi.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp (°C)</td>
<td>24</td>
<td>23</td>
<td>24</td>
<td>26</td>
<td>28</td>
<td>29</td>
<td>28</td>
<td>29</td>
<td>28</td>
<td>28</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>Temp (°F)</td>
<td>75</td>
<td>73</td>
<td>75</td>
<td>79</td>
<td>82</td>
<td>84</td>
<td>82</td>
<td>84</td>
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### 9.4 Tropical Cyclones

The southern part of Pakistan can be affected by tropical cyclones, especially the south-east (coast of Sindh): Karachi, the large city located right on the coast, is the most at risk; sometimes the coast of Makran can be interested as well, though more rarely. Cyclones form from May to November, and are more frequent at the beginning of the period (May-June) and a little less at the end (October-November). Particularly intense cyclones hit Pakistan in May 1999 and in June 2010 (the latter was called cyclone Phet).

**Best Time for Visit**

It's hard to find a period which is good for all of Pakistan. The best time to visit central and southern Pakistan (zones B, C, and D, where Karachi is located) is winter, from December to February. You can visit the northernmost lowland area (Punjab, zone A, where Peshawar, Lahore and Islamabad are located) from
November to March, and if you want, you can avoid the coldest months, choosing March and November.

In Quetta and in the mountain regions of the west (zone 2), you can choose April and October, bearing in mind that it can get cold at night.

For the mountains of the north too (zone 1), you can choose spring and autumn, but since spring on the south side is rainy, you may prefer autumn, in particular, October and November. For the north side, in the high mountain areas of the Hindu Kush and the Karakoram, you may prefer the summer, from June to September. As previously mentioned, the sea is warm enough to swim in throughout the year. However, given that the air temperature can be a bit cool from December to February, the best months to go to the beach are March and November.

9.5 Economic Potential of Pakistan

Resources like mineral, power, water and forest have a huge influence on the economic and social development of a country. Availability of natural resources is the necessary but not a sufficient condition of economic and social development. If a country is rich in resources and these resources are optimally used then there is more possibilities of economic and social development. Accordingly, there is positive relationship between natural resources and economic and social development.

9.5.1 Mineral Resources

The Pakistan Mineral Development Corporation (1974) is the responsible authority for the support and development of the mining industry. Gemstones Corporation of Pakistan Limited (1978) looks after the interests of stake holders in gem stone mining and polishing as an official entity. Baluchistan is the richest province in terms of mineral resources available in Pakistan. While recently Sindh discovered coal deposits in Thar. Khyber Pakhtoonkhwa is rich in terms of gems. Most of the mineral gems found in Pakistan exist here. Apart from oil, gas and some mineral used in nuclear energy purposes which comes directly under federal control mining of other minerals is provincial issue. Currently around 52 minerals are minned and processed in Pakistan.
Coal

Coal which is also named as black gold is found into huge quantities in Thar, Chamalang, Quetta and other sites. Thar reserves are estimated 850 Trillion Cubic Feet. There is enough coal in Pakistan Thar area (though a part of coal is not of good quality) that it can be used for power generation for next 100 years without relaying on other i.e. hydro / oil resources. Pakistan recently discovered one low and four low-to-medium quality coal seams in the Punjab. Low sulfur coal was recently reported at the Baluchistan and near Islamabad. Bituminous, sub-bituminous, and lignite coal have been found in Pakistan. About 80% of coal is produced by government and 20% is produced by private sector.

It is one of the oldest industries. Its major users are iron, steel and bricks industries. Coal reserves are estimated at 175 billion tons. This would equate to 618 billion barrels of crude oil. When compared to oil reserves this is more than twice the amount of the top four countries. If At KSA’s current usage, the reserves would last more than 200 years.

