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The Indus Basin is indispensable: An agro- hydropower dependency of India and Pakistan

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Abstract

The importance of water is undeniable for the human and states' survival. Since World water level is constantly on decline, the future conflicts are most likely to develop over the control of this dying source of life. South Asian region is one of the vulnerable region of the World due to the nuclear neighbors; India and Pakistan. There are many unresolved issues including distribution and sharing of the waters of Indus Basin comprises of six rivers; the Indus, Jehlum, Chenab, Ravi, Beas and Sutlej. Both these states have heavy reliance on the water of these rivers, since Pakistan is an agriculture state at the same time almost 60% of Indian society lives in rural areas and agriculture production in India has significant contribution in the total GDP of the state. Moreover, the hydropower generation in both these states is also attached to the uninterrupted flow of the water from the rivers. Thus the water of the Indus basin is indispensable reality of the South Asian politics and tussle for the control over it may lead to future conflict between the two states.

Keywords: Indus Basin, drainage area, GDP, dependency, agricultural products, hydropower units.

Introduction

Water is the life line of any State. The economic activity is supported by water, thus shortage of water is a characteristic of state security although non-traditional in nature yet equally precarious as conventional security threats.

There are two prominent theories established to elucidate the position of natural resources in conflict. One emphasized on the scarcity (sometimes called the neo-Malthusian view, named after the English demographer Thomas Robert Malthus) and the other on abundance. "The neo-Malthusians argue that rapid population growth, environmental degradation, resource depletion, and unequal resource access combine to exacerbate poverty and income inequality in many of the world's least developed countries. These deprivations are easily translated into grievances, increasing the risks of rebellion and societal conflict." Domestic clashes can developed from local environmental degradation, ethnic clashes can occur in situation so internal migration which ultimately creates the demand for scarce resources such as water or timber. While other scholars claim that it is resource abundance, rather than scarcity, that is the bigger threat to create conflict. Some countries with abundant natural resources have experienced what has been coined the "resource curse"—corruption, economic stagnation, and violent conflict over access to revenues…but regardless of which

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theory describes the bigger threat, it is clear that both scarcity and abundance can create environments that are ripe for violent conflict(Kahl, 2006).
South Asia previously water abundant now scare region is an area which is a flash point of disagreements and issues between two neighbors India and Pakistan. These two states also share water source. This paper is based on hypothesis that water of the Indus Basin is vital and crucial for both India and Pakistan and thus a potential source of real clash in the future.

Global importance of water

The World Water level is reducing alarmingly. There are several reasons for this decline. The most prominent of all is obviously the increase in population. The world's population is growing by about 80 million people a year. It has increased the freshwater demand of about 64 billion cubic meters a year (UNESCO, 2014).
It is estimated that only after15 years almost 47% of world population will be living in areas of high water stress. Since most population growth is reported in developing countries, and especially in regions that are either experiencing water stress situation or in areas with limited access to safe drinking water (UNESCO, 2014).
Water is inevitable for human life. It is used for agriculture, industry, hydro-electric power generation and drinking and also for household purposes. It is assessed that at present every individual needs 20–50 liters (21-53 quarts) of clean water every day. Scarcity of water is creating drought like situation and nearly every continent. (USIP, n.d.). 'According to the United Nations, 1.1 billion people live without clean drinking water, and 3,900 children die every day from water-borne diseases. As the global population continues to rise and will become more of a problem in the future. Water scarcity causes and sustains conflict in many parts of the globe; violent conflict over water resources has broken out in many countries. In China, (Shandong and Guangdong Provinces 2000), Ethiopia (2006), India (2004), Kenya (2005), and Yemen (1999). In the Darfur region of Sudan, for example, much of the unrest is due to water shortages' (Gleick & Heberger, 2014).
The South Asian region is also effected by the shortage of water. Situation is politically sensitive since both Pakistan (mostly) and India (partly) are reliant on the waters of Indus basin and both are water deficient states as well.
Of the many river systems in the world, the mighty Indus with its tributaries is of striking and unmatched importance. The Indus basin has the largest irrigated area on any one river system. It is comprised river Indus and its major tributaries: the Kabul, Swat, and Khurram from the west and the Jehlum, Chenab, Ravi, Beas, and Sutlej from the east.
There are three distinct physical features of the basin that must be noted. First, the Greater Himalayan ranges, snow, and glaciers forms a natural storehouse from which the rivers draw perennial supplies of water. The impact of climate change on the glaciers is therefore critical to their future flows in the rivers. Second, they have great potential as a source for the development of hydroelectricity. This is because the

