

Interrogating South Asia's Hydro Politics

Implications for Water Security and Hydro-Power Cooperation in the Sub-Continent

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CONTENTS

Abstract	2
Emergent Water Crisis in South Asia	3
The Magnitude of Water Resource Problem of South Asia	3
Issues Contribute more to the Problem of Water Security of South Asia	5
Hydro-politics in South Asia: A Path Dependent Analysis.....	7
Hydro Power Development and Regional Energy Security.....	9
Challenges and Opportunities for Cross-Border Cooperation	11
What Needs to be Done?	12
Endnotes	14
References	15

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Abstract

With the largest population density and widespread poverty, South Asia is beginning to face a major water and energy crisis. It has been claimed that water is going to be one of the critical drivers of peace and stability in the subcontinent, in coming decades. In spite of the richness in water resources, South Asian countries face an acute crisis of water availability. Simultaneously, the region is considered to be a hub of energy poverty, with largest share of global population without access to modern energy sources. However, complementarities of resources and demand for water and energy in the region have a huge potential to improve the resource security scenario in the region, through cross-border cooperation. While this potential has been well recognized by the governments, the initiatives in this regard have seen limited success. This paper analyses the politics of regional water and energy security in South Asia, and discusses the challenges and opportunities for cross border cooperation. Building on the findings, it suggests a pathway for consolidating emergent cooperation between South Asian countries to achieve regional energy and water security.

The issue of water has a central position in world politics today. The flow of trans-boundary water makes it relevant for more than one state. There are about 260 river basins, home to 40 percent of the world population with roughly 145 sharing agreements/treaties in existence.ⁱ Numerous problems raised by the management of water resources are currently receiving ever-greater attention from governments around the globe. Rapid increase in world population, industrialisation, urbanisation and scarcity of fresh water resources has put immense pressure on water resources, both surface and ground water. The heightened issues and debates over access and development of these waters are frequently challenged by a variety of stakeholders across a range of political scales.

South Asia region, given its population density and poverty on the one hand, and rapid urbanisation and industrialisation on the other, seems to be facing an incipient water crisis not due to water shortage, but intergovernmental conflicts.ⁱⁱ South Asia is the part of the world, inhabiting about one quarter of the global population and presenting to the world most volatile conflicts. Interstate hydro politics are today one of the most important issues on the states' agenda. The partition plan of India and Pakistan sowed the seed of this conflict. The other states of South Asia i-e, Bangladesh, Bhutan, Nepal are also in a constant rift with India over water.ⁱⁱⁱ

South Asia, the region with the largest population density in the world and widespread poverty, has also been identified by many as an area of quickly emerging water and energy crisis.^{iv} Except the island areas, the South Asia region covers about 3.3 per cent of terrestrial area and receives 6.8 per cent of the annual replenishable amount of water of the world. With this land and water resources, it supports 21 percent of the world's population.^v

The challenges in water systems management are rooted in the common objective of all the country's poverty alleviation and sustainable development. However, while the challenge is clear, the region is not ready with appropriate responses. Most importantly, it does not have the necessary intergovernmental arrangement to resolve and manage the trans boundary water related issues.^{vi}

The worldwide paradigm shift in river basin management has not affected policymakers in South Asia. Hydro-diplomacy is still based on the reductionist engineering and looks at marginal economic benefits, without showing any concern for the long run implications.^{vii} The management of the water resources is not a cool headed technological issue *per se* that many like to believe. It is more an issue of social and institutional adoption and adaptation because it is an arena of conflict and contestation.^{viii}

South Asia faces many crises at the current juncture and that these can be understood as having social, political, economic and environmental dimensions and no single theme can address such complexity. However, by examining the multiple crisis of water we can go some way to understand the dimensions of South Asia's crises on different scales and across different regions of the sub-continent.^{ix}

Emergent Water Crisis in South Asia

The Magnitude of Water Resource Problem of South Asia

Water is an essential resource for basic human livelihood, but this resource is coming under increasing pressure as the world's population continues to grow. Access to fresh water to meet growing demands has become a mounting concern in many countries over the last 60 years. There are several million population in South Asia who still do not have access to clean water, sanitation or

modern sources of energy. Natural forces affecting the world's water systems, human activities also constantly putting pressures on water resources, for which there are no substitutes. These pressures are in turn affected by a range of factors, such as technological development, political, institutional and financial conditions, and climate change.^x

In the context of South Asia, water is going to be one of the critical drivers of peace and stability in the second decade of the 21st century. For South Asia region this seems a compelling concern and since the 1990s, it has been more prominent that the conflicts of this century will be about water because it appears increasingly scarce. While the competition over water resources is intensifying and is being one of the significant issues for geopolitics, South Asian states are not taking clear actions for the region's troubled hydro politics.^{xi}

The South Asian region is home to one quarter population of the world, but the available fresh water resources are not ample to meet the need of such huge population. In spite of its richness in water resources, faces an acute crisis of water availability. Apart from its growing population, rapidly growing economy, changing lifestyles, high levels of pollution, uncontrolled pumping of groundwater, lack of storage capacity, conspicuous waste and mismanagement of water resources has posed a serious challenge for the region as far as water resource is concerned. India's domestic, agricultural and industrial sectors used about 829 billion cubic meters of water in 2006. It is expected to double by 2050, it is likely to exceed the 1.4 trillion cubic meters of available water, which means India is drifting swiftly towards a situation of water stress.

