

## **China-Pakistan Economic Relations: Areas of Cooperation and Mutual Advantages**

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### **Abstract**

*The paper presents the main areas of cooperation between China and Pakistan and their mutual advantages. The research attempts to analyze the problems and obstacles for a win-win situation in economic and trade relations between the two countries, and focuses on explanation of identified problems. Besides the identified problems, the study also highlights areas in which cooperation is much needed for development and strengthening of economic relations between Pakistan and China. These areas, which require cooperation, are of mutual benefits for the two countries. However, cooperation in those areas is very limited or in some cases not yet initiated. Therefore, cooperation in the mentioned areas is very central for strengthening and improving the economy of Pakistan.*

**Keywords:** Balance of Trade, China-Pakistan Relations, Disaster Management, Technical knowhow.

### **Introduction**

China has a relative edge over Pakistan in terms of technological and economic domains. This relative advantage provides China to possess technological, economic and skilled human resources in diverse issue areas. For instance, China has remarkably developed its expertise in the field of disaster management; while lately, Pakistan has suffered from natural disasters like floods and earthquake, mainly lack of relevant resources or preparedness to cope with it. Similarly, China possesses the technology prowess that has proved to be milestone in the infrastructure development vis-à-vis exploration purposes. Pakistan, a key neighbor and strong friend of China, can seek benefit to harness its natural resources i.e. minerals and energy through developing some mutual areas of cooperation between two countries.

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Besides investing in the field of energy and minerals exploration, agriculture and water management are other core and important areas of cooperation between Pakistan and China. Furthermore, the transfer of intermediate technology to Pakistan by China is an important step towards cooperation and mutual advantages. For instance, in the field of technology, China can transfer weapon technology, home appliances and automobiles technologies to Pakistan. In addition, the technology of solar energy is also very vital as China is moving from intermediate technology to high technology.

The said technologies and their productions are the demand of Pakistan's domestic market as it is relying on imports from China, and a large amount is spent annually on the imports, such as weapons, home appliances, solar energy products and automobiles. Therefore, in this regard, cooperation between the two would be beneficial for Pakistan in terms of business and capacity building while China would gain in terms of business. Comprehensive details of the main areas of cooperation and advantages between the two countries are discussed in the following paragraphs.

### **Cooperation in Disaster Management**

China is situated next to a geographical setting, which is prone to natural calamities. Due to its huge area & uncertain climatic and geological conditions, China has been vulnerable to nature vis-à-vis man-made disasters, which include floods, earthquakes, droughts, landslides and typhoons. It is a known fact that China has made significant and tremendous progress in establishing an infrastructure for disaster preparedness, response and management; and has formulated ways to prevent and mitigate both types of disasters i.e. natural and man-made.

Keeping in view the effective expertise of China in the field of disaster management, if China-Pakistan develop a mechanism to train Pakistani human resource and transferring of technology in the field of disaster management, it will be beneficial for Pakistan in number of ways. For example, it will assist to minimize the would bring development in the disaster prone areas of Pakistan like Azad Jammu and Kashmir, Gilgit-Baltistan and other provinces of the country..

To throw a glimpse on few past episodes of natural calamities in Pakistan, it is important to mention the earthquake of 2005, which damaged life and property at a large scale in Azad Kashmir, Gilgit-Baltistan and Khyber Pakhtunkhwa, particularly the districts of Battagram and Mansehra (Khan, 2015). According to the annual review report - 2005-2006 of the Earthquake Reconstruction and Rehabilitation Authority (ERRA), 73,338 people were killed in the 2005 earthquake.

More than fifty percent among the killed were children and women. Moreover, 69,412 people were injured and 3.5 million were displaced. Approximately 30,000 square kilometers area was affected, where infrastructure, communication and cropped land were severely damaged. The earthquake left 42,600 families without their bread earning family members and leaving them reliant on the society. Furthermore, the number of houses destroyed stood at 600,000, schools at 6,298 and health facilities at 796. Almost 6,440 kilometers roads were damaged and fifty to seventy percent of water supply, sanitation, telecommunication and power infrastructure was rendered un-operational ("Pakistan Earthquake" October, 2005).

The above – mentioned data shows the gravity of the situation and the unprecedented loss occurred due to earthquake of 2005 in Pakistan. Unfortunately, Pakistan did not have proper mechanism and a system to deal with such catastrophic situations. In this regard, capacity building and technical know-how in this field is much needed for Pakistan. In addition, reconstruction and rehabilitation are the main phases of post-quake, which also need resources and technical know-how. Pakistan is in dire need of advanced system and mechanism to deal with disasters of such magnitude ("Pakistan Earthquake" October, 2005).

During the earthquake of 2005 in Pakistan, the Government of China offered US\$ 6.2 million emergency aid as a relief to earthquake victims in Pakistan. Furthermore, an international rescue team of forty-nine members and the first batch of rescue goods were sent to Pakistan on October 9, 2005. In addition, US\$1 million in cash was sent on October 10, 2005 ("International response to the 2005 Kashmir earthquake", May 11, 2017).

