WATER and VIOLENCE

Crisis of Survival in the Middle East

Strategic Foresight Group

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With support from

Swedish International Development Cooperation Agency (Sida)

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Preface

Since 2009, Strategic Foresight Group has been committed to finding collaborative solutions to trans-boundary water problems in the Middle East. With our growing engagement in the region, we are being increasingly made aware of the need to address the real victims of scarcity and conflict over water. These are vulnerable and marginalised communities who do not have carrying capacity to manage water related disasters.

This paper examines the problems of populations made vulnerable by the abuse of water as a weapon or as a target in violent conflicts. In the past, some of the state agencies and combatant forces in the region have destroyed water infrastructure. Since 2014, ISIS, a new terrorist group active in Iraq and Syria has shown propensity to use water resources and infrastructure to achieve its illegitimate objectives. In the process thousands of innocent people have been pushed into misery.

This month, we are also bringing out another paper - The Hydro-insecure - which examines economic, social and gender related factors leading to water vulnerability. As this paper concentrates on military and militant tactics, together the two papers map a wide range of factors underpinning the crisis of survival in the Middle East.

We are grateful to HRH Prince Hassan bin Talal of Jordan for encouraging us to address the plight of vulnerable populations in the Middle East. Besides, many senior government officials, Members of Parliament, and media leaders from the region urged us to use our neutrality to undertake a dispassionate analysis of difficult social, economic, political and security environment from the perspective of the hydro insecure. We are humbled by the trust reposed in us by decision makers and opinion makers from all parts of the Middle East.

We must also express our gratitude to Swedish International Development Cooperation Agency (Sida) for supporting this endeavour. Sida has been a long and constructive partner of the Strategic Foresight Group ever since we decided to respond to requests from the Middle East to facilitate search for solutions almost half a decade ago.

This paper emphasises that the abuse of water as a weapon or a target in violent conflicts is not an issue limited to the Middle East. The Euphrates and Tigris rivers are cradles of civilization. Any effort to take illegitimate control by force of these water courses which have seen the evolution of human civilization for millennia should be treated as a crime against humanity. Undoubtedly the primary responsibility to respond to the challenges pressed by non-state violent groups such as ISIS rests with the countries in the region. However, the international community cannot ignore a developing tragedy. The paper explores possible options for the United Nations and other international actors.

Considering the long term and wide implications of the issues raised in the paper, we fervently hope that leaders and experts in the region as well as outside will discuss our analysis and recommendations.

Sundeep Waslekar
President
Strategic Foresight Group

Mumbai, December 2014

Contents

Notable events in Middle Eastern conflicts involving water

Sr. No.	Period	Country	Event
1	November 2014	Syria	IS attacks Homs (Qattinah lake, Orontes)
2	November 2014	Syria	Jabhat al Nusra takes Idlib (Orontes,
3	October 2014	Baghdad, Iraq	Samarra barrage flooding plan of IS
4	Second half of 2014	Turkey	PKK attacks hydroelectric plants and dams in
5	September 2014	Syria, Iraq	Chlorine from water treatment plants used
6	August 2014	Rakka, Syria	Airstrikes by govt hit city water plant
7	August 2014	Nineveh, Iraq	IS gained and lost control on Mosul dam
8	August 2014	Qaraqosh, Iraq	Water cut off by IS to minority town
9	July 2014	Syria	35% of water treatment plants damaged
10	July 2014	Deir ez Zor, Syria	Water pumping reduced by 90% due to damage
11	July 2014	Baghdad, Iraq	IS gained control on Samarra Barrage
12	June 2014	Aleppo, Syria	explosion damaged water pipes, sewage pipes,
13	June 2014	Nineveh, Iraq	IS captured and cut off water to Mosul city
14	Mid 2014	Syria	Pipeline to Homs and Hama from Orontes
15	May 2014	Aleppo, Syria	Water pumping station stopped working,
16	May 2014	Rakka, Syria	Lake Assad dried up
17	April 2014	Tikrit, Iraq	Oil pipeline burst, oil ablaze on Tigris
18	April 2014	Al Anbar, Iraq	IS shut Fallujah gates
19	First half of 2014	Iraq	IS floods 22 villages
20	February 2014	Baghdad, Iraq	Kurds cut off Tigris water to Baghdad
21	January 2014	Al Anbar, Iraq	IS gained control on Fallujah
22	2013	Syria	Water poisoning in Aleppo, Deir Ez Zor, Rakka, Idlib
24	February 2013	Rakka, Syria	IS captured Tabqa dam
25	November 2012	Syria	IS captured Tishrin Dam
26	2010-2012	Turkey	PKK carries out three attacks on Silvan Dam
27	July 2006	Lebanon	Jiyyeh power plant bombed by Israel
28	July 2006	South Lebanon	Israeli bombing of roads, canals, water plants,
29	April 2003	Zarqa, Jordan	Iraqi agents caught scheming poisoning water
30	2003	Baghdad, Iraq	40% of water network destroyed due to bombing,
31	Late 1990s	Iraq	US imposed sanctions and withheld contracts for
32	1992	Istanbul, Turkey	PKK poisons water tank with potassium cyanide
33	1991	Kuwait	Iraq army burnt 730 oil wells, destroyed marine
34	1990s	South Iraq	Draining of marshes
35	1990s	South Iraq	Alleged poisoning of wells
36	Mid/late 1980s	Turkey	PKK attacks dam infrastructure, especially
37	July 1981	Kurdistan, Iraq	Blackouts due to Irani bombing of hydropower
38	1975-1990	Lebanon	Toxic waste buried underground by militants
39	1960s	Syria	Israeli bombing of diversion infrastructure on

	Target	Weapon	Strategy
		★	
next to Lattakia, sea)			★
thwarted by Iraqi army	★		
eastern and south eastern Turkey	★		
as weapon		★	
	★		
			★
		★	
	★		
	★		
			★
electric cables for water station, 2 million affected	★	★	
		★	
attacked and damaged	★		
3 million people affected	★	★	
	★	★	
	★		
		★	
		★	
		★	
			★
	★	★	
			★
being built in eastern and south eastern Turkey	★		★
	★		
power stations etc	★		
of US army		★	
half city cut off from supply	★	★	
water network	★	★	
at Turkish air force base		★	
life and water	★		
	★	★	★
	★	★	
Ataturk Dam	★		
station	★	★	
	★		
Jordan river	★		

CHAPTER I

Introduction

For more than five thousand years, water all over the world has been seen as a source of cooperation and peace. There have been occasional conflicts over entitlement to water resources in the early civilizational period as well as in modern times. Nevertheless, such conflicts have been secondary to the understanding of the role of water in societies around the world. Water has primarily played the role of nourishing life. It has enabled the growth of agriculture, human settlements, rise of states and the expansion of population. This is particularly true of the Middle East, the birth place of modern civilization, and a theatre of conflicts in the first two decades of the twenty first century.

In the last few decades, an unfortunate trend can be observed in the Middle East and indeed in some other parts of the world. States, societies and illegitimate groups have demonstrated a growing tendency to use water as a force of destruction rather than as a source of nourishing human society and environment.

While some treat water infrastructure as a target in violent conflict, others use water as an instrument of violence. Sometimes, it is difficult to decipher whether water is a target or an instrument of violence, as the two aspects of destructive perception of water is interchangeable.

When water is treated as a target of violent conflicts, there is a deliberate effort:

* To damage water and sanitation infrastructure such as natural or manmade water bodies, dams, water treatment plants, supply networks, sewage networks and pipelines.

* To damage supplementary infrastructure such as hydropower plants, electricity cables connected to any water-related activity, roads, bridges, infrastructure in proximity of natural or manmade water bodies.
* To contaminate water using chemicals, bacteria, or any other harmful substance.
* To drain natural and manmade water bodies by cutting off of water supply to those bodies, or filling them up with soil, rocks, cement or other material.

When water is used as an instrument of violence, there is a deliberate effort:

* To harm civilians by flooding towns, cutting off water supply to communities, polluting or drying up water bodies, and terminating hydropower supply.
* To ruin the economy by disrupting supplies to irrigation and industrial areas, flooding farms and industrial areas, over exploitation and destruction of water infrastructure.
* To harm political opponents by flooding or drying up key opponent settlements, poisoning their water supplies, destroying their water infrastructure, imposing sanctions.

