



ORSAM WATER BULLETIN

Weekly Bulletin by ORSAM Water Research Programme

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❖ Iraqi army says it has retaken dam from Islamic State

Muqdadiyah dam outside Baghdad captured by Iraqi forces backed by Shiite militias; heavy toll inflicted on Islamist fighters

The Iraqi army and an alliance of Shiite militia groups on Saturday retook a dam northeast of Baghdad after days of fighting believed to have killed dozens, security sources said. Fighting has been raging for days around Muqdadiyah, in Diyala province, around 90 kilometers (55 miles) from Baghdad, between jihadists from the Islamic State group and pro-government forces.

“We are now in full control of the dam,” said an army lieutenant colonel, adding that the final stages of the operation on Saturday had left seven IS militants dead.

A police captain confirmed the toll.

The officers said the final push to retake Muqdadiyah dam involved Iraqi troops and fighters from the Asaib Ahl al-Haq, Badr and Saraya al-Salam Shiite militias.

Government sources in the area have reported high casualties among jihadist ranks over the past few days.

The fighting has also left many dead in pro-government ranks. At least 12 members of the Saraya al-Salam militia killed in the area were buried in the holy Shiite city of Najaf on Thursday alone.

IS fighters have repeatedly attempted to control dams across the country, and in some cases weaponized them by either reducing the flow of water to areas under government control or flooding swathes of land to impede army operations.

The jihadists briefly controlled the dam in Mosul, the country’s largest, before Iraqi special forces and Kurdish peshmerga troops backed by US fighters jets retook it in early August.

“Iraqi army says it has retaken dam from Islamic State”, 27/09/2014, online at: <http://www.timesofisrael.com/iraqi-army-says-retook-dam-from-islamic-state/>

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❖ **Letter: Protecting Mosul Dam needs to be top priority**

At the top of any list of the failures of President Obama’s feckless foreign policy would be his decision to turn away from negotiating a residual military presence in Iraq prior to leaving the country. By the end of 2011, our military had eliminated ISIS’ predecessor, the Islamic State of Iraq, by recruiting about 100,000 Sunnis into the Sahwa militia to help fight ISI. Predictably, with the United States gone, Prime Minister Nouri al-Maliki disbanded these militias and accelerated his marginalization of Sunni politicians and military officers.

The consequent rise of ISIS, incredibly brutal but well-organized and technically savvy with a worldwide reach, is now well known. What seems less well understood is the potential for disaster that sits 31 miles upstream of the city of Mosul on the Tigris River.

The Mosul Dam, a 371-foot-high earth-fill structure over 2 miles long, was built on a soluble and inherently unstable gypsum and karst foundation. Ever since its completion 28 years ago, cement slurry grout has been pumped into the dam foundation on a 24-hour basis to prevent catastrophic failure. The U.S. Army Corps of Engineers has declared Mosul “the most dangerous dam in the world.” The dam has already fallen to ISIS once this summer, before being retaken by Kurdish and Iraqi forces with U.S. air support. A prolonged series of battles around the dam would make the complex grouting procedure impossible.

With 1.7 million people in Mosul and 7 million in Baghdad, the corps estimates a death toll of 500,000 if the dam collapses. This environmental disaster would be the largest single human-induced loss of life in history.

“Letter: Protecting Mosul Dam needs to be top priority”, 28/09/2014, online at:

<http://www.buffalonews.com/opinion/letters-to-the-editor/letter-protecting-mosul-dam-needs-to-be-top-priority-20140928>

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❖ Peshmerga Bring Mosul Dam Back Online

After retaking control of it in the middle of August, Kurdish Peshmerga forces, have re-activated Mosul Dam.

“On Monday Peshmerga forces re-activated Mosul Dam and brought all employees, engineers and experts back to work,” the Kurdistan Democratic Party (KDP) official in Mosul Saed Mamuzini told BasNews.

“The dam now provides water and electricity to local residents. A large number of villagers, refugees and as some other towns around will be benefit,” he added.

Mosul Dam is one of the biggest dams in Iraq and was captured by Islamic State (IS) militants in July after they took control of Mosul city.

During their control of the dam, IS insurgents often threatened to destroy it, and that would have resulted in catastrophic damage to many Iraqi cities.

The dam was later retaken by Peshmerga forces with the help of US air strikes late last month.

“Peshmerga Bring Mosul Dam Back Online”, 22/09/2014, online at: <http://basnews.com/en/News/Details/Peshmerga-Bring-Mosul-Dam-Back-Online/35017>

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❖ Water scarcity to water crisis in Iran

Iran's water crisis has sparked demonstrations and clashes in recent years and is developing into a threat to national security, Amin Khorami reports

Last Monday, some 3,057 “large consumers” of water in Tehran had their supplies cut for seven hours during the day, according to an Iranian [energy ministry official](#).

Two days after the flow was cut, Iranian Vice President Eshagh Jahangiri [said](#) the country’s “water crisis” needs to be taken seriously, and that the problem had grown in magnitude this year, demanding an immediate response.

While the incident in Tehran came after constant and serious government appeals to the public to reduce water consumption, especially in Iran’s capital, this is the first time in years that a high-ranking official in the Iranian government has confirmed that the water shortage in the country is at a “critical” level.

While water scarcity has been a continuing problem over the past decade, a severe decline in precipitation this year has made things worse. Lar Dam, one of four major dams feeding water to Tehran, has almost dried up.

About 35 percent of the capital’s water consumption comes from Lar reservoir; while its capacity is more than 960 million cubic meters, the volume held there at present stands at 30 million cubic meters. Of that, only 18 million cubic meters can be used, [according to](#) Iranian energy ministry official Mohammad Shahriari.

Tehran is fed water from four dam reservoirs - Lar, Latian, Taleghan and Karaj - and wells south of the city. The total volume of water in Tehran's these reservoirs has fallen 40 percent in comparison with last year, Energy Minister Hamid Chitchian [warned](#) in August. “Given reduced rainfall and supply strains, Tehran is now relying more heavily on wells,” Chitchian [said](#) on 17 September.

Twenty-five percent of Iran's drinking water is consumed by Tehran's nine million inhabitants who represent 12 percent of the total Iranian population, according to Chitchian. The four dams had a total reservoir of 716 million cubic meters two years ago; that is now down to 355 million cubic meters.

The cabinet has approved [spending of \\$11 million](#) to accelerate the “emergency supply of water to Tehran”, according to Mohammad Bagher Nobakht, vice president for planning and strategic supervision. Officials during a visit to Tajikistan this month also discussed the possibility of importing water.

Drought and mismanagement

Iran, the second-largest country in the Middle East after Saudi Arabia, is arid and semi-arid, with annual precipitation ranging from less than 50 millimetres in central Iran to about 2,000 mm on the Caspian coast. Average precipitation is about 250 mm per year, less than one-third of the global average; 75 percent falls over only 25 percent of the country. The annual renewable water per capita in Iran is only 1,700 cubic meters, well below the global level (7,000 cubic meters) and slightly above the regional level of 1,300 cubic meters.

According to statistics the Ministry of Energy, Iranians use more than 250 liters of water per day per person and their daily consumption can exceed 400 liters per person in some urban areas like Tehran. This means Iran’s water usage is twice as much as the world’s standard despite its limited water availability.

Water losses as a result of aging distribution infrastructure exceeds 30 percent, yet interest is focused on finding new supply sources rather than repairing and upgrading old systems. To satisfy water demand, Iran is using more than 70 percent of its renewable freshwater resources. Usage of 60-80 percent of renewable freshwater resources indicates a “water crisis”.

"Water scarcity poses the most severe human security challenge in Iran today," Gary Lewis, United Nations Resident Coordinator for Iran, told [Reuters](#). Excessive damming of rivers, bad irrigation practices, drought and climate change have all contributed to the country’s water crisis, he said.

The present water crisis in Iran has three main drivers: rapid population growth and inappropriate spatial population distribution; inefficient agriculture; and mismanagement and rapid speed development, according to an [article](#) published in the *Journal of Environmental Studies and Sciences* last month.

Iran’s population almost doubled during the last two decades of the 20th century after the Islamic Revolution of 1979 and there is now a mismatch between delivery capacity and regional water

demand in most parts of the country as a result of migration from rural to urban areas. About 70 percent of the population currently live in urban areas, up from 27 percent in the 1950s and 44 percent in the 1970s.

Meanwhile, per capita annual renewable fresh water in Iran has not kept up with the population increase, falling from 4,770 cubic meters in 1970 to 2,079 cubic meters in 2001 and is estimated to decline to 1,555 cubic meters by 2025, according to a [report](#) by the Washington-based Population Reference Bureau.

Despite the size of the population being an important factor in Iran's water crisis, the government wants to increase it further even though the country lacks the required water resources and infrastructure to meet increased demands.

Iran has long suffered from very inefficient agriculture, which relies heavily on irrigation and consumes most of the limited water resources. While only 15 percent of the country's area is cultivated, agriculture consumes 92 percent of its water, compared with 6 percent by the domestic sector and 2 percent by industry.

More than any other factor, the water crisis in Iran is the result of decades of bad management, the *Journal of Environmental Studies and Sciences* ' report insists. While the desire for rapid modernisation during the Pahlavi rule had major socio-economic benefits, the modernisation process has not been free of effects on the country's hydro-environmental resources.

The Islamic Revolution and subsequent international pressure on Iran further strengthened the country's desire for development in order to prove its independence to the world. Rapid development and the construction of major infrastructure with minimal concern for the long-term, non-economic impact has created water and environmental problems.

Water crisis leading to tension

In the near future, the water crisis in Iran might develop from a human security issue to a national security challenge. According to a US-based *National Intelligence Council* [report](#), “The world's major belt of water stress lies across northern Africa, the Middle East, central and southern Asia and northern China.” Countries such as Iran are heavily dependent on imported water and could become

embroiled in conflicts with neighbours over dwindling water from shared river basins, the report says.

In the eastern part of the country, the border lake of Hamoun has been in dismal condition during the past decade as a result of a trans-boundary conflict with Afghanistan over the Hirmand (Helmand) River. Under an [agreement](#) between the two countries signed in 1973, Afghanistan is obliged to let at least 26 cubic meters per second flow from its dams onto the Hirmand River into Iran.

When Afghanistan was under Taliban control, the flow was completely halted and, as a result, Lake Hamoun dried up. After the fall of Taliban in 2001, the new Afghan government opened the river into Iran for short-term periods, with one consequence being intensified sandstorms. Thousands of acres of farmland have been destroyed, forcing residents to immigrate to cities in order to escape drought and unemployment.

Afghanistan re-opened the river this year, but billions of fish have died recently because of water mismanagement on the Iranian side, according to [environmental activists](#).

In the west of Iran, Lake Orumie, the largest lake in the Middle East and one of the world's largest hyper-saline lakes, has shrunk significantly as a result of frequent droughts and aggressive upstream water use, excessive damming projects, diversion and storage. The lake's declining condition prompted protests in September 2011, during which [60 people were arrested](#). More demonstrations in 2012 [resulted in clashes](#) between security forces and environmental activists. Iran's government has also been under pressure on social media for its mismanagement of the lake.

In central Iran, the Zayandeh-Roud River has dried up completely, imposing extensive pressure on the agriculture, industries and urban population of Isfahan province. The Gavkhouni wetland and its once-valuable ecosystem at the end of the river have also totally died.

