

Impact of Infrastructure Development and Pakistan Economy (Hydrology & Ecology)

This is a multi-faceted subject since infrastructure development cannot be limited to energy projects alone. The three priority infrastructure developments for any nation would be firstly "Water supply & Drainage". Nearly 20 years ago I convened under the kind guidance of late Lt. Gen. Dr. G.S. Butt an International Conference on Water Reservoir in the National Economy. The event was held on 09 Feb 1998 at Islamabad. My countrymen have forgotten its lessons. Second priority should be "Transportation Infrastructure" including primary & secondary routes, bridges and means of access. As civilization moved into the various stages of mechanization the impact of the transportation infrastructure became greater for every economy including Pakistan. Industrialization & modern agriculture both require an efficient transport infrastructure. Rail transport, sea transport & airports all form part of the transportation infrastructure. Thirdly the "Energy Infrastructure" which does include all upstream activity for hydrocarbons and their delivery systems. Hydropower, renewable & thermal based infrastructure as well as the T&D infrastructure to deliver this energy to the load centers, are all part of Energy Infrastructure.

This article will focus on the first i.e; Water & Drainage. Water is a seriously ignored endowment in Pakistan. Therefore it becomes absolutely imperative and inevitable that Water and its main factors; its utility, its applications are understood by us. Based on this main endowment we could become prosperous, powerful, healthy & impregnable. However the infrastructure development for Water & Drainage became stagnant and ineffective for our nation of +210 mn souls. Equally vital is to understand that our upper riparian neighbor never reconciled to the existence of Pakistan. Today we have a serious Surface Water (SW) crisis, a Ground Water (GW) crisis and a recurring political battle on the issue of water infrastructure especially large dams. For this reason this article includes review of the Greater Indus Cascade as a hydrological machine. Ecology is now inseparable from Hydrology. Worldwide 50% of hospital beds are occupied by patients of water-borne diseases. Over 20% infants die due to contaminated water. "Some three fourths of jobs in the Global work force are dependent on Water"; the exact statement of The National Geographic edition of March 2017 (pg 130).

Every rupee spent on water & sanitation infrastructure returns atleast two in direct & indirect benefits each year. Therefore agriculture alone does not depend on Water. Industrialization is also Water dependent. However water is not a commodity like coal & minerals. It is a molecule that nature recycles but does not guarantee its precise availability and quality.

I refer to the Water Panel Report of November 2015 duly revised on December 2016. The Pakistan Business Council was formed in 2005. Today it consists of Pakistan's 47 largest enterprises that have substantial investments in Pakistan's economy including multinationals. Our analysis is diverse, ranging from climate change problems, to the poor quality and chemical properties of the water that is available, to a severe neglect of the issues at hand. The Water Panel studied these issues, and identified potential solutions from creating more reservoirs to the recycling & reuse of wastewater in Pakistan. The stress is on infrastructure development. It was presented at the PEF III held at Habib University Karachi on November 19, 2015.

Let us first remember the message of several noble souls who ardently served the cause of water & the environment. The late Mr. Syed Salar Kirmani, late Dr. G.S. Butt (Lt. Gen Retd) and the sage of Karachi, the late Mr. Ardeshir Cowasjee. Several icons are with us and continue to deliver their clarion calls based on scientific truths. Can we deny the intrepid & heroic campaign of Dr. (Hony) Shams ul Mulk Sahib. What is stopping us from standing with him?

It is not in the nature of the bureaucracy to resist pressure from their superiors. When the subject concerns the crucial “Politics of Water” there can be extreme ‘arm-twisting’ of subordinates to comply with instructions. A great son of the soil Mr. Chaudhry Mushtaq Ahmad was Chief Engineer (H&WM) of WAPDA’s Water Wing at the time of the cataclysmic floods of 2010. The WAPDA Chairman Mr. Shakeel Durrani and his Member Water Mr. Syed Raghیب Abbas Shah were both determined that any report from WAPDA should highlight that if the Kalabagh Dam (KBD) would have existed in 2010 the flood damage would have been greater. This brave patriot stayed the course and in the WAPDA Report (Jan 2011) he factually analyzes that the structure of a dam attenuates downstream flows; exactly as the Tarbela Dam achieved. With data on the Attock Gorge & smaller Nowshera Gorge he proves that back-pressure from these constrictions developed as they were unable to pass the deluge and caused upstream flooding. **Clearly, KBD would have been invaluable for flood control downstream.**

Engr. Saeed Akhtar Niazi, a WAPDA mechanical engineer with vast experience of hydropower focused his attention on the run of river Ghazi Barotha HPP. This wonderful project utilizes Indus River downstream of Tarbela to produce upto 1450 MW of low cost power during high flow season. From concept to reality in 15 years he gave his nation a great gift.