In either case:

* Destroying water also impacts the environment and those dependent on it, while using it as a weapon against a specific target adversely impacts the water resource/ infrastructure in the long run.
* Using water in a violent conflict has a multiplier impact across regions, sectors and populations, causing large scale collateral damage.

The increasing use of water as a target or instrument of violence is attributed to a number of factors.

First, depleting water resources and growing scarcity makes water a highly vulnerable target and an equally effective weapon in Middle Eastern conflicts. Several rivers have lost almost half of their annual flow in the last fifty years. During the same period, several lakes have witnessed shrinking of their surface area. As a scarce yet essential resource, control on its quality, quantity, distribution and use can help control the regional economy, food security and population.

Secondly, water infrastructures in the Middle East have poor quality maintenance and other qualitative weaknesses which render them vulnerable to attacks. Poor quality infrastructure is easy to destroy. A small attack can have wide impact. Even non-state violent groups with limited access to weapons and instruments can create havoc by damaging infrastructure if it cannot withstand pressure of due to structural weaknesses.

Thirdly, water infrastructure is normally a part of the complicated linkages in the economy. Water is a part of a kaleidoscope covering electricity, tourism, agriculture, services, transportation, and other aspects of a national or district economy. The linkages make it possible to affect water resources and infrastructure by acting upon these and other related industries. Instead of directly harming and/or using water infrastructure or water bodies, destruction and/or use of any supplementary infrastructure can produce significantly adverse impacts as well.

Fourth, some kind of damage such as contamination of water resources is very easy. However, it is very challenging to clean a lake or pipe lines that have been contaminated. Non-state terror groups which have limited means at their disposal can use water contamination as a low cost weapon against their enemies. They can easily make life impossible for local and downstream populations who are directly dependent on a contaminated water body for survival.

Fifth, shortage of engineers and trained technicians can compound damage when

water is used as a target or instrument in violence. Non-state groups can gain control on water resources by military might. However, they largely lack adequate technical resources and expertise to manage and operate these water structures. In the case of governments, improper recruitment practices and inadequate training can lead to lack of efficient and knowledgeable personnel. This can increase the risk levels of the water resources, and make them weaker or more harmful.

Sixth, many of the rivers and lakes in the Middle East are shared by two or more countries. This makes it easy to internationalise the role of water as a target or instrument of violence. Control on dams and other water infrastructure on trans-boundary water bodies results in the control on population, agriculture and economy not only at the local level but also in downstream regions.

Destruction or depletion of transboundary water bodies can also create transboundary pockets of 'water refugees' i.e. populations displaced due to water shortages. Neighbouring countries are affected by the influx of these refugees. Their water systems particularly are strained due to a significant rise in population in a comparatively short period of time. The result is rise in the scarcity of water and vulnerability of water resources in violent conflicts.

The situation is complicated further if there is little to no joint monitoring of the water bodies in the region. Lack of cooperation and transparency in qualitative and quantitative aspects of shared water bodies provides for speculation on deprivation of water.

Seventh, targeting and using water resources and infrastructure as a weapon to cripple the civilian population, economy or opponents can provide short term victories in a conflict. However, it is highly unlikely that a strategy that disrupts societies, economies and eco systems at many levels would remain sustainable and help the victor have effective control on the population in the long run. In fact, it is quite likely that in the long run, the destruction of a vital resource such as water will affect all the warring factions in the larger community irrespective of their military strength and financial capacity. The centrality of water in human life will ensure that destruction of water resources and infrastructure by one party to defeat another will leave no winners in the end. However, the parties to violent conflicts often do not have foresight to anticipate long term adverse consequences of short term gains on the battle ground. And therefore at their own peril, they are motivated to use water as a tool in violent situation.

Consequences

When states or non-state actors target water infrastructure or use water as an instrument of violence, they inflict consequences on the society which are far more extensive than any implications for the given water body. As pointed out earlier, water is central to environment, economy and society. As a result, any destruction involving water has adverse consequences for an entire region and sometimes for large parts of the country.

These consequences can be assessed at three levels.

First, there are consequences for the water body which is misused in the conflict. These include:

* Loss in the seasonal flow of the water course
* Deterioration of water quality
* Drying up of an entire water body in certain situations
* Desertification
* Land degradation.

While the loss of water flow can be short term or long term, some of the other

consequences can have long term impact. If quality of water deteriorates because of mismanagement of reservoirs, pipes, dams and other infrastructure, it takes a long time to restore the original standards. If water is contaminated deliberately, it can have implications not only for the water body, but also for the bio-diversity in and around it.

Frequent disruptions in the flow of a water course or tactics to dry up a reservoir over a long period of time can affect the topography of the region. This can in turn deteriorate the eco-system and living conditions of inhabitants in the area. Such environmental deterioration can then lead to implications for the local economy.

Second, disruption, destruction and damaging of water resources and infrastructure can have direct consequences for the local or regional economy. These include:

* Agricultural losses
* Food insecurity
* Industrial losses
* Loss of traditional livelihood
* Demographic shifts.

Disruption in water flow or deterioration of the quality of water either due to mismanagement or contamination directly impacts agriculture in the area. This leads to losses in terms of food security or raw materials supplied to industry depending on the nature of farming. In some cases, there can be direct impact on industry. If non-state actors disrupt water supplies to industrial areas, it can create problems for operating cooling towers. If non-state actors take control of dams, they can obstruct the generation of hydel electricity. Industry can also be affected by demographic shifts, resulting in reduction in purchasing power. Once a vicious cycle of economic downturn sets in, it is very difficult to reverse it.

Third, manipulation, contamination or even neglect of water bodies can create health hazards for people as well as animals and plants in the area. Some of these health issues can be of low intensity, while some can be of a very serious nature. While some health problems can be seen immediately, others could be of chronic nature and felt only in the long run. Poor health conditions affect labour productivity and create obstacles for economic growth. They also have implications for societal peace.

Four, water scarcity in itself or indirectly through its implications for economy or health, can give rise to social tensions. Normally, water scarcity is not absolute. Access to good quality and adequate water in reality depends on economic and political power. This can give rise to conflicts. Therefore non-state actors may deliberately use water as an instrument of violence to create discrimination in the allocation of water resources favouring the religious, ethnic or geographical groups that support them and depriving others. Once they create a cycle of conflict, the conflict itself may perpetuate for a number of other reasons and the society may get destabilised. Thus, control of water resource and their misuse can form a small but critical factor in conflict cycles. If water resources are shared by two neighbouring countries, such a conflict may not be confined within the boundaries of a nation and become international.

CHAPTER 2

Recent History

Water Infrastructure

The destruction of water infrastructure has featured frequently in the conflicts in the Middle East. The wide occurrence of such destruction is explained by the wider scope of its consequences. In recent years, attacks on water infrastructure have increased, both in intensity and frequency.

In the 1960s, Israel attacked the diversion infrastructure that was being built by Syria over the Jordan River to prevent its completion and operation. The dispute between Israel and Syria over Israel's National Water Carrier and Syria's attempts to divert the Jordan River was one of the factors which increased regional tensions which then escalated into the 1967 war.

A long standing example of the use of water infrastructure as a target in the Middle East is that of Syria, Turkey and Iraq. In the 1970s, Iraq warned Syria of bombing the Tabqa Dam and even gathered troops at the Iraqi-Syrian border, claiming that the flow of the Euphrates to Iraq had been reduced because of the dam. In the 1980s and 1990s, both Syria and Iraq were wary of Turkey's hydro-infrastructural expansion in the upstream region of the ET basin. However, the three countries have stopped short of actually destroying each other's water infrastructure.

Overall, the destruction of water infrastructure remains a widespread characteristic of conflicts in the Middle East.