After a week of demonstrations in March 2013, violent clashes erupted in Varzaneh, a town near the city of Isfahan, between protesters and security forces. Dozens of people were injured and more arrested. The protests came after the government decided to divert water from the Zayandeh-Roud in Isfahan to the neighbouring province, Yazd.

Recently, there have also been protests in Khouzestan and Chahar-Mahal Bakhtiari provinces over projects for fresh-water transmission to central provinces. The projects have been halted due to the objections.

The water condition in Iran seems to be critical enough to result in more local tensions among several provinces in the near future. The tension might also involve ethnic differences, and could develop into a serious threat to national security.

“Water scarcity to water crisis in Iran”, 23/09/2014, online at: <http://www.middleeasteye.net/in-depth/features/water-scarcity-water-crisis-iran-377184594>

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❖ Sharing water is key to peace in the Middle East

We hear much about countries battling over control of oil, far less about the struggle to secure fair use of water.

Water is a vital resource, even more essential than oil for everyday human existence. As it becomes an increasingly scarce resource across the globe, water has also become a major trigger point in conflicts.

Countries that get their water from a common source often misuse it, causing far-reaching social and practical problems for those who share the resource. This is especially true in the Middle East today.

Jordan is one of the ten most ‘water-poor’ nations in the world, relying mainly on Israel to provide its supply. People buy their household water by the tank-load, which costs around 23 dinars (\$36) each and lasts the average family for around one week. This water is not suitable for drinking, so people have to rely on bottled mineral water as well.

In the wider Middle East, there are more than 40 million people who are identified as water-vulnerable, according to a report from the Strategic Foresight Group. These include populations spread across large swathes of Turkey, Lebanon, Jordan, Iraq and Syria. To make matters worse, the latter two countries are also embroiled in severe and ongoing conflict.

According to the Strategic Foresight Group, the Syrian civil war was triggered in part by water shortages resulting from the severe drought between 2006 and 2010. The notorious Islamic State (IS) terrorist group has made strategic use of water resources in eastern Syria and Western Iraq, in particular the Mosul Dam. The dam, located on the River Tigris, is Iraq’s largest. Whoever controls it also controls the majority of Iraq’s water and power resources. IS uses the control of water to put pressure on governments and populations.

Speaking to the BBC in August, Salman Shaikh of the Brooking Centre in Doha, Qatar, said about IS: ‘There’s a method in their madness. They’ve managed to amass cash and natural resources, oil and water, the two most important things. And of course, they’re going to use those as a way of continuing to grow and strengthen.’

At the time of writing, Kurdish and US forces have managed to recapture control of the Mosul Dam from IS. But the situation remains unstable. While the advance of IS cannot easily be halted, some of the world’s best water specialists are hard at work devising methods to manage water more effectively in this troubled region.

Christophe Bösch, lead water specialist at the Swiss Agency for Development and Co-operation, speaking at the Blue Peace Forum held in Istanbul on 20 September, said: ‘Three million people have been displaced in Syria. This is a massive crisis. But we hope that water management will be an element of the future reconstruction and reconciliation process.’

Cultural, religious and political issues may add fuel to the fire, but the underlying causes are often poverty and poor water management. When water is scarce, there is an increased struggle to control

the existing supply. This can quickly escalate into violence and discrimination, as the groups controlling the resource favour their own when distributing it.

The populations most likely to be affected by such conflicts – and to participate in them – are poor, rural, and agricultural. Inclusive developmental policies can help address some of their grievances and make daily life easier, reducing the likelihood of war.

Water co-operation between different countries has already proved successful in parts of Latin America, Africa and Asia. But so far, most countries in the Middle East have been reluctant to embrace the idea.

The Strategic Foresight Group report on the region points out that the main obstacle remains a ‘lack of vigorous political commitment’ to co-operation. So what lessons in water cooperation can be learned from the examples of other countries? Take the Senegal River Basin Cooperation programme.

In 1960, the West African country of Senegal gained independence from France, at a point where its economy was in bad shape. The Senegal River is Africa’s second largest. It flows for 1,800 kilometres, crossing Mauritania, Mali and Senegal, to its end point in the Atlantic Ocean. This river formed a common link between the countries, but during the 1970s it was also a source of regional tension.

As the 1980s dawned, all three nations decided that it was in their best interests to co-operate in water management in the Senegal River Basin. Two large dams were built, which provided water for agricultural and municipality use. One of the dams was designed to produce hydroelectric power for the whole region, forming part of an ambitious economic growth strategy that has paid dividends today.

Dr Ba Madine, Secretary General of the Senegal River Basin authority (OMVS), said: ‘Ideally, the water courses belong to no country, they belong to everyone.’

In the Middle East, unless an approach to managing this key resource is implemented soon, the scarcity of water is likely to persist and may even get worse in coming decades.

There are many strong international examples to learn from. Better water cooperation could be the key to mitigating the risk of further conflict, while helping the next generation gain stable and secure access to vital water resources.

“Sharing water is key to peace in the Middle East”, 24/09/2014, online at: <http://www.towardfreedom.com/51-global-news-and-analysis/global-news-and-analysis/3673-sharing-water-is-key-to-peace-in-the-middle-east>

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❖ PA criticises Israeli seizing Palestinian water in West Bank

The Palestinian foreign ministry has strongly condemned the Israeli war on Palestinian water in the occupied West Bank, saying it is part of a series of actions leading to undermining the Palestinian existence in Area C, which is under full Israeli control.

In a statement, the ministry said: "In the glare of the sun, the Israeli occupation carries out a war on Palestinian water. It is based on controlling all water and its springs, depriving the Palestinians from using it and making it a subject to political blackmailing."

The ministry continued: "The occupation prevents Palestinians from digging wells, seizes and Judaizes fertile lands, closes farms by announcing them closed military zones and preventing owners from entering them unless with entrance permits, which are difficult to obtain."

"The ministry is following up on the issue of closing a number of wells very closely and it has been working on following up on all the Israeli violations aiming to drain the springs of the Palestinian water, as well as to undermine the Palestinian existence in the Palestinian lands."

The reason Israel is doing this, the ministry explained, is to force Palestinians to give up on farming and become dependents on the Israeli agricultural products.

"The occupation is working to replace Palestinians, who are legitimate residents, with Jewish settlers, who are occupiers," the statement said.

"PA criticises Israeli seizing Palestinian water in West Bank", 22/09/2014, online at: <https://www.middleeastmonitor.com/news/middle-east/14304-pa-criticises-israeli-seizing-palestinian-water-in-west-bank>

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❖ Gaza water network malfunctioning due to Israel war

The water distribution network in the Gaza Strip is malfunctioning due to damage caused by the Israeli regime's military aggression against the besieged Palestinian territory, Press TV reports.

Palestinians in Gaza are suffering from water shortage with a Gaza resident telling Press TV that the drinking water is not suitable for use.

Reports say the damage to the sewerage system has led to the contamination of drinking water, making residents vulnerable to waterborne diseases.

More than 90 percent of the drinking water is reportedly contaminated.

"The water is very scarce and very salty and it is almost the same as sewage water," said a Palestinian woman.

The Israeli military aggression has exacerbated the humanitarian situation in Gaza and Palestinians in the enclave are in desperate need for additional desalination plants.

"The devastation has created massive needs for more desalination plants," a Palestinian desalination plant owner said.

Water pollution has also increased the death rate among the children in Gaza.

Experts say it would cost over USD 7 billion to rebuild the Gaza Strip.

The Palestinian Economic Council for Development and Reconstruction said on September 4 that the reconstruction process would take "five years if Israel removed its blockade on Gaza entirely."

The Tel Aviv regime started pounding Gaza in early July. Some 2,140 Palestinians, mostly civilians including women, children and elderly people, were killed in the Israeli onslaught. Around 11,000 others were injured.

The latest Israeli war on Gaza ended on August 26, when representatives of the Palestinian resistance fighters and Israel agreed to an Egyptian-brokered ceasefire following indirect negotiations in Cairo.

"Gaza water network malfunctioning due to Israel war", 23/09/2014, online at:

<http://www.presstv.ir/detail/2014/09/23/379758/israel-war-wreaks-havoc-on-gaza-water/>

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❖ **Australia and Israel to be the main country partners for 'India Water Week' next year**

NEW DELHI: Australia and Israel to be main partner countries for third edition of 'India Water Week' during January 13 to January 17 in 2015.

The 'India Water Week' is observed to raise awareness of water conservation issues. It also provides a platform to "elicit ideas and opinion" from decision makers, politicians, researchers and entrepreneurs from across the world in the field of conservation of water resources.

"The Third edition of 'India Water Week' has been scheduled for policy dialogue, stakeholder's consultation and will showcase innovation through exhibition on 'Water Management for Sustainable Development' during January 13-17, 2015 in New Delhi", said Union water resources secretary Alok Rawat.

Making presentation of his ministry on initiatives taken in first 100 days of the Narendra Modi government, Rawat on Friday said, "All aspects relating to water management for sustainable agriculture, drinking water supply, urbanization, industrial and energy development will be discussed".

A large participation of international experts is expected here during the 'India Water Week' next year.

While Australia and Israel have agreed to be the main partner countries, states of Maharashtra, Gujarat, Andhra Pradesh, Karnataka and Sikkim would be "partners for organizing the event".

Union water resources and river development minister Uma Bharti said, "People's participation through concurrent mass awareness programme on water conservation with focus on 'Hamara Jila - Hamara Jal' at all district Head quarters will also be undertaken during the week".

"Australia and Israel to be the main country partners for 'India Water Week' next year", 26/09/2014, online at:
<http://timesofindia.indiatimes.com/india/Australia-and-Israel-to-be-the-main-country-partners-for-India-Water-Week-next-year/articleshow/43543812.cms>

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❖ Grow more food with less water? There's an app for that

With nearly 3 billion people already facing water scarcity, farmers look to both tech and tradition for ways to grow more food with less of an increasingly strained resource

Today some 2.8 billion people face insufficient supplies of fresh water, and according to the United Nations that number is set to increase to half the world's population by 2030. The UN Food and Agriculture Organization (FAO) reports that 40% of the world's food depends on irrigation, which accounts for almost 70% of fresh water used.

It makes sense then that farmers are turning to new and old technology in an attempt to manage their water.

Measure twice, pump once

The old business dogma, “If you can't measure it, you can't manage it”, holds especially true with water usage. But in many places around the world the amount of water diverted from rivers or pumped from the ground to irrigate crops is not measured. Even California groundwater was totally unregulated until this month.

That's a political rather than a technological problem, said Peter Gleick, co-founder of the Pacific Institute, an independent research organization focused on water issues. Flow meters to measure water use are neither new nor expensive, Gleick said. But in many places groundwater has long been considered a property right, so farmers have seen no need measure or justify how they use it.

But with drought and over-pumping dropping water tables, some are beginning to recognize that better water use tracking will help to keep a dwindling resource flowing.

Milwaukee, Wisconsin-based Wellntel, a water technology company, is answering that need with a water-measuring system that uses sound sensors to detect the water level in a well – without touching the water or opening the well. The sensors transmit data to the Wellntel website, where customers can log in to private accounts and see their water level at various points: when pumping, after rainfall, and over time.

In an attempt to mollify farmers, WellIntel specifically touts a farmer's right not to share data on the amount of water used with anyone else.

Waste not, want not

The first place to save water is in conveyance: as much as 60% of the water withdrawn for irrigation is lost through leaks in canals, spillage and evaporation, according to the FAO.