According to an estimate, by 2030, 60 per cent of world population will be left with fresh water supply and areas like South Asia might experience water stress and the region could experience water related conflicts.^{xii} As far as per capita availability of water is concerned, it seems that there is a marked decline in renewable per capita fresh water availability in the region as a whole and large parts of the region the decline has attained immediately threatening dimension.^{xiii}

Table 1: India. Total Renewable Water Resources Per Capita (m³/per capita/year)

1988-1992	1993-1997	1998-2001	2003-2007	2050 (estimate)
2,146	1,955	1,799	1,719	1,403

Sources: United Nations Food & Agriculture Organization, *Aquastat Database*, at: <http://www.fao.org/nr/water/aquastat/data/query/results.html>; and National Institute of Hydrology *Water Resources of India*, at: <http://www.nih.ernet.in/water.htm>

The countries in the South Asian regions are mostly agricultural and these have also to produce food grains for its large population. Water in this regard is considered as one of the most important resources. Since a considerable percentage of the available fresh water supplies are utilised for agricultural activities in order to produce food grains. Water insecurity is a paramount threat to the future sustainability of the food grain production in this region. A lack of safe water is linked to food insecurity, improper sanitation, increased cases of waterborne diseases, loss of livelihood and environmental degradation which can provoke regional tensions and conflicts.^{xiv}

Water is already an extremely contentious and volatile issue in South Asia. The amount of water available, for the present as well as future, has reduced dramatically. This is due to water-fertiliser

intensive farming, overexploitation of groundwater for drinking, industrial and agricultural purposes, large scale contamination of water sources. Although water scarcity is a common problem in all South Asian countries, the situation is worse, particularly in India and Pakistan. In both the countries, demand of fresh water is very high for domestic, agricultural as well as industrial use, which could create water crisis in the future.

Another two countries, Nepal and Bangladesh of this region, have different issues as far as water problems are concerned. Both of these countries have relatively better supplies of water, but the lack of capacity to utilise the available water resources results in severe seasonal water scarcity.^{xv} The growth in the extraction of ground water in India is a web of public policy and private sector behaviour. There was a failure of the initial large scale irrigation strategy which lead to lack of access to canal water in several areas. The introduction of the affordable pumps and drilling equipment has transformed irrigated economies. Groundwater resources now account for almost 80 per cent of the recent growth in irrigation in South Asia and they are reaching the limits of exploitation. However, groundwater over extraction has accelerated the depletion of water resources.^{xvi}

Apart from the agricultural sector, water is also going to be one of the scarcest resources for the growing urban centres and industrial towns of South Asian region. Growing urban centres and their increasing population, higher energy demands, strong income growth and rising living standards have led to the sharp increase of water consumption for domestic and commercial uses.^{xvii}

In South Asian region where supplies are vulnerable, distribution, price, consumption and management are poorly regulated – this kind of use could be unsustainable for the development of the region. As many of the rapidly growing cities in the South Asian region already face problems related to water and have limited capacity to overcome the problem, in the future such cities will be major hotspots for water related crises. In India, for example, the government's norm for rural water supply schemes is 40 liters per capita per day (pcpd) but for towns without sewers it is 70 pcpd; for cities with sewers it is 135 pcpd; and for metropolitan and mega cities, with populations over 1 million, it is as high as 150 pcpd.

While these are design standards, the actual demand for water in these cities could be higher. For instance, Mumbai claims its water demand to be 300 pcpd (UNESCO, 2014). At the moment none of the 35 Indian cities with populations greater than one million distributes water for more than a few hours per day; and even in the capital, New Delhi, 27 per cent of homes receive tap water for less than 3 hours per day (Wirsing, 2008: :4). Kathmandu, for example, is currently able to supply only about one-third of the total water demanded by its one million plus residents, who are also struggling with up to 14 hours per day of power cuts in the dry season.^{xviii} Per capita renewable water availability in India has declined by roughly 60 per cent over the last half century (from 1986 cubic meters in 1998 to 1731 cubic meters in 2005). The situation is likely to worsen in the next few decades with the high rising population, urbanisation and industrial developments.^{xix}

Issues Contribute more to the Problem of Water Security of South Asia

Fresh water scarcity is a common problem in the whole region because countries have a high rate of population growth, wide-spread poverty, declining food production and a rapidly rising demand of water for domestic, agricultural as well as industrial users. In the present condition water security is the single most important factor for the sustainable development of the whole South Asian region.

The paradox of the region is, although it is linked together by water co-dependencies but very poorly integrated. Several scholars have pointed out that poor water management and the impact of the climate change on water resources contribute more to the problem of water security of the region.^{xx}

It is well evident from several studies that across the region water management is very poor. There is a gross mismanagement in the agricultural sector as well as in big urban centres.^{xxi} One of the major concerns of all countries of the region is the gap between policies and their implementation. The policymakers have overlooked the water losses due to theft, defective pipelines, unsustainable agricultural practices, irrational pricing and populist policies like free power to run tube-wells drawing underground water. A NASA report in 2009 stated that during 2002-2008 significant amount of ground water had disappeared from aquifers in agriculturally developed states, such as Punjab, Haryana, Rajasthan etc.^{xxii}

The study shows that (John, 2011) in big urban centres water scarcities are due to theft and leakages in pipelines. In addition to that, lack of coordination between different departments is one of the major problems. For that country lacks a coherent water management strategy as well as investment in water infrastructure. Apart from this, there are several scientifically management of water resources, such as rainwater harvesting, recycling water, monitoring groundwater which are still in their initial stages in many countries.^{xxiii}

