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Water Security in South Asia:
Issues and Policy Recommendations

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This brief is largely based on several discussions organised at Observer Research Foundation over a period of time. These discussions were enriched by the presence of some of the well-known experts on water issues in the country, like former Union Minister for Water Resources, Dr. Suresh Prabhu, current High Commissioner of Bangladesh, Tariq Ahmad Karim, Mr. Sunjoy Joshi, Director, Observer Research Foundation, Ms. Clare Shakya, Senior Regional Climate Change and Water Adviser, DFID, India, Mr. Samir Saran, Vice President, ORF and Dr. Dinesh Kumar, Executive Director, Institute for Resource Analysis and Policy, Hyderabad.*

Water will be one of the critical drivers of peace and stability in South Asia in the second decade of the 21st century. If the first decade of the new millennium was shaped by terrorism, the next two decades (2010-2030) will witness issues around water dominating internal and external policies of countries, especially in South Asia where the fresh water crisis is brewing with great intensity.

It is estimated that by 2030, only 60 per cent of the world's population will have access to fresh water supplies[1]. This would mean that about 40 per cent of the world population or about 3 billion-people would be without a reliable source of water and most of them would live in impoverished, conflict-prone and water-stressed areas like South Asia.

Since over 70 per cent of the available fresh water supplies are utilised to produce foodgrains, the depleting water availability will accentuate the already worsening per capita availability of food in large parts of the world. The demand for food in 2030 will witness a quantum jump of 50 per cent

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while there is likely to be a 30 per cent rise in the demand for fresh water by the time the world population crosses 8.3 billion[2].

These developments would drive the present agrarian crisis in many countries around the world to a deeper morass, rendering millions of farm owners and workers jobless, pushing a large number of them towards urban centres. Countries in South Asia, by their sheer number of people and demand for food and water, figure high on the list of such critical regions. It is quite obvious that availability of clean, unpolluted water, its management and the willingness, or reluctance, to find a cooperative mechanism to face the crisis will, in more ways than one, influence geo-strategic policies in South Asia in the decades ahead.

Water is already an extremely contentious, and volatile, issue in South Asia. There are more people in the region than ever before and their dependence on water for various needs continues to multiply by leaps and bounds. The quantum of water available, for the present as well as future, has reduced dramatically, particularly in the last half-a-century. This is due to water-fertiliser intensive farming, overexploitation of groundwater for drinking, industrial and agricultural purposes, large scale contamination of water sources, total inertia in controlling and channelising waste water, indifferent approach to water conservation programmes and populist policies on water consumption.

Although fresh water scarcity is a common problem across the borders, the situation is particularly acute in Pakistan and India. Both the 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 uses. The fresh water crisis is reaching critical proportions in these two countries at an alarming speed. In Nepal and Bangladesh, two other countries in South Asia with water problems, the issues are different. Both have relatively abundant supplies of water but it is the lack of capacity to utilise the available water resources and prevent the cycles of frequent floods and shortages during lean seasons that render their water future 'critical'.

Despite the looming threat of water scarcity staring at many of the countries in South Asia, there has been a persistent reticence, often deliberate, in working together to reduce the impact of the impending crisis on the people of the region. Most of the blame should squarely lie on the political and bureaucratic leadership of these countries which has treated water strictly as a sovereign issue, ignoring the fact that many of the rivers and river systems that feed billions in the region transcend political boundaries. Water is treated as a political feature with the corresponding shorthand on rights, volumes and ownership describing the narrative. Petty squabbles, feudalistic approach and plain obduracy among the policymakers in the region have considerably accentuated the possibility of a 'water war' not only between two countries but within the countries themselves.

The latter is perhaps already a reality and may result in unrest and 'water riots' in India and Pakistan, particularly due to their ethno–political composition and rivalries. Due to the politicisation of 'water', each country in the region has pursued policies that are almost always at variance with policies in neighbouring countries sharing the same river systems for sustenance. Water governance is disjointed, weak and often at odds within and across the countries in the region.