Another part of the problem is flood irrigation – the most common method of field irrigation globally. About half the water on flood irrigated fields isn't absorbed by crops, according to the US Geological Survey. Instead it runs off, taking with it fertilizers, pesticides and topsoil that pollute water bodies around the world and cause dead zones, areas where too much fertilizer causes algae to bloom, which in turn sucks oxygen out of the water, killing other life.

Flood irrigation is commonplace because it's cheap. But in response to strained water supplies, some farmers have made the shift to much more efficient underground irrigation or precision micro-sprinkler and drip irrigation systems that deposit tiny amounts of water directly above the roots of crops. These systems also help farmers earn more money by allowing them to plan more acreage while using less water than before.

The up-front cost of a drip system is significant – about \$500 to \$1000 per acre, according to the FAO. Even though these investments pay for themselves within a few years thanks to better water-use efficiency and lower irrigation-related energy bills, many farmers don't have the cash – or credit access – to install them.

However a Middle Eastern firm has developed a new low-tech solution that also places water right at the roots of crops and can work with or without drip irrigation – and comes with a much smaller price tag.

In Israel, where water scarcity has been a way of life for decades, Tal-Ya (“God's dew” in Hebrew) manufactures trays that capture dew and funnel it to plants, often tree crops. The 28- by 22-inch polypropylene trays trap air underneath themselves as well, insulating plants from extreme temperatures and catching moisture evaporating from the earth to create a perpetually moist soil pocket around the roots. They also block weeds that would otherwise compete with crops for water. Each tray costs \$3 to \$5 apiece.

Mickey Chesla, Tal-Ya's vice president of marketing and sales, said the trays can reduce water use by up to 90% although 50% is more typical. They can also reduce fertilizer use by 30% because the trays direct the nutrient straight to the plant's roots.

While introducing more plastic into the environment might not seem like a great idea, Tal-Ya states that its trays last for up to 10 years and are 100% recyclable. Since beginning commercial production in 2013, farmers in Israel, the United States, China, Chile, Georgia, Sri Lanka, and Australia have adopted them according to the company's web site.

This past spring Tal-Ya was a runner-up in the Imagine H2O food and agriculture competition. Its tray system "improves agricultural yields without increasing resource allocation", said Scott Bryan, Imagine H2O's chief operating officer. "These solutions that enable farmers to produce more with less are proving crucial to surviving the California drought", he said.

Just in time

Another way to avoid waste is to avoid watering when it's about to rain or the soil is still moist. A variety of systems – including Measure-Tek, Ranch Systems and Pure Sense – use weather-monitoring stations and soil moisture probes that send data via radio or cellular signals to a grower's computer or smart phone. Some can be programmed to turn irrigation off and on as needed.

Taking this concept to the extreme, Oakland, California-based Fruition Sciences has created a web application that crunches data from more than 40 sensors to determine whether crops need more water. The system tracks crop nutrient uptake, aerial photos, and weather and soil conditions. One special sensor tracks sap flowing through grapevines.

"People are overwatering", said Thibaut Scholasch, founder and vice president of research and development for the company. "Everywhere we go, from Spain to Argentina to California to Italy to France, we measure a plant response showing that vines are much more resilient than we think."

"We are teaching people to un-train their eyes: drippy-looking leaves do not mean the plant needs water", Scholasch said. "Often it simply means the weather is hot even if there is still plenty of water in the root system."

Fruition Sciences is working with farmers in the Los Angeles Metropolitan Water District on a project to save water. "So far we have saved anywhere from 40% to 100% of water used for

irrigation”, Scholasch said. The range reflects a big swing in how much a grower is over-irrigating as well as the spatial variability and climate dryness of a given vineyard.

The systems aren’t cheap however. Costs range from \$40 to \$5,000 for a “site” which can be as large as 50 acres – if the field is planted with a single crop – but is often much smaller.

The expense has so far limited the appeal of Fruition Sciences’ system to use with wine grapes. But Scholasch said the firm is currently testing the technology with other cash crops.

From restraint to reuse

An even more nuanced way to manage watering is a strategy called regulated deficit irrigation. The goal is to irrigate crops just enough to maximize crop-water productivity by reducing irrigation at the point of diminishing returns. For example, reducing water by 50% might result in a yield reduction of just 10%. Some crops, such as wine grapes and certain nuts, actually benefit from water stress during drought-tolerant life stages.

Regulated deficit irrigation can be implemented with any type of irrigation system. It is sometimes used with rain-fed crops, adding a bit of irrigation during droughts or in sensitive growth stages, such as when the plants are producing vegetation and during final ripening.

Reuse is also growing in appeal, with urban wastewater being lightly treated and directed to landscaping, industry, power plant cooling, groundwater recharge – and crop irrigation.

“In Monterey and Salinas Valley, much of the strawberries and artichokes are grown with recycled wastewater effluent”, said David Sedlak, a professor of civil and environmental engineering at the University of California at Berkeley.

A new technology from Calgary-based Livestock Water Recycling is treating animal waste for reuse on row crops in what amounts to a little sewage treatment plant. The nutrients in the treated sewage benefit the crops by reducing the need for fertilizer inputs, and reduce pollutant runoff because the plants absorb some of the nutrients.

It’s an improvement over the common lagoon system, in which waste sits in a pool for multiple months, to allow solids to settle out before being sprayed on crops. These pools emit toxic gases and can leak into nearby water bodies.

Farmers can also capture flood irrigation runoff and reuse it. This kind of reuse is easier and more cheaply done in organic farming, where the water contains fewer fertilizers and pesticides, than in more conventional agriculture.

And dry-land farmers have developed many strategies to collect rain via barrels and cisterns for direct use, and to resupply groundwater using bioswales (land features that filter water), buffer strips, off-stream storage reservoirs and natural wetlands.

Right-cropping

Not all countries or regions may be able to be self-sufficient in food production. Fifty-one percent of the world's population may rely on food imports in 2050, according to a study last year in Environmental Research Letters. Certain crops need less water and are well suited to dry environments, whereas others such as rice, cotton, or alfalfa – notoriously thirsty crops – are probably better left to wetter regions. Choosing to grow the right crops for the climate – right-cropping – is important in making the most of available water.

Countries in the Persian Gulf are turning increasingly to international food imports after decades of depleting their groundwater.

Israel, too, is spending more of its limited water resources on industries other than agriculture, earning money to buy food internationally. “There may be no countries in the Middle East that have enough water to be self-sufficient in agriculture,” said Gleick of the Pacific Institute.

However, some countries are buying land in wetter countries to grow their food, a practice that can jeopardize local food security, environmental justice and human rights. A study last year in the Proceedings of the National Academy of Sciences found land grabbing inextricably linked to gaining water rights, with 60% taken by the United States, the United Arab Emirates, India, the United Kingdom, Egypt, China and Israel. Forty-seven percent of such land purchases occurred in Africa and 33% in Asia.

There is also a growing debate over whether some non-food crops should be grown at all in an increasingly water-scarce world. Feedstocks for biofuels, for example, take hundreds of gallons of water per gallon of fuel to produce. The International Energy Agency predicts a 317% percent increase in water consumption by biofuel crops by 2035.

Happy soil, happy plant life

While modern industrial agriculture has tended to treat soil merely as a medium that props up plants – first bombing it with insecticides and pesticides, then applying fertilizer to pump up the plants – healthy soil has built-in plant nutrients, absorbs water more deeply and retains it better.

Many traditional agricultural practices – such as reduced tillage, crop rotation, planting cover crops, applying compost, manure, or mulch – nurture the microscopic critters that live in soil. But ways to increase soil moisture and water efficiency are also coming to conventional farming. Polymer soil additions have been researched for 20 years as a means to help soil retain moisture. The idea is that when the farmer irrigates, the polymer absorbs water that would otherwise run off and holds it around the seed.

Bay Area-based mOasis, which produces a soil polymer called BountiGel, claims its product is a significant advance on this concept: it doesn't break down before the plant can use it, said Steven Hartmeir, mOasis' CEO. But it does break down. It's harmless to soil microorganisms because it is highly diluted in the soil at about 10 parts per million, he said.

Made of ingredients already approved for human use and consumption, BountiGel has been approved for use by the California Department of Food and Agriculture. Roda Group, a venture capital firm based in Berkeley, Calif., has invested more than \$5m in mOasis.

In use the polymer has shown the potential for 25% higher crop yields due to decreased stress on plants, 25% reduced water use overall, and 15% savings on water-related energy utilities, Hartmeir said. "We had a tomato grower this year that would normally drip-irrigate every seven days, and with our product, they stretched it out nine to 11 days".

Although BountiGel costs about \$150 an acre, an average grower can generate about \$900 more per acre thanks to increased yield and water savings, according Hartmeir.

The farmers he works with, like farmers nearly everywhere around the world, "need to figure out how to grow more with less water", Hartmeir said. "We have a water problem in California, and it's not going away".

This piece was published in conjunction with Climate Confidential.

Erica Gies is an independent reporter who covers water and energy for The New York Times, The Economist, Scientific American and other publications.

“Grow more food with less water? There's an app for that”, 25/09/2014, online at:

<http://www.theguardian.com/sustainable-business/2014/sep/25/water-scarcity-drought-food-tech-california-israel>

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WWW.ORSAM.ORG.TR

Süleyman Nazif Sokak No: 12-B Çankaya -Ankara/TURKEY
Tel: +90 (312) 430 26 09 Fax: +90 (312) 430 39 48 orsam@orsam.org.tr

❖ Egypt minister visits site of Ethiopia's Nile dam

Egypt's irrigation Minister Hossam al-Moghazi on Sunday paid a visit to the construction site of Ethiopia's Great Renaissance Dam, a project that has in recent years brought tension to relations between the two Nile Basin countries.

Accompanying the Egyptian minister during his five-hour visit, almost the first by an Egyptian official to the site, was Egypt's ambassador to Addis Ababa Mohamed Idriss, a Sudanese four-member delegation, Ethiopia's Water, Energy and Irrigation Minister Alemayehu Tegen and Ethiopia's ambassador to Cairo Mohamoud Dirir.

Following the visit, the three ministers returned to the Ethiopian capital Addis Ababa where they are expected to be part of talks on Ethiopia's multibillion hydroelectric dam.

Dirir described the visit as "important." He said it is a positive step on the way of improving relations between Egypt, Ethiopia and Sudan.

The Ethiopian diplomat added that the ministers of both Egypt and Sudan had seen the construction site of the dam in reality.

"The Renaissance Dam is a civilian project that aims to serve the peoples of the region, particularly the peoples of Ethiopia, Egypt and Sudan," Dirir told Anadolu Agency, noting that the project would seek to generate electrical power.

The water ministers of Ethiopia, Egypt and Sudan are due to meet in Addis Ababa on Monday to discuss the results of the meetings of national experts on future work. The three ministers are also due to discuss the selection of an international consultation firm on the Ethiopian dam.

The \$6.4-billion hydroelectric dam is being built on the upper reaches of the Nile River – Egypt's primary water source.

The project – which Ethiopia says is necessary for its national development plans – has raised alarm bells in Egypt, which relies on the river for almost all of its water needs.

Ethiopia insists the project won't impact Egypt's traditional share of Nile water, which has long been determined by a colonial-era water-sharing treaty that Addis Ababa has never recognized.

Last month, a trilateral committee – comprised of the Egyptian, Ethiopian and Sudanese water ministers – convened in Khartoum where they agreed to form a follow-up committee comprised of water experts from the three countries to discuss the impact of the Ethiopian dam project.