In July 1981, Iraq experienced blackouts in its Kurdistan region when Iran targeted and bombed a hydroelectric station in the Kurdish region, destroying half of the turbines and 70% of all transformers. During the US-led invasion

of 2003, the water infrastructure of Iraq was destroyed extensively. About 40% of Baghdad's water network was destroyed due to bombings, due to which half of the city lost water supply. In the aftermath of the war, water lines, wastewater treatment plants and pumping stations were damaged and looted, which further contributed to the deterioration of the water system in the country. In 2011, an explosion occurred at a water treatment plant in Baghdad which formed a chlorine gas cloud over the city and harmed hundreds of residents.

Water infrastructure in the southern region of Lebanon underwent extensive damage due to Israeli bombing in 2006. The bombing was preceded by a Hezbollah rocket which directly hit water pipes of a hospital in Safed, Israel. Israel retaliated by bombing wells, storage tanks, water pumping stations, water and sewage pipelines, and water treatment plants. About 1.7 million people in south Lebanon suffered temporary or full stoppage of water supply as most of southern Lebanon got totally cut off from the main water supply grid. Many water resources like canals and reservoirs were littered with unexploded ordnances (UXOs). They not only posed threat to the water body, but also gave rise to the risk of them sinking into surrounding land and turning into land mines. The irrigation infrastructure of southern Lebanon too was seriously damaged and filled with UXOs. The estimated cost of damage to water facilities alone was more than USD 70 million.

Destruction of irrigation infrastructure, Litani canal and electrical power plants in South Lebanon has had far reaching effects on agriculture and allied occupations, beyond the years of conflict. Moreover, the region experiences continual droughts and is arid by nature; the groundwater reserves and rainfall in the region are not adequate for agriculture to depend completely on them.

Since 2011, civil war in Syria has caused indescribable harm to its water infrastructure. The worst affected city in Syria has been Aleppo. It has been the stage for all warring factions, and seen water being used and abused by all at multiple levels. In May 2014, the local water pumping station had stopped working and water supply was cut off to half of the city affecting 1.5 million residents. Amid the resultant chaos in the city, the regime and the rebels blamed each other for the disaster. A month later, an explosion in the city damaged water pipes, cutting off water supply to half the local population. The explosion also damaged sewage pipes. Overall, 2 million people were affected.

The overall damage to water infrastructure across Syria has been extensive. In July 2014, the government of Syria had estimated that 35% of all water treatment plants in the country had been damaged due to war. In Deir ez Zor, large parts of which are currently under the siege of ISIS, water pumping dropped by 90% due to war and resultant serious damage to water pumps.

Both rebels as well as government forces are responsible for the destruction of water infrastructure during the Syrian civil war. In August 2014, when government forces conducted air strikes on ISIS positions in the eastern Syrian city of Rakka, one of the air strikes ended up hitting the city water plant and cut off water supplies to the locals. Whether the government forces intended to hit the water plant is not clear, but the damage was done.

At the same time in western Syria, water treatment plants on the Orontes River were attacked and damaged by unknown forces. Water pipelines from Orontes to Hama and Homs, which are largely regime-controlled, were damaged severely, forcing both cities to go without water for weeks.

Militant groups in Syria have not spared even the water supplies reserved

for refugees and IDPs. In September 2014, after a drought and a typhoid outbreak in the summer, conflict between government forces and militant groups destroyed the pipelines supplying water to Yarmouk refugee camp in south-western Syria. Since then, the 18,000 residents have been forced to deal with additional health and sanitation challenges.

With the war showing no signs of abating as of November 2014, the conditions of water infrastructure in Syria seem to have worsened. The destruction of water infrastructure has also led to contamination of soil, water and air and spread of diseases among the local population.

In the north, Turkey too has been facing attacks on its water infrastructure. The Kurdistan Workers' Party (PKK) has been attacking water infrastructure in south-eastern and eastern Anatolian regions since the 1980s. The construction of the Ataturk Dam since 1984 was frequently disrupted by violent attacks by the PKK; as many as 1100 vehicles and parts of working machinery were destroyed, driving up the costs of the project considerably. The then President Turgut Ozal viewed hydraulic energy as the means to end poverty and usher prosperity in the region and to integrate it with the rest of the country. However, the PKK continued to protest violently, through the 1980s and the 1990s.

Post 2010, the PKK has resorted to violent activities such as burning trucks and attempting to bomb dam infrastructure and has raided buses and houses of dam workers. From 2010 to 2012, it orchestrated three attacks on the Silvan Dam, with a fourth one prevented by Turkish Security Forces. These attacks on activities which were expected to bring employment and development to the region not only slowed the progress but also caused losses worth millions of Turkish lira.

Beginning from mid-2014, the PKK has targeted and attacked hydroelectric plants and dams in the region. The attacks have severely impacted private investments and growth, forcing the government to deploy security to protect private factories and other economic activities.

The impact of harming water infrastructure is significant in scope and intensity. Destroying water pipelines causes water wastage and heightens the water scarcity in the region. Water-intensive industries are also immediately impacted due to loss of water supply, leading to economic and industrial losses. Targeting water infrastructure in enemy positions can effectively weaken the opposition forces. However, indiscriminate bombing of water infrastructure can have a direct, adverse impact on civilians. They have to face water cuts and resort to buying water, often at exorbitant prices.

One of the features of damaging water infrastructure during conflict and which occurs repeatedly in the examples mentioned above is the difficulty in determining the extent of deliberate purpose in the act. A report published by Amnesty International on the Israeli-Lebanese conflict in 2006 states that the bombings of Lebanese water infrastructure by Israelis "was deliberate and an integral part of a military strategy" while Israel claimed them to be "legitimate and legal" and "collateral damage".

The malfunctioning of the water station in Aleppo, Syria in May 2014 is speculated to be the act of either the government or the rebels. Also, it is not known whether the explosion in the same city in June 2014 which destroyed water pipes was a deliberate attack specifically on water infrastructure or unintended damage. Coupled with multiple consequences, the ambiguity of the act heightens the vulnerability of water infrastructure as a target. It serves the purpose of gaining an edge over the enemy and their (the enemy's) active and passive supporters.

The damage caused to Baghdad's water network in 2003 was intensified due to the poor quality of the pipes. Most of them were decayed due to years of neglect. The shocks of the bombing and vibrations caused

by military tanks on the streets led them to leak and burst. The poor quality of the pipes caused more loss than intended. Similarly in Lebanon, the water system suffered from years of neglect, significant disparity in efficiency of water distribution, and lack of maintenance. These weak points aggravated the intensity of destruction caused by the Israeli bombings. For non-state groups with limited resources, targeting these weak systems can maximize damage with minimum use of their resources.

Supplementary Infrastructure

Water can be indirectly targeted through attack on power plants and other civil infrastructure. The explosion of June 2014 in Aleppo is a notable incident in this regard as it damaged not only water and sewage pipes, but also electrical cables carrying power to water pumping stations. As a result, operations of irrigation and water supply systems stopped, and led to a water crisis among the general population.

Power and civil infrastructure play a vital role in treatment and supply of water. Their destruction causes water-related hardships, and leads to economic, social and environmental crises. The Israeli-Lebanese conflict of 2006 is an example. Israel bombed the electricity infrastructure – cables, fuel stations, power generation plants – as well as roads and bridges of south Lebanon. By the time of the ceasefire, south Lebanon received no electricity, which directly prevented the functioning of the irrigation and water supply infrastructure. The destruction of transport routes prevented water from being supplied by trucks to the local population.

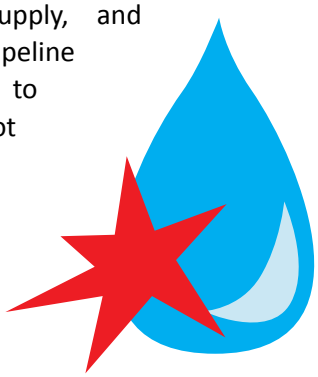
The effectiveness of an indirect strategy lies in its ability to disguise any intentional destruction as collateral damage. In the 2006 conflict, Israel defended the destruction of civil infrastructure in South Lebanon by citing the presence of Hezbollah embedded in the civilian population and their use of the civil population as "human shields". Its army reported the civilian population to have been stopped from fleeing and forced to stay in south Lebanon by Hezbollah. They cited their attacks to be on Hezbollah's presence, and not on infrastructure. Whether the intention or not, infrastructure and the population dependent on it had been harmed.