There is, therefore, an urgent need to break this gridlock for ensuring sustainable water security for the people of this region. One of the creative ways could be to reassess the problems associated with water availability and use. This can be done by identifying and documenting issues related to water, common challenges for the affected

countries in the region and discuss and develop cooperative water management and governance frameworks that are both sensitive to the specific locality and also add to the regional effort of securing supply and availability of this resource. The following issues would be included in any such cooperative framework are as follows:

Declining Water Availability

The reasons could vary but almost all the countries, barring perhaps Bhutan[3], face the problem of water availability and more specifically the seasonality of water availability against the requirements. The problem of demand and supply of water is most acute in Pakistan and India. The per capita water availability in India has fallen from 1986 cubic meters (cu m) in 1998 to 1731 cu m in 2005, bringing the country close to being declared a water scarcity region. The situation is likely to worsen in the next few decades with the population of India set to reach 1.6 billion (2050). The water required to sustain such a huge population far exceeds the available water supplies. In 2006, for instance, about 829 billion cubic metres of water was used by domestic, industrial and agricultural sectors. In 2050, the demand is expected to reach 1.4 trillion cubic metres of water, pushing India deep into a water stress condition. It is estimated that by 2025, of the 4 billion people expected to live in water stress conditions, more than 30 per cent would be in India.

Pakistan is already a water stressed country. Per capita water availability in Pakistan fell from 5000 cubic metres per annum in 1951 to 1100 cubic metres per annum in 2006. With the population reaching close to 173 million in 2010, the per capita availability of fresh water is estimated to have fallen closer to 1000 cubic metres, the threshold figure for a country to be declared `water scarce'. This figure is like to dip still further down to almost 700 cubic metres per capita by 2025 when the population figures are likely to cross 221 million.

With 57 rivers of various dimensions, Bangladesh, on the other hand, has no shortage of water available for use. The per capita availability of water is said to be around 8444 cubic metres (2002). It is likely to be 7670 cubic metres in 2025, way above the point of water stress. The problem lies in the fact that over 90 per cent of the rivers flow from other countries in the neighbourhood, particularly India and China. This means that the country is heavily dependent on its upper riparian neighbours and has to navigate the politics of water. This dependence raises serious concern during the lean season when the water flow in these rivers remains low with a simultaneous increase of demand for water for farming in India. As the country is affected every year by flooding in the three major river systems—the Ganges, Brahmaputra and Meghna—it has not been feasible to construct water reservoirs to offset the water shortage during the lean seasons. With water availability becoming a serious concern in the upper riparian countries of India and China, and the population figure likely to cross 280 million in 2050, an impoverished Bangladesh might witness a drastic reduction in the per capita availability in the next few decades.

Water Mismanagement

The raging debate on 'water wars' in the region ingeniously avoids any deeper investigation of gross mismanagement of water resources, particularly in the agricultural sector and in the urban centres. The policy-makers in some of the water critical countries have paid scant attention to prevent 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 over 26 cubic metres of groundwater had disappeared from aquifers in areas of Haryana, Punjab, Rajasthan and New Delhi, between 2002 and 2008[4]. The situation is even more acute in urban centres. In Mumbai, for

instance, the water loss due to theft, aging pipelines and infrastructure is as high as 40 to 50 per cent[5].

Inadequate investment in augmenting and strengthening the existing water infrastructure over decades, partly due to financial limitations and policy infirmities, have underlined the water management woes in the region. However, under-investment in water resources is not specific to South Asia alone. It is a global problem. It is estimated that the amount of funding required for water infrastructure development in developing countries would have to be close to $18 billion in addition to the $54 billion already required annually to maintain existing infrastructure[6].

In India, the absence of scientific management and inadequate investment in water resources have been key factors behind the rapid decline in per capita water availability[7]. Take for instance the way India has been unable to optimally harness water generated by an annual rainfall of 1170mm[8]. The country receives more than 75 per cent of its total rainfall between June and September, except in the eastern coast, and half of it occurs within a span of fortnight[9]. On an average, the rainy days could range from 12 to 100 days. A large part of this water goes waste as run-offs and as a result only a small portion is available for use by different sectors[10]. The average rainfall run-off in the river basin is estimated to be 1548 billion cubic metres (BCM), of which about 872 BCM is available for recharging the ground water aquifers. The capacity to store such run-off water, however, is not more than 214 BCM[11]. Adequate planning and investment in creating infrastructure to harness water generated by annual rainfall alone could ease the immense pressure on river systems and underground water reservoirs.

In Pakistan, the disastrous consequences of poor management of water resources were felt during the devastating floods last year. Experts believe that the unprecedented flooding of Indus was caused, among other reasons, by over-exploitation of river channels, leaving a smaller area for the rainwater to be absorbed by the earth. Wetlands which once absorbed the excess water in the river have long been converted to farmland[12]. The total runoffs and losses through canals, distributaries and water courses are estimated to be 60% of rainfall which comes to 35 million acre feet (MAF). Another 45.6 MAF is lost due to seepages, and about 8.4 MAF additional water loss occurs due to improper irrigation applications. If these losses were to be reduced, it would go a long way in bridging the gap between demand and supply, estimated to be 22.9 MAF (2000)[13].