A true professional & humanist who has been an inspiration for many is remembered. Dr. John Briscoe the South African born Environmental Engineer passed away on 18 Nov 2014. During his 20 years at the World Bank he had also served as Senior Water Adviser in New Delhi. He grasped the Indian mindset and predicted the present developments/ manipulations of Kashmir waters as a result of Indian military occupation. His writings are a testimony to his great intellect & sensitivity. He is also the Author of “Pakistan’s Water Economy Running Dry.” From 2009 he was Gordon McKay Professor of Environmental Engineering & Environmental Health at Harvard University. His deep sense of balance & fairness can be observed from just his two short articles at Annexure D. In 2014 he received the 2014 Stockholm Water Prize commonly referred to as the Noble Prize of Water. His fair & incisive style improved perceptions around the IWT 1960 during international arbitrations. Pakistan, Infact the world has lost a great mind.

Thanks to the inhuman Radcliffe Partition Award, the world’s largest contiguous irrigation system at the time of partition came under instant stress as control of the three Eastern Rivers (Ravi, Sutlej & Beas) came into the hands of the Upper-Riparian/ India. The genesis of the Indus Waters Treaty 1960 was laid in 1952 with an initiative by President H. Truman involving the World Bank as facilitator (& guarantor) during an eight years period which allowed the Indian & Pakistan delegations to talk & negotiate. The Eisenhower administration in this period gifted the concept for WAPDA in 1958 based on their successful TVA model. The Pakistanis built 12 link canals. Five before the Treaty of September 1960 and seven after Treaty to transfer waters from Western Rivers to basically keep the main Eastern River (Ravi & Sutlej) alive within Pakistan. The two most critical link canals for the Southern Cotton belt being:

TP link canal: TAUNSA (Indus) - PANJNAD River (Jhelum & Chenab combined) link.

CJ link canal: CHASHMA (Indus) - JHELMUM link.

It is also clarified that IRSA (Indus River System Authority) based on the March 1991 Water Accord is between the four provinces and establishes an equitable water sharing arrangement of the Indus Basin resource within Pakistan. In 1997/2001 a regulatory network for Ground Water (GW) was created but nobody wants to own the GW resource. The aquifers are over-exploited and now highly contaminated South of the Potohar.

Pakistan has been flying blind in the water sector since several decades. Water is our main endowment but there is no continuity in policy directions or even an attempt to have a

comprehensive appreciation of the past and future water scenarios. With help from the World Bank and USA administration, we created a great vehicle in 1958 to harness the potential of the Indus river basin. WAPDA was modeled on the successful Tennessee Valley Authority, the seven states initiative of 1933 that brought USA out of recession. In 1969, WAPDA's annual budget was nearly 50% higher than the Federal budget of United Pakistan. What happened suddenly to our green revolution that was being taught to European schoolchildren in the 1960's? Today in spite of the plunder of our Ground Water Resource we cannot have enough irrigation water to maximize the irrigated agriculture output. The dream of going beyond the 42mn acres of irrigated croplands remains a mirage. At least 21mn acres are available but remain fallow since 1947 due to lack of irrigation water. Did we need to so excessively over-exploit the ancient & priceless sweet water aquifers during the last 45 years? It must be understood that surface hydro flows & storages are the basic source of GW Recharge. Rainfall being the other main source in the hydrologic cycle. The ever deeper mining of GW has resulted in arsenic & heavy metal contamination of the aquifers, far exceeding WHO recommendations. The untreated discharge of raw sewage, as well as industrial & agriculture effluents into surface channels & GW aquifers has in many cases caused an irreversible deterioration of water quality. Dams create storages and do not consume water. The future scenario is very frightening. The nation has been unable to analyze the impact of the lack of planning of our water endowment. A single basin country with the planet's sixth largest population cannot afford this state of virtual paralysis with respect to its hydro resource. Solution is infrastructure for hydrology & ecology.

The geographical & hydrological realities cannot be changed. Six of the eight major tributaries of the Indus Main are in control of one upper riparian neighbor, India. Our relentless adversary has her undeniable compulsions. There were reportedly 400 mn Indians without electric power in early 2013. A population of over 1.25 bn souls having a strong system of governance which manifests itself in continuity of selfish initiatives. Water is an article of deep faith with them. In sharp contrast to our state of deep apathy. Both Nepal and Bangladesh have also suffered at their hands. How do we stop them from further attrition of our water endowment? Can we as a nation finally get to understand the deadly consequences of our internal "Politics of Water". Clearly there is a nexus here. We have an active fifth column which is behind decades of mischief. These people refuse to believe the leading experts in hydrology, in environmental sciences, in geo-physics, in hydropower, in hydraulics because they either wish to damage Pakistan irreparably or simply consider their own regional interests to be above the common national interest. Tragically the Federal Authorities have always turned a blind eye to these regional "lobbies". The obvious result is that today even water for human consumption is scarce or seriously polluted; from the hills of Malakand to the coast of Karachi & Mekran. The economy weighed down by an all pervasive energy crisis as we ignored large dams. Agricultural growth blocked by non-existent reservoirs & depleted aquifers. At the mercy of floods related to Global Warming simply due to the lack of high dams & major storages. We have not built one in 40 years while our population tripled! We can reverse this poverty cycle with infrastructure.