Natural Gas

Natural gas production is at a high level in Pakistan. Estimated reserves are 885.3 billion cubic meters (as of January 2009). Gas fields are expected to last for another 20 years. The Sui gas field is the largest, accounting for 26% of Pakistan’s gas production. Gas deposits of Sui discovered in 1953. Daily production is 19 million cubic meters a day. Under the barren mountains of Balochistan and the sands of Sindh, there are untouched oil and gas reserves. Major users of natural gas areas are Karachi, Lahore, Faisalabad, Multan, Rawalpindi and Islamabad.

Crude Oil

Pakistan's first oil field was in the late 1952 in Baluchistan near a giant Sui gas field. The Toot oil field was not discovered in the early 1960s in the Punjab. It covers 122.67 square kilometers (47.36 sq mi). Pakistan Petroleum and Pakistan Oilfields explored and began drilling these fields with Soviet help in 1961 and activity began in Toot during 1964. Pakistan has more than 326 million barrels of oil the Senate was told on Wednesday 29 January 2009.
Uranium Production

Pakistan has a long history of exporting small amounts of uranium to the west. The Tumman Leghari mine in South Punjab, Baghalchur mine, Dera Ghazi Khan Mine and IssaKhel / KubulKel mines in, Mianwali District. Pakistan has recently used some in its own nuclear power and weapons programs. Pakistan produced about 45 tonnes of Uranium in 2006

Mineral Salt

Salt is being minned in the region since 320 BC. Khewra Salt Mines are among world oldest and biggest salt mines. Salt has been mined at Khewra since 320 BC, in an underground area of about 110 square kilometres (42 sq mi). Khewra salt mine has estimated total of 220 million tonnes of rock salt deposits. The current production from the mine is 325,000 tons salt per annum.

Copper and Gold

In ReqoDiq, Baluchistan deposits of copper and gold are present. Antofagasta the company having possession of ReqoDiq field is targeting initial production of 170,000 metric tons of copper and 300,000 ounces of gold a year. The project may produce more than 350,000 tons a year of copper and 900,000 ounces of gold. There are also presences of copper deposite in Daht -e- Kuhn, Nokundi, located in Chaghi district.

Iron Ore

Iron ore found in various regions of Pakistan including Nokundi, Chinot and the largest one in Kalabagh (Less than 42% quality), Harripur and other Northern Areas.

Gems and Other Precious Stones

A number of precious stones are minned and polished for local as well as export purposes. The centre point of this operation is Khyber-Pakhtoonkhwa. These includes Actinolite, Hessonite, Rodingite, Agate, Idocrase, Rutile, Aquamarine, Jadeite, Ruby, Amazonite, Kunzite, Serpentine, Azurite, Kyanite, Spessartine
(garnet), Beryl, Marganite, Spinel, Emerald, Moonstone, Topaz, Epidote, Pargasite, Tourmaline, Garnet (alamandine), Peridot, Turquoise, Garnet (green, grossular), Quartz (citrin& others) and Vesuvianite. The export from these gems is more than 200 Million dollar.

9.5.2 Power Resources

Electricity is one of major source of power in Pakistan due to improper use of coal and oil resources.

9.5.2.1 Hydro Electricity

Nature has provided suitable environment in Pakistan. To produce hydroelectricity environment is better for it. The northern and north western area of Pakistan is suitable for building of dams. We can produce hydroelectricity to create steep slopes in rivers and canals. Its best example is the Ghazi Barotha project in river Indus. Both public and private sectors have planned to increase the production of hydroelectricity in Pakistan. Pakistan's total hydroelectricity production is 4963 Megawatt. Pakistan has the capacity of production of 30000 MW from its river Indus, Jehlum and Chenab.

Important Hydroelectricity Stations

There are three hydroelectricity stations working in Pakistan:

Tarbela Dam

This dam is situated on Indus River. The Tarbela dam produces 70% of the total hydroelectricity production of Pakistan. Its installed generation capacity is 3478 MW. The Tarbela Dam was constructed in 1976 and its cost was about Rs.18 billion. This dam is about 9000 feet long. The Tarbela is one of the biggest dams of the world.