The primary reason for Pakistan's inability to tackle the problem of water losses is inadequate water storage capacity. Pakistan's per capita storage capacity is merely 150 cubic metres in comparison to 5000 cubic metres in the US and Australia and 2200 in China. The holding capacity of the existing reservoirs and dams in Pakistan is 30 days while it is between 120 to 220 days in India, 500 days in South Africa and 900 days in the US[14].

These and other associated issues of investment, policy formulation and implementation are accentuated by colossal amounts of theft or overdrawals that take place between various reservoirs and provinces. In 2010, the 'water theft' between Chashma (Punjab) and Kotri (Sindh) barrages reached such a level—50000 cusecs--that the Indus River System Authority had to intervene to balance the water discharged to Punjab[15].

A serious problem shared by almost all the countries in the region is the overexploitation of groundwater resources. Majority of the people in the region rely on groundwater for their daily sustenance and farming. Populist policies of giving free power to farmers to draw groundwater for farming, unregulated urbanisation, contamination of groundwater sources by fertilisers, pesticides, industrial and domestic effluents have dramatically impacted the availability of fresh water in the

region. A Planning Commission (of India) study[16] found that the overexploitation of ground water was highest in areas where cropping patterns and cropping intensity had undergone a dramatic change over the years. Despite the depleting levels of ground water, farmers in these areas opted for water-intensive crops for better remuneration for their crops. Absence of legal frameworks or regulatory regime governing ground water use, minimum support price policy and agricultural trade policy were some of the reasons for such a situation. The policy of giving free power or at subsidised rates in states like Punjab has made the problem even more acute.

Water Salinity and Pollution

Pollution and salinity of water sources are common in many parts of South Asia. In India, regular groundwater quality monitoring carried out by the Ministry of Water Resources has shown high incidence of arsenic, fluoride and iron in certain inland and coastal areas. The problem of salinity has been increasingly noticed in the coastal areas of Tamil Nadu, Gujarat, Orissa and Pondicherry. The inland presence of salinity has been detected consistently in Maharashtra, Punjab, Rajasthan, Haryana, Gujarat, Karnataka, Uttar Pradesh, Delhi, Orissa and Bihar. The high levels of salinity are caused by excessive exploitation of ground water and surface water. In addition, about 1.93 lakh sq.km area (mostly in Rajasthan and Haryana) is estimated to be affected by salinity, making the water non-potable. Presence of fluoride is a far more serious problem in India with 119 districts in 19 states reporting excess fluoride in ground water. Nearly 90% of the rural population of the country uses ground water for drinking and domestic purposes. Arsenic occurs in groundwater in West Bengal's eight districts, putting over 16 million people at risk. Groundwater in Bihar, Chattisgarh and Uttar Pradesh, among of the most populous states in India, too has shown excess presence of arsenic[17].

In Bangladesh the case of arsenic poisoning is far more serious than in India. According to various estimates, out of 125 million, 35-77 million people are at great risk from using contaminated ground water. A Bangladesh expert put the tragedy to be far more serious in magnitude than the Bhopal disaster (1984) and the Chernobyl accident of 1986[18]. Besides the serious effect the poisonous water has on the health of the people, its effect on farm production is equally grave. High levels of arsenic were detected in various sample surveys of rice grown in Bangladesh recently[19].

In Pakistan, it is estimated that 36 per cent of the population of Sindh and Punjab was exposed to high (five times the safe limit) arsenic levels in water. Surveys have also revealed that drinking water in most urban areas of Pakistan is laced with biological and chemical pollutants mainly because 99 per cent of industrial effluent and 92 per cent of urban wastewater are discharged into rivers without treatment. A national water quality study carried out by the Pakistan Council for Research in Water Resources (PCRWR) in 2001, covering 21 cities, revealed bacteriological contamination and presence of arsenic above the WHO safe limit in water. The presence of lead, chromium and cyanide has been detected from ground as well as surface water sources in many parts of Pakistan. A survey carried out between 1988 and 2000 of groundwater in different locations showed the presence of pesticides beyond the safety limits. In Punjab, drinking water supplied to 11 cities with over a population of 2 million was found to be laced with excess arsenic and fluoride concentrations[20].

In Nepal, water contamination may not be as alarming as in Pakistan and India or Bangladesh but is equally affecting the lives and health of the people. The contamination of water channels and sources is caused by untreated and unregulated industrial and domestic effluents. Arsenic poisoning of water resources is also becoming a serious issue in Nepal, particularly in the Terai

areas which has the highest population density. A survey carried out by the National Sanitation Steering Committee (NSSC) in 25 districts of Nepal recently showed rising levels of arsenic in ground water[21].