“Egypt minister visits site of Ethiopia's Nile dam”, 22/09/2014, online at:

<http://www.worldbulletin.net/news/144876/egypt-minister-visits-site-of-ethiopias-nile-dam>

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❖ Sudan, Egypt and Ethiopia agree on committee for Nile dam

September 23, 2014 (KHARTOUM) – The Water ministers of Sudan, Egypt and Ethiopia have signed an agreement to form the committee of national experts on the Ethiopian renaissance dam at the end of their fifth round of talks in Addis Ababa.

Last month, a trilateral committee comprised of the Egyptian, Ethiopian and Sudanese water ministers convened in Khartoum where they agreed to form a follow-up committee consisting of water experts from the three countries to discuss the impact of the Ethiopian dam project.

The water ministers' meeting in Addis Ababa on Monday discussed the outcome of the meetings of national experts on future work besides selection of an international consultation firm.

The national experts committee, which is comprised of four experts from each country, will select international experts to work with to conduct two studies on a hydrological simulation model and a trans-boundary economic, social and environmental impact assessment.

The committee has been given a six-month deadline starting September to come up with a timeframe to carry out the reports.

The Egyptian water minister, Hussam Maghazi, said in press statements following the meeting that technical issues such as capacity of the dam and time needed to fill up its reservoir will be decided by the international consultants.

“We are conducting lateral contacts and making efforts [to ensure] that Egypt's water share will not be impacted [by the dam]”, he added

He said each of the three countries will nominate 10 international consultants within ten days; pointing nominations will be discussed in the next round of talks in Cairo between 20 and 21 October in order to select the consultant by consensus.

The \$6.4-billion dam is being built on the upper reaches of the Nile River, Egypt's primary water source.

The project, which Ethiopia says is necessary for its national development plans, has raised alarm bells in Egypt, which relies on the river for almost all of its water needs.

Ethiopia insists the project will not impact Egypt's traditional share of Nile water which has long been determined by a colonial-era water-sharing treaty that Addis Ababa has never recognized.

"Sudan, Egypt and Ethiopia agree on committee for Nile dam", 23/09/2014, online at:
<http://www.sudantribune.com/spip.php?article52509>

❖ Ethiopia, Egypt and Sudan to form dam committee

Water ministers from Ethiopia, Egypt and Sudan have signed an agreement to form a tripartite committee to study Ethiopia's mega dam, currently being built on the Nile's upper reaches. The three ministers have agreed to the terms of reference and procedures regulating the work of a tripartite Technical National Committee (TNC), which includes four experts from each of the three countries, to prepare studies on the Grand Ethiopian Renaissance Dam (GERD), *Anadolu Agency* reported.

The next tripartite meeting will be held in Cairo on 20-21 October 2014.

Ethiopia is building a US\$6.4bn hydroelectric dam on the upper reaches of the Nile River, which is Egypt's primary water source.

Ethiopia, however, said that the project won't impact Egypt's traditional share of Nile water

"Ethiopia, Egypt and Sudan to form dam committee", 25/09/2014, online at:
<http://www.africanreview.com/manufacturing/water-a-environment/ethiopia-egypt-and-sudan-to-form-dam-committee>

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❖ Egyptian, Sudanese officials visit site of Grand Ethiopian Renaissance Dam

ADDIS ABABA, Ethiopia – The Ethiopian News Agency says Egypt's irrigation minister has toured the site in western Ethiopia where the country is building a controversial dam on the Blue Nile River.

The Ethiopian agency said Monday that Hossam El-Moughazi's visit Sunday marked the first time that an Egyptian official has been able to visit the site of the \$4.2 billion hydro-electric project named the Grand Ethiopian Renaissance Dam.

Egypt, Sudan and Ethiopia are currently holding talks aimed at reducing tension over the dam. Ethiopian officials have previously said they have arrested Egyptian citizens who allegedly entered the country illegally and tried to reach the site of the dam.

Egypt reportedly fears that the dam will diminish its share of the Nile, which provides almost all of the desert nation's water needs.

“Egyptian, Sudanese officials visit site of Grand Ethiopian Renaissance Dam”, 24/09/2014, online at:
<http://nazret.com/blog/index.php/2014/09/24/egyptian-sudanese-officials-visit-site>

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❖ **Ethiopia: Minister Says Egypt Keen to Boost Cooperation With Ethiopia**

Egypt's Minister of Water Resources and Irrigation, Dr. Hossam Moghazy, said Egypt is desirous to scale up its relations with Ethiopia in various areas of cooperation.

Ethiopia and Egypt have a very longstanding relations dating back to several thousand of years.

Most of all, the River Nile has been and will be the reason for the strong ties between the peoples of the two countries.

Yet, the two countries' relations are not confined to the river; bilateral economic cooperation has for long been the other face of their relations.

More than 67 Egyptian projects with a combined capital of over 1.5 billion Birr are currently operating in Ethiopia.

Dr. Hossam Moghazy was in Ethiopia to partake in the Tripartite National Committee that happened from the 20 to 22 September 2014.

Talking to EBC, the minister said Egypt is keen to intensify its relations with Ethiopia in different sectors.

Speaking about the issue of GERD, he expressed conviction that the dam should be a source of cooperation rather than a bone of contention.

Dr. Moghazy is the first Egyptian Minister to visit the construction site of GERD. He said the visit he paid on Sunday has boosted confidence between the two countries.

In his message, the minister assured Ethiopians of Egypt's positive attitude towards ongoing development endeavors in the country.

While in Addis, the minister signed the Terms of Reference and the rules and procedures of the Tripartite National Committee with his Ethiopian and Sudanese counterparts.

“Ethiopia: Minister Says Egypt Keen to Boost Cooperation With Ethiopia”, 24/09/2014, online at:

<http://allafrica.com/stories/201409250826.html>

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❖ Drought Worsens China's Long-Term Water Crisis

The corn has grown to only half its normal height on Yan Shuqin's ranch in the hills of Inner Mongolia this year, as a swath of northern China suffers its worst drought in 60 years.

The ruddy-faced woman said that even before the rains stopped, the groundwater in her region had been sinking, from 20 meters (about 70 feet) below the surface just a few years ago to as much as 80 meters (260 feet) this past summer. While she can still eat and sell the corn, lettuce and other vegetables on her farm, the yield has shrunk.

"If the grass doesn't grow and the vegetables die off, who's going to be able to live here?" Yan asked outside her family's spotless two-room house. "My mother and her mother lived here. My family has always lived here. What are my children going to do?"

After a season of record-breaking drought across China, groundwater levels have hit historic lows this year in northeast and central parts of China where hundreds of millions of people live. Reservoirs grew so dry in agricultural Henan province that the city of Pingdingshan closed car washes and bathhouses and extracted water from puddles.

But this is no one-time emergency. Farmers like Yan and water-hungry industries have been wrestling with a long-term water crisis that has dried up more than half the country's 50,000 significant rivers and left hundreds of cities facing what the government classifies as a "serious scarcity" of water.

Half a billion Chinese live in a handful of provinces, largely in the northeast, where coal-fired power plants, steel foundries and other water-gulping industries already burden reservoirs and aquifers. Widespread chemical runoff and other pollution have contaminated 60 percent of the country's groundwater.

The country's climate is also warming, particular in its populous northeast where rain levels have fallen, according to a 2011 study by Chinese, French and British researchers. Meanwhile, the

country's south has seen its rainfall concentrated in shorter bursts, which has made it harder to predict water supplies.

As a result, per capita water availability in the megacities of Beijing and Shanghai as well as their surrounding provinces equals that of dry Middle Eastern countries such as Israel and Jordan, said Feng Hu, a water analyst with the Hong Kong-based research group China Water Risk. By comparison, the average U.S. household has access to nearly five times more available water than Chinese households do.

"If we continue with our business-as-usual model, the demand will exceed supply by 2030," Feng said in a lecture in Beijing last month. "The water crisis is a real risk."

Already, Chinese farmers have lost an estimated \$1.2 billion this year due to drought, while China has slowed plans to tap its vast deposits of shale gas, which sit in areas with the greatest scarcity. The water crisis is also hitting China's main energy source, coal, which requires large amounts of water to extract and convert into power.

Heavy rains over the past week helped lift some of the immediate crisis in central China, flooding cities that just days earlier had been struggling to keep taps flowing. But fields remain bone-dry and parched in Inner Mongolia and other northern regions.

In response to the country's water woes, Chinese authorities have called for solutions that include relying more on imports for foods that require lots of water to produce, such as grains and vegetable oils.

They also are betting on more than 2,400 kilometers (1,500 miles) of canal that when completed will move trillions of gallons of water from the rivers of China's south to its dry north. One branch of the canal leading straight to Beijing is expected to be done this fall.

Many water experts remain skeptical about the project, however, with some warning it could wreak havoc on southern aquifers and watersheds.

But Fuqiang Yang, a senior adviser with the U.S.-based National Resources Defense Council, said the canal could relieve water shortages in some northern cities such as Beijing, if launched with conservation and water reuse measures. Without the canals, metropolitan Beijing only has enough water for 15 million people, not the 20 million who now live there, he said.

"This has always been a regional problem," Yang said. "Groundwater is going down very quickly ... These areas will not be able to solve the problems themselves. So this canal will provide some important help there."

But Feng said Chinese authorities also need to encourage conservation by ending its subsidization of water consumption by all users, from households to farmers to industries. The average price of residential water in Beijing, for example, is a fifth of that in New York. And although China's per capita consumption rate still falls below the global average, it is rising steadily as the country's economy expands.

Industry and agriculture make up 85 percent of China's water consumption.

"For something so scarce, water in China is not priced at the level it should be," Feng said.

The canals still won't help farmers in remote regions such as far western Xinjiang and Inner Mongolia where the drought has hit the hardest. Despite the arid conditions there, China's government actually hopes to stimulate more water-dependent industries such as coal-fired energy production that will compete with farmers for meager resources.

In Hexingten county in Inner Mongolia, people say they've already seen radical climate shifts. Last winter went by without any significant snows to replenish streams and groundwater, followed by a drought-plagued spring and summer.

A 40-year-old farmer in Hexingten who would only identify himself by his family name of Bao said everyone there is wondering how long they can survive in these grasslands.

"The environment was good before," Bao said. "The grasses grew so tall. Now, it doesn't even rain anymore."

"Drought Worsens China's Long-Term Water Crisis", 24/09/2014, online at:
http://abcnews.go.com/International/wireStory/drought-worsens-chinas-long-term-water-crisis-25718407?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=b593b8b60a-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-b593b8b60a-250657169

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WWW.ORSAM.ORG.TR

Süleyman Nazif Sokak No: 12-B Çankaya -Ankara/TURKEY
Tel: +90 (312) 430 26 09 Fax: +90 (312) 430 39 48 orsam@orsam.org.tr

❖ Arab Spring a curse on environment

The ecosystems and biodiversity are the real victims of military conflicts in many Mena countries such as Syria, Iraq, Yemen and Libya

About three years ago, I wrote a policy briefing that was published by the Middle East Institute, titled ‘Middle East Revolutions: An Environmental Perspective’. The key message was that environmental challenges and problems related to water, food, air, waste management etc as well as the unfair distribution of wealth derived from natural resources were the root causes of the uprisings in the Middle East. I also warned that if the environmental problems are not solved, one could expect more waves of unrest across the region. I had hoped that the Arab Spring would lead to better environmental governance, and social equality. And that in turn would lead to prosperity, a better quality of life and contentment among citizens in the region.