Mangla Dam

This dam is located on Jehlum River. This dam installed generation capacity of power is 1000 MW which is 20% of total hydroelectricity of the country. This dam was constructed and completed in 1967 the height of this dam is 110 meters.
This dam is made of concrete. This is second biggest dam in Pakistan.

9.5.2.2 Thermal Electricity

The Thermal power stations are generating electricity by gas, oil and coal in Pakistan. The 49.8% of the total electricity is produced by the thermal power. The thermal power production is 4921 MW in Pakistan. There are 13 thermal power stations working in Pakistan. The biggest station is working in Karachi this station generates 1756 MW. The second biggest station is working in Multan. It generates 260 MW.

Important Thermal Stations

Other important thermal plants are in Faisalabad, Kotri, Pasni, Guddu, Jamshoro, Muzaffargarh, Sukkur and Larkana etc.

Future Plans

A large number of projects have been planned to meet future energy requirements of Pakistan. This project is working rapidly. If this project works better than our country will make progress by leaps and bounds.

9.5.2.3 Solar Energy

The energy that we get from sun is called solar energy. The climate of Pakistan is extremely hot and dry. Pakistan is situated near the Tropic of cancer so the sun rays are vertical most of the year. These days are hot. That's why the season of summer is longer than winter in Pakistan. The sun rises most time. We can use this energy to the maximum in life. This is the cheapest source of energy.

Use of Solar Energy: We have abundance of this energy but important thing is the maximum use of it. This energy is used to operate small machines and motor in future the solar energy will become the biggest source of energy of the world because other sources are costly and difficult to exploit.

9.5.2.4 Advance Sources

Atomic Energy

Atomic energy is the advance source of this world. Although this source of energy is very sophisticated and multi disciplinary system. As the rapid growth of
population sources are also increasing at the same rate. That's why it is an important source of energy in developing countries.

**Pakistan is an Atomic Power**

By the grace of Allah Pakistan has become a great Atomic Power. Pakistan has operated Atomic blasts in Chagi in Balochistan on 28 May 1998. Pakistan had to face many difficulties to achieve progress in the atomic program.

**Nuclear Power Technology**

Nuclear Power technology was introduced in Pakistan in 1971 when a plant of 136 MW capacity namely Karachi. Nuclear power plant (KANUPP) was installed. This plant has been operating safely for more than 31 years. IN other important Cheshma nuclear power project is also working with the help of China. This has been connected to the national grid on June 13 2000. It has a gross capacity of 325 MW and is located near Cheshma Barrage on left bank of river Indus.

**Water Resources**

As per World Health Organization (WHO) report 80 percent of the diseases are due to unhygienic conditions and unsafe drinking water. Safe drinking water and proper sanitation are inseparable and critical to health.

**Access**

According to ESP 2010-11 in Pakistan, currently over 65% of population is considered to have access to safe drinking water. More than 0.884 billion people lack access to safe water, and 2.5 billion lack access to basic sanitation. However, access to water remains difficult in Southern Khyber Pakhtunkhwa, parts of Baluchistan, Tharparker and Cholistan.

**Importance of Water**

1. **Power Generation**

Water is also essential for power generation in Pakistan, since about 29% is generated through hydropower.
2. Fishing Industry

The fishing industry plays a role in the national economy of Pakistan. The coastline is 814km and fishery resources still have room to grow. Fishing in Pakistan is a major source of export earnings.

3. Water for Home

We drink water, cook with it, bathe in it, sprinkle our lawns with it, fill our backyard swimming pools with it - even create theme parks based on it. We need water in our homes, to brush our teeth, cook food and wash dishes.

4. Base for Life

Without water, there can be no life. In fact, every living thing consists mostly of water. Your body is about two-thirds water. A chicken is about three-fourths water, and a pineapple is about four-fifths water.