The October 2005 earthquake caused heavy loss of human life in Pakistan and damaged infrastructure on a large scale. Till the end of 2006, the Calamity Act of 1958 remained focused on organizing emergencies in Pakistan; however, there was absence of proper departments for disaster management such as National disaster management authority (NDMA), Provincial disaster management authority (PDMA). Besides this, an Emergency Relief Cell (ERC) in Cabinet Secretariat was also set up for rapid response during disasters.

After the earthquake, due to criticism, the Government of Pakistan realized the importance of disaster risk reduction. Therefore, National Disaster Management Ordinance (NDMO) was promulgated in December 2006. Under the Ordinance, National Disaster Management Commission (NDMC) was established. The Commission was headed by Prime Minister of Pakistan with other members including Leader of Opposition in the Senate in the National Assembly, the Chief Ministers

of the four provinces, and Prime Minister of Azad Jammu and Kashmir (AJ&K). They notified the National Disaster Management Authority (NDMA) on January 18, 2007 to handle disasters and manage its aftermaths in Pakistan ("Annual report 2007 & 2008", May 07, 2017).

Similarly, floods are another type of natural disasters that occur frequently in Pakistan. Floods of July 2010 brought heavy destruction throughout Pakistan. Besides many others, the worst affected areas were Swat, Charsadda and Nowshera districts of Khyber Pakhtunkhwa (Khan, 2015). Magnitude of the 2010 floods was so colossal that it outnumbered the loss of lives and livelihoods occurred as a result of the 2005 earthquake. According to Pakistan Floods 2010 — Disaster Emergency Committee (DEC) Real-Time Evaluation Report, the loss was more than the combined total affected individuals by the Indian Ocean tsunami-2004, Kashmir-2005 earthquake and Haiti-2010 earthquake, ("Pakistan floods", July, 2010).

In another report of Asian Development Bank (ADB), World Bank, it was reported, "as per Damage Need Assessment (DNA), the loss to life and property was colossal. The floods affected an area of about 160,000 km<sup>2</sup> (one fifth of the country), claiming about 1,985 lives, damaging around 1.5 million houses, wiping out cropped area of more than 17 million acres, displacing a population of about 20 million and resulting in economic loss of PKR 10 billion" (Hashmi, Siddiqui & Razzaq, February 19, 2012).

It is worth mentioning that during the above mentioned crises in Pakistan, China announced US\$ 47.6 million of assistance for the flood victims. Besides helping the flood victims, the People's Liberation Army (PLA) of China provided US\$ 1.5 million of relief supplies to the Pakistan military and sent medical teams and helicopters to participate in the relief activities. Furthermore, China's Red Cross Society, local governments such as district government, NGOs, the public and Chinese firms in Pakistan all made donations in cash or in kind of the total value amounted to US\$ 6 million ("China to continue providing support to flood-hit Pakistan", September 20, 2010).

Unfortunately, despite having the National Disaster Management Authority (NDMA) of Pakistan and the Provincial Disaster Management Authority (PDMA) of Khyber Pakhtunkhwa, the risk of disaster was not properly assessed, particularly during the floods of 2010 in Pakistan. The public was also not warned to adopt preventive measures. According to Rehman (2015), the NDMA neither has an early warning system nor a proper risk assessment mechanism, which are the main components of disaster management system. That is to say, that a proper technology and

prevention system could minimize the magnitude and the loss and damage caused due to floods.

According to Dar (2005), China has an effective early warning system called Hydro Met Model. It is important to state that “the 3 main types of natural disasters in the world, geological, hydro-meteorological, and biological, hydro meteorological disasters account for over seventy five percent in terms of the damages involving fatalities, economic losses, infrastructure damage and disruption to normal life” (“Hydro-meteorological disasters”, July 25, 2017, p.3.).

In addition, China has advanced Meteorological Data Sharing Service System, which helps the authorities to issue warning and preventive measures regarding floods. In this regard, Cooperation between China and Pakistan in sharing these advanced systems will assist Pakistan in reducing the losses from disasters in future (Dar, 2015).

### **Exploration of Energy and Minerals**

Energy and minerals exploration are also core areas of cooperation and mutual advantage between China and Pakistan. Pakistan is munificently blessed with rich natural resources. China needs energy on a large scale to support its growing industries. According to a report by Ministry of Petroleum and Natural Resources, the main mineral varieties and discoveries of Pakistan include; huge resources of Coal in Sindh, Copper and precious metal potential of district Chagai in Baluchistan, including Waziristan and Gilgit-Baltistan, marble and granite deposits of Khyber Pakhtunkhwa, rare earth elements in carbonates in Khyber Pakhtunkhwa, gemstones of Khyber Pakhtunkhwa, AJ&K and Gilgit-Baltistan, lastly, huge potential of industrial rocks and minerals (rock salt and coal) in Punjab.

Pakistan is exporting Marble, copper and chromium to China. Its demand is increasing in China since 2001 and reached its peak till 2014. The following table shows the demand of marble, copper and chromium in China since 2010 till 2014.