Water Quality

The use of water as a target or a weapon, especially in a qualitative manner, can have a direct and adverse impact on the local and dependent populations. Contamination of water is a less violent but an equally or more dangerous method of attack. While most infrastructural damage does lead to contamination of water, contamination can also be achieved without actually carrying out extensive material damage. This is clearly evident in the conflicts across Syria and Iraq, and also in the Israeli-Lebanese conflict of 2006.

In April 2014, an oil pipeline running from Tikrit to Baiji oil refinery in Iraq burst and spilt oil in the Tigris. It was said to have caused by attacks by gunmen, but engineers also cited the aging, rusting and corroded nature of the pipeline as a contributing factor. The oil spill spanned over 4 kms and travelled more than a 100 kms to reach Baghdad. The oil was set ablaze, reportedly by the emergency crew of the oil company, which led to air and water pollution in the region. Major water plants along the way had to be shut down, including three plants in Baghdad city.

The spill had an adverse impact on the locals' health, drinking water supply, and irrigation. Whether the pipeline was burst specifically to pollute the Tigris could not be determined, but the damage, even if collateral, was serious.



Contamination of water can prove to be deadlier than damage of infrastructure, as it has a direct impact on human health, local biodiversity and agriculture. Also, it can spread over large distances swiftly, and is difficult to control.

During the years of the Lebanese civil war, toxic waste was accepted by militia outfits in order to raise money. This waste was hidden and buried in the sparsely populated and mountainous areas across Lebanon. Over the years, it began seeping into the local groundwater reserves and water supply infrastructure built underground. By 1995, about 70% of Lebanese watersheds were deemed polluted from biological and chemical wastes and was found to be unsafe to drink.

The weakened state of water infrastructure in the region allows for considerable water contamination with minimal usage of resources. Damage caused to sewage pipes and sanitation infrastructure in south Lebanon by Israeli bombings in 2006 worsened the quality of fresh water supply as the pipes of both ran very close together which led to an easy mixing of contents on their destruction. The resultant contamination of water was widespread and contributed significantly, especially in the rural areas, causing suffering of the civilian population by spreading diseases and creating scarcity of safe drinking water.

The civil war has been a principal contributor to the deteriorating water quality in Syria. Water contamination has been affecting civilians and militants alike since February 2013. In 2013, typhoid and hepatitis A spread all over the country through contaminated water, the hardest hit region being Deir ez Zor. By June 2014, water poisoning had become widespread in the governorates of Idlib, Aleppo, Deir ez Zor and Al Rakka.

Moreover, due to conflict, national production of water treatment chemicals like chlorine has almost ceased. At the same time, the Organization for the Prohibition of Chemical Weapons (OPCW) confirmed in September 2014 that chlorine has been 'systematically' used as a weapon during the civil war.

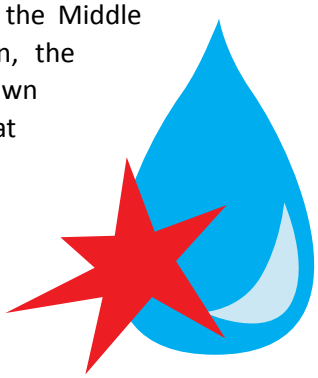
A variety of factors have contributed to widespread water contamination in Syria. Destruction of water and electricity infrastructure has rendered the water supply system of Syria inoperable. Due to high prices of fuel, the average population has not been able to afford boiled water on a daily basis. In government-controlled areas, it is possible to treat water, but the deterioration has reached such an extent that the water system needs to be flushed with fresh water every two days. Given that there is already an acute shortage of water, this method is not feasible. In many areas of active conflict and those controlled by rebels and opposition forces, government authorities have not been able to access water sources for testing and treatment. Until there is ceasefire, there are little to no chances of quality upgrading and maintenance of Syrian water systems.

Apart from harming civilians, contamination of water has also served as a weapon against opponents throughout history. In 1992, a water tank at the Turkish Air Force base in Istanbul was found to contain high concentrations of potassium cyanide. The Kurdistan Workers' Party (PKK) claimed responsibility for the act. In 2003, a small group of Iraqi agents was arrested by Jordanian police in the eastern desert near the Iraqi-Jordanian border. The men were caught plotting to poison the water supply to American soldiers stationed at a military base in Khao near the Iraqi-Jordanian border. While the plots did not succeed, they did serve as a glimpse of the potential devastating effects of deliberate water contamination.

For non-state actors, the biggest advantage of targeting or using water as a weapon is that the effects are not isolated but widespread, varied, swift, and difficult to detect and control. Additionally, they are aided by the benefit of ambiguity as they can explain considerable number of acts as collateral damage. By controlling a strategic asset like water, a non-state actor with limited funds, resources and logistical support can significantly increase its capacity to tackle its opponents.

Economy

Water is vital to the economy. Agriculture and some sectors of industry are water-intensive, with agriculture alone accounting for 70% of global water withdrawal. In the Middle East, a dry and arid region, the proportion of water withdrawn for agriculture is higher at almost 75%. The scarce water resources of the region, especially aquifers, are heavily exploited. The



withdrawal rate frequently exceeds the natural replenishment rate. Moreover, the region experiences frequent droughts, which makes it all the more important to store water.

While the economy of the Middle East is considerably service-sector driven, industries too play an important role, contributing between 20% and 65% to the GDP. The industrial sector in the Middle East is largely based on oil. Infrastructure development, construction and chemicals are key sectors as well. Water plays a crucial role as all of these sectors are water-intensive. Any imbalance in water availability can put these sectors directly at risk in both, short as well as long run.

Destroying water storage structures and polluting water reserves can have a lasting adverse impact on the agricultural sector. During the conflict with Israel in 2006, up to 90% of the cultivation of water-intensive and seasonal fruits and vegetables in Lebanon suffered losses due to destruction of water infrastructure and contamination of irrigation water.

The short term effects on the economy are instantaneous; water shortage and consequent rise in water prices, agricultural losses and resultant food insecurity and inflation, power shortages and ensuing industrial losses.

The long term damage is primarily environmental, manifested through desertification, land degradation, alterations in local water availability and loss of local biodiversity. The resultant economic losses are disruption of traditional local livelihoods, high unemployment and mass migrations, stagnant or even negative growth rate, rising local insecurity, and significant rehabilitation expenses.

Recognizing this, terrorist and non-state groups can use water to damage and ultimately control local and regional economies. Examples of governments using water as an economic tool abound as well. For non-state groups aspiring to achieve statehood, economic stability in their area of conquest and control is of utmost importance. A stable economy is in their interest as it can provide them with local support and resources vital to their functioning and maintenance.

However, targeting or using water as a weapon even with the intention of controlling and running the economy can have adverse impacts. Whenever water resources are involved in conflict, the loss of agricultural and industrial production is inevitable. A by-product of targeting water infrastructure and quality is the steep rise in 'water inflation' in the region. Destruction of water supply networks adversely impact adequate and reliable supply of water. Where availability of water resources is already scarce, rendering them unusable due to contamination can cause a severe setback to the local economy.

Due to extensive destruction of water resources in the Syrian civil war, most civilians have no option but to buy water from private suppliers at exorbitant rates; they have to pay much as USD 35 (more than SYP 5000) to fill up a household water tank. The Iraqi counterpart of this phenomenon can be seen in the city of Qaraqosh. Water required for farms, industries and small firms is not included in this calculation. Civilians have been forced to allocate a large share of their financial resources to purchasing water as it is a necessity, and even prioritize it over other essential commodities.

Consequently, their purchasing power has been directly hit, with little to no avenues of increasing income as income-generating activities in the economy have been disrupted. The deteriorating economy has not been particularly helpful in garnering local support for the rebel and militant groups in Syria and Iraq. Even in cases where they have received support and control, the inherited economies are more of a liability than an asset for them.