5. Water for Agriculture Sector

Every plant, animal, and human being needs water to stay alive. We need water for irrigation, to raise crops in regions that do not get enough rain. It is estimated that 70% of world-wide water use is for irrigation. In some areas of the world, irrigation is necessary to grow any crop at all, in other areas it permits more profitable crops to be grown or enhances crop yield.

6. Water in living things

All living things need a lot of water to carry out their life processes. Plants, animals, and human beings must take in nutrients (food substances). If the body loses more than 20 percent of its normal water content, a person will die painfully. Human beings must take in about 2.4 liters of water a day.

7. Water in our homes

In our homes, we use far more water than the amount we need simply to stay alive. We require water for cleaning, cooking, bathing, and carrying away wastes. For many people, such water is a luxury. Millions of homes in Asia, Africa, and South America have no running water. The people must haul water up by hand.
from the village well, or carry it in jars from pools and rivers far from their homes.

8. Waterpower or Hydropower

Water power, or hydropower, furnishes about 7 percent of the world's commercial energy. Where water flows from a high place to a lower one, the gravitational energy of the falling water can be captured and used to produce other forms of energy.

9. Water for Industry

It is estimated that 15% of world-wide water use in industrial. Major industrial users include power plants, which use water for cooling or as a power source (i.e. hydroelectric plants), ore and oil refineries, which use water in chemical processes, and manufacturing plants, which use water as a dissolving something.

10. Fisheries

Pakistan’s in land water bodies also support a thriving inland fisheries industry. Fish catches vary from place to place, with the largest yields associated with major lakes and dams.

11. Water for Transport/Recreation

Today, people still depend on water transportation to carry such heavy and bulky products as machinery, coal, grain, and oil. People build most of their recreation areas along lakes, rivers, and seas. They enjoy water sports, such as swimming, fishing, and sailing.

12. Environment and Tourism

Explicit environmental water use is also a very small but growing percentage of total water use. Environmental water usage includes artificial wetlands, artificial lakes intended to create wildlife habitat, fish ladders around dams, and water releases from reservoirs timed to help fish eggs.

9.5.3 Irrigation System of Pakistan

The irrigation system of Pakistan is considered best in all over the world. The irrigation system was actually structure by the British before the partition of India.
1. Wells or Tube-wells

It is the oldest method of irrigation in Pakistan. Wells and Tube-wells system is successful where water level is high and where canal system is not common. Animal power and electricity is used for to obtain water from wells and tube-wells. To utilize ground water 0.7 million tube wells have been installed.

2. Canals

Canal is an artificial waterway constructed for purposes of irrigation, drainage, or navigation, or in connection with a hydroelectric dam. Canal is the thing which brings river water close to the field where it is required to be.

The irrigation system of Pakistan is one of the best one in the world due to the largest irrigation system in the world. In Pakistan, almost 75% of the land which is in agricultural use is covered by the irrigation system. Currently there are 3 large dams and 85 small dams, along with these dams there are 19 barrages to fulfill the water need. From these dams and barrages 12 inter link canals, 45 canals have been taken to provide water to the fields.

3. Perennial Canals:

These canals supply water throughout the year. Perennial canals are the canals that are used to supply water to the field and these are taken either from dams or barrages. Important Perennial Canals of Punjab are Upper Bari Doab, Lower Bari Doab, Sidhnai Canals, Upper and Lower Chenab, Upper Jhelum canals originating from Trimmu Headworks and Canals originating from river Sutlej at Ferozpur, Islam, Suleimanki and Panjnad Headworks.

4. Non-Perennial Canals:

These canals run during the summer and the rainy season. Sidhnai canals from the Ravi, Haveli canals from the Chenab and some of the Sutlej canals fall in this category.

5. Inundation Canals (Flood Canals):

These canals run only during the rainy season when water level in river rises. The
quantity of water they supply is uncertain. These canals, like other canals, are
taken from the rivers but the difference is that they get water when there is a rise
in the water level due to flood. Many old canals from the Indus and the Chenab
fall in this category.