**Export of Marble, Copper and Chromium to China (2010 to 2014)**  
(Value in US\$ Thousands)

<b>Products</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Marble	20,151	34,198	39,755	58,432	43,415
Copper	6,900	13,053	12,030	11,126	9,960
Chromium	137,626	97,432	110,792	108,576	78,275

Source: <http://www.trademap.org>

Unfortunately, despite having rich minerals, Pakistan lags behind in exploiting these resources. It needs modern techniques of exploration of minerals, which mainly include aeromagnetic and geophysical techniques, which could further increase the exports of minerals. Furthermore, as listed above the rich natural resources in Pakistan, some additional valuable deposits include resources of metal commodities such as Chromite, Gypsum, Zinc, Copper/Gold and banded Iron-ore, which indicates that Pakistan is a big market for large mining enterprises (Kaleem, 2014, p.139). Since independence, due to lack of technical expertise or technology, Pakistan exploited only thirtynine minerals out of fifty under 1080 licenses (Kaleem, 2014, p.139).

Mineral sector is a potential source of growth for Pakistan. Exploration of such kind of resources requires professionally trained staff. The acquisition of latest exploration techniques will give Pakistan a big leap forward in economic growth. Nevertheless, it is an important area of cooperation where both Pakistan and China can cooperate. China can provide latest technology and technical knowledge sharing for exploration of mineral resources in Pakistan (Jia, 2011, p.88). The Exploration of mineral resources can generate employability to a large number of young employed populations and also support weak economic conditions of Pakistan.

Coupled with the above areas of cooperation, various investment opportunities are available in Pakistan in coal mining and power generation. At present, in Pakistan, only one percent of coal is used for electric power generation. As discussed earlier, coal is an inexpensive source of power generation and Pakistan is an energy deprived country. According to the Geological investigations, Pakistan have 185 billion tons of measured coal reserves, of which more than 184 billion tons deposits are located in Sindh, which needs exploration. The other investment opportunities include base metal exploration and mining, decorative stones and gemstones mining, such as cooperation in technology sharing for exploration and mining of Ruby of Kashmir and Hunza Gilgit, Topaz of Mardan and Dassu-Skardu and Emerald deposits of Swat can be of mutual benefit to both countries. ("Investment Opportunities in Mineral Sector," May 13, 2017). Investment in these fields will also increase the opportunities for the labour of both the countries and particularly Pakistani labour.

### **Opportunities for Pakistani Labour**

To be able to understand the situation, it is important to highlight that labour market in Pakistan has been facing two daunting challenges since 1990s, that are, unemployment and under-employment. The graph of labour productivity has also gone down over the years and job creation is

another issue faced by Pakistan. Availability of cheap labour in Pakistan is beneficial for China and hence, for the industrial cooperation of the two countries. For instance, as discussed in the aforementioned paragraphs, if China invests in the energy and mineral exploration sectors of Pakistan, it will automatically provide opportunities for Pakistani labour, keeping in view that it is less costly. It will be a win – win situation for both the countries, as Chinese investors will get more business at low cost and as a result, unemployment and the lower growth in industries in Pakistan will also be tackled. In this regard, the Government of Pakistan needs to make an investment friendly environment in the country by reducing utility bills and taxes which will further reduce production costs (Malik, 2015).

#### **5.4 Cooperation in Agriculture**

Since Pakistan is an agrarian country, its agricultural sector is considered as an important constituent of its economy. It contributes twenty one percent to the total GDP of the country (Pakistan economic survey, 2011-12, ch.2, p.17). The agriculture sector of Pakistan comprises of the three main components, which are livestock, crops and forestry. The composition of agriculture sector is 21 percent the GDP share in Pakistan. The percentage of livestock is 52 percent, crops is 45.4 percent, of which are cotton, wheat, rice and sugarcane was 34.0 percent and pulses, fruits and vegetables and oil seeds was 11.4 percent, and finally forestry was 1.0 percent.

Being an agrarian economy, Pakistan has the potential to produce surplus food for export purposes. For example, Pakistan is exporting rice and oil seeds to China, and its demand is rapidly increasing in China. The following table shows the increasing demand of oil seeds and rice in Chinese market. In the year 2010, Pakistan was exporting 1,594 (value in US\$ thousands) of oil seeds, which reached to 6,675 (value in US\$ thousands) in 2014. Similarly, rice export to China was 1,485 in 2010 (value in US\$ thousands) with an increase of 137, 478 (in 2014).

In this regard, the Government of Pakistan has been trying to bring agricultural reforms to improve the agricultural sector for production of food beyond the need of the country so as to import it to other countries. For this purpose, however, Pakistan needs high quality of chemical products for the improvement of its agricultural system, while Chinese fertilizer companies and chemical products occupy important place not only in their own market but also reach the South Asian countries. Thus, cooperation between China and Pakistan in this area has great potential (Jia, 2011, p. 88). China has remarkable excellence in agriculture sector and, in a very short span of time, it has become the largest exporter of agriculture and horticulture products to Asia and Europe (“China urged

to help agriculture sector”, March 12, 2017). The following table shows the different kind of fertilizers imported from China since 2010 to 2014.