The economy and its close connection to water

go to the core of the conflicts in this region. Both have been fundamental to tensions in the region in general and Syria, Lebanon and Iraq in particular. In Syria, mismanagement of water, inadequate drought-countering mechanisms, and economic inequality have played a vital role in shaping the current conflict. In such a situation, destruction of water resources will further weaken the already suffering economy. In the short run, water-related military tactics might provide a territorial and resource advantage, but in the long run, the result will be a ruined economy which will benefit neither the militant groups nor their opponents, and least of all the civilian population.

Regional Impact

In many conflicts water has been used against military or militant forces, but along with them, the local populations and economy of neighbouring countries have suffered as well. Every conflict in which water has been targeted or used as weapon has caused damage to the environment and the larger ecosystem even though such damage has not been the priority.

Use of trans-boundary water bodies in conflict has also caused adverse impacts in downstream countries, especially on their water resources.

In Jordan, shortage of water has risen to more than 30% due to an increase in refugees. The lack of water also caused riots and protests, especially in Mafraq, a major refugee-hosting governorate, in 2013. Official estimates have placed the size of Syrian refugees in Jordan around 1.6 million as of August 2014. The increased population pressure has led to quantity of water consumed per capita to fall by more than 75%, from an average of 135 litres/day/capita to 30 litres/day/capita. Jordanians have resorted to buying water from non-governmental sources and as a result, water prices have quadrupled.

The hardest hit has been Lebanon. Due to the conflict, Lebanon has seen a rise of 7% in its annual pre-crisis water demand (26.1 MCM/yr). In the period 2012-14, an estimated USD 340-375 million will be needed to stabilize water and related services to refugee as well as host populations.

While Jordan and Lebanon are not directly involved, their economies and water systems have not been able to avoid the impacts of the war in Syria. Extensive destruction of water system and resources in Syria have contributed to mass migrations out of Syria, which in turn have pressurized and weakened water systems in neighbouring countries hosting Syrian refugees. For non-state groups aiming at territorial expansion beyond established political borders, the extended effects of destruction of water bodies and infrastructure can prove to be beneficial.

Whether water is targeted or used as a weapon, the resulting multi-faceted consequences almost always contain the element of collateral damage. It is not possible to avoid collateral damage under any circumstances. Furthermore, it is also difficult to sift through the damages and make a clear classification of what is intentional and what is collateral. These difficulties arise largely because of the nature and position of water in our environmental, social and economic systems.

CHAPTER 3

Role of ISIS

Water and Violence

Recent history shows that water has been used as a target or weapon in violent conflicts in the Middle East. The manner and speed of using water resources for destructive purposes has changed remarkably in the current conflict in Iraq and Syria. In previous conflicts, cutting off water supply, diverting water flow, draining of water bodies, and disrupting pipelines and water networks were the tactics employed mostly by governments, military forces or intelligence agencies.

However in the current conflict, the Islamic State of Iraq and Syria (ISIS), a non-state entity, has used water more strategically and played it as a vital card for its benefit and ambitions. While it aims to control oil and gas fields, the traditional key and coveted resources of the Middle East, it has also recognized the importance and vulnerability of water in the region. It is aware of the indispensability of dams and water resources in building a state and its economy and is making active use of the water resources it already controls, while keeping up its efforts to conquer more strategic water bodies and structures.

The strategy of the ISIS includes using water and its infrastructure as:

* Tool of expansion
* Tool of extortion
* Financial asset
* Instrument of Arsenal

Sr. No.	Period	Country	Event	Target	Weapon	Strategy
1	November 2014	Syria	ISIS attacks Homs (Qattinah lake, Orontes)		★	
2	October 2014	Baghdad, Iraq	Samarra barrage flooding plan of IS busted by Iraqi army	★		
3	September 2014	Syria, Iraq	Chlorine from water treatment plants used as weapon		★	
4	August 2014	Nineveh, Iraq	ISIS gained and lost control on Mosul dam			★
5	August 2014	Qaraqosh, Iraq	Water cut off by ISIS to minority town		★	
6	July 2014	Baghdad, Iraq	ISIS gained control on Samarra Barrage			★
7	June 2014	Nineveh, Iraq	ISIS captured and cut off water to Mosul		★	
8	May 2014	Rakka, Syria	Lake Assad dried up due to ISIS activities	★	★	
9	April 2014	Al Anbar, Iraq	ISIS closes Fallujah gates		★	
10	First half of 2014	Iraq	ISIS floods 22 villages		★	
11	January 2014	Al Anbar, Iraq	ISIS gained control on Fallujah			★
12	February 2013	Rakka, Syria	ISIS captured Tabqa dam			★
13	November 2012	Syria	ISIS captured Tishrin Dam			★

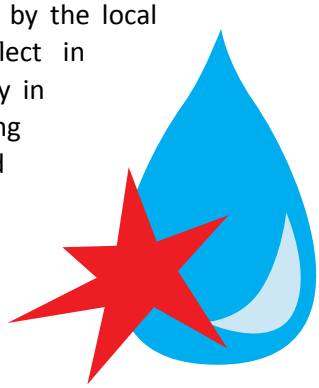
Tool of expansion

By capturing strategic dams and upstream portions of the ET basin, it has gained control over nearby regions which are dependent on those water bodies and for drinking water, irrigation and electricity supply. The vital nature of these facilities has enabled the ISIS to control large swathes of territory, including areas which they have not invaded physically.

Financial Asset

The oil fields which the ISIS has captured in Syria and Iraq require significant amount of water for various processes in oil production such as drilling, fracturing and well treatment. The oil industry needs about 1.8 BCM of water per year for oil extraction in Iraq alone. Due to the control on water reserves, IS has been able to extract and sell oil, and make profits of as much as USD 1 million a day from its northern Iraq operations alone.

The oil fields operated by the ISIS in Iraq have been producing oil which is not properly refined and contains relatively high levels of lead. This can have long term impacts on the demand, pricing and future costs of producing oil from these fields, which ISIS, or their future owner, will have to bear. Additionally, when the ill-refined oil is burnt, it can have a toxic impact on the environment and health of locals. If not by the owner, the brunt of the costs will have to be borne by the local population, which will reflect in their health and productivity in the economy. These, along with environmental and social costs, can be large and persist over the long run.



Moreover, control over water also gives it control over agriculture and electricity, both vital to the strength of the economy. Until the ISIS lost the Mosul Dam in August 2014, it controlled 40% of Iraq's wheat producing area. Due to its hold on Fallujah Dam, it continues to control thousands of acres of farmland in southern Iraq. As of October 2014, it remains in control of most of the water infrastructure in Baqubah, the capital of Diyala, a largely Sunni governorate to the east of Baghdad. Control on power plants in northern and north-eastern Syria and parts of northern Iraq enables the ISIS to generate revenues by producing and selling electricity.

If ISIS manages to regain control on the Mosul Dam and take over Haditha Dam, it will be able to control more than 75% of electricity production, and most of the water supply in Iraq. This will give it the power to destroy the Iraqi economy, as well as the key to controlling the Iraqi economy in their favour

Financial resource abundance is vital to increasing and maintaining forces, artillery and conquered territories. Water plays a direct role in fortifying the ISIS financially.

Tool of extortion

By controlling vital water resources and infrastructure, the ISIS subjugates local and dependent populations. The prolonged drought conditions and increased water shortages have strengthened water as a weapon of blackmail, leaving the local population with little choice but to comply with the demands of the ISIS combatants. Even in regions where the organisation has lost territorial control, it continues to pressurize and financially exploit the local populations through control of their water and/or electricity supply.

A notable example of this tactic is the incident in the wheat-growing village of Talkhaneim in northern Iraq in October 2014. The retreating militants cut off electricity to the water wells of the village and demanded a ransom of IQD 4 million (USD 3500) to resume supply. While the local government body refused to pay, the local population felt otherwise, as it directly affected their lives, farms and livestock.