The situation is quite same in other countries of the region. For instance, the primary reason for Pakistan's inability to tackle the problem of water losses is inadequate water storage capacity. The per capita storage capacity as well as the water holding capacity of the existing reservoirs and dams is very low as compared to developed countries (John, 2011). For the improvement present situation, there is a need to change in the system of water governance, which need new legal requirements and public participation.^{xxiv}

Further, the issue is the impact of climate changen on the water resources of the region. Climate change impacts the hydrological cycle and consequently impacts water resources. Changes in temperature and frequency levels and intensity of rainfalls lead to increased risks of droughts and floods. It may affect water supplies directly and potentially increase the water demand for agriculture and energy. If each sector is analysed briefly, then it can be found that climate change has an adverse effect on the quality, quantity and accessibility of water resources.^{xxv}

Climate change adaptation is primarily about water, as stated by the Intergovernmental Panel on Climate Change (IPCC), which identifies water as the fundamental link through which climate change will impact humans and the environment.^{xxvi} The IPCC also predicts that freshwater availability in many parts of the world is likely to decrease due to climate change, along with population growth and a rising standard of living. It is likely to have serious implications for water availability in the dry season in water stress areas.^{xxvii}

To manage this problem there will be need of more energy as it will purify water of lower quality/polluted water or pump water from greater depths or distances. This would intensify the competition for the existing water resources.^{xxviii} It is believed that South Asian countries' water management ability will determine the impact of climate change in the region. The preliminary assessments of the United Nations Framework Convention on Climate Change (UNFCCC) have revealed that the severity of droughts and intensity of floods in various parts of India and other

neighbouring countries is likely to increase. The report pointed out that rise in sea levels and melting of glaciers will adversely affect the water balance in different parts of India. In addition, current projections show that freshwater related risks increase significantly with increasing green house gas (GHG) emissions, which will lead to competition for water among all uses in the future. This increasing demand of fresh water will create huge challenges for water resources management.^{xxix}

These are few water security related challenges which South Asian region is dealing with. It is challenging for policymakers to address these issues adequately in the sustainable development of the region. The United Nations World Water Development Report (WWDR) 2015 has highlighted the need of water security for the sustainable development. Water security would create social, economic, financial and other benefits that would extend to poverty alleviation, health, education, food and energy production and the environment. WWDR clearly demonstrates that water is critical to nearly every aspect of sustainable development. Sustainable development requires to properly manage freshwater resources and equitably share its benefits.^{xxx}

For the sustainable development of the South Asian region, there is a need for effective mitigation of this problem. As discussed earlier, South Asian region has a considerable number of poor and marginal population and for their socioeconomic development, water is one of the important natural resources. Therefore, water security is necessary for the future which requires a coordinated response across sectors.

Hydro-politics in South Asia: A Path Dependent Analysis

As discussed above, water-related issues and tensions in South Asia seems to increase because of the water scarcity and increasing competition for the resources. In this regard, the attitude towards trans-boundary water resources plays a significant role. Many of the region's countries depend on the same rivers and, by extension, neighbouring upper riparian for their water supply. For instance, India, Bangladesh and Nepal look to the Ganges, while both Pakistan and India are sharing rivers of the Indus basin.^{xxxi}

However, the current trans-boundary cooperation has been limited and trans-boundary water conflicts are not new phenomena in South Asia. The sharing of water by states without a joint mechanism makes this issue more complex. These all factors have challenged the security of South Asia and issue of water has assumed a prominent position in politics and often trans-boundary water debate are set around the impact of the construction of the infrastructure like a dam on downstream population rather than future water security.^{xxxii}

South Asia is not the politically and socially stable of regions. Although for political relations of some of the countries seems smooth, but relations regarding the shared rivers and water projects are in serious disputes. Hydro-tension between India and Pakistan in sharing the water of the Ravi, Sutlej and Beas rivers of Pakistan and Indus, Jhelum and Chenab rivers of India, controversy on water sharing of Koshi, Gandak, Tanakpur and Mahakali between India and Nepal and disputes between India and Bangladesh for the Ganga and Teesta are some of the instances of trans-boundary water conflicts.

Scholars have very rightly highlighted the water politics issues and pointed out that regional cooperation is especially needed due to the multiplicity of trans-boundary water resources. South

Asian countries naturally depends on one another for water as major rivers of this region criss cross several countries before meeting the sea. Therefore, managing waters of South Asian region requires a more sensitive understanding of this region's hydro-ecology than the mindlessness of earthworks.^{xxxiii}

Although there are existing treaties of water sharing and infrastructure development, i.e. Indus Water Treaty 1960 (IWT) between India and Pakistan; Kosi Agreement 1954; Gandak Agreement 1959 and Mahakali Treaty 1996 between India and Nepal; Ganges Water Sharing Treaty 1996 between India and Bangladesh) but lack of specificity in provisions fueling the disputes in the region, which leads for ambiguity and controversy in the interpretation and enforcement of the provisions of these water sharing agreements. In addition, these agreements also lacked the necessary norms and mechanisms to deal with and adapt to variability in water flows and other environmental changes over time.^{xxxiv}