Sadly, after nearly four years, the Arab Spring has turned out to be a real curse on environment and natural resources across the Middle East and North Africa (Mena) region. There is massive destruction of ecosystems and a severe depletion of the already scarce natural resources, as well as corruption and theft of natural assets and heritage. Besides, fertile land is eroding. Soil, water and air pollution have become the norm; noise and garbage are everywhere. It is really very ironic because Islamic teachings call for protection of natural resources and environmental stewardship. It is even considered a religious duty to protect the environment and natural resources. Failing to do so, as a Muslim, is considered to be a sin.

In Syria, for instance, one can see that the very low precipitations and drought are among the first modern events in which a climactic abnormality has resulted in mass migration. This has created what are called “environmental refugees” (water refugees in this case). This has resulted in widespread deterioration of agricultural harvests and led to food insecurity and contributed to state instability. Currently, the environmental situation has deteriorated further not only because of low rains, but also because natural resources have been polluted and/or looted as a result of the military conflict in Syria.

The ecosystems — which are already fragile in the Mena region — and the biodiversity are the real victims of the military conflicts in many Mena countries such as Syria, Iraq, Yemen and Libya. Military operations lead to the destruction of soil, rendering it unsuitable for agriculture and for habitation. Whoever the ultimate ‘winner’ might be, the environment is the real victim, especially nowadays when humanity has many weapons of mass destruction.

Across Iraq and Syria many churches, mosques, museums and statues have either been destroyed or looted by the Islamic State of Iraq and the Levant (Isil). In addition, Assyrian monuments in Syria are being ruined. That is apart from the destruction of statues of musicians, poets and thinkers because they represent a different ideology than that of Isil. Sadly, all these treasures, many built more than 5,000 years ago, are being looted or destroyed. This is a loss not only for Iraq, Syria and the Arab region, but also for human heritage and civilisation.

Almost all Arab countries are suffering from water scarcity. In addition, the very poor water governance in the region has led to many disputes/tensions, between sectors and governorates and even between neighbouring countries. Libya, for instance, was and is still suffering from water insecurity. And despite the fact that the Muammar Gaddafi regime initiated the “great artificial river project”, which depends on withdrawing water from the shared underground aquifer between Libya, Chad, Sudan and Egypt, the sustainability of the project is in deep doubt after the depletion of the available water in the reservoir.

After almost four years of Arab uprisings, it is very obvious that the economy still has the same brown colour, which proved to be a total failure in almost the entire Mena region. Unless the region adopts greener economic policies at least in some key sectors, like the energy sector, one can expect no improvement at all. Problems such as pollution, social inequalities and unemployment will continue and are even expected to increase, making these countries more vulnerable to socio-economic unrest.

However, one still hopes that the Arab Spring and the socio-political transformations in the region will represent a real opportunity for reforms and reconsideration of developmental priorities, notably social justice and job creation, as well as the adoption of green economy as a tool to achieve sustainable development. Any government in the region, if it really wants to address and resolve the reasons behind the unrest and stabilise these societies, must solve the environmental issues first. Otherwise, the environmental problems and conflict over natural resources will be the catalysts for further instability and tensions in the Middle East.

Dr Mohamed Abdel Raouf is an independent environmental researcher.

“Arab Spring a curse on environment”, 23/09/2014, online at: <http://gulfnews.com/opinions/columnists/arab-spring-a-curse-on-environment-1.1388999>

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❖ Studies to highlight effects of desalination plants

Durban - Scientists have been asked to investigate whether hyper-salty waste from two new sea water desalination plants could damage or alter the marine environment along the KwaZulu-Natal coastline.

The studies, to be co-ordinated by the CSIR, are part of a proposal by Umgeni Water to build either one or two desalination plants to boost Durban's dwindling fresh water supplies.

One of the studies will examine the potentially harmful environmental impacts of pumping large volumes of hyper-salty water back into the sea near oThongathi and at Lovu.

Each desalination plant would process about 330 million litres of sea water a day to generate about 150 million litres of drinking water daily using a reverse osmosis filtering system. The remaining brine water (about 180 million litres a day) would be pumped back into the sea.

The brine was expected to be about 1.7 times more salty than average sea water, but this was likely to be diluted and mixed rapidly to reach normal sea salinity levels within about 10m of the dispersal nozzles. As a result, potential environmental impacts were likely to be restricted to a small area closest to the dispersal pipeline.

Detrimental

Nevertheless, the CSIR acknowledged in a draft report last week that brine disposal caused "significant detrimental effects" on coastal environments in parts of the Middle East and other low-energy coastlines with shallow water levels.

This was because the brine sank and smothered the seabed unless it was dispersed rapidly by currents.

Some studies undertaken in the early 1990s have suggested that brine discharges caused reductions in some fish populations, and die-offs of plankton and coral in the Red Sea.

In 2007, Spanish researchers also documented significant changes to the composition of sea creatures close to the Alicante desalination plant off the coast of Spain.

Apart from the impact of high salinity levels, the CSIR has also recommended further studies into the effect of different water temperatures on marine life, since the brine water discharges were likely to be about 1.5C above the normal sea temperature.

The brine is also likely to contain small volumes of clay, sand and other tiny marine creatures, along with biocides, coagulants and anti-scaling agents such as sulphuric acid that are used to clean the desalination equipment about three times a year.

1 Public meetings about the project will be held at the Amanzimtoti Civic Centre at 5pm on October 7, and at the Tongaat Town Hall at 5pm on October 8.

“Studies to highlight effects of desalination plants”, 26/09/2014, online at:

http://www.iol.co.za/scitech/science/environment/studies-to-highlight-effects-of-desalination-plants-1.1756535#.VCkQifl_tz8

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❖ **China says first-half results exceed target for cutting water pollution**

(Reuters) - [China](#) is on track to exceed its 2014 target for cutting water pollution, the government announced on Wednesday, amid reports that it plans a \$326 billion action plan to clean up its rivers and lakes.

A lack of environmental oversight during decades of economic growth has caused a dire water crisis in [China](#), as toxic waste from factories has left 70 percent of rivers and lakes and over half its groundwater polluted.

But in the first six months of this year, emissions of ammonia nitrogen and chemical oxygen demand (COD, a measure of organic pollutants in water) fell 2.7 and 2.3 percent, respectively, the Ministry of Environmental protection announced on its website Wednesday.

The overall target for 2014 is a 2 percent cut.

While the rate of emission cuts is modest, experts expect steeper reductions as recently adopted standards take effect.

"With more stringent waste-water discharge standards in some sectors, we should expect to see further reduction ... in the future," said Debra Tan, director of Hong Kong-based think-tank China Water Risk.

But the new rules might cause problems from some big-polluting sectors already battling a slowing economy.

"For the textiles sector, the new standard will come into effect in 2015 and since there is no cheap way to clean up, smaller factories may face difficulties in complying with the new regulations."

The data came as the state-owned China Securities Journal reported that the ministry is readying a 2 trillion [yuan](#) (\$326 billion) plan to clean up polluted water, including waste water deemed so polluted it is not even fit for industrial use.

The MEP was not immediately available for comment.

Some regions in China, especially the north, is naturally short of water, and with the added stress of widespread pollution experts say food production and **energy** generation could be threatened unless the government takes action.

China has already launched a \$63 billion project to transfer water from the water-rich southern and central parts north to Beijing and other under-pressure regions.

“China says first-half results exceed target for cutting water pollution”, 24/09/2014, online at:
http://www.reuters.com/article/2014/09/24/us-china-water-idUSKCN0HJ0FF20140924?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=b593b8b60a-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-b593b8b60a-250657169

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❖ Modi Pursues 1980s Plan to Solve India's Water Shortages

Prime Minister **Narendra Modi** is trying to make good on his promise to tackle India's water woes. He isn't the first Indian leader to make such a vow.

Indira Gandhi was among the previous prime ministers who tried even though she was skeptical of mega-dam projects. She approved the \$1.2 billion **Tehri dam**, India's highest in the Himalayan foothills, while saying it "will benefit only the contractors." Construction began in 1978, and 100,000 people whose lands and homes were to be submerged by reservoir waters were relocated. The dam didn't open until 2006.

Now one of the Modi government's bigger initiatives will be to start implementing a three-decade-old plan to connect 30 rivers, the priciest step yet to begin solving some of the water, sewage, health and pollution issues that bedevil **India**.

Asia's third-biggest economy, home to 18 percent of the global population, within six months will begin to link the Ken and Betwa rivers in northern India that flow through **Uttar Pradesh**, its most populous state, the director-general of the **National Water Development Agency**, S. Masood Husain, said in an interview in New Delhi. It's part of plans estimated a decade ago to cost \$92 billion to connect the waterways.

The projects linking 14 rivers from the Himalayas and 16 across the India peninsula are to bring waters from one area with plentiful supplies to others with not enough, aiding farmers and helping with supply shortfalls and contamination.

The first river link was approved in July by Modi's cabinet, which is under a mandate from the new government to start cleaning the Ganges River, India's holiest waterway.

Not everyone sees the water projects as beneficial.

Ignores ‘Reality’

The river link “ignores the reality that the mainstay of India’s water needs is groundwater and is going to remain for many years to come,” said Himanshu Thakkar, coordinator at Delhi-based **South Asian Network on Dams, Rivers and People**. “River-linking will not help sustain our groundwater lifeline; on the contrary, it will make the situation worse.”

India extracts 230 cubic kilometers of **groundwater** every year, the world’s largest user of the resource, according to the **World Bank**. In comparison, the U.S., suffering droughts in California and **Texas**, uses about 111.7 cubic kilometers of groundwater a year.

With access to just 4 percent of global water resources, India is trying to move forward as it runs the world’s biggest **food subsidy program** and plans to increase irrigated land to grow more crops for its population by connecting the rivers.

The government’s river-revival plan in essence is looking to cut dependence on groundwater, source of 85 percent of the drinking water and 60 percent of irrigation in India, by relocating water.

Abundance, Deficit

Channeling water from abundant basins to deficit ones with dams and canals is intended to add 35 million hectares (86 million acres) of irrigated farmland and 34,000 megawatts of electricity, enough to power three cities the size of **New York**.

When the river-linking plans were first readied in 1980, “the main stumbling block” was building consensus, Husain said of the **National Perspective Plan** his agency prepared.

Now the government wants to complete its river-linking projects in 10 years, Water Minister Uma Bharti said.

That's an ambitious plan as not all states agree with sharing water and environmental fears exist. The plan to build the river links also goes "against the declared objective of river rejuvenation," according to Thakkar.

Water resources are governed by state governments under India's constitution. As a federal union of 29 states, the nation has yet to implement even one of the proposed links and costs are likely to be much more than the estimated 5.6 trillion rupees (\$92 billion) calculated a decade ago, according to Husain.

Sardar Sarovar Project

"It's not the first time that India will attempt inter-basin transfers," Husain said. "Water from surplus basins have been transferred to deficit ones before." He cited the **Sardar Sarovar** project that transfers waters from the Narmada River in central India across four states.

Sardar Sarovar is a single dam, Thakkar said. "Each of the 30 schemes have multiple dams with interstate, and some with international, implications," he said.

Linking the Ken and Betwa rivers, which also flow through **Madhya Pradesh**, will bring drinking water to 1.35 million people and irrigate 600,000 hectares of land, according to Husain.

While his agency has submitted a detailed project report to two states, work cannot start until India's environment ministry approves the plan because 7 percent of the **Panna** tiger reserve would be submerged.