Instrument of Arsenal

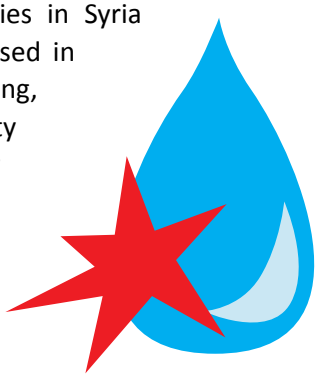
The unconventional use of water infrastructure as an arsenal by the ISIS was evident in September 2014 when its militants were reported to have used chlorine against Iraqi forces and Shia militiamen near Baghdad. This chlorine had been obtained from the water treatment plants it had captured across the country.

While the use of chlorine as a chemical weapon is not a novel concept in itself, this would be the first time the non-state terrorist group has used it since its expansion. In doing so, it has expanded the role of water infrastructure in its strategy from a tool to an arsenal.

The aggressive and speedy use of water as a weapon, in both conventional and unconventional ways, is the highlight of the current conflict in the Middle East. The ISIS is at the forefront of such a strategy. Apart from making it a core factor of its expansionist ambitions, it has also used water to directly harm civilians, to harm the economy and to fight their opponents. Almost every move has led to collateral damage, spreading over sectors and even countries.

The Aggression of 2014

In the span of one year, 2014, the ISIS has made aggressive and frequent use of water to terrorize and harm civilians, attack military forces and conquer territories in Syria and Iraq. Water has been used in a versatile manner; flooding, cutting of water and electricity supply and diverting water flow are some among the various tactics employed by the ISIS.



In late 2012 and early 2013, the terrorist group had captured the Tabqa and Tishrin Dams in Syria. Since January 2014, it has been controlling Fallujah Dam on the Euphrates in Iraq. While the Syrian counterpart of the organisation has not yet resorted to using the dams as a weapon of war, the Iraqi counterpart has closed the gates of the dam twice and caused multi-faceted damage in western and southern Iraq.

In April 2014, the ISIS closed the gates of the smaller Nuaimiyah dam in Fallujah, flooding surrounding regions and drying up the Shia-dominated south. As a result, about 12,000 families lost their homes and a total of 200 km2 of villages and fields were flooded and dried up respectively. Cities of Karbala, Najaf, Babil, and Nasiriyah faced water cut-offs and electricity shortages while areas as far as Abu Ghraib, a town to the west of Baghdad, were flooded.

However, the loss was not just civilian. The economy of the region also suffered a setback, with destruction of cropland about 160 kms downstream and severe impact on the urban economy due to electricity shortages in many cities. In retaliation, government forces shut down the Haditha Dam, causing further flooding and lessened flow to Fallujah Dam. On the backdrop of a severe drought, both flooding and water cut-offs destroyed over 8000 ha of crops in the governorates of Muthanna and Al Anbar.

The flooding was also fundamentally targeted towards Iraqi military settlements and positions in the region. It forced the government forces to pull back from the city. They had to then rely on long-range artillery with imprecise aiming, which resulted in civilian casualties on a daily basis. The forces were significantly obstructed in attacking the ISIS and had to curtail their offensive. The ISIS could thus retain its hold over the Nuaimiyah and Fallujah dams. In both instances, even though the intended targets were military forces, farmland, civilians and civil infrastructure were impacted as well.

Throughout the first half of 2014, the ISIS flooded twenty-two villages in Miqdadiya and Saadiya in Diyala province, and villages situated to the north of Babil and south west of Baghdad.

In early May 2014, the water level of Lake Assad, the reservoir of ISIS-controlled Tabqa Dam in Syria dropped by 6m. The reservoir dried up by more than 1 BCM and the flow of the Euphrates reduced significantly downstream Al Rakka province. The drop directly affected five million Syrians, and put an additional two million at risk. The water shortage led residents of Aleppo and Al Rakka to draw water from unreliable and potentially unsafe sources of water, and some even resorted to drinking from puddles in the streets.

The terrorist organisation had been diverting water from the lake to Iraq and Aleppo, partly to provide water to the areas under its control and partly to threaten downstream opponents. It also used the dam extensively to produce and provide electricity to surrounding regions. Lake Assad was designated as “only a strategic reserve of water”, not meant for intensive electricity production. However, ISIS increased power generation at the dam’s power plant from the maximum limit of four to five hours per day to twenty four hours per day. Earlier the Free Syrian Army controlled the dam and managed to supply electricity for only an hour every day, with a blackout for one whole month. However, when the ISIS took control in February 2013, locals started receiving electricity for eight hours a day.

The ISIS also retained the employment of the staff at the power plant, and began diverting water to areas in neighbouring Aleppo facing water shortage. Moreover, it continued to distribute electricity to government-controlled areas too, especially Damascus and Hama, as the destruction of many other power plants forced the Syrian government to buy from the terrorist outfit. While ISIS took control of the dam, the government still paid the salaries of the dam staff.

This is a tactical move to garner support of the locals and the larger, dependent population by providing electricity, employment and a resultant boost to the local economy. The ISIS hopes to benefit from this act in their quest to control the al-Haririye thermoelectric station in eastern Aleppo independently. By July 2014, they controlled the station militarily, but were dependent on the government for refined fuel. In such a situation, support of locals and especially local miners and fuel suppliers was vital, and economic incentives could prove to be the pivotal factor.

The ISIS has tried to blame Turkey for the reduction in water quantity at Lake Assad, claiming that it had intentionally cut off the flow of the Euphrates as a war tactic against the group. However, there is no evidence of Turkey's activities upstream the Euphrates causing the drastic drop in the level of the lake. The dam staff have stated that levels of Lake Assad were stable before the ISIS took over.

The situation has been aggravated by the on-going, 8-year-long drought. The falling levels of Lake Assad are an immediate phenomenon, but they are only a precursor to a chain of environmental and economic damage that will follow if the drying up of Lake Assad and downstream Euphrates is not stopped in time. Not only would the river face significant shrinkage and adverse alterations, but the economy, agriculture and local populations also would encounter grave challenges regarding growth and survival. The trans-boundary nature of the river can be instrumental in extending these effects into downstream Iraq as well.

In June 2014 the ISIS captured Mosul city in Iraq. After capturing Mosul, it took over farms around the city and cut off water supply, forcing about half a million civilians to flee the region almost overnight. Water needed to be trucked in, which turned out to be expensive. Free water tanks were installed across Mosul, but they covered only 5% of the population's needs. Only when the ISIS restored water supply did the local population start returning to the city.

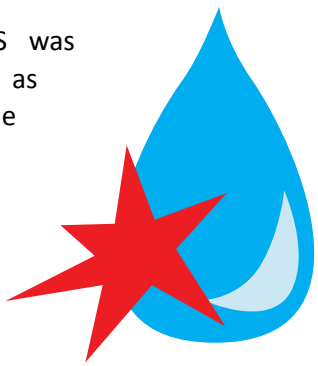
The ISIS has used water to also target minorities. The city of Qaraqosh in Kurdistan has been dominated by Christians and Shias. It has been protected by the Kurdish Peshmerga. However, it has been reliant on one pipeline from the Tigris for their water. Recognizing this, the organisation seized the pipeline in July 2014, and cut off water supplies to the city.

Locals were forced to import water at high prices. Well-digging began in and around the city, but the process , spanning over a couple of months, would be of little help in providing water during the dry summer. In the meantime, the residents of Qaraqosh had to pay as much as USD 10 per day for emergency water tanks. For the average individual in Qaraqosh, water became expensive and ultimately unaffordable in the long run.

In July 2014, the ISIS also captured the Samarra Barrage. The Samarra barrage is a major water structure for irrigation and hydroelectricity and is another key to controlling Baghdad's water supply. Even though it has not yet disrupted the activities of the dam as of November 2014, the position of Baghdad and also southern Iraq has become vulnerable. By gaining control over areas and key water structures along the ET rivers, the ISIS clearly seems to aim to approach Baghdad via tightened control of water.

The ISIS captured the Mosul Dam in early August 2014, but the Kurdish and Iraqi forces took it back by the end of the month. The capture raised alarm in the international community as fears of the terrorists flooding downstream regions, especially Baghdad, surfaced. While these fears did not materialize, the ISIS did cut off water supply to many towns and villages which relied on the Mosul dam.