South Asian countries have made significant progress in opening up the areas such as trade and energy. However, regional cooperation on water lags behind due to geopolitics and a history of cross border disputes. In this region, trans-boundary water issues are perceived largely from a perspective of national security. India and Pakistan are facing a water dispute since partition over sharing waters of the Indus and its tributaries. Although there is IWT between India-Pakistan but Pakistan remains understandably concerned that India might use water as a political tool and has challenged every move by India to undertake even IWT-approved water infrastructure projects.^{xxxv}

Highly securitised approach and limited access to hydro and climate information in the region is affecting the planning, management and development of the trans-boundary water resources. While IWT already has provisions of bilateral data sharing, but actual information sharing is quite limited and the practices are *ad hoc*.^{xxxvi}

On the contrary, problems of the east of South Asian region are different. Controlling huge amount of water flow in the Ganges-Brahmaputra-Meghna Basin provides unique opportunities for all countries. There are opportunities for infrastructure building for the hydropower generation and flood control in the lower riparian which could benefit all the three countries, i.e Nepal, India and Bangladesh. However, there are significant environmental, social and political concerns which overshadow these opportunities. For instance, there are social issues, such as land and resettlement and rehabilitation and political problems like infringement of one another's sovereignty. Most of the South Asian governments seek to control the great rivers of the region because they offer solutions to their water problems and fulfill the sectoral water needs of the country.^{xxxvii}

As mentioned above, regional cooperation over water is a contentious issue in this region although the South Asian Association for Regional Cooperation (SAARC) established in the 1980s provides a forum for discussion. However, water resource negotiations were excluded from the beginning because countries like India repeatedly insisted on bilateralism on the issues of water.^{xxxviii}

There are several failure negotiations between India-Bangladesh and India-Nepal on issues of strident nationalism. Several times other bilateral issues also create problems in water related cooperation. For instance, water security between India and Bangladesh are influenced by issues like Bangladeshi migrant influx in northeast Indian states, Chakma refugees, border issues and insurgent groups in the northeast states. Similarly, India-Pakistan water sharing negotiations is dominated by the broader territorial dispute and infiltration of the insurgent groups in Kashmir and long standing distrust, while Nepal's insecurities as a landlocked state dependent on India for trade and transit play a major role in

its discussions with India over water issues. In addition to that, all three countries share a common distrust and touchiness about India as the regional Hegemon.^{xxxix}

Besides, many issues of water sharing among the countries of the subcontinent, climatic changes and the role of China also need to be addressed. China, while not a geographic entity of South Asia, is an upper riparian for many of the key rivers flowing into South Asia. As far as China is concerned, it controls the vast Tibetan Plateau, the world's largest repository of fresh water. The aggressive dam building at the upper end of Brahmaputra could have great consequences for lower riparian's in India and Bangladesh.^{xi}

Despite the looming threat of water scarcity in almost all countries of South Asia, there has been a persistent silence in working together to reduce the impact of future water crisis. It is mainly because countries of South Asia treat water as a sovereign issue, ignoring the fact that many of the rivers transcend political boundaries and cooperation is needed to reduce the risk of water scarcity in the region (John, 2011). The changing paradigm of water management throws new light on the diverse ecological process and services associated with the river system.^{xii} The rivers are providers of extensive ecosystem services on which a large number of the population depend for their survival and livelihood.^{xiii} Therefore, the non-cooperation of the South Asian water system has both environmental as well as economic consequences.

Mismanagement and non-cooperation in the South Asian region has both ecological as well as economic cost. However, these two are related to each other. Poor management of the river basin, use and misuse, overexploitation of water resources has a huge ecological cost in the future. In addition to that, mismanagement and non-cooperation (lack of flood management plans, effective warning system, etc.) in the upper riparian countries several times create an ecological disaster in the lower riparian areas which destroy human life and productive assets. The loss of productive assets has a cost associated with it. The lower riparian countries bear these costs due to ineffective water governance in the region. If the resource can manage coherently and equitably to meet regional and national goals, it can solve the evolving sectoral needs of the region.

In addition to that cooperation has several benefits. First it could provide a space for better management of the ecosystems by providing benefits to the river, second it could be in the area of food and energy production, thirdly, the effective management of the water between co-riparian countries could be economically beneficial as it can mitigate the water disasters and finally these international river cooperation could pave the way to much greater economic integration among countries.^{xliii}

Hydro Power Development and Regional Energy Security

In a world confronting depleting resources the idea of water and energy security is in the topmost agenda of every country. In the context of all South Asian countries, energy security is considered to be one of the most important issues. South Asia is as one of the fastest growing regions in the world, it puts energy at the very heart of the development process in the region.^{xliv} Water and energy are interlinked and highly interdependent and the choices made in one domain may have direct and indirect consequences on the other, positive or negative. Scarcity is rapidly escalating due to increased demand, resource degradation and pollution. As far as water resources and energy production are concerned, South Asia produces only six per cent of its total energy demand from hydro power.^{xlv}

There is a growing imbalance between energy demand and its supply from indigenous sources resulting in increased import dependence.

With rising international oil prices, the concern for energy security in the region is on the top of the policy agenda. To meet the growing demand all the South Asian countries are under immense social and political pressure to secure reliable, sustainable and affordable priced energy supply. The countries in the region are independently pursuing policy options to mitigate energy security risks. However, much more needs to be done to sustainably meet the growing demand for energy to fuel their economies.^{xlvi} It is expected that the energy deficiency situation can be overcome with high-quality regional energy cooperation and through the effective management of available resources such as river waters in the high Himalayas.