Water for Diversion

"We don't see how this project and the other river-linking projects will help us," said Ashish Sagar Dixit, who heads **Prawas**, a rural advocacy group in Banda on the banks of the Ken. "Both river basins have been facing droughts in the past four to five years."

The Ken has little water left for diversion, Dixit said in a phone interview on Sept. 9. Growing industries using the waters and urbanization put pressure on the rivers.

According to Unicef's 2013 water and sanitation **report**, about 71 percent of India's water resources are available to only 36 percent of the area while the remaining 64 percent has the balance, or 29 percent available.

Meanwhile, cost estimates for the links have risen greatly, Husain said. Each will involve building large dams and canals. In many places the government will need to compensate for loss of land and livelihoods too, he said.

In 2006, the government estimated the two-phase Ken-Betwa **project** to cost 76 billion rupees. That was revised to almost 94 billion rupees in 2008.

Government Funding

Modi's government will fund 90 percent of the Ken-Betwa and subsequent projects, with states providing the rest. India may also consider private sector investments for certain projects, according to Husain.

The government-run Water Agency, which employs about 150 engineers, has also completed work on project reports for the **Damanganga-Pinjal** river link in the western states of Gujarat and Maharashtra, Husain said.

Reports on connecting the Par, Tapi and Narmada rivers in the same states will be finished by March, he said.

It may take longer for Modi's government to bring about the water changes it envisions, though.

“The Ken-Betwa link has none of the statutory clearances and I do not think they will get it in six months,” Thakkar said. Husain on the other hand expects the projects to move faster.

“Our water needs are becoming bigger,” he said. “India can’t afford to lose more time.”

“Modi Pursues 1980s Plan to Solve India’s Water Shortages”, 23/09/2014, online at:

http://www.bloomberg.com/news/2014-09-23/modi-pursues-1980s-plan-to-solve-india-s-water-shortage.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=b593b8b60a-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-b593b8b60a-250657169

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❖ Morocco Courts Private Capital for \$27 Billion Water Plan

Morocco will let private capital take the lead in developing desalination and irrigation projects as part of a \$27 billion plan designed to lessen the stress on its water resources, Minister Charafat Afilal said.

The National Water Plan provides for an additional 5 billion cubic meters in water resources by 2030, as much volume as what flows over Niagara Falls in 24 days, the water minister said in an interview at her office in Rabat.

“The plan aims to address an expected rise in the national water deficit from 3 billion to 5 billion cubic meters in 2030,” Afilal said Sept. 19. The investment will maintain Morocco’s annual average for water availability at its current 700 cubic meters per capita as the population increases.

“Morocco has always had a water deficit, which explains how aquifers have been subject to abuse over the last few years,” said Afilal, a hydraulics engineer and one of five women in the 39-member cabinet of Islamist Prime Minister **Abdelilah Benkirane**.

The plan, whose cost is almost twice the total public investment budgeted for 2014, will rely mostly for financing on long-term concessions open to private operators.

Wasteful irrigation practices have been blamed for some inefficiencies and loss in the country’s agricultural industry.

“The government will raise the amount of its annual contribution to the water sector but operators will be shouldering a greater proportion of the costs incurred under this plan, whether it’s the investment or the running cost of the facilities they develop,” Afilal said.

‘Pay for Water’

Consumers “should pay for the water they use,” she said.

The government subsidizes the cost of drinking water by 2.3-2.5 dirhams per cubic meter but only for households whose monthly consumption is less than six cubic meters.

The subsidy is above what some regional independent utilities, such as in the resort of Marrakesh, charge households for up to 8 cubic meters but barely covers two-thirds the tariff in the drier eastern city of Oujda.

Morocco, where tourism has doubled since 2000, is prone to drought and heavily dependent on rainfall. Its agricultural industry employs almost 40 percent of the 11 million workforce. Pressure on water resources in such places as Marrakesh led to clashes in 2012 over rising costs.

“The water plan was elaborated in close cooperation with the agriculture department, which accounts for 80-90 percent of total water usage in Morocco. They agree on the need to shift to less thirsty crops but there is also a need to revamp the predominantly wasteful irrigation systems,” Afilal said.

No Watermelons

The growing of watermelons for instance was banned last week in the southern desert region of Zagora by her department and the agriculture ministry after aquifers fell to such levels it affected the salinity and quality of the water, she said.

Half of the 5 billion cubic meters Morocco hopes to gain from the plan will be through economies in consumption mostly by modernizing agricultural irrigation systems.

“The scope for broadening the use of drip irrigation is huge in Morocco where farming irrigation is generally traditional and wasteful,” she said.

The other 2.5 billion cubic meters will come from a half-dozen new desalination plants in build-operate-transfer partnerships between private operators and the state utility Office National de l'Eau et l'Electricite.

ONEE, which hitherto dominated the production of drinking water, signed a partnership in June for the first of the desalination plants with a consortium that includes [Abengoa SA \(ABG\)](#) of Spain and InfraMaroc, an affiliate of Rabat-based Caisse de Depot et de Gestion, Morocco's biggest pension fund.

The agreement allows the group for 20 years to sell to ONEE the water it produces from a 100,000-cubic-meter a day desalination unit near Agadir it's building.

North-South Canal

Another major project is a north-south waterway that Afilal said may carry 800 million cubic meters of water each year from the wetter north mostly to Casablanca, the biggest city and industrial center, as well as farming areas in the Rhamna region.

"It will cost 30 billion dirhams. We had a preliminary study and are currently in the phase of detailed studies which can take up to five years," Afilal said.

Prime Minister Benkirane has described the canal project as "huge and strategic" and said once completed it would exempt Morocco from the need to import wheat.

"Morocco Courts Private Capital for \$27 Billion Water Plan", 23/09/2014, online at:
http://www.bloomberg.com/news/2014-09-23/morocco-courts-private-capital-for-27-billion-water-plan.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=2a11b95d13-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-2a11b95d13-250657169

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❖ Experts Warn of Dire Consequences as Lake Victoria's Water Levels Drop Further

KAMPALA, Sep 23 2014 (IPS) - Over the years, Cassius Ntege, a fisherman from Kasenyi landing site on the Ugandan side of Lake Victoria, has observed the waters of the lake receding. And as one of the many who depend on the lake for their livelihoods, he has had to endure the disastrous consequences of the depleting lake.

Ntege told IPS that he first started going to the lake as teenager to fetch water for domestic use, then as a fisherman, and now as vice chairperson of the beach management unit — a body set up by the government to curb illegal fishing and stop depletion of fish stocks from the lake.

But the declining water levels of Lake Victoria have become his daily concern.

Expected changes of plus or minus 10 percent from present annual rainfall totals may seem minimal, but it's the shift in water patterns that are of concern.

“Look, where that wooden kiosk is placed was previously centre of the lake and now traders have put shops and food kiosks there,” said Ntege as he pointed to the wooden and metallic structures placed about 50 metres into where the lake waters used to be.

There are many traders operating businesses at Kasenyi landing site, which lies about 30 km from the country's capital, Kampala. And for them, a drop in water levels means additional land to set up shop.

Ntege, like many fishermen here, believes the decline in Lake Victoria's water levels is because of the effect of wind blowing across the waters from the land — a phenomenon known locally as “Muguundu”.

But climate experts state in the [Intergovernmental Panel on Climate Change \(IPCC\) Fifth Assessment Report](#) that a rise in global temperature is what is affecting rainfall patterns over Lake Victoria — and the worst is yet to come.

The report states that increased warming in the western Indian Ocean and precipitation over the ocean system will bring about climate extremes in East Africa and increase precipitation during the short rainy season.

Professor Hannes Rautenbach from the [University of Pretoria](#), and one of the authors of the report, told IPS that temperatures are projected to rise by +2°C in the next 50 years, and by +2.5°C in about 80 years. This, he said, would alter rainfall patterns over Africa's biggest fresh water lake that is shared by the East African countries of Uganda, Kenya, Tanzania.

Changes in sea surface temperatures in distant tropical oceans will strongly influence annual rainfall amounts and timing, Rautenbach said. He said expected changes of plus or minus 10 percent from present annual rainfall totals may seem minimal, but it's the shift in water patterns that are of concern.

"The rain belt over Uganda will shift, in that areas like in the Northwest and Western regions, which have been receiving minimal rains, will receive more rains compared to the Lake Victoria region," Rautenbach explained.

Lake Victoria, which has been receiving high volumes of rainfall, will experience a 20 percent drop in rainfall from present. This, coupled with evaporation due to an anticipated temperature rise of about 1°C over Lake Victoria, will cause a drop in water levels very soon.

East Africa is also projected to experience a change in mean annual precipitation. This will result in increased rainfall over the short September to November rainy season and it will mean that the long rainy season, which takes place between March and May, will reduce. This will negatively impact Uganda's farmers particularly those in areas where [vital crops such as coffee](#), tea, cotton and maize are being grown.

Youba Sokona, chair of the [IPCC Working Group III](#) that looked at possible mitigation measures, advised that the Uganda government invest in research for varieties to withstand the changing climate.

"Crops varieties as we know them today could not withstand the change and Uganda like other East African governments has no option but to race against time and fund research into new varieties," said Sokona.

The Ugandan government, however, say they are taking the warning seriously and are developing strategic interventions to mitigate the effects.

Dr. Anuciata Hakuza of the [Ministry of Agriculture, Animal Industry and Fisheries](#), said strategic interventions include promoting and encouraging highly adaptive and productive crop varieties and cultivars in drought-prone, flood-prone and rain-fed crop farming systems.

She said other adaptation strategies that the government was working on include highly adaptive and productive livestock breeds, conservation agriculture and ecologically compatible cropping systems to increase resilience to the impact of climate change.

Hakuza said the government was also promoting sustainable management of rangelands and pastures through integrated rangeland management.

Uganda's climate change policy also provides support for community-based adaptation strategies.

Dr. Chebet Maikut, one of Uganda's negotiators to the [Conference of the Parties](#), told IPS that there are plans to develop innovative insurance schemes, such as low-premium micro-insurance policies, and low-interest credit facilities to insure farmers against crop failure and livestock loss due to droughts, pests, floods and other weather-related events.

"Traditional finance institutions have already been reluctant to fund farming so as the risks grow even further due to climate change there will be need to develop insurance policies," he said.

Uganda also plans to promote irrigated agriculture, and improved post-harvest handling, storage and value-addition in order to mitigate rising climate-related losses and to improve food security and household incomes.

Maikut argued that all these plans require huge investments. He said in addition to the funds that Uganda was making available out of its national budget, developed countries should also be willing to make contributions.

"Experts Warn of Dire Consequences as Lake Victoria's Water Levels Drop Further", 23/09/2014, online at: http://www.ipsnews.net/2014/09/experts-warn-of-dire-consequences-as-lake-victorias-water-levels-drop-further/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=2a11b95d13-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-2a11b95d13-250657169

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❖ **Tanzania Plans for \$3.3 Billion in Water Projects, Daily Says**

Tanzania will extend piped water supplies throughout most of its cities and cut leakages by more than half in the second stage of a development program, the Daily News reported, citing Water Minister Jumanne Maghembe.

The government and donors will finance 5.6 trillion shilling (\$3.3 billion) of water-infrastructure projects, Maghembe said, according to the Dar es Salaam-based newspaper.

Under the plan, access to clean water in urban centers will climb to 95 percent from 68 percent, while seepages will decline to 25 percent from 55 percent, the newspaper reported.