In October 2014, the ISIS was reported to have flooded as many as nine villages in the Shirwain area by diverting waters of nearby rivers to halt the advance of Iraqi military forces. In



the process, it submerged around 200 acres of farmland. Around the same time, the Iraqi forces foiled an attempt of the militants to flood Baghdad by opening the gates of the barrage. However, as ISIS tightens its control over water structures and regions around Baghdad, it can get more and more difficult to thwart similar plots in the future. The possibility of a real threat of flooding as well as water cut offs, particularly in case of any major setbacks to the ISIS, cannot be denied.

Just like in Qaraqosh, the ISIS has continued to target minorities and non-Sunni populations elsewhere in the country. In October 2014, they cut off water from the Sudur Dam to Balad Ruz, a predominantly Shia area in Diyala governorate forcing the local government to hire trucks to bring potable water for residents' use.

As of December 2014, having established control over as many as four dams in the ET basin, the ISIS continues to use water as a weapon to harm civilians and villages resisting its rule. It is contesting for the Haditha Dam on the Euphrates in Iraq and has recently launched an attack in Homs, Syria. It is important to note that the Orontes flows through Homs and the Qatttinah Lake is located there.

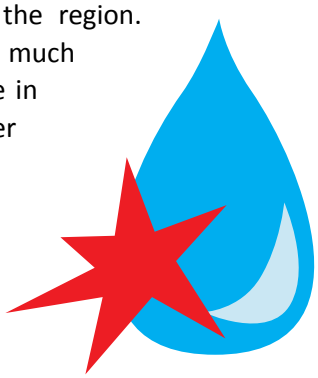
Many of the areas occupied by the ISIS in Iraq have been reconquered by the Kurdish and Iraqi forces. However, the areas that share water and power supply grids with Mosul still suffer as the departing militants have used their control of the water and power networks in Mosul to cut off the power and water supply of these areas.

Among the four dams under the ISIS control is the Samarra Barrage located upstream of Baghdad. The barrage controls the volume of water in Lake Tharthar, the biggest lake of Iraq, and can prove to be a formidable tool in flooding the lake and the surrounding areas, especially Baghdad. Samarra is particularly sensitive due to its religious importance; it was the site of the sectarian violence of 2006-2007 in Iraq.
Also, since its expansion through Iraq and Syria, the ISIS was stated to not have the technical knowledge or expertise to operate and maintain the water reserves it captured. It was known to engage locals and retain the government-employed technical staff of the dams for their operation and maintenance. News reports in early November 2014 however showed instances of IS managing to recruit trained engineers and hydrologists within its folds. With control on water, the ISIS has gained the power to run or ruin the local economy, and it has been doing both, selectively and strategically.

The ambition of establishing and expanding its caliphate continues to be on the cards of the ISIS. While battling the US and allies at the town of Kobane on the Syrian-Turkish border, the ISIS is simultaneously encroaching on Homs in West Syria, and Baghdad in Iraq. It controls a major part of the governorate of Al Anbar, parts of northern Iraq, notably Mosul, and areas to the east of Baghdad. Most importantly, it controls four dams in the ET basin. The total area under its control is slightly smaller than the size of Britain. While they are contesting for gas fields and air bases, the regions of their target, like Homs for example, continue to be places housing or in the vicinity of major water structures. The water-related strategy of the IS is likely to be a part of a larger "have resources, have all" plan by which the ISIS seems to be pursuing.

Future Risks

The risk of the ISIS realizing its ambition and carving a caliphate out of eastern Syria and western Iraq cannot be ignored. The creation of the caliphate would then lead to a re-drawing of the political borders of the region. Iraq could be reduced to a much smaller Shia-dominated state in the east and Syria to a smaller Alawite state in the west, near Lebanon.
The Kurdish parts of northern Iraq and Syria and



possibly some part of south-eastern Turkey could unite and form an independent Kurdistan. Currently, the Kurdish peshmerga forces are in control of the Mosul Dam. They led the ground offensive against the ISIS and played a crucial role in capturing the Mosul Dam and averting a significant water crisis in Baghdad. They are one of the important forces fighting the ISIS in Iraq and Syria. Armed with a water structure vital to Baghdad's water supply and military effectiveness, the Kurds have gained a stronger position in the region. The renewed attacks by the PKK in the past few years, the increasing involvement of the Kurdish forces in recapturing territories from the ISIS in northern Syria and Iraq, and the natural endowment of both oil and upstream ET basin can possibly lead to the creation of an independent Kurdish nation.

The formation of the new entities in the region would not be smooth; stiff resistance from a multitude of opponents, ranging from the US and its allies, to Hezbollah, Iran, Assad's government and militant groups like Jabhat al Nusra, will prevail and lead to further conflict and instability in the region.

CHAPTER 4

Options

Since water has acquired growing relevance in violent conflicts in the Middle East, remedial measures ought to be specifically introduced with a focus on water resources and infrastructure. Governments of affected countries, regional organisations and the United Nations and other international organisations can all play a role.

Disaster Management by Governments

It is an obligation of any government to prepare for disaster management to protect assets and citizens of the country. There are standard operating procedures for disaster management. These include emergency rehabilitation, alternative supplies of critical commodities and resources, education and training of government officials and civil society groups. These procedures are known in the eventuality of earthquakes, wild fires, wars and civil strife. However, it is necessary for the disaster management experts to explore how these procedures can apply to situations where water is used as a target or an instrument of conflict, taking into account direct impact on water bodies as well as the multiplier impact on the local ecology, biodiversity and economy. An important issue here is the recognition of water related violence in the disaster management priorities in the Middle East. Since it is a relatively new phenomenon, it is possible that conventional disaster management programmes may not have addressed it. Once the importance of focus on water is recognised specific and practical measures can be proposed by national experts depending on local realities, assessment of relevant assets and the availability of manpower and technology.

UN Peacekeeping Force for Water

It is important to recognise that rivers such as Euphrates and Tigris have been flowing for thousands of years. While they have direct impact on the population in the basin, they are cradles of civilization of global importance. Therefore, they should be treated as treasures of humanity, and not only of the countries where they flow. It is therefore necessary to mobilise political will at the global level to protect such assets of relevance to mankind from illegitimate control, destruction and deliberate damage.

The United Nations should be empowered to protect such assets through an appropriate resolution of the UN Security Council. It is possible to have conflicting views in the Security Council about geopolitical dynamics in the region. However, protection of rivers that have given humanity early civilization is beyond politics of national interest. It is absolutely essential that all members of the Security Council rise above the short term political calculations and join hands to protect these rivers and similar assets.

One option to do this could be a special UN Peace Keeping force for protecting water resources. At the end of 2014, the UN Department of Political Affairs was in the process of creating capacity for resolving water related conflicts. It shows the subtle recognition of the importance of water in the UN secretariat. In recent years, the UN Department of Peace Keeping Operations (DPKO) has recognized the impact of its operations on the environment. In 2009, along with the Department of Field Support (DFS) it has formulated and implemented an environmental policy (The DPKO-DFS Environmental Policy for UN Field Missions) covering a host of environmental factors, one of them being water. Along with legislation, both departments collaborate with partners like the United Nations Environment Programme (UNEP) and the Swedish Defence Research Agency (FOI) for information, resources, and sharing of best practices. The UN operational divisions thus are sensitive to the relevance of water in conflict situations. They can now move ahead on the same path to create DPKO forces especially to protect water resources and infrastructure from illegitimate control and destruction by non-state actors.

As of December 2014, there are sixteen peacekeeping operations led by the department of Peacekeeping Operations (DPKO) of the UN out of which three are in the Middle East. The functions of the peacekeeping forces range from assisting and reforming political, judicial and law and order systems to supporting disarmament of former combatants and return of IDPs and refugees. It should not be difficult to add protection of water resources as additional functions.

A more ambitious vision would be to create peacekeeping forces entirely and specially deployed for the protection of water resources in the Middle East. Such a force would be similar in structure and formation to the general peacekeeping forces. However, its functions will primarily evolve around protecting water bodies and surrounding eco systems, assisting reforms in the law, policy and technology aspects of the water sector, and rehabilitating water refugees. The deployment of such forces in the Middle East can prove to be a vital support for safeguarding water bodies and their infrastructure.