rivers of the Indus system receive all their waters only in the upper parts of their mountainous catchments and have maximum flow when emerging from the foothills. Third, the basin also includes Tibet, from where the Indus and Sutlej originate, and Afghanistan, from where the river Kabul begins. China as an upper riparian has the capability and capacity to change the hydrological dynamics of the basin. While Afghanistan is less significant as an upper riparian, it remains an important aspect of the basin system (Sinha, December 14, 2010).

The historical Indus Waters Treaty in 1960 decided that Pakistan will have riparian rights over the three western rivers of Indus, Jehlum and Chenab, while India will have the rights over the three eastern rivers, namely Sutlej, Beas and Ravi (Indus Water Treaty, 1960). India would, in accordance with the treaty, completely withdraw the waters of the three eastern rivers in 10 years, during which time Pakistan would construct link canals and mega dams to replace the water lost by Pakistan due to the treaty.

Total water withdrawal in the Indus river basin is estimated at 299 km3, of which Pakistan accounts for approximately 63 percent, India for 36 percent, Afghanistan for 1 percent, and China for barely 0.04 percent. Irrigation withdrawal accounts for 278 km3, or 93 percent of the total. Surface water and groundwater account for 52 percent and 48 percent of total withdrawals in the Indus river basin respectively. The total area equipped for irrigation in the entire Indus river basin is estimated to be around 26.3 million ha, of which Pakistan accounts for approximately 19.08 million ha or 72.7 percent, India for 6.71 million ha or 25.6 percent, Afghanistan for 0.44 million ha or 1.7 percent and China for 0.03 million ha or 0.1 percent ("Irrigation in Southern and Eastern Asia in figures - AQUASTAT Survey ", 2011).

Pakistan's water profile has changed drastically from being a water abundant country, to one experiencing water stress. 'During the period 1990-2015, per capita water availability declined from 2,172 cubic meters per inhabitant, to 1,306 cubic meters per inhabitant. Pakistan extracts 74.3 percent of its freshwater annually, thereby exerting tremendous pressure on renewable water resources'. The demand of water continues due to constant growth in population, urbanization, and industrialization and also due to water-intensive farming. Pakistan also has some level of groundwater pumping. Moreover, the entire water structure is still on primitive methods like limited storage capacity and inadequate lining of canals further complicate water availability situation (UNDP, 2015) Pakistan experiencing environmental stresses. It is in the form of loss of valuable agricultural land and reductions in crop yields. Due to the soil erosion and pollution and serious climatic effects there is constant water shortages in Pakistan especially during summer seasons. There is also very low hydroelectric power and transportation because of the siltation of rivers and reservoir. All these factors lead to 'economic decline and reduce the flow of revenue to the states. Environmental depletion and degradation will obliviously have the most serious adverse effects on countries whose economics dependency is on natural resources' (Kahl, 2006).

Situation in India is not different from Pakistan. India has about 16 per cent of the world's population as compared to only 4 per cent of its water resources. With the present population of more than 1,000 million, the per capita water availability is around 1,170 cu m/person/year (UNICEF, 2013)

The water table in India is falling on average by 0.3 meters as much as 4 meters in some places. Water-starved regions often cultivate water-hungry crops like paddy, cotton and sugarcane. Then there are intra state issues on water as well. Punjab in the north and Tamil Nadu and Karnataka in the south are in dispute over water sharing of rivers.