Impact of climate change

The impact of climate change on ground water as well as surface water is a subject of extensive studies across the world. Though the early reports are highly contentious, it is becoming quite clear that visible changes in the patterns of seasons, rain and snowfall have been witnessed in several parts of the world, including South Asia. The cumulative impact of these changes on agriculture, industry and lives of people are yet to be fully comprehended.

Relying on several studies, "India's Initial National Communication to United Nations Framework Convention on Climate Change"[22] pointed out that "the hydrological cycle, a fundamental component of climate, is likely to be altered due to climate change and that preliminary assessments have revealed that the severity of droughts and intensity of floods in various parts of India 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 and quality of ground water along the coastal plains".

Countries like Pakistan and Bangladesh, many experts believe, could face a climate catastrophe in the near future. It is believed that Pakistan could suffer serious food crisis caused by flooding of its fertile areas in Punjab and other places as it happened in 2010. Dramatic changes in monsoon patterns are likely to render large areas less productive because of scanty rainfall in the years to come. Scientists have already noted a 10 to 15 per cent decrease in precipitation in the coastal belt and hyper-arid plains over the last 40 years. There has been a simultaneous increase in summer and winter rains in northern Pakistan. Droughts in 1999 and 2000 caused sharp dips in water tables, drying up wetlands in some parts of Pakistan[23].

The impact of climate change in Bangladesh could be more severe. Large coastal areas are under the threat of inundation by rising sea levels, causing large scale deaths, displacement and migrations. Meteorological changes like the erratic duration and quantum of annual rainfall, frequent droughts and increase in cyclones/typhoons/hurricanes could be felt more immediately[24].

Prospects

These are but a few of the problems related to water availability and use which the countries in South Asia are confronted with. Addressing them adequately is undoubtedly a challenging task for policy-makers. Some of the issues could be tackled either unilaterally or bilaterally but a sustainable and effective mitigation calls for a more vigorous regional approach. Sharing of knowledge, best practices and resources to tackle some of the most pressing issues of livelihood and survival could perhaps lead to a more pragmatic understanding of the real threat looming on the horizon. Unfortunately, there are only few positive signals of such a responsive regional framework in the making.

This is because water is not a high priority for the policy-makers as well as people in the region. Political parties are not voted in or out on issues of water contamination or availability. Water takes a low precedence in public debates except to score a rhetorical point or two against adversaries. Issues like onion prices and power rates bring governments to knees yet widespread contamination of fresh water sources in Punjab or Kerala with greater impact on life still eludes public discourse. A vigorous and sustained effort must be made by the governments as well as non-government organisations like think-tanks and media to bring the water crisis facing South Asia to the forefront of policy priorities for governments.

The South Asian region has demonstrated some successes in water cooperation. The Indus Water

Treaty between the bitter neighbours in South Asia has stood the test of time; arrangements between Nepal and India, Nepal and Bangladesh have shown sporadic successes in managing the regional resources. This must now be taken further. Some of the steps that are small, easy to take, yet significant in their impact would include:

1. **Regional Working Group of Ministers on Water:** A regional working group of ministers must be set up to give impetus to the process of dialogue and decision-making in resolving issues of water use and sharing. The group, assisted by senior government officials and independent experts, must meet once a year to iron out the differences in perception and approach to address the pressing challenge of fair and just distribution of scarce water resources among the people of the region, and its optimum utility.

2. **Regional Database of Water Flow and Availability:** A regional database should be created on water flows and availability in the river basins of the region. This will considerably ease the overall anxiety over water data and bring about a much-needed transparency in dealing with water issues in the region. For reasons best known to them, every government in the region protects water flow data from its own citizens citing national security 'concerns'. A transparent and easily accessible data base on water availability, flow, quality and use shared by all the people of the region will go a long way in giving a sense of urgency to the water debate as a whole.

3. **Joint Monitoring Mechanism on impact of climate change on water:** The impact of climate change on the future availability of water is no longer a wild card scenario. It is today as real as the pollution of water resources. The senior leadership of the countries in the region must not only talk to each other on the possible fallouts of climate change on water but also share how they can pool resources and talents to address them for the welfare of the people. A Joint Monitoring Mechanism involving both the government and non-government sectors can provide the necessary impetus to help educate the public as well as encourage policy makers to factor in the issue of climate change as part of the broader discourse on resource availability and dispute resolution.

4. **Joint Watershed Management:** The countries in the region must actively pursue the possibility of setting up a framework for Joint Watershed Management. Such a mechanism could be facilitated by first setting up a regional centre for water management with representatives from each country. The centre could facilitate studies and dialogue on the joint mechanism and help draft the agenda and other necessary modalities.