Along with the peacekeeping forces, water resources can also be secured with advanced technology like warning systems, password-controlled gates for water facilities, anti-hijack systems and other security devices. The peacekeeping forces can train local police to support them. Efficient intelligence services are key to preventing water attacks, or at least, to removing the surprise element from them. Hence, intelligence services can also be trained

to recognize and thus help prevent possible water attacks.

Safeguarding water treatment can also be a significant step. The process of water treatment can be made more stringent. If water is passed through multiple filtration, UV radiation, ozonation, chlorination and overall strict treatment, then it can be difficult to orchestrate contaminative attacks on water sources. With stringent treatment methods and high security of treatment plants, the possibility of contaminating water for using it as a weapon can be significantly reduced.

Similar security needs to be provided to other infrastructural facilities, particularly those that are supplementary to the water sector. Power plants, roads, bridges, sewage treatment plants, water treatment plants, and other forms of civil infrastructure are directly or indirectly connected to the water system of the region. It is important to invest in their quality, maintenance, and security in order to ensure minimum damage to or by water during conflict.

Red Cross for Blue Peace

While water is precious for the economy, it is more fundamental to the survival of humanity. Essentially, it is a basic human right and not merely an economic factor of production or commodity. Keeping this principle in view, a humanitarian approach to water resources can help in reducing the impacts of violence on water and its surrounding eco system.

The International Committee for Red Cross (ICRC) has a strong water security programme. The Red Cross Water Programme should be strengthened as a strong humanitarian, impartial, neutral and independent entity looking after the protection and rehabilitation of water resources which have been targeted or used as a weapon in both internal and cross border conflicts. It can also extend its functions to providing rehabilitation and assistance to water refugees and populations directly dependent on the affected water resources. Under the auspices of ICRC, this programme should be extended. The ICRC already undertakes these functions and also builds water infrastructure in conflict zones in the Middle East. However, it is essential to strengthen its work in this area by several folds.

Cooperation Council with Water Protection on its Agenda

The Blue Peace initiative of Strategic Foresight Group has proposed the establishment of Cooperation Council for the Sustainable Management of Water Resources in the Middle East. Initially, the functions of this body were envisaged to be focussed on data exchange, harmonisation of standards, development of regional climate change models, joint projects in water and related spheres, using water as a leverage of comprehensive peace. The same body can also be mandated to protect water resources.

The Cooperation Council would enable Heads of Government, ministers and officials to exchange information on the abuse of water in violent conflicts at all levels and negotiate collaborative and regional response. The scope of its mandate can also be extended to regional cooperation for helping and supporting water refugees and other directly affected populations. The impacts of targeting or using water as a weapon in a conflict spill over borders, displacing populations and disturbing economies. The council can work jointly to mitigate the spill-over effects and to restore normalcy in the affected regions. With consistent political will and support at all levels, the regional council can become an effective body fostering cooperation to protect water resources the region, in addition to its original idea to promote cooperation for sustainable management of water resources.

Applicability of Principles of International Humanitarian Law to Water Conflict

The Geneva Conventions comprising four treaties and three Additional Protocols, form the basis for international law for the humanitarian treatment of war including the water-war nexus. Both Protocols I and II, which deal with the protection of victims during international and non-international/internal armed conflicts, refer to the term 'civilian objects' which includes water infrastructure. Protocol II is particularly important as it offers more protection to civilians and water infrastructure. These Protocols can be used as a pressure tactic to limit state and armed non-state actors from both targeting and using water as a weapon, as well as minimising harm done to civilians and water bodies.

Those involved in the current conflict in the Middle East have also deliberately used water to target civilians. The armed non-state actors can be charged with war crimes for committing mass executions and destroying civilian objects. However, it is important to note that of the five countries in question, only Jordan and Lebanon are party to Protocols I and II of the Geneva Conventions. Both Iraq and Syria are party only to Protocol I and Turkey is not party to any Protocol. By being party to these protocols, the countries will be in a better position to negotiate with the armed non-state groups and ask them to follow the rules laid down in the protocols. Abiding by the rules laid down in the Geneva conventions and their Protocols can give non-state actors protection under these instruments. Also, for any non-state actor which aspires to create its own state, following the Geneva Conventions and its protocols can be an important and necessary step as they may seek legitimacy in the future.

International Conference on Water, Security and Peace in the Middle East

It is better to deal with a problem in its early stage than after it crosses the tipping point. While the use of water as an instrument of war is still a new phenomenon, it is necessary to draw attention to the problem and seek globally accepted solutions. This can be done with an instrument of an International Conference under the auspices of the United Nations for all state parties in the Middle East, as well as representatives of UN and other international organisations and envoys of the permanent members of the Security Council. An alternative model could be the Madrid Conference for regional state parties with support from major countries and international organisations. The conference can discuss and take decisions in support of practical solutions including some mentioned in this paper such as special UNDPKO forces, strengthening of ICRC Water Security Programme, Cooperation Council with protection of water resources in its mandate and other solutions that may not be presented here. At times international conferences have been helpful in setting the agenda for a region or the world. The Congress of Vienna, Paris Peace conference, Bretton Woods, Rio and other UN conference, Madrid conference on the Middle East are some of the best known examples in history. There has never been an agenda setting conference to transform water from a source, target and weapon of conflict to an instrument of peace and cooperation. It is about time that the international community considers convening such a conference either in specific context of the Middle East or at the global level including the situation in the Middle East in its agenda for action.

Conclusion

This paper demonstrates that water has emerged as an important factor in violent conflicts in the Middle East, often with disastrous results for the environment, society and security of the region. While governments have been regularly using and abusing water, the speed and aggression with which the ISIS, a non-state actor, has manipulated water for its benefit has thrown more light on the vulnerability of Middle Eastern water resources.

While military and militant strategies involving use and abuse of water prove their mettle with significant gains in the short run, the long term losses, which spare no one, are often either unrealized or overlooked. There is a need to highlight and understand them, and to stop and prevent targeting of water infrastructure or use of water resources as a weapon in the future. The most ideal solution is to build peace, resolve conflicts, uphold dignity and human rights, deliver good governance and promote development in general sense. However, besides these general solutions to prevent all kinds of violence specific solutions at national, regional and international level are required to focus specifically on water resources and infrastructure.

The best response to ISIS and similar non-state actors in the Middle East is establishing cooperation in the region. While the trans-boundary water bodies have aided ISIS in its use of water as a weapon for war and territorial expansion, the same water bodies can also enable riparian countries and their populations to establish an efficient preventive and curative mechanism against any destruction of and by water. Regional cooperation at the highest political levels, in technology and data exchange, and in water basin conservation and development can serve as an effective means to defeat the ISIS spirit.

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About Strategic Foresight Group

Strategic Foresight Group (SFG) is a think - tank engaged in crafting new policy concepts that enable decision makers to prepare for a future in uncertain times. Founded in 2002 to create new forms of intellectual capital, our body of work today encompasses over 50 countries, across four continents. SFG has published over 30 in-depth research reports in English with some translations in Arabic and Spanish. We currently work within three areas of focus: 1. Water Diplomacy 2. Peace, Conflict and Terrorism 3.Global Foresight.

SFG analysis and recommendations have been discussed in the United Nations, UK House of Lords, House of Commons, Indian Parliament, European Parliament, Alliance of Civilization, World Bank, World Economic Forum (Davos), and quoted in over 2000 newspapers and media sources. Several Heads of Government, Cabinet Ministers and Members of Parliament have participated in SFG activities.

SFG is known for pioneering the concept of Blue Peace to transform water from a source of crisis to an instrument of peace and cooperation. It has worked in the Middle East, Africa, Eastern and Western Himalayan rivers basins in Asia to craft the Blue Peace approach. These efforts have involved the participation of Cabinet Ministers, Members of Parliament, heads of water authorities and experts from the three continents and defined sustainable and collaborative solutions to the trans-boundary water issues. In its 2013 report, Water Cooperation for a Secure World, Strategic Foresight Group has proposed a unique formula to predict the probability of war on the basis of water and peace equation.

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