The importance of Indus Waters for these two states will be evaluated simply on basis of few standards. The agricultural contribution of the areas irrigated by Basin Rivers and the hydroelectric power generation. Since for Pakistan Indus is the single most important river so Pakistan's has total dependency. Unlike Pakistan, India has some other basin systems irrigating Central and western part of the land, yet for the vast lands on the Eastern side of the territory Indus Basin rivers are the single water available system. There are some peripheral issues for India as well. After the Indus Waters treaty India has practically diverted the three rivers Ravi, Beas and Sutlej. Thus India has huge investments on the projects for the river diversion, canal construction and for dams and hydroelectric power projects. This itself an additional reason for the importance of the water of Indus basin.

Agriculture

The agriculture sector is central to Pakistan's economic activity. It is the second largest sector, accounting for over 24 percent of GDP, and it accounts for half of the employed labor force and also the largest source of foreign exchange earnings of Pakistan (Federal Bureau of Statistics, 2017). Nearly 62 percent of the country's population resides in rural areas, and is directly or indirectly linked with agriculture for their livelihood (Farooq, n.d.). On the one hand, it is a primary supplier of raw materials to the downstream industry, thus contributing significantly to Pakistan's exports, and on the other, it is a large market for industrial products such as fertilizers, pesticides, tractors and agricultural implements.

The total water supply for the agriculture sector comes from three sources: rainfall, surface water, the river Indus and its tributaries, and the ground water. Irrigated agriculture is the backbone of the national economy and the level of agricultural production is directly related to the availability and effective use of water as a major input. This year the Rabi harvest showed decline in production, as there is 'nearly 15 percent shortage in actual surface water availability...It means that about 5.46 million acres feet of less water will be available for irrigation purposes... In total….availability of surface water to the tune of 30.94 MAF against average system uses of 36.4 per cent in Rabi 2016-17" (Hassn, September 16, 2106). Due to the non-presence of large water storage and reservoirs Pakistan could stock only limited amount of water despite heavy rains and floods in the last two years. Thus the entire

burden of agricultural irrigation fell on the continuous flow of Indus river water which originates and pass through Indian Territory.

Water is a limited resource and at the same time is progressively becoming scarce due to persistent increases in competing demands. In Pakistan, more than 95 percent of irrigation is located in the Indus river basin. The World's largest contiguous irrigation system; the Indus Basin Irrigation system commands an area of about 14.3 million hectares (35 million acres). In Pakistan, the system includes three large reservoirs (Tarbela, Mangla and Chashma), 23 barrages/ headworks /siphons, 12 inter-river links and 45 canal commands extending for about 60,800 km to serve over 140,000 farmer-operated watercourses (Farooq, n.d.).

Overall this south Asian region is the cotton producing region from where nearly 30 percent of the world's cotton supply comes mainly from India, Pakistan and Bangladesh, much of that from the Indus River Valley. Cotton is the primary foremost product of Pakistan. Pakistan is the 4th largest cotton producer and consumer (preceded by China (Mainland), India and the USA). Pakistan is currently the 2nd largest importer of cotton (behind China Mainland). The cotton industry is an integral aspect of Pakistan economy. This is also true of the textile sector on which the economy is heavily reliant. Pakistan economy is linked to the success of the cotton and textile sectors. There are approximately 1.3 million cotton farmers; 3 million hectares are currently allocated for cotton farming with an average farm size of 4 hectares. They account for 8.2% of the value added in agriculture and 2% of GDP. Furthermore, the cotton and textile industries dominate exports, accounting for 55% of export value (Osakwe, May 18 2009). On average, about 737 billion gallons are withdrawn from the Indus River annually to grow cotton. The other important agricultural products of Pakistan are wheat, maize, rice and sugarcane. These industries also relied and use tons of water (William, October 12, 2011).