Hydropower is an important source of clean and renewable energy. The hydro initiative apparently looks promising when seen from the huge power generation and revenue earning point of view. The past century has witnessed a huge surge in hydropower development to meet the growing water and energy needs of the people. Dams have emerged as symbols of modernisation process in the South Asian region and mostly it is proved to be an effective way for harnessing water resources to meet energy needs, irrigation and alleviate flooding.^{xlvii}

In spite of having a rich hydropower potential, the region is one of the energy deficit regions of the world due to lack of cooperation in the water infrastructure development and management. Although the Hydro-power generation infrastructures have several negative social and environmental externalities, but it can help to meet the water and energy needs of the region in the future. The South Asian region is geographically well located to tap hydropower, especially in the Himalayas. However, the dilemma is evident in the case of transboundary water resources. The countries of this region suffer from mutual distrust. This mutual suspicion, coupled with the reservations at the international level over large hydroelectric projects, limits the scope of realisation of the hydropower potential.^{xlviii}

South Asian nations have huge potential of hydropower generation and trans-border electricity trade. However, due to lack of trust and non-cooperation the power sharing exists only at the bilateral level. South Asia's current cross-border energy trade is limited to Bhutan, India and Nepal. Hydro power trade between India and Bhutan is a unique example of smooth trans-border cooperation that started with the signing of the Jaldhaka Agreement in 1961. Hydropower is one of the main pillars of bilateral cooperation. Three hydroelectric projects are already exporting electricity to India. In 2015, during the visit of the Indian Prime Minister to Bhutan, both the countries have also agreed to further strengthen hydroelectric sharing and increase their projected generation of electricity from 5000 MW by 2020.^{xlix}

Similarly, there is a lot of scope for power trade between India and Nepal and India Bangladesh. The current electricity exchange between Nepal and India is limited to 50 MW, which is under process of being upgraded to 150 MW. Nepal and Bhutan have ample opportunity to export their surplus energy to India and other South Asian countries. However, technical and supply constraints on both sides of the border prevented the trade from reaching much higher level. In addition, the hydroelectricity generation and sharing in Nepal has not materialized seemingly due to suspicion and mistrust between two countries.¹

There are several economic and social benefits of energy trade. Through the energy trade these small countries can gain revenue and be significant sources of foreign exchange earnings for exporting countries. These economic gains can also lead to social development activities exporter countries. In spite of all these benefits, regional energy trade and cooperation affected by various things, such as volatile political situation in the region; lack of infrastructure, institutions and legal framework; and lack of political commitment and economic ties.^{li}

Challenges and Opportunities for Cross-Border Cooperation

As discussed above, tensions certainly exist about the management and development of shared rivers in South Asia. In the current situation there are several challenges on South Asian regional cooperation in general, and on trans-boundary water issues specifically. In South Asia trans-boundary water disputes are linked to geopolitics in the region. In most of the South Asian countries water cooperation is almost exclusively under the domain of national governments. One of the greatest challenges South Asia suffer from increasing politicisation when it comes to cross border water cooperation matters. The attitude is also negative towards this issues because of the political distrust between neighbouring countries. In addition, there are very limited opportunities for civil society, local communities, media and other stakeholders to participate in water-related bilateral discussions.

As mentioned in the earlier discussions in South Asia most of the bilateral negotiations are reductionist in nature and mainly centered around technical formulas to divide available water flows between both countries. The trans-boundary negotiations in the region disconnected from economic, social, environmental and cultural issues from the debate, thereby preventing the development of a basin-wide, integrated approach to planning, management and conservation of shared river systems.^{lii} Apart from these issues, diplomatic clout has been always a challenge for cross border water cooperation. Studies found that highly bureaucratic mind set, lack of expertise and information and weak negotiation skills are some of the challenges in the water related cross border cooperation (Price, 2014). As mentioned in the above section, the closed data environment related to water and climate information in the region is also a major obstacle for cooperation (Surie, 2015). However, these challenges can be converted into opportunities keeping in view the socio-economic growth of the region.

Cooperation is an important objective and a regional public good that will support growth and peace. Studies reported that people in the South Asian region believe that there is a need of more frequent dialogues between countries of the region to build trust (Price, 2014). A multilateral forum like SAARC gives members the invaluable opportunity to develop bilateral cooperation on the protection of water sources from pollution, degradation and creating water infrastructures. The opportunities can be created to conduct joint research, build a common shared vision and create structured, multi-track dialogues. These researches and data could help better management of the cross-border water resources.

For instance, it could help control flooding across countries sharing a basin though the sharing of hydrological data and effective warning system. This system would also simultaneously enhance the availability of water in upper riparian as well as lower riparian countries which could have multiple economic as well as socio-ecological benefits.^{liii} Regional cooperation in the region in this area could be used for irrigation and hydropower production. For instance, watershed management in Nepal

could generate hydro and irrigation benefits in Nepal and flood control in India. The same thing could be done in northeast India for the mutual benefit of the India and Bangladesh. In the present context, specifically looking at the current resource constraints and the impact of climate change there is a stronger need for closer integration in water management and development. This could create opportunities for improving the prospects for growth and prosperity across the South Asia region.

Similarly, cooperation in the energy has strong incentives. Building collaboration and mutual agreement on water resources will facilitate energy cooperation, but not necessarily lead to collaborative energy development. Pursuing regional energy cooperation in South Asia would require addressing several barriers. While some of these barriers emanate from regional political climate, others arise due to limited scope and extent of national electricity policies and governance. The major barriers to regional energy cooperation exist mostly at the domestic level. Addressing the following barriers is critical to pursue regional energy security in South Asia, building on the complementarities and cooperation.