“Tanzania Plans for \$3.3 Billion in Water Projects, Daily Says”, 23/09/2014, online at:

http://www.bloomberg.com/news/2014-09-23/tanzania-plans-for-3-3-billion-in-water-projects-daily-says.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=2a11b95d13-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-2a11b95d13-250657169

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❖ **Zimbabwe to Sell Bond to Complete Dam Construction, Herald Says**

Zimbabwe plans to use the proceeds from a proposed bond sale to complete construction of the Tokwe-Mukosi dam that will help manage water supplies and generate hydropower, the state-run Herald newspaper reported.

The government requires \$82 million to pay for construction that's already been done, and \$39 million for further work, the Harare-based newspaper reported, citing water and finance ministers, Saviour Kasukuwere and Patrick Chinamasa. Urgent work, costing \$13 million, must be completed before the rainy season starts in November, Chinamasa said.

The government plans to raise the debt "soon," Kasukuwere said, without specifying the amount or tenure.

Independent power producers are encouraged to run a 12-megawatt mini-hydropower plant stationed at the dam that will send electricity to the national grid, said Kasukuwere.

The \$200 million Tokwe-Mukosi dam is on the southern African nation's second-largest body of water, along the border it shares with Zambia. A 90-meter wall will hold 1.8 billion cubic meters of water.

About 4,400 families were evacuated from the area in February after rising water levels threatened their homes and a dam wall shifted under the weight of water.

"Zimbabwe to Sell Bond to Complete Dam Construction, Herald Says", 22/09/2014, online at:
http://www.bloomberg.com/news/2014-09-22/zimbabwe-to-sell-bond-to-complete-dam-construction-herald-says.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=2a11b95d13-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-2a11b95d13-250657169

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❖ Could Water Scarcity Prompt A Battle Between U.S. and Canada?

Is water so scarce that it could lead to war between the U.S. and Canada over ownership of the valuable substance?

Post Media's Canada.com recently reported: "Canada must prepare for diplomatic water wars with the U.S., as demand on both sides of the border grows for this vital but ultimately limited resource, says Gary Doer, Canadian ambassador to the United States."

He said the problem is so pressing that in five years it will make other public debates look "silly."

"I think five years from now we will be spending diplomatically a lot of our time and a lot of our work dealing with water," he said in the report. "There will be pressure on water quality and water quantity."

Canada is rich in water resources. The country "happens to control over 21 percent of the world's supply of fresh water," a *TreeHugger* column recently noted. The Great Lakes, located on the U.S.-Canada border, contain 84 percent of North America's surface fresh water, the column said. They "are protected by treaty and the USA cannot simply stick a straw in it. Or can they?" the column asked.

Canada's ambassador is not alone in forecasting colossal future conflicts over water. Just ask three successive United Nations secretaries general.

Back in 1985, Boutros Boutros Ghali said, "The next war in the Middle East will be fought over water, not politics," according to BBC News.

Kofi Annan said in 2001: "Fierce competition for fresh water may well become a source of conflict and wars in the future," per an announcement by United Nations University, an academic and research arm of the U.N.

Ban Ki Moon said in 2007: "The consequences for humanity are grave. Water scarcity threatens economic and social gains and is a potent fuel for wars and conflict."

Blood has already been shed in the Middle East over water.

"There is a water war going on in the Middle East this summer. Behind the headline stories of brutal slaughter as Sunni militants carve out a religious state covering Iraq and Syria, there lies a battle for the water supplies that sustain these desert nations," *Yale Environment 360* reported.

The sides are fighting "to capture the giant dams that control the region's two great rivers, the Tigris and Euphrates. These structures hold back vast volumes of water. With their engineers fleeing as the Islamic State (ISIS) advances, the danger is that the result could be catastrophe — either deliberate or accidental," the report said.

"Could Water Scarcity Prompt A Battle Between U.S. and Canada?", 25/09/2014, online at:
<http://www.wateronline.com/doc/water-scarcity-could-it-prompt-a-u-s-canada-war-0001>

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❖ The risks PH faces due to climate change

MANILA, Philippines—The Philippines could face more food and water shortages, more poverty, and more droughts and floods if climate change persists.

The Philippines is ranked sixth in the 2011 Climate Change Vulnerability Index (CCVI) released by global risks advisory firm Maplecroft and is considered as among those facing “extreme risk.”

“We have abundant evidence that we are changing our climate. The atmosphere and oceans have warmed, the amounts of snow and ice have diminished, and sea level has risen,” Rajendra Pachauri, Chairman of the IPCC, said in his opening statement at the United Nations (UN) Climate Summit.

“The longer we wait the higher the risk of severe, widespread and irreversible impacts such as food and water shortages, increased poverty, forced migrations that could increase the risk of violent conflict, extreme droughts and floods, the collapse of ice sheets that flood our coastal cities, and a steady rise in our death toll, especially among the world’s poorest,” Pachauri said.

IPCC recently released their Fifth Assessment Report on Climate Change written by scientists from all over the world which found clear and compelling evidence that human activity is the root cause of global warming due to rising greenhouse gas emissions.

President Benigno Aquino III spoke during the summit saying that the Philippines will be greatly affected by climate change despite being among the lowest greenhouse gas emitters in the world.

“It would not be an exaggeration to say that Filipinos bear a disproportionate amount of the burden when it comes to climate change,” Aquino said.

Supertyphoon “Yolanda” (international name: Haiyan), which devastated several provinces in the Visayas region, has repeatedly been cited as among the signs of climate change after it broke the record as the strongest typhoon to make landfall in history.

“There is growing evidence climate change is increasing the intensity and frequency of climatic events,” Anna Moss, Environmental Analyst at Maplecroft, said in their 2011 CCVI statement.

“Very minor changes to temperature can have major impacts on the human environment, including changes to water availability and crop productivity, the loss of land due to sea level rise and the spread of disease,” she said.

The attendees at the UN Climate Summit were urged to institute reforms in energy as soon as possible no matter the cost in order to slow down climate change.

“We already have the means to build a better, more sustainable world. The solutions are many and allow for continued economic development. While some technologies need additional development, many are already available,” Pachauri said.

“We also have tremendous opportunities to improve energy efficiency. And we can further reduce emissions by stopping deforestation. We are told that limiting climate change will be too expensive. It will not. But wait until you get the bill for inaction. There are costs of taking action—but they are nothing compared to the cost of inaction,” he said.

Pachauri said that climate change has to be stopped in order to ensure a future for the coming generations as well as for the human race.

“How on Earth can we leave our children with a world like this? I’m not sure I could stand before you if the threats of climate change had no solutions. But they do.

“It comes down to a matter of choice. We can continue along our existing path and face dire consequences. Or we can listen to the voice of science, and resolve to act before it’s too late. That’s our choice,” he said.

“The risks PH faces due to climate change”, 24/09/2014, online at: <http://globalnation.inquirer.net/111616/the-risks-ph-faces-due-to-climate-change>

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❖ Climate Change 2014: UN Climate Summit In New York Comes At Critical Point In Fight To Reduce Emissions

For residents of the [Marshall Islands](#), normal life is disappearing. The Pacific Ocean's encroaching waters are wiping away beaches and poisoning drinking water. Crops are shriveling amid persistent drought, and massive floods have forced thousands of people from their homes. "Life is quickly becoming like living in a war zone," Tony de Brum, the island nation's foreign affairs minister, says. "For us, climate change is not a distant threat. It has already arrived." De Brum is one of hundreds of government officials gathering in New York City this week for a triple-header of climate events.

On Sunday, [some 400,000 people](#) marched along Manhattan's west side in what is being called the biggest climate demonstration in history. Monday marks the kick-off to [Climate Week NYC](#), an annual forum to promote the business case for a low-carbon economy. A U.N.-led summit Tuesday will be the largest gathering of its kind in five years. Organizers say they hope it can revive a languishing effort to commit the world's countries to reducing dangerous greenhouse gas emissions.

The efforts come at [a critical point in the climate fight](#). The 1997 Kyoto Protocol, the first international agreement to reduce emissions, expired two years ago with little discernable impact. (The United States signed the treaty, but never ratified it.) Attempts to negotiate a successor treaty collapsed in 2009 at the U.N. climate talks in Copenhagen. Now world leaders have set a target to negotiate a new treaty at the Paris conference in December 2015 -- and the sense of urgency is building.

The planet is on track to warm by [4 degrees Celsius](#) (7.2 degrees Fahrenheit) above pre-industrial levels by the end of the century. Scientists say that warming should be kept below 2 degrees Celsius (3.6 degrees Fahrenheit) to avoid the most catastrophic climate impacts.

"We are running out of time," U.N. climate chief Christiana Figueres told reporters this month. "We can no longer afford the luxury of being gradual or incremental. We need very, very stark changes right away."

Government leaders like de Brum won't be negotiating an international climate treaty this week. Instead, the idea behind the summit -- which was convened by U.N. Secretary-General Ban Ki-moon -- is to pressure governments into adopting aggressive domestic strategies for reducing emissions and

investing in clean energy technologies. Those plans will then be incorporated into formal negotiations in Paris.

“We believe this summit will be a major turning point in the way the world is approaching climate change,” Selwin Hart, who directs Ban’s climate support team, said on an earlier press call. “The summit provides countries [a chance] to show what they are doing and what they intend to do ... instead of waiting to see what others do.”

While representatives from more than 125 countries -- including President Obama -- will attend the Sept. 23 event, the real onus for climate action rests on only a handful of governments. China and the United States together account for roughly [45 percent](#) of all emissions of carbon dioxide, a potent greenhouse gas; the European Union, India, Russia, Japan and Brazil are among the other top emitters.

Climate experts say for a global climate strategy to have a significant impact, countries need to commit to at least two overarching measures: First, unprecedented investment in low-carbon electricity, transportation and fuel. And second, a price on carbon dioxide emissions, which would make it costlier to extract and burn coal, oil and natural gas. Nations have implemented these policies to varying degrees, but the world has yet to bring these approaches to a massive scale.

The first point, investing in technology, is critical because many of the low-carbon options that countries need to reduce their emissions are not yet mature or cheap enough to replace fossil fuel-dependent energy systems, said Emmanuel Guerin, who directs the [Deep Decarbonization Pathways Project](#) at the U.N.’s Sustainable Development Solutions Network.

“There are massive research, development and deployment efforts that need to be done to bring these technologies to deployment at scale and on time,” he said in an interview.

According to his project team, the United States and China, for instance, will eventually need to adopt so-called “carbon capture and storage” to keep emissions from coal- and natural gas-fired power plants out of the atmosphere. Neither country has a commercial-scale CCS facility in operation, and the ones under development could cost upward of \$1 billion each to build. India will rely heavily on renewable energy like solar and wind power to meet the growing demands of its

rising middle class. The two technologies, however, are still technically and economically challenging on the whole when compared to fossil fuels.

All told, a colossal \$36 trillion in additional clean energy investment is needed by 2050, the International Energy Agency has estimated -- roughly 250 times the amount that countries spent on low-carbon technology last year.

The U.N. climate process has set up a way for developed countries to help emerging economies make these investments and adapt to the effects of global warming. The Green Climate Fund aims to channel an annual \$100 billion in public and private money to developing nations from 2020 onward, but right now, the 5-year-old fund is practically empty. Germany is the only rich country that has made a sizable pledge so far: \$1 billion over four years.

The second key climate measure -- a price on carbon -- will be essential for incentivizing this massive economy-wide shift away from fossil fuels, climate policy proponents say.