**Import of Fertilizers from China (2010 to 2014)**  
(Value in US\$ Thousands)

Product	2010	2011	2012	2013	2014
Chemical fertilizers	2,143	163,622	137,191	82,757	254,890
Mixture of nitrogen, phosphorous, potassium fertilizers	133,995	244,648	202,139	144,782	294,050

Source: <http://www.trademap.org>

There is a dire need to find all possible ways to enhance cooperation between China and Pakistan in agricultural sector. Pakistan has the capacity to boost agricultural resources, agricultural industry and agricultural management system. China can help boost bilateral cooperation with Pakistan in the field of agriculture by sharing seed production industries, fertilizers and modern techniques to increase production in agriculture. Moreover, Pakistan can play an important role in providing food security by exporting rice, wheat, vegetables and fruits to China. Pakistan geographically important location has enabled it to export its agricultural products easily to Central Asia, the Middle East, China and other countries, which have large food markets (“China urged to help agriculture sector”, March 12, 2017).

It is argued in this scenario that both the countries can facilitate each other by providing mutual assistance in agricultural field. As mentioned earlier, China can provide agricultural equipment and chemical products to Pakistan. Pakistan is importing about seven ton hybrid seed from China annually while China with its advanced and outstanding command on technology can help by providing hybrid seed production technology to Pakistan, which will be cost effective and will also increase agricultural production in Pakistan (Zia, 2015).

According to Hatam (2015), China can facilitate Pakistan in the agricultural sector by providing assistance in the following three major areas; farm mechanization equipment, capacity building and arranging training workshops for Pakistani farmers and agricultural professionals and lastly, improvement of irrigation system of Pakistan. These measures by China will enable Pakistan to improve her agricultural sector and play an important role in the food security of the region (Hatam, 2015). It is worth mentioning that the technologies of high efficiency irrigation system and hybrid seed production are needed for agriculture sector of Pakistan, because these are the core areas for cooperation between China and Pakistan in terms of agriculture sector (Hatam, 2015).



During the visit of President of Pakistan Asif Ali Zardari from February 20-23, 2009, both the countries signed four MOUs for cooperation in the field of agriculture. These includes, an MOU signed between the Government of Sindh and Hubei Seed Group. The purpose of the MOU was to jointly develop the seed of hybrid rice and its commercial production in Pakistan, besides achieving maximum productivity of hybrid rice ("Pak-China Cooperation", March 09, 2009).

Another MOU signed during the visit of President Zardari, was between Pakistan Agriculture and Research Council and Hubei Research Group, which emphasized on establishing joint breeding of animals in Pakistan. According to the MOU, China would assist Pakistan in development and transfer of germ plasm technology and oil seeds to Pakistan that would yield high production. Thee MOU stated that Pakistani scientists would be trained in breeding agronomy and oilseed production. In addition, both the countries also signed MOU on drip irrigation system. President Zardari emphasized the need for better irrigation methods to conserve water, as it is a scarce commodity, which needs to be utilized economically ("Pak-China Cooperation", March 09, 2009).

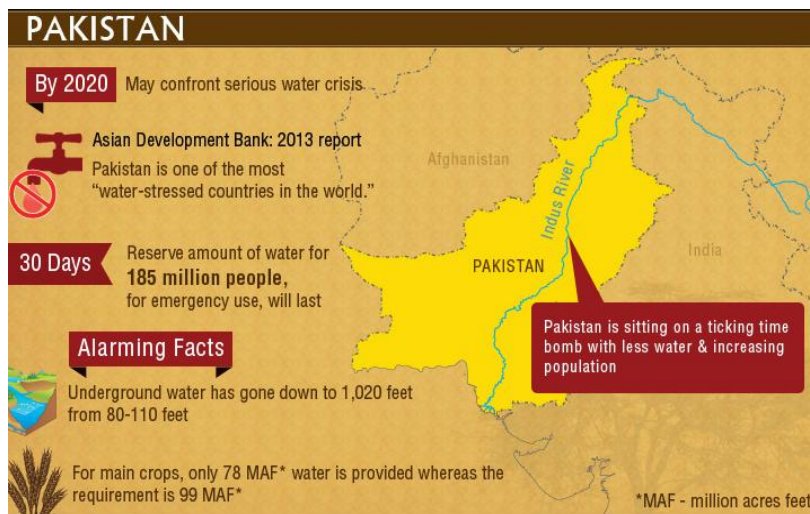
From the above mentioned facts, it is clear that for the improvement of agricultural sector, it is very vital to improve water management and irrigation system in Pakistan, as agriculture and water management are inter related and indispensable for each other. The connection between the agriculture and water management and its importance as the core area of cooperation is discussed in the subsequent paragraphs.

### **Water Management**

Having vast experiences, China, in spite of having limited water resources as compared to its population, has developed remarkable system of water resource management through which it has gained control over main issues like water pollution, flood management and proper usage of water for agricultural purposes. On the other hand, in Pakistan, due to lack of political will and consensus on the issue of construction of dams, particularly construction of Kala Bagh Dam has never been addressed. For the mentioned reasons, there are no long term and consistent water management policies and projects in Pakistan. Hence, joint water management projects between China and Pakistan would be highly beneficial for both the countries.