- *Insufficient Installation of Generation Capacity:* The pace of growth in generation capacity across the subcontinent has been slow and failed to match the growing demand. As a result, there is a persistent demand-supply gap that resulted in rolling power outages and sluggish grid extension. Even those countries endowed with adequate resources (primary energy sources) have failed to add generation capacity to match their demand.
- *Poor Operational Efficiency:* While performance of generation plants has been low (poor plant load factor), transmission and distribution losses in the region is estimated to be as high as 25 per cent. Subsequently, more than half of the installed capacity is lost to operational inefficiencies.
- *Weak Financial Performance of Utilities:* Owing to the technical and non-technical losses and politically distorted tariffs, most of the electricity utilities in the region are running on a financial loss.
- *Hesitant Private Sector Participation:* Over the last two and half decades, there has been greater emphasis on private sector participation in the sector to maximise investment. However, owing to low financial incentives and political uncertainties, private sector participation has been limited across the region.
- *Limited Power Sector Reforms:* Domestic power sector reforms have an important bearing on the prospects for success in cooperation, cross-border and ultimately regionally. While all the countries in South Asia have restructured their power sector with the objective to improve efficiency and effectiveness in service delivery, reforms have been incomplete in most cases and stalled at different levels.
- *Policy, Institutional and Political Barriers:* Lack of confidence and trust across countries, trade-restrictive policies and challenges in establishing effective regional agencies are other barriers to regional energy cooperation.

What Needs to be Done?

Water and energy security are important issues for South Asian countries. Moreover, access to certain amount of modern fresh water and energy at individual level is crucial for human development and well-being. Realising the need and importance, Sustainable Development Goals recognises ‘access to clean water and sanitation’ and ‘access to affordable and clean energy’ as two of the 17 main goals.

National governments in South Asia recognise the need and urgency, as evident in domestic policy agendas. Subsequently, there has been greater emphasis on regional cooperation around water and energy resources. But such initiatives have been hesitant in nature, with limited result. In recent years, there have been some bilateral success on energy front, but water sharing still remains contentious. At the larger level, there is a major trust gap, not only among national governments, but also among stakeholders. For expedited results, countries must focus on bridging the trust gaps through inclusive dialogues.

At present, dialogues happen among national governments, while the affected parties have been deliberately excluded, which has created mistrust. This requires promotion of multi-track dialogues, involving all stakeholders in the process. Civil society organisations (CSOs), with their grassroots presence, have a greater role to play by creating a positive public discourse and evading the mistrust through wider information dissemination.

Because these dialogues have happened between governments, outcomes have been vulnerable to political change. With change in government, all efforts have lapsed. As new governments came into power, they tried to initiate the dialogue fresh. To avoid this multiple and fragmented initiatives, there is a need to institutionalise initiatives, possibly through a regional agency. Such an agency would help keep dialogues and initiatives focussed and maintain an institutional memory.

Finally, there is need to bring in harmony in policy and regulatory framework across countries, especially in case of energy. Partial domestic power sector reforms have stalled electricity policies and regulatory frameworks at different stages in South Asian countries. Working towards regional energy cooperation, therefore, would require some degree of harmonisation in policy and regulatory framework. Given the momentum with recent developments, it is critical to initiate a new wave of reforms to bring the policy and regulatory framework in harmony, so that the domestic electricity markets can interact. There is a need to promote national and subnational electricity reforms to achieve global standards. Unfortunately, all South Asian countries lack robust legal and regulatory framework for water resource management. Yet, such a framework is a pre-condition for regional cooperation. In addition, the framework must ensure a systematic approach to data sharing across the countries.