5. **Regional Group on Water Pollution:** Perhaps the most critical aspect of water management in South Asia is the alarming rate of pollution affecting the scarce water resources. This is a common problem for all the countries in the region. There is, therefore, an imperative need to share information and pool resources and expertise to tackle this multi-faced problem urgently. Large areas of agricultural tracts, urban centres and rural areas are becoming deeply affected by different kinds of pollution. It may be difficult for individual countries to address this problem on their own, largely due to the absence of adequate resources and expertise. A joint mechanism to monitor and tackle water pollution can help restore at least part of the poisoned water resources for general use.

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Ends Note:

1. The Business Opportunity in Water Conservation, *McKinsey Quarterly 2010 Number 1.* Accessed at http://aquadoc.typepad.com/files/mckinsey-the-business-of-water-dec-09.pdf
2. Population growth: global water crisis 'to strike by 2030', *IRC International Water and Sanitation Centre,* April 2009. Accessed at http://www.irc.nl/page/47888.
3. Sri Lanka, although part of South Asia, does not share water resources with any of the other countries in the region and hence is being kept out of the purview of this paper.
4. Ground water loss in N.India due to human activity: *NASA, Daily News and Analysis, August 13, 2009. Accessed at http://www.dnaindia.com/world/report_ground-water-loss-in-n-india-due-to-human-activity-nasa_1282237*
5. Water loss in Mumbai at 50% is highest in country: Report, *Daily News and Analysis*, January 5, 2011. Accessed at http://www.dnaindia.com/mumbai/report_water-loss-in-mumbai-at-50pct-is-highest-in-country-report_1490423.
6. More investment in water can help global economy, say experts, *NDTV.com*, March 20, 2009.Accessed at http://www.ndtv.com/news/world/more_investment_in_water_can_help_global_economy_say_experts.php
7. Mismanagement of water resources, *Deccan Herald*, January 16, 2011.
8. *Background Note for Consultation meeting with policy makers on review of National Water Policy*, Ministry of Water Resources, India, July 2010.
9. Water resources development in India: Critical issues and strategic options, *Asian Development Bank*, February 2009.
10. Master Plan for artificial recharge to ground water in India, *Central Ground Water Board*, India, 2002.
11. *Report of the Ground Water Management and Ownership*, Planning Commission of India, September 2007.
12. River mismanagement behind massive Pakistan flooding, www.rainharvest.co.za, August 2010. Accessed at http://www.rainharvest.co.za/2010/08/24/river-mismanagement-behind-massive-pakistan-flooding/
13. Dr S.M. Alam, M. A. Khan and Dr R Ansari, How to manage water scientifically?, Nuclear Institute of Agriculture, Tandojam, Pakistan, Jul 03 - 09, 2000.
14. Better Management of Indus Basin Waters-Strategic Issues and Challenges, The World Bank, January 2006.
15. Irsa acts to defuse water dispute, *Dawn*, May 26, 2010.
16. *Report of the Ground Water Management and Ownership*, Planning Commission of India, September 2007
17. *Report on Ground Water Quality in Shallow Aquifers of India*, Central Ground Water Board, Ministry of Water Resources, India, 2010.
18. Allan H. Smith, Elena O. Lingas and Mahfuzar Rahman, Contamination of drinking-water by arsenic in Bangladesh: a public health emergency, *Bulletin of the World Health Organization*, 2000, 78 (9)
19. J.M. Duxbury, A. B. Mayer, J.G. Lauren and N. Hassan, Arsenic Contamination of Groundwater: Cause, Effect and Remedy, *Paper presented at Fourth International Conference*, Dhaka, 2002.
20. Pakistan's Waters at Risk-A Special Report, *World Wide Fund for Wildlife*, August 2007. Accessed at http://www.wwfpak.org/pdf/water-report.pdf.
21. Thakur, J.K.; Thakur, R.K.; Ramanathan, A.; Kumar, M.; Singh, S.K. Arsenic Contamination of Groundwater in Nepal—An Overview. *Water 2011*, 3, 1-20
22. Accessed at http://www.indiaenvironmentportal.org.in/files/Climate%20change_1.pdf.
23. Combating climate change priority: PM, *Daily Times*, January 14, 2009. Accessed at http://www.dailytimes.com.pk/default.asp?page=2009%5C01%5C14%5Cstory_14-1-2009_pg11_2
24. Ainun Nishat, Climate Change and Water Management in Bangladesh, *Paper presented at the International Conference on Global Climate Change and its Effects*, Dhaka, August 25, 2008.

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