Pakistan is one of the most water-stressed countries in the world and it is feared that there will be unmitigated water scarcity because of the high population growth. The following figure, according to 2013 report of Asian Development Bank, shows the details of expected water crises in Pakistan.

### Water Crisis in Pakistan



Source: <https://www.mapsofworld.com>

From 1965 to 1975, there was around 5000 cubic meter water per capita in Pakistan. However, this number has alarmingly decreased and has reached almost 1000 to 800 cubic meter per capita. It is also important to mention that there is no proper mechanism for water management and storage in Pakistan (Jan., 2015).

The water management could be divided into two broad categories;

1. On farm water management: this is related to agricultural sector.
2. Off farm water management: this is power and irrigation related water management (Jan, 2015).

In this regard, the World Bank (WB), Asian Development Bank (ADB), United States Agency for International Development (USAID), and Swiss Development Authority (SDA) have initiated different projects in Pakistan related to on farm water management but unfortunately China has not facilitated Pakistan so far in this field and has not initiated any project (Alamgir, 2015).

One of the drawback of current low water productivity is that Pakistan can get much more product—crop, jobs and income—per drop of water. The water supplies has been reduced in the irrigated areas which has negative impacts on production in the short run, in part because groundwater is available to make up the difference in the short run, in part because waterlogging and salinity are reduced, and in part because

in case of shortage, limited water supplies are used more carefully (Briscoe, Qamar, Contijoch, Amir and Balckmore, October, 2005).

Nonetheless, it is reasonably possible to increase the production with the current water supply. In addition, an important aspect is the growth of a new group of progressive farmers, who are moving to high-value crops (which yield more income and jobs per unit of water). These farmers are pioneering new crops and agrarian knowledge and are setting extraordinary pressures on the irrigation departments to be more answerable and competent (Briscoe, Qamar, Contijoch, Amir and Balckmore, October, 2005).

According to Alamgir (2015), China can initiate water management related projects in Pakistan such as watercourse improvement projects which would help Pakistan to address its water issues particularly water storage and agricultural management issues.

Besides watercourse improvement projects, China can facilitate Pakistan in high efficiency irrigation system, keeping in view China's excellence in high efficiency irrigation system. This system will increase agricultural production in Pakistan (Jan., 2015). The high efficiency irrigation system has two broad categories; sprinkler irrigation and drip irrigation

China-Pakistan cooperation in agricultural and water management is beneficial not only for both the countries, but also for the region. If advanced technologies are injected into the systems of Pakistan, it will be able to produce surplus food which will enable Pakistan to supply food production to other food markets particularly Chinese food market. Similarly, China will be able to get its required food items from Pakistan at much lower costs. Both the countries need to seriously think over initiating cooperative projects for the larger benefit of the region (Jan, 2015). The above discussion indicates that cooperation between the two in the mentioned areas is very vital, as there is no such example of previous cooperation and no mega project has been initiated between the two countries in the said fields.

### **Cooperation in Technology Transfer**

The transfer of technology is an international phenomenon, which positively contributes to the economic and social development of a country. Technological advancement is necessary for human development of any country. The contemporary age places demands on technological cooperation and sharing, as all the regions of the world are connected through technological cooperation and agreements. As discussed earlier, except strategic and military cooperation and

relationship, China–Pakistan economic and trade cooperation and relations remained limited. Similarly, cooperation in the field of technology still has not hit the desired mark. However, under the ongoing grand project of CPEC, there is room for innovative cooperation in technology transfer and scientific cooperation. According to Malik (2015), Pakistan needs to pay full attention to the transfer of technology from China, as discussed earlier, the latter is moving from intermediate technology to high technology.

It is important to mention here apan that shift from intermediate technology to high technology benefitted countries like Malaysia, South Korea and Singapore. These countries took tremendous advantage form it and; as a result, with the passage of time became technologically advanced. This is a good example of gaining economic growth (Malik, 2015). Similarly, Pakistan and China can fully cooperate and facilitate each other in this regard. The transfer of intermediate technology from China to Pakistan will be beneficial for both the countries (Malik, 2015). As China has already acquired high technology, and the Chinese market is no more dependent on intermediate technology.

In China, particularly its province Yunnan, is a hub for equipment and machinery manufacturing enterprises, and products are exported to developing countries, while these production facilities can be transferred to developing countries to strengthen their economies. Hence, there are opportunities for both sides to collaborate in the production of agricultural machinery, electrical, mining, chemical and industrial equipment (Jia, 2011, p.88). Furthermore, the transfer of hybrid seed production technology to Pakistan is very vital to fulfill the domestic demand of Pakistani market and after that to export the surplus, which will yield positive results not only for agriculture sector, but also for the overall economy of Pakistan. Similarly, technology of high efficiency irrigation system is also needed for agriculture sector of Pakistan. (Hatam, 2015).

Above all, there are some industries in which more bilateral cooperation will be beneficial for both the countries, particularly for Pakistan. As some of the Chinese products such as automobiles, home appliances and Chinese weapons occupy Pakistani market, the transfer of such technology is very vital for economic prosperity of Pakistan and for creating a win-win situation.