India:

The drainage area of the Indus Basin network in India is approximately 440 000 km, nearly 14 percent of the total area of the country (Ahmad, 2009). While Indian agricultural reliance on water of the Indus Basin rivers is not exactly the same as that of Pakistan but even then it is tremendous dependency.

Sl.No	Basin Code	Basin Name	Area(sq.km)
1	1A	Sutlej	53108
2	1B	Beas	20187
3	1C	Ravi	13626
4	1D	Chenab	29945
5	1E	Jhelum	29513
6	1F	Indus	138613

Source: http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=Basins

Traditionally, India has been an agriculture-based economy. Therefore the irrigation development to increase agricultural production remained crucial importance for the policy makers. The irrigation sector was given a very high primacy in the 5-year plans (Kumar, Singh, & Sharma, 2005). Despite India's economic development and a shift in economic activity India is still a major exporter of agricultural products and more than 70% of the population in India still lives in rural areas (European Commission, December 2007). Over 600 m people in India depend on agriculture for their living and it is still the predominant sector in terms of employment and livelihood with more than half of India's workforce engaged in it as the principal occupation (around 60% of the labor force). It contributes significantly to export earnings and is an important source of raw materials for many industries. But interesting to find out is that nearly two-thirds of land under cultivation has no irrigation and so either relies on rain or ground water abstractions. That is why India is the largest consumer of groundwater in the world with an estimated usage of 230 km3 per year. Approximately 60 per cent of the demand from agriculture and irrigation, and about 80 per cent of the domestic water demand, is met through groundwater (UNICEF, 2013).

The Indian Indus Basin covers 321289 square kilometers, roughly 9.8 per cent of the total geographical area of the country which is a small percentage of the total area but the importance is the irrigated lands of states whose contribution in overall agriculture and hydroelectric power generation is significant. The basin is spread over in the States of Jammu and Kashmir, Himachal Pradesh, Punjab, Rajasthan, Haryana and the Union Territory of Chandigarh.

The State-wise distribution of the drainage area is tabulated below.

State	Drainage area (sq. km)
Jammu and Kashmir	193,762
Himachal Pradesh	51,356
Punjab	50,304
Rajasthan	15,814
Haryana	9,939
Chandigarh	114
Total	321,289

(National Institute of Hydrology, n.d.)

In India the whole share of agriculture and allied sectors (including agriculture, livestock, forestry and fishery is around 17.3 per cent of the Gross Value Added (GVA) during 2016-17 at 2011-12 prices. India is the principal producer, exporter and user of spices and spice products and it is also the second largest fruit producer in the world (India Brand Equity Foundation, June 2017).

The Indus originates in Jammu and Kashmir. The entire agriculture production of the state of Jammu and Kashmir is reliant on the waters of the Indus basin rivers. The J & K has agro-climatic conditions best suited for horticulture and floriculture. Horticulture is the mainstay of the rural economy, providing employment to large

number of local inhabitants. The state's share in the overall apple production in India increased from 65.97 per cent in 2013-14 to 69.15 per cent in 2015-16, with the overall production of apple in the state reaching around 2.00 million metric tons (MT) in 2015-16. This state is also a major exporter of walnut & its international market share is about seven per cent (India Brand Equity Foundation India Brand Equity Foundation, 2017).

Another state irrigated by the waters of the Indus is Himachal Pardesh. It is called as one of the fastest growing states in India. Agriculture is the main occupation and the major source of employment in the state, as 89.96 per cent of the population lives in rural areas. Due to the suitable agro-climatic conditions the commercial crops, including off-season vegetables, potatoes and ginger are the major crops of the state. Apart from agriculture the Pharmaceutical and textile industry are also the major economic activity of the state. In 2015-16, production of raw silk in the state was 32 metric tons which also used river water (India Brand Equity Foundation, June 2017).

State of Punjab, comprising 1.5 per of the geographical area of the country but is contributing around 17 per cent of the country's wheat production and 11 per cent of rice production to the central pool (Singh & Bhangoo, 2013).