A carbon price is “the most powerful move that a government can make in the fight against climate change and the reengineering of the economy,” said Rachel Kyte, a special envoy for climate change at the World Bank, a U.N. financial institution. “What the public sector needs to do is send a clear, consistent signal through the economy of what the direction of capital is.”

Global investors said as much in a Sept. 18 letter to government leaders at the U.N. summit. More than 340 institutional investors representing \$24 trillion in assets urged countries to tax carbon emissions or adopt cap-and-trade emissions policies to boost the economic incentive to invest in low-carbon technology.

Nearly 40 countries and 20 local governments so far have put, or are planning to put, a price on carbon emissions. The European Union’s Emissions Trading System is the largest cap-and-trade scheme in the world. In the United States, California and nine Northeastern states operate smaller programs, though previous attempts to adopt a nationwide system have resoundingly failed.

But those piecemeal efforts along aren’t enough to steer capital markets away from fossil fuels, Jeff Swartz, director of international policy at the International Emissions Trading Association, said by

phone from Brussels. The nonprofit business group -- whose members include major oil and gas firms -- is calling on countries to link their carbon markets to create an overarching global framework.

“Not only will we get greater emissions reductions, but policies will be more cost-effective” if they’re able to harmonize, he said. His association recently studied various options for doing so, along with researchers from the Harvard Kennedy School. The two groups will present their research Tuesday with the hopes of building a carbon market collaboration into a 2015 global agreement in Paris.

For some climate activists, however, this entire week of U.N.-backed activities is missing the point when it comes to curbing the causes and effects of global warming.

Rather than drag out a decades-long process that so far has failed to produce meaningful emissions reductions, some say the climate movement should instead target fossil fuel companies directly. As long as oil, gas and coal companies have a powerful political influence, and as long as governments subsidize fossil fuels and offer favorable regulations, the world can’t move the needle on climate change, activists [told VICE News](#) last week.

“What the big [environmental] organizations believe is that they can work within the existing political system -- that they can get global politicians, they can get Obama to do the right thing and then it will be okay,” Scott Parkin, an organizer with the environmental activist network Rising Tide North America, told VICE News. “But that political system is rigged against us in all possible ways.”

Even proponents of U.N.-led climate negotiations expressed a degree of fatigue with the process. “We can’t be absolutely confident that the outcome [in Paris] will be a success,” Andrew Steer, president and chief executive of the [World Resources Institute](#), an environmental research organization, said on a press call this month.

Still, most mainstream climate groups remain hopeful. As scientific data increasingly points to a warming planet, momentum is building again among policymakers and the general public; the People's Climate March on Sunday drew four times as many people to the event as organizers first expected.

“In general we are more optimistic about a deal than realistically we could’ve been a couple of years ago,” Steer said.

“Climate Change 2014: UN Climate Summit In New York Comes At Critical Point In Fight To Reduce Emissions”, 21/09/2014, online at: <http://www.ibtimes.com/climate-change-2014-un-climate-summit-new-york-comes-critical-point-fight-reduce-emissions-1692061>

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❖ Fresh Water Crisis, Not Climate Change Is Most Urgent Global Issue Says Water Advocate

“One issue will define the contours of this century more than any other – and that is the urgent and growing threat of changing climate.”

Barak Obama UN Speech, September 24, 2014

The number one “urgent and growing threat” to human health, civilization, and life on Earth, according to water advocate and radio show host Sharon Kleyne, is not climate change, as President Obama states, but the growing global fresh water crisis. Kleyne is alarmed that in Obama’s recent climate change speech to the United Nations, there was no mention of water whatsoever.*

*Gilmour, Jared, “UN climate summit: Obama flexes US muscle in global climate fight,” Christian Science Monitor, September 23, 2014;

<http://www.csmonitor.com/Environment/Energy-Voices/2014/0923/UN-Climate-Summit-Obama-flexes-US-muscle-in-global-climate-fight-video>

Sharon Kleyne hosts the syndicated Sharon Kleyne Hour Power of Water radio show, heard on VoiceAmerica and Apple iTunes. The show is sponsored by Bio-Logic Aqua Research, a global research and technology center specializing in fresh water, the atmosphere and dehydration. Nature’s Tears® EyeMist® is the Research Center’s signature product for dry eyes. Kleyne is Bio Logic Aqua’s Founder and Research Director.

Worldwide, according to Kleyne, insufficient fresh water is the number one cause of disease, the number one cause of wars, the number one barrier to economic development and the most important single factor in understanding climate change

Kleyne believes that fresh water availability and water security should be the number one priority of every government on Earth. Worldwide, according to Kleyne, 1.6 billion people lack reliable access to abundant and safe fresh water. Each year, thousands of children die from dehydration and water borne diseases. This global tragedy is getting worse, not better. Deserts are expanding, drought is increasing and water shortages are becoming increasingly urgent. In some areas, extended drought is having a long term impact on soil micro-organisms, fertility and productivity.

The human body, says Kleyne, is 70 percent water and every function of every cell requires water – and not just drinking water. Water vapor in the atmosphere, called “humidity,” enables oxygen

transfer in the lungs and prevents the human body - and all other terrestrial organisms - from losing their water to evaporation and dehydrating into dust. Life cannot long survive in a zero humidity atmosphere.

Atmospheric water vapor is especially concerning to Kleyne. A frequent guest Climatologist on her show (L. DeWayne Cecil, PhD),* reported that that while lower level humidity is largely unaffected by climate change, water vapor in the upper atmosphere has significantly declined.

*Sharon Kleyne Hour Archive; <http://www.voiceamerica.com/show/2207/the-sharon-kleyne-hour>

Upper atmospheric water vapor is critical for two reasons, according to Kleyne. First, life on Earth exists only because our atmosphere is able to prevent water that evaporates from the surface from floating off into outer space. The upper atmosphere has an accumulation zone where the rising humidity hits a ceiling, collects into clouds and is recycled back to Earth as precipitation.

Second, Kleyne explains, water vapor is the most abundant greenhouse gas that absorbs harmful radiation, moderates temperatures and protects life on the planet surface. Water vapor constitutes 36 to 72 percent of greenhouse gases, carbon dioxide (CO₂) constitutes 9 to 26 percent, methane 4 to 9 percent and ozone 3 to 7 percent.

Unlike carbon dioxide, Kleyne notes, water vapor is beneficial and the atmosphere needs as much as it can get. CO₂ in large amounts is toxic and must be limited in the atmosphere.

It is unknown whether the atmosphere's CO₂ content can be moderated by increasing the water vapor content, says Kleyne. What is known is that particulate pollution in the air causes water vapor droplets to accumulate around the particles and fall back to Earth before reaching the upper atmosphere. The result is fewer clouds, less rain, more direct solar radiation and increased drought.

While far too many scientists in Kleyne's view, have omitted water from the climate change equation, many other well known scientists agree with her.

"Fresh Water Crisis, Not Climate Change Is Most Urgent Global Issue Says Water Advocate", 26/09/2014, online at: <http://www.virtual-strategy.com/2014/09/26/fresh-water-crisis-not-climate-change-most-urgent-global-issue-says-water-advocate#axzz3EhZ8ww3R>

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❖ Earth's water cycle, over Carbon Dioxide, cause of Global Warming

CHICAGO, September 23, 2014 — Climate scientists are obsessed with carbon dioxide. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) claims that “radiative forcing” from human-emitted CO₂ is the leading driver of climate change. Carbon dioxide is blamed for everything from causing more droughts, floods, and hurricanes, to endangering polar bears and acidifying the oceans. But Earth's climate is dominated by water, not carbon dioxide.

Earth's water cycle encompasses the salt water of the oceans, the fresh water of rivers and lakes, and frozen icecaps and glaciers. It includes water flows within and between the oceans, atmosphere, and land, in the form of evaporation, precipitation, storms and weather. The water cycle contains enormous energy flows that shape Earth's climate, temperature trends, and surface features. Water effects are orders of magnitude larger than the feared effects of carbon dioxide.

Sunlight falls directly on the Tropics, where much energy is absorbed, and indirectly on the Polar Regions, where less energy is absorbed. All weather on Earth is driven by a redistribution of heat from the Tropics to the Polar Regions. Evaporation creates massive tropical storm systems, which move heat energy north to cooler latitudes. Upper level winds, along with the storm fronts, cyclones, and ocean currents of Earth's water cycle, redistribute heat energy from the Tropics to the Polar Regions.

The Pacific Ocean is Earth's largest surface feature, covering one-third of the globe and large enough to contain all land masses with area remaining. Oceans have 250 times the mass of the atmosphere and can hold over 1,000 times the heat energy. Oceans have a powerful, yet little understood effect on Earth's climate.

Even the greenhouse effect itself is dominated by water. Between 75 percent and 90 percent of Earth's greenhouse effect is caused by water vapor and clouds.

Yet, the IPCC and today's climate modelers propose that the “flea” wags “the dog.” The flea, of course, is carbon dioxide, and the dog, is the water cycle. The theory of man-made warming assumes a positive feedback from water vapor, forced by human emissions of greenhouse gases.

The argument is that, since warmer air can hold more moisture, atmospheric water vapor will increase as Earth warms. Since water vapor is a greenhouse gas, additional water vapor is presumed to add additional warming to that caused by CO₂. In effect, the theory assumes that the carbon cycle is controlling the more powerful water cycle.

But for the last 16 years, Earth's surface temperatures have failed to rise, despite rising atmospheric carbon dioxide. All climate models predicted a rapid rise in global temperatures, in conflict with actual measured data. Today's models are often unable to predict weather conditions for a single season, let alone long-term climate trends.

An example is Atlantic hurricane prediction. Last May, the National Oceanic and Atmospheric Administration (NOAA) issued its 2013 hurricane forecast, calling for an “active or extremely

active” hurricane season. At that time, NOAA predicted 7 to 11 Atlantic hurricanes (storms with sustained wind speeds of 74 mph or higher). In August NOAA revised their forecast down to 6 to 9 hurricanes. We entered October 2013 with a count of only two hurricane-strength storms. Computer models are unable to accurately forecast one season of Earth’s water cycle in just one region.

The IPCC and proponents of the theory of man-made warming are stumped by the 16-year halt in global surface temperature rise. Dr. Kevin Trenberth hypothesizes that the heat energy from greenhouse gas forcing has gone into the deep oceans. If so, score one for the power of the oceans on climate change.

Others have noted the prevalence of La Niña conditions in the Pacific Ocean since 1998. During 1975-1998, when global temperatures were rising, the Pacific experienced more warm El Niño events than the cooler La Niñas. But the Pacific Decadal Oscillation (PDO), a powerful temperature cycle in the North Pacific Ocean, moved into a cool phase about ten years ago. With the PDO in a cool phase, we now see more La Niña conditions. Maybe more La Niñas are the reason for the recent flat global temperatures. But if so, isn’t this evidence that ocean and water cycle effects are stronger than the effects of CO₂?

Geologic evidence from past ice ages shows that atmospheric carbon dioxide increases *follow*, rather than precede, global temperature increases. As the oceans warm, they release CO₂ into the atmosphere. Climate change is dominated by changes in the water cycle, driven by solar and gravitational forces, and carbon dioxide appears to play only a minor role.

“Earth’s water cycle, over Carbon Dioxide, cause of Global Warming”, 24/09/2014, online at:

<http://www.commdiginews.com/health-science/earths-water-cycle-over-carbon-dioxide-cause-of-global-warming-26603/>

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