## Home Appliances Technology

Home appliances or house hold appliances such as, electric, electromechanical or gas powered devices save labour and time in the house hold. Collectively, their effects on industrial society are to eliminate the labour and reduce and save the time associated with housekeeping and home making (“Home Appliance” April 10, 2017).

There are three types of home appliances, major appliance, small appliances and consumer electronics. The first category, that is, major appliances are used for cooking, washing and laundry purposes. The second category includes small appliances, for example microwave oven, toasters and coffee maker, which are mostly used in kitchens. The third category of home appliances, are consumer electronics, which include, flat screen televisions, Liquid Crystal Displays (LCD), Digital Versatile Disc (DVD), video games, laptops and computers (list of home appliances, December 10, 2016). There are a number of different home appliances that Pakistan is importing from China. The following table shows the imports of different products of home appliances from China since 2010 to 2014.

**Import of Home Appliances from China (2010 to 2014)**  
(Value in US\$ Thousands)

Product	2010	2011	2012	2013	2014
Air vacuum pumps	64,734	53,964	58,932	64,365	94,045
Dish washing machines	7,242	11,384	7,517	12,724	9,307
Laundry washing machines	4,000	4,485	6,240	4,404	7,332
Parts of computers	3,308	4,876	4,672	4,914	7,572

Source: <http://www.trademap.org>

Besides imports from China, Pakistan is also importing different item of home appliances from various other countries, and a huge amount is spent on it annually. To be able to produce home appliances for the demand of domestic market, Pakistan needs to be self – sufficient in home appliances technology. Bilateral cooperation with China in technology transfer is of great importance, particularly when it comes to cope with the increasing demand of home appliances in Pakistan. China has acquired smart home appliance technology, which has opened new vistas for it in the global markets. Cooperative projects, particularly of manufacturing plants of home appliances, will lead to the economic development of Pakistan.

### **Automobiles Technology**

China, US, Europe, and Japan are the four Key players in the car sales globally. The automobiles manufacturing Multi-National Companies (MNCs) have established plants in Pakistan, for example, Toyota, Suzuki, and Honda. These companies earn millions of dollars annually from Pakistan. China is the largest and is progressively growing in automobile manufacturing. After the oil and petroleum sector, auto industrial sector in Pakistan is the second largest taxpayer in the country. Although, the automotive industry has been an active and growing field in Pakistan for a long time, but it is not as established to be counted in the prominent list of the top automotive industries (“Competitive analysis of auto sector in Pakistan and China”, June 22, 2017).

Since 1950 till now, twelve automobile multinational companies have been established in Pakistan. The car industry in Pakistan primarily comprises of four types, all of which are Japanese. These are; Pak Suzuki Motor Company Ltd., Indus Motor Company Ltd., Honda Atlas Cars Ltd., and Gandhara Nissan Ltd. Amongst these, the first player holds the major position in the market. Dewan Motors is the manufacturer of Kia. The market for buses and trucks include Hino-Pak Motor, National Motor, Gandhara Nissan Diesel etc. The tractors market comprises of Al-Ghazi Tractors, Master Motors and Millat Tractors (“Competitive analysis of auto sector in Pakistan and China”, June 22, 2017). It is important to mention here that Japanese companies are earning a huge amount of money in Pakistan from automobile industry, if China shifts the said technology, it will change the situation.

Pakistan is importing different kinds of automobiles from various countries, and China is the main automotive exporter to Pakistan. During 2003, Pakistan imported motorcycles and sidecars worth 6,074 (US\$ Thousand) from China, and by 2014 the imports of the mentioned automobiles reached to 57,238 (US\$ Thousand), which indicate a huge increase. Furthermore, Pakistan is importing different kinds of automobiles, its parts and accessories from China. For instance, Pakistanis importing electric cars, mini dumper trucks, commercial trucks and three wheelers from China. The following table shows the increasing number of imports of Automobiles and its accessories from China since 2010 to 2014.

**Import of Automobiles from China (2010 to 2014)**  
(Value in US\$ Thousands)

Product	2010	2011	2012	2013	2014
Parts of motor cycles	33,946	48,284	28,820	32,040	45,018
Parts of motor vehicles	10,484	12,871	11,000	8,524	11,013
Trucks for transport of goods	5,117	12,504	8,131	15,782	11,610
Passenger motor vehicles	1,252	12,483	43,330	7,817	2,340

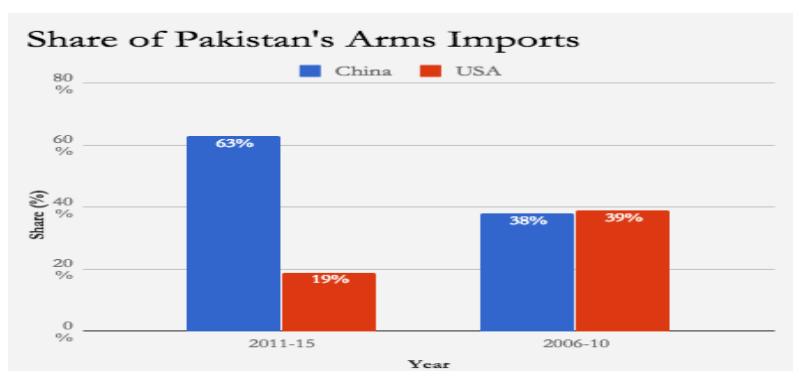
Source: <http://www.trademap.org>

The Government of China has been providing the automotive parts at low cost to Pakistan. However, it is important that the Government of Pakistan take serious measure to involve China Association of Automobiles Manufacturers (CAAM) in the smooth transfer of automobile technology. The transfer of the said technology will enable Pakistan in automobiles production not only for its own market but also for exports, it will also reduce Pakistan's reliance on import of automobiles form Japan, which will definitely have positive impacts on the economy of Pakistan.