Endnotes

- ⁱ Cooley et al., 2009; TFDD, 2002
- ⁱⁱ Bandyopadhyay, 2007a; Salman and (Global Water Partnership, 2012; Bandyopadhyay, 2007b); Petheram, 2010; Shah and Giordan, 2013
- ⁱⁱⁱ Khalid et al., 2014; Bandyopadhyay, 2007b
- ^{iv} Bandyopadhyay, 2007b; Tripathi, 2011; Global Water Partnership, 2012
- ^v Bandyopadhyay, 2007b
- ^{vi} Supra Note 4
- ^{vii} Bandyopadhyay and Ghosh, 2009
- ^{viii} Gyawali, 2001
- ^{ix} Hill, 2013
- ^x UNESCO, 2014; Petheram, 2010; Hoff, 2011; Bizikova et al., 2013; Tripathi, 2011
- ^{xi} Hanasz, 2014; John, 2011
- ^{xii} John, 2011; Khalid et al., 2014; Wirsing, 2008; Hanasz, 2014
- ^{xiii} Wirsing, 2008; Biggs et al., 2013; ADB, 2001
- ^{xiv} Biggs et al., 2013; John, 2011; Tripathi, 2011; Lele et al., 2013
- ^{xv} John, 2011; Wirsing, 2008; Biggs et al., 2013; Petheram, 2010; Tripathi, 2011
- ^{xvi} Lele et al., 2013; Food and Agriculture Organization, 2014
- ^{xvii} Hoff, 2011; Food and Agriculture Organization, 2014) (Price, 2014; UNESCO, 2014; UNESCO, 2015; Surie and Prasai, 2015
- ^{xviii} UNESCO, 2014: :62; Surie and Prasai, 2015
- ^{xix} John, 2011; Wirsing, 2008; Surie, 2015; Surie and Prasai, 2015
- ^{xx} Biggs et al., 2013; Kugelman, 2011; Bandyopadhyay, 2007b; Bandyopadhyay and Ghosh, 2009; John, 2011; Price, 2014; Cook and Bakker, 2012
- ^{xxi} John, 2011; Price, 2014
- ^{xxii} Biggs et al., 2013; John, 2011, Lele et al., 2013
- ^{xxiii} Bandyopadhyay 2007, John 2011, Biggs, Duncan et al. 2013, Price 2014
- ^{xxiv} Cook and Bakker, 2012; UNESCO, 2015
- ^{xxv} Shah et al., 2011; Lele et al., 2013; Bandyopadhyay, 2007b; Palanisami et al., 2010; UNESCO, 2015; Hanasz, 2014
- ^{xxvi} UNESCO 2014) (Bandyopadhyay, 2007b
- ^{xxvii} Bizikova, Roy et al. 2013, Rasul 2014)(Palanisami et al., 2010
- ^{xxviii} Shah, Lele et al., 2011; Carter and Gulati, 2014; Rasul, 2014; Hanasz, 2014
- ^{xxix} John 2011, Price 2014, UNESCO 2014; UNESCO, 2015; Hanasz, 2014
- ^{xxx} UNESCO, 2015
- ^{xxxi} Kugelman, 2011; Shah and Giordan, 2013; Hanasz, 2014
- ^{xxxii} Crow and Singh, 2000; Baqai, 2005; Iqbal et al., 2009; Kugelman, 2011; Khalid et al., 2014; Price, 2014
- ^{xxxiii} Gyawali, 2001; Salman and Uprety, 1999; Hanasz, 2014; Wirsing, 2008; Surie and Prasai, 2015
- ^{xxxiv} *Ibid*
- ^{xxxv} Surie, 2015; Surie and Prasai, 2015; Shah and Giordan, 2013; Tripathi, 2011; Khalid et al., 2014; Wirsing, 2008; Kugelman, 2011
- ^{xxxvi} Surie, 2015; Surie and Prasai, 2015
- ^{xxxvii} Shah and Giordan, 2013; Crow and Singh, 2000
- ^{xxxviii} Crow and Singh, 2000
- ^{xxxix} Shah and Giordan, 2013; Khalid et al., 2014; Tripathi, 2011
- ^{xl} Shah and Giordan, 2013; Kugelman, 2011; Khalid et al., 2014; Wirsing, 2008
- ^{xli} By rejecting the traditional engineering system where the main use of rivers seen from supply augmentation perspective
- ^{xlii} Bandyopadhyay and Ghosh, 2009
- ^{xliiii} Sadoff and Grey, 2002; Bandyopadhyay and Ghosh, 2009
- ^{xliv} Srivastava and Misra, 2007; Kurian and Vinodan, 2013; Chaudhury, 2009
- ^{xlv} Chaudhury, 2009; Hoff, 2011
- ^{xlvi} Sankar et al., 2000
- ^{xlvii} Sankar et al., 2000; Mahanta, 2010; Hill, 2013
- ^{xlviii} Tripathi, 2010
- ^{xlix} Chaudhury, 2009
- ^l *Ibid*; Dhungel, 2008
- ^{li} Dhungel, 2008; Tripathi, 2010
- ^{lii} Surie and Prasai, 20015; Hanasz, 2014; Price, 2014; Shah and Giordan, 2013
- ^{liii} Bandyopadhyay, 2007b; Shah et al., 2011; Lele et al., 2013

References

- ADB. (2001) *Water for All: The Water Policy of the Asian Development Bank*. Manila, Philippines: Asian Development Bank.
- Bandyopadhyay J. (2007a) Water Systems Management in South Asia: Need for a Research Framework. *Economic & Political Weekly* XLII 863-873.
- Bandyopadhyay J. (2007b) Water Systems Management in South Asia: Need for a Research Framework. *Economic and Political Weekly* 42: 863+865-887.
- Bandyopadhyay J and Ghosh N. (2009) Holistic Engineering and Hydro-Diplomacy in the Ganges-Brahmaputra-Meghna Basin. *Economic & Political Weekly* XLIV: 50-60.
- Baqai H. (2005) Water-related Issues in South Asia: Conflicts in the Making. *Pakistan Horizon* 58: 77-88.
- Biggs EM, Duncan JMA, Atkinson PM, et al. (2013) Plenty of water, not enough strategy How inadequate accessibility, poor governance and a volatile government can tip the balance against ensuring water security: The case of Nepal. *Environmental Science & Policy* 33: 388-394.
- Bizikova L, Roy D, Swanson D, et al. (2013) *The Water–Energy–Food Security Nexus: Towards a practical planning and decision-support framework for landscape investment and risk management*. Winnipeg, Manitoba, Canada: The International Institute for Sustainable Development.
- Chaudhury ABR. (2009) The Energy Crisis and the South Asian Security: An Indian Perspective. *India Quarterly: A Journal of International Affairs* 65: 137-151.
- Cook C and Bakker K. (2012) Water security: Debating an emerging paradigm. *Global Environmental Change* 22: 94–102.
- Cooley H, Christian-Smith J, Gleick PH, et al. (2009) *Understanding and Reducing the Risks of Climate Change for Transboundary Waters*. California: Pacific Institute.
- Crow B and Singh N. (2000) Impediments and Innovation in International Rivers: The Waters of South Asia. *World Development* 28: 1907-1925.
- Dhungel KR. (2008) Regional Energy Trade in South Asia: Problems and Prospects. *South Asia Economic Journal* 9: 173-193.
- Food and Agriculture Organization. (2014) *The Water-Energy-Food Nexus: A new approach in support of food security and sustainable agriculture*. Rome: United Nations
- Global Water Partnership. (2012) *Increasing water security – a development imperative*. Perspective paper. Stockholm, Sweden: GWP.
- Gyawali D. (2001) Missing Leg: South Asia’s Hobbled Water Technology Choices. *Economic & Political Weekly* XXXVI 3743-3758.