The State of Punjab is a part of the Indus River System in the north and northwest of the Indian Sub-continent. It is separated from the Ganga basin by the Ghaggar River. It flows only seasonally and is famous for its flash floods in the south-eastern parts of the state. Other significant perennial rivers of the Indus system, which flows through Punjab, are Ravi, Beas and Sutlej. Himalayan glaciers melt account for about 58 percent of the source water supply of these rivers. All these rivers are tapped by using dams at different levels in the catchment areas and stored water is utilized for irrigation through a strong network of canals in the command areas. These rivers feed a vast network of canal system in the State and provide water to the neighboring states, Haryana and Rajasthan (Singh & Bhangoo, 2013).

The confluence of five rivers makes Punjab's agricultural land rich and productive. Approximately 82 per cent of the land is under cultivation compared with the national average of 40 per cent. During 2015-16, total vegetable production in the state was 4.16 million tones, wheat production stood at 17.10 million metric tons, and rice production stood at 10.62 million metric. Punjab has strong agriculture base with the huge production of principal crops. In 2015-16, production of sugarcane was recorded at 7,125 thousand metric tons. Punjab is among the largest producers of cotton and blended yarn as well as mill-made fabrics in India. Ludhiana is often referred to as the 'Manchester of India. The state accounted for 15.47 per cent of the country's cotton production in 2015-16 (up to June 2015) (India Brand Equity Foundation, 2017a).

Indus also irrigates the vast lands of Rajasthan. Rajasthan is the largest producer of rapeseed, bajra and mustard. It is the second largest producer of oilseeds and spices and third largest producer of soya bean and coarse cereals in India. Not only that the leading products of the state that is limestone, silver, gold, copper, marble, sandstone, rock phosphate, and lignite also used the enormous amount of water. This state is also

the largest producer of cement in India. It has 21 major cement plants, it is also the second-largest producer of milk and the largest producer of wool in India. All these contribution is mostly on the basin of the river waters or the ground water that is also the result of the river basin (India Brand Equity Foundation, 2017b).
Haryana is among the northern most states in India and adjacent to national capital Delhi, and Union territory of Chhattisgarh are also irrigated by Indus but their contribution in overall central agriculture pool is not very significant.

Hydro power

Pakistan's dependency on the Indus basin system is also due to its hydroelectric power generation potential. Two major dams - Tarbela and Mangla – have been built on the Indus and the Jehlum respectively.
Mangla Dam is the 12th largest dam in the world. The main structures of the dam include 4 embankment dams, 2 spillways, 5 power-cum-irrigation tunnels and a power station. Since its first impounding, the gross storage capacity has reduced to 4.75 MAF from the actual design of 5.88 MAF. The live capacity has reduced to 4.58 MAF from 5.34 MAF. This implies a reduction of 19.22 % in the capacity of the dam. The dam was designed primarily to increase the amount of water that could be used for irrigation from the flow of the Jehlum and its tributaries. Its secondary function was to generate electrical power from the irrigation releases at the artificial head of the reservoir. The present hydropower generation capacity of the dam is 1000MW. However, due to the construction of dams on the river Jehlum, upstream in India the water flow in the river is reducing (India Brand Equity Foundation, 2017b).
Tarbela Dam is the largest earth and rock filled dam in the world. It was constructed as part of the Indus Basin Plan. The primary function of the dam was also to regulate the Indus river flows especially for irrigation. While a secondary function was the generation of electric power. Tarbela Power Station has generated 341.139 Billion KWh of cheap hydel energy since commissioning. Annual generation during 2007-08 was 14.959 Billion KWh while the station shared peak load of 3702 MW during the year which was 23.057% of total WAPDA System Peak. WAPDA has several other hydel station constructed all along the route of the Indus, Jehlum and Chenab rivers (Tarbela Dam, June 17, 2017).
India has planned very large number of hydro power units on the Indus river. There are 69 large and medium irrigation projects on Indus up to the border. While basin wise Hydroelectric projects and Powerhouses on Indus are 54 and 59 ("Major and medium irrigation projects in India, water resource information system of India," May 20, 2016). The Indian Water Ministry has identified 190 schemes, out of which 18 schemes with a total installed capacity of 3517 MW are in operation and 14 schemes with a total installed capacity of 5626 MW are in various stages of construction. These 32 schemes account for nearly 28% of the assessed potential of the basin ((Indian) Central Water Commission, n.d.).