### Weapon Technology

China is the World's third largest arms producer after the US and Russia. Pakistan is the main recipient of Chinese arm exports accounting for 35 percent. Pakistan is importing weapons from China and US to fulfill her domestic demand; the following figure shows the increasing demand of Chinese weapons with a comparison of weapons import from US.

**Pakistan's Arms Imports from China and US (2006 to 2015)**



Source: Stockholm International Peace Research Institute

Pakistan, Bangladesh, and Myanmar are importing around twenty three percent of the total production of the arms and weapons from China. Among these countries, Pakistan is the largest importer of weapons with around forty one percent out of the total combined imports of Pakistan, Bangladesh, and Myanmar (World's third largest arms producer," March 17, 2015).

It very clearly indicates the demand of Chinese weapon in Pakistan. The following table highlights the increasing demand of Chinese weapons in Pakistan.

**Table 5.6: Import of Weapons China (2010 to 2014)**  
(Value in US\$ Thousands)

Product	2010	2011	2012	2013	2014
Revolvers and pistols	2,178	2,900	2,349	2,126	3,318
Bombs, grenades, ammunitions & parts	2,113	3,541	1,269	7,952	1,774

Source: <http://www.trademap.org>

Therefore, government needs to take concrete steps to take up the issue with Chinese authorities for the transfer of this technology. For example, a focus on Dara Adamkhel in Khyber Pakhtunkhwa, where weapons are manufactured that fulfill the local demand. In this regard, the transfer of the weapon technology will improve the quality of locally manufactured weapons in Pakistan. It will enable Pakistan to meet not only its own needs but will also qualify it to export weapons to other countries.

### **Solar Energy Technology**

Solar power technology refers to the production and development of electricity with the help of solar thermal or photovoltaic technology. Energy and the production of electricity are assumed to be the main pillars for economic success and prosperity of a country. Unfortunately, in Pakistan there are controversies regarding the construction of new dams, such as Kalabagh Dam, which compels Pakistan to look for alternative means of energy to fulfill the energy needs in the country. In this regard, solar power is an easy alternative source of energy in this region. Not only Pakistan, but also other countries, particularly the South-East Asian region, are also trying to promote solar energy and explore it further. In addition, international and regional bodies, such as International Energy Agency are also trying to promote solar energy.



The aim of exploring and promoting new source of energy is to increase the energy generation by a climate friendly way to reduce pollution. One of the objectives is also to reduce the cost of energy production. In this regard, energy generation via sun and its heat is climate friendly and also lower than other means of energy production. There are certain advantages of the solar energy which are as under;

1. Intensive energy supply—solar power is one of the products that does not exhaust.
2. Clean and Safe—in contrast to other resources that create waste, solar power is clean and safe.
3. Seamless technology—the technology that drives solar energy has become a standard.
4. Limitless opportunities—because of the universal existence of solar rays, the solution of solar power can be initiated in urban and rural areas.
5. Cheap—with the advent of mass production, the cost of operation has become cheaper and has facilitated the public to purchase it.

Solar technology has advantages and most important is its environment friendly, when global community is sensitive about rising fears of climate change. Solar Energy can be consumed for private and the corporate sector. It is used in offices and homes, particularly in rural areas. Most importantly it is used in agriculture sector, such as in the shape of solar tube wells (Arsalan, June 25, 2017).

### **Solar Energy in Pakistan**

As mentioned, power generation is a big challenge in Pakistan due to the controversies regarding the construction of new dams, therefore the power sector of Pakistan needs time to provide quality electricity to the homes and residential areas in Pakistan. Therefore the need and demand of the solar energy has increased in Pakistan with each passing day (Arsalan, June 25, 2017). It is important to note that the use of solar energy has improved the agriculture sector of Pakistan. The installations of solar tube wells have reduced the irrigation problems in Pakistan to some extent.

On July 02, 2009, the former Federal Minister for Water and Power, Raja Pervaiz Ashraf, announced that 7,000 villages would be provided electricity through solar energy plants by 2014. Furthermore, Keeping in view, the importance of energy needs and the advantages of the solar energy, the government of Pakistan has initiated solar plants in Kashmir, Punjab, Sindh and Balochistan, with the help of International Renewable Energy Agency, the Japan International Cooperation Agency, Chinese

companies, and Pakistani private sector energy companies (“Solar power in Pakistan”, June 13, 2017).