-
- Hanasz P. (2014) Troubled Waters: India and the hydropolitics of South Asia. *The Fearless Nadia Occasional Papers on India-Australia Relations*. Melbourne: University of Melbourne, 1-20.
- Hill DP. (2013) Trans-Boundary Water Resources and Uevern Development: Crisis Within and Beyond Contemporary India. *Journal of Asian Studies* 36: 243-257.
- Hoff H. (2011) Understanding the Nexus. Background Paper for the Bonn2011Conference. *The Water, Energy and Food Security Nexus*. Stockholm: Stockholm Environment Institute.
- Iqbal MM, Goheer MA, Punyawardena BVR, et al. (2009) Assessment of Food and water security in South Asia under Changing Scenario using crop Simulation and Water Management Models and Identification of Appropriate Strategies to Meet Future Demands. Asia-Pacific Network for Global Change Research.
- John W. (2011) Water Security in South Asia: Issues and Policy Recommendations. In: Foundation OR (ed). New Delhi: ORF.
- Khalid I, Mukhtar A and Ahmed Z. (2014) Water Scarcity in South Asia: A Potential Conflict of Future Decades. *Journal of Political Studies* 21: 259-280.
- Kugelman M. (2011) Safeguarding South Asia's water security. *Seminar*.
- Kurian AL and Vinodan C. (2013) Energy Security: A Multivariate Analysis of Emerging Trends and Implications for South Asia. *India Quarterly: A Journal of International Affairs* 69: 383-400.
- Lele U, Klousia-Marquis M and Goswami S. (2013) Good Governance for food, water and energy security. *Aquatic Procedia* 1: 44-63.
- Mahanta C. (2010) India's North East and Hydropower Development: Future Security Challenges. *South Asian Survey* 17: 131-146.
- Palanisami K, Meinzen-Dick R and Giordano M. (2010) Climate Change and Water Supplies: Options for Sustaining Tank Irrigation Potential in India. *Economic & Political Weekly XLV*: 183-190.
- Petheram L. (2010) Dam it?: Hydropolitics in the changing political context of Nepal. *Department of Geography*. Dunedin, New Zealand: University of Otago, 1-236.
- Price G. (2014) Attitudes to Water in South Asia. London, UK: Chatham House Report.
- Sadoff CW and Grey D. (2002) Beyond the river: the benefits of cooperation on international rivers. *Water Policy* 4: 389-403.
- Salman SMA and Uprety K. (1999) Hydro-Politics in South Asia: A Comparative Analysis of the Mahakali and the Ganges Treaties. *Natural Resources Journal* 39: 295-343.
- Sankar TL, Raza HA, Barkat DA, et al. (2000) Regional Energy Security for South Asia. USAID.
- Shah T and Giordan M. (2013) Himalayan Water Security: A South Asian Perspective. *Asia policy* 16: 26-31.

-
- Shah T, Lele U and members GTC. (2011) Climate Change, Food and Water Security in South Asia: Critical Issues and Cooperative Strategies in an Age of Increased Risk and Uncertainty. *A Global Water Partnership (GWP) and International Water Management Institute (IWMI) Workshop, 23-25 February 2011, Colombo, Sri Lanka*. Stockholm, Sweden: Global Water Partnership.
- Srivastava L and Misra N. (2007) Promoting regional energy co-operation in South Asia, . *Energy Policy* 35: 3360–3368.
- Surie MD. (2015) South Asia’s Water Crisis: A Problem of Scarcity Amid Abundance. *Notes from the Field*. New Delhi: The Asia Foundation.
- Surie MD and Prasai S. (20015) Strengthening Transparency and Access to Information on Transboundary Rivers in South Asia. New Delhi: The Asia Foundation.
- TFDD. (2002) Product of the Transboundary Freshwater Dispute Database. In: College of Earth O, and Atmospheric Sciences, Oregon State University (ed). Oregon State University.
- Tripathi NK. (2010) Hydropower in Asia: Spinning A Dependence and Interdependence Binary. *South Asian Survey* 17: 219–235.
- Tripathi NK. (2011) Scarcity Dilemma as Security Dilemma: Geopolitics of Water Governance in South Asia. *Economic & Political Weekly* XLVI: 67-72.
- UNESCO. (2014) World Water Development Report: Water and Energy. Paris, France: UNESCO, United Nations.
- UNESCO. (2015) Water for a sustainable world. Paris, France: United Nations Educational, Scientific and Cultural Organization, 1-122.
- Wirsing RG. (2008) Rivers in Contention: Is There a Water War in South Asia’s Future? In: Mitra SK (ed) *Heidelberg Papers in South Asian and Comparative Politics*. Heidelberg: University of Heidelberg, 1-26.