State wise Hydro-electric projects and power house projects are;

HE projects and Power Houses

Jammu and Kashmir	19	19
Himachal Pradesh	33	31
Punjab	6	12
Rajasthan	2	4
Haryana	2	4
Chandigarh	3	3

(Water Resource Information system of India, n.d.)

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Most of the projects are in J&K. As of November 2015, J&K had a total installed power generation capacity of 3,142.34 Megawatts (MW), comprising 1579.81 MW under central utilities, 1511.53 MW under state utilities and 51.00 MW under private utilities (India Brand Equity FoundationIndia Brand Equity Foundation, 2017). While as of June 2016, Himachal Pradesh had a total installed power generation capacity of 4,537.5 megawatt (MW). With a hydro power potential of 27,436 MW (of which just 9,433 MW has been harnessed), Himachal Pradesh accounts for 25.9 per cent of the country's total hydro power potential (India Brand Equity Foundation, June 2017).

In Punjab a number of dams are constructed. Anandpur Sahib is the project downstream from Bhakhra Dam near the historic town of Anandpur Sahib. The plant was constructed to take advantage of additional water flows from the Beas and Sutlej rivers. A new 34km canal was built from Nangal Reservoir on the Sutlej River. Bhakra was the first large multipurpose hydro project in Punjab. The facility uses the Sutlej River to supply drinking and irrigation water. Chupki is one of four mini hydel plants on the Abohar Branch Canal. Mukerian is one of the main hydel stations in northern Punjab and consists of four powerhouses. UBDC, the Upper Bari Doab Canal project (UBDC) is near Pathankot in Gurdaspur district. The multipurpose UBDC draws water from River Ravi downstream of the Ranjit Sagar Dam at Thein (Water Resource Information system of India, n.d.).

India has also invested a very sizeable amount of money on the diversion of river projects dams and hydro projects. After the signing of Indus Water Treaty, it has practically diverted Ravi, Sutlej and Beas to the plains of East Punjab by constructing a network of canals.

The new projects in India have, however, faced significant hurdles, mainly from two sources. Firstly, the costs of planning, site surveys, data collection, design and tenders for the proposed projects, along with the construction, building and implementation of the projects all add to the significant finances involved. Secondly, the costs are further multiplied especially for the projects which are still not complete due to Pakistani objection on, for instance, the Kishenganga project. Pakistan raised objection on the diversion of river waters for the hydroelectric project, citing provisions of the Indus

Water Treaty. That has increased the cost of the project, which has gone up from the original Rs. 2,238 crore (nearly $490 million) to Rs. 3,642 crore ($800 million) according to statistics provided by the power development department (Sify Finance, November 18, 2010).

On the cost and expenses on large projects on Jammu and Kashmir the data bank of the Indian water commission said, 'the Capital Expenditure during the year has consistently increased from Rs. 871 lakh to Rs. 3843 lakh during 1990-91 to 2006-07. Similarly, the Annual Working Expenses has consistently increased from Rs. 668 lakh to Rs.3487 lakh from 1990-91 to 2006- 07. The Working Expense on Direction and Administration in 2006-07 was almost 9.5 times of the corresponding value in 1997-98. There had been no expenditure on Direction and Administration till 1996-97 and thereafter it has gradually increased from Rs.206 lakh to Rs. 3919 lakh. The Gross Receipt was in the range of 1.6% to 7.1% of Capital Expenditure during 1990-91 to 2006-07 (Central Water Commission, 2010).