While Pakistan looks forward to China for cooperation in energy sector, it is also receiving assistance from other countries in this sector. The first solar power on-grid power plant was inaugurated on May 29, 2012 in Islamabad. For the said project, Japan International Cooperation Agency (JICA) provided the grant. The said project also comprised the installation of two 178 kilowatts (KW) photovoltaic (PV) systems at the Planning Commission and Pakistan Engineering Council’s sites. It was the primary solar project, which employed net-metering, thus, allowing the beneficiaries to sell surplus electricity to the Islamabad Electric Supply Company (IESCO). The project was executed with grant aid of 480 million Yen beginning in the year 2010 (approx. 553.63 million Pakistani Rupees) and concluded in three years. Additionally, Beacon house School System installed the first high quality integrated solar energy system with a 10 kilowatts power generation capacity, which was capable of grid tie-in at its Canal Side Campus, Lahore. Furthermore, 50 to 100 megawatts of photovoltaic has been installed in 2013, and at least 300 megawatts in 2014 (“Solar power in Pakistan”, June 13, 2017).

It is also noteworthy to mention that the Chinese President, Xi Jinping, during his visit to Pakistan on April 21, 2015, launched projects worth US\$46 billion under its flagship China-Pakistan Economic Corridor (CPEC) project. In addition, before addressing the joint session of the Parliament, President Xi Jinping inaugurated the Solar Power Generation System (SPGS), a 1.2 megawatt project for providing electricity to the Parliament building through solar energy as a gift from the Chinese Government to Pakistan (“Pakistan was with us when China stood isolated: Xi Jinping”, April, 21, 2015).

This increase of energy demand, Pakistan also aims to build the world's largest solar power park, the Quaid-e-Azam Solar Power Park (QASP) in Cholistan Desert in Bahawalpur, Punjab by 2017. The initial 100 megawatts power plant has been inaugurated by the Prime Minister of Pakistan Main Muhammad Nawaz Sharif on May 05, 2015. The power generation capacity of the said solar power park will be approximately 01 gigawatt (GW). The said capacity of power is enough for approximately 320000 homes (“Solar power in Pakistan”, June 13, 2017).

### **Solar Energy in China**

China is the world’s largest market for photovoltaic (PV) and solar thermal energy. Since 2013 China has been the world's leading installer of solar photovoltaic. China has more than four hundred companies of

Solar PV, which indicates the growth of the industry in China. In 2015, China became the world's largest producer of photovoltaic power. By the end of 2016, the total PV capacity increased to over 77.4 gigawatts (GW). Furthermore, since 2008, China has been the world's largest manufacturer of solar panels. Since 2011, China has produced the bulk of worldwide photovoltaic on a yearly basis. Industry projections estimate that, by the end of 2017, China will have adequate manufacturing capability to generate 51 GW of photovoltaic per year, an amount that is double of the 2010's global production of 24 GW. The major manufacturers of the said industry in China are; China Group Corporation, JA Solar Holdings, Jinniu Energy, Suntech Power, Yingli, China Sunergy, Hanwha Solar One, GCL-Poly Energy Holdings Limited, Yunnan Semi-Conductor Parts Plant, Guofei Green Energy Source, and Shanghai Poly-Vision Energy Science & Technology ("Solar power in China", June 16, 2017).

The above discussion allows to summarize that Pakistan is largely relying on the imports of solar panels from China to fulfill her domestic needs, and the imports are increasing with each passing day. Therefore, it can be argued that the transfer of the said technology is very vital for win-win situation between the two countries.

## **Conclusion**

To conclude, there are certain areas of bilateral cooperation between China and Pakistan which can boost business activities and investment that need to be pursued by following international trends and demand of local and global markets. There are various areas, in which cooperation is much needed for development and strengthening of economic relations between the two countries. In some of the mentioned areas, China has remarkable expertise, while Pakistan due to lack of expertise and technical know-how is suffering in those area despite having abundant resources. For instance, China has significant expertise in the field of disaster management, while on the other hand, Pakistan is suffering from disasters (particularly from floods) and is trying to achieve excellence in disaster management. Consequently, cooperation between the two is much needed in these fields.

Besides, Pakistan has sufficient mineral resources and China has expertise in exploration of minerals; therefore, assistance and mutual cooperation in this key area between the two countries will benefit both. Similarly, agriculture, water management and transfer of technology are the core and very important areas of cooperation between Pakistan and China. As China is moving from intermediate technology to high technology, so China can shift its intermediate technology to Pakistan, as earlier Japan did with neighboring nations. Specifically, China can

transfer weapon technology, home appliances, solar energy technology and automobiles technologies to Pakistan. Thus making Pakistan one of the best options for China to transfer her intermediate technology, and longer run Pakistan can be suitable investment avenue for China for offshore reasons.

In this regard, CPEC Project has provided an opportunity to Pakistan for the transfer of such technologies, as China has to set up special economic zones (SEZs) along the CPEC routes. Industrial zones will be a strengthening factor within CPEC, which will enable Pakistan to achieve high-level industrialisation. Moreover, these zones will have companies whose technologies are the demands of Pakistani market. If these technologies are shifted to Pakistan and installed in SEZs, it will definitely be fruitful for both the countries, and it will be a major step towards achieving the desired win-win situation in economic relations of both the countries.

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