6. Link Canals

Link canals are those canals which creates link between one river to an other river
to fulfill the shortage of water. There are a number of link canals constructed
under Indus water treaty in Pakistan.

7. Karez

Karez is also an irrigation system which is adopted only in Baluchistan province.
It is an underground-short canal system which is built to carry water at the foothill
to the fields. Karez system is very popular in Pashin and Quetta districts.

9.5.4 Forest Resources

Forests are limited to 4% of Pakistan’s land; nonetheless the forests are a main
source of food, lumber, paper, fuel wood and medicine. The forests are also used
for wildlife conversation and ecotourism.

According to ESP 2010-11, Pakistan is a forest deficient country, mainly due to
arid and semi-arid climate in large parts of the country. The area of natural
forests and state-owned plantations declined at a rate of 27,000 ha/year but there
was a 67 percent increase in the area of tree over farmlands.

During the year 2010-11 forests have contributed 91 thousand cubic meters of
timber and 261 thousand cubic meters of firewood as compared to 93 thousand
cubic meters timber and 263 thousand cubic meters firewood in 2009-10.

Economic and social development of a country mainly based on the natural
resources. Influence and importance of resources are discussed below:

Influence of Resources on Economic Development

1. More Production

Natural resources are helpful to increase in level of productivity by applying
modern techniques of production. If a country is rich in resources it means there
are more possibilities to enhance the production.

2. Agriculture Development

Availability of natural resources like fertile land, favorable climatic conditions and more water resources are necessary for the development of agriculture sector. Resources are also required to develop the agro based industries.

3. Industrial Development

Development of agriculture sector means the development of industrial sector. Power and energy resources like oil and gas etc. are like primary requirement of industrial development. Iron and steel resources are helpful to develop the industrial sector. Furniture and fishing industries are mainly depend upon natural resources.

4. Increase in Forex

Pakistan is exporting food items, textile goods, petroleum and some other goods which is only and only possible due to availability of natural resources. Accordingly natural resources increase the forex resources of a country.

5. Infrastructure Development

Development of infrastructure like water, sanitation, roads, energy and electricity is possible only with the help of various natural resources. Developed infrastructure is necessary for the economic and social development of a country.

Influence of Resources on Social Development

1. Transportation

Extraction of resources and movement of resources develops the transport system in a country. Transportations like railways, road, water and air transport is playing a vital role in the economic and social development of a country.

2. Communication

Economic development mainly based on availability and proper use of resources.
It leads to the development of communication system.

3. High Living Standard

Availability and proper use of natural resources is compulsory to improve the living standard of the population. Natural resources play very important role in the economic development that leads to high living standard.

4. More Employments

Natural resources like forests, fisheries and oil extractions have provided a lot of jobs to population. More employment opportunities develop the social set up of a country.

5. Urbanization

Utilization of natural resources has increased the process of urbanization in the country. It has developed some new cities and developed the some existing cities.

The economy of Pakistan is the 24th largest in the world in terms of purchasing power parity (PPP), and 42nd largest in terms of nominal gross domestic product. Pakistan has a population of over 212.2 million [35] (the world's 5th-largest), giving it a nominal GDP per capita of $1,357 in 2019,[36] which ranks 154th in the world and giving it a PPP GDP per capita of 5,839 in 2019, which ranks 132th in the world for 2019.

9.6 Self Assessment Questions

1. Keeping in view the geographical position of Pakistan, discuss the importance of mountains of the country.

2. Highlight the significance of Potwar plateau & salt range and the Baluchistan Plateau.

3. Discuss the significance of the plains, deserts and deltas of Pakistan.

4. Keeping in vies the term “Tropical Cyclones”, Evaluate the salient features of the climate of Pakistan.
5. Elaborate the economic potential of Pakistan with reference to its mineral Resources, Power Resources and Advance Resources.

6. Highlight the salient features Irrigation System of Pakistan… also discuss he issues of this system.

7. Discuss the need and importance of the forest with reference to the Forest Resources of Pakistan.

9.7 Bibliography:


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