State-wise Status of Central Loan Assistance (CLA)/Grant released for major, medium projects in India, in corrors.

S. No	State	CLA released up to 2004-05	Grant released total up to 21.01.2009	Cumulative CLA/grant released	Percentage share
1	Jammu & Kashmir	75.80	188.60	264.40	0.93
2	Haryana	78.03	12.51	90.54	0.32
3	Chhattisgarh	267.33	75.45	342.78	1.21
4	Punjab	415.47	39.82	455.29	1.60
*5	Rajasthan	1387.43	542.92	1930.34	6.80

(Central Water Commission, 2010)

Conclusion

The importance of water is undeniable both for the survival of individual and states. The depleting level of water is a part of the environmental studies and the importance given is of the same intensity as that of any other environmental challenge. Scarcity of water is accepted as a non-conventional threat to any state's security. Since these issues are not posing instantaneous threat thus the declining water table is noted by the states yet the reactions are slow and the direct collision is avoided. In-fact this has become the characteristic of nonconventional security threats to any state. The water is expected to be the future issue of collision for some states, especially in the South Asian region.

Pakistan and India has many unresolved disputes. The most prominent of all is the Kashmir issue. The Indus originates from Kashmir. Five of the rivers of the system pass through the Indian control Kashmir and then enters Pakistan. Out of these fiver

rivers Jhelum and Chenab are huge in size and amount of water while the three western rivers which were diverted by India after the historic Indus Basin waters treaty are Sutlej Beas and Ravi, both smaller in size and amount of water. By the Indus Waters Treaty (1960) India was given limited upper riparian rights to use the waters of these eastern rivers Jehlum and Chenab as well. The present water issues between Pakistan and India is on the use of that limited water right given by the treaty. As former President of Pakistan Mr. Asif Ali Zardari said "The water crisis in Pakistan is directly linked to relations with India. Its resolution could prevent an environmental catastrophe in South Asia, but failure to do so could fuel the fires of discontent that may lead to extremism and terrorism' (Buncombe & Waraich, March 26, 2009).

Apart from many strategic reasons, the significance of Kashmir for both these states is also because of the Indus Basin Rivers. Pakistan is an agrarian economy. It has full dependency on the continuous flow of water. All-important agricultural production in Pakistan like cotton, rice, wheat and sugar are heavily reliant on the water of these rivers. Pakistan is also facing very serious power crisis and shortage of electricity production especially during the summer season when the water level in the rivers decline. The decline is also because of several multimillion projects which India has initiated on these rivers. The shortage of electricity has direct impact on the industrial output of the state. Thus the general economic activity in Pakistan is directly or indirectly associated to the waters of the rivers Jehlum, Chenab and Indus.

This is one side of the picture; the other side is equally alarming because Indian reliance is similarly crucial for Indian economy. Approximately 321,289 sq. km of the land is irrigated by the waters of the rivers. Not only that the agricultural contribution of Punjab which is called as the bread basket of India and also Rajasthan is significant in the total agricultural output and its overall GDP. Moreover, India has developed a very large number of hydroelectric power units, dams, reservoirs and large and small storage facilities on these rivers. The hydroelectric power units supply power to of the entire area of eastern side of the Indian state. Not only has that, since 1960 billion of Rupees been invested on the river diversion, link canal network and the projects. Any interruption or transfer of control of river means irreparable damage to the state economy which is unaffordable.

This water dependency is one of the key reason for keeping Kashmir as part of India, otherwise Pakistan's dependency on India would transformed into Indian dependency on Pakistan. Thus the waters of Indus Basin Rivers are vital for both Pakistan and India and the tussle to control it would lead to real conflict in the future. As Sardar Asif Ali the former Foreign Minister of Pakistan said' water is a sensitive issue and if India continues to deny Pakistan its due share, it can lead to a war between the two countries (Daily Dawn, January 18, 2010).

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