"Water is life" yet our nation refuses to wake up and create a policy on war footing which will lead to economic & social harmony. Water is the most economical source of electrical energy, yet we are unable to resurrect the hydel : thermal ratio of 70:30; long decided as a national priority. Can we deny that lack of water reservoirs has caused over a trillion USD equivalent of economic loss in the last some thirty years; which now manifests itself as the energy crisis, the basic cause of the economic paralysis & un-sustainability. It has caused inter provincial tensions and one of the major reasons of the militancy & extremism in our society. This crisis has to be remedied and we will have to take the "bull by the horn" otherwise our adversary under its own compulsions will continue to commit "water-aggression". The lesson of Bangalore Feb 2014 is simply that India now seeks every pretext to bypass the letter & spirit of the IWT 1960. They

started to call it a “limited agreement” not because they wish to remedy its inhuman provisions such as lack of “environmental flows” for Pakistan but as a pretext to further develop infrastructure to divert our waters in IHK. They now claim that “ground water” was not a part of the IWT 1960. Adding yet another very ominous dimension to their water aggression agenda. The adversary is convinced that we will not understand & cannot protect our interests in this realm. They denied (Bangalore Feb-2014) that there is glacier retreat in IHK & subsequently there are no global warming flows. Srinagar was ironically flooded in the summers of 2014. Their statements defy logic & common sense. Renegotiation of the IWT 1960 is not possible because the Indians will not discuss the ownership of the three eastern rivers. Indian official strategy is leading to history’s greatest genocide & this must be reversed for the sake of all people in the region and beyond. Mr. John Briscoe correctly hoped for an Indian Mandella. Let us pray for one otherwise both resultant scenarios are very frightening. An economically crippled Pakistan obviously prone to separatist intrigues (or nuclear Armageddon).

Where is our salvation? Clearly it requires a joint civil-military effort. The best and brightest in a grand coalition to monitor the hydrologic cycle of the region. Our report presents 18 Chapters. In addition there are included 6 Annexures which discuss related issues in some detail. The first two Annexures include statements by national icons including Engr. Shams ul Mulk, Sardar M. Tariq, Shamshad Gohar & Begum Dr. Zaigham Habib. All of them are professionals & qualified to speak on the broad spectrum of “water”. Strengthening of the Pakistan Commission on Indus Waters (PCIW) remains a top priority together with rehabilitation of WAPDA our Economic Headquarters. Both are vital cogs. The concept of CIBSA as a counter weight to the ICIW & ICID becomes a national priority. The concept of the Great Indus Cascade (2015-2040) is presented in Annexure-F. It outlines the great opportunities for storage projects and hydropower. Chapter 18 covers water & wastewater recycling. Environmental degradation is leading to severe ecological damage. The population south of the Potohar is in the midst of a health epidemic manifesting itself through hepatitis and very high rate of cancers. In a recent TV talk-show one of India’s top media person stated “Pakistan is now a gutter”. No doubt the ecological war being waged by the Upper-Riparian has also devastated large tracts of agricultural land in South Punjab and denied water to the North West KP province. By blocking the construction of large dams since +40 years she has also compelled us to over-exploit the aquifers which in the process have been seriously degraded. She projects to the outside world her “great civilization” but treats her minorities & neighbors as untouchables. We will have to stand up to this tyranny & protect our sovereign rights on the Indus Basin Waters. Above all we must first understand the truth. For the Indians, IWT always meant: India Wanted Time.

Major challenges in outline that must be understood by our nation:

- a) Revive WAPDA. Create CIBSA (refer Appendix Chapter-I on CIBSA & Annexure C)
- b) Interpret IWT 1960 precisely and logically. There is need for 3rd party intervention/ mediation.
- b) Have a political will to build the Great Indus Cascade, and overcome the economic crises.
- d) KBD is indispensable for powergen, flood control & for a fair share of KP irrigation waters.
- e) DBD must be lower/ safer Arch CFRD design instead RCC. This is logical and economical.
- f) Stop wasteful projects such as Tarbela T5. Revive the critical Akhori Off-channel storage.
- g) Regulate & reduce ground water use. Balance GW abstraction and aquifer recharge.
- h) Our stolen rivers are the basis of our nation’s economic deprivation. Genocide on the Indus? The 2011 book “Water, Asia’s New Battleground” by Brahma Chellaney must be understood.

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