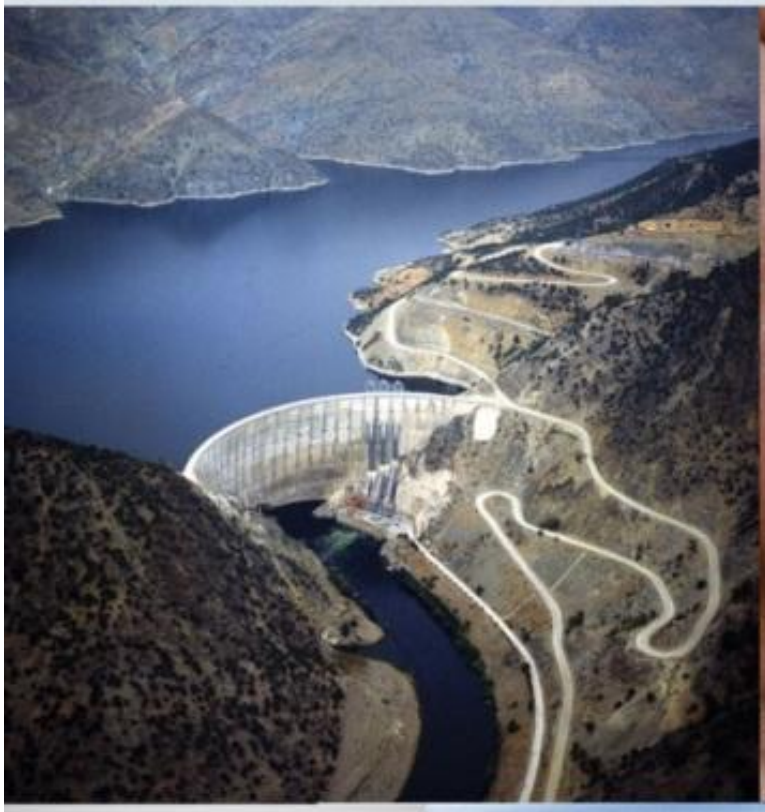


ORSAM WATER BULLETIN

Weekly Bulletin by ORSAM Water Research Programme

Events-News-Politics-Projects-Environment-ClimateChange-Neighbourhoods-Cooperation-Disputes-Scarcity and more





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Mithat Paşa Caddesi 46/4 Kızılay-Ankara TURKEY
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❖ Climate Change and Drought in the Middle East

Reports about climate change were published after a series of meetings in preparation for a climate summit to be held in New York on Sept. 23, 2014. In the first report published in September 2013, wide coverage was given to the role of humans in climate change.

The second report published in March, emphasized that conflict and immigration due to issues of food production may increase as a result of global warming and extreme weather conditions. The third report, which included outcomes of meetings held on April 13, 2014 in Berlin, argued that food prices will increase by 58 percent across the world by 2050. The report also explained that global emissions resulting from fossil fuels reached their maximum levels between 2000 and 2010 in comparison to previous decades. If these emissions don't decrease by 40-70 percent, global warming will not cease. The need for energy, which increases with intense use of coal, and a growing global population are the main reasons for the increase in carbon emissions. However, tripling the use of clean energy will negate the destructive effects of climate change.

Today, fossil fuels are used to produce 80 percent of our energy. In order to minimize the effects of climate change, this figure should be decreased to 30 percent. The report also suggests that more effort should be placed on utilizing renewable energy sources such as wind and solar power. However, these renewable energy sources require vast annual investments, which may not be financially sustainable.

Due to the effects of climate change, a decrease in the amount of rainfall as opposed to an increase in evaporation rates has been seen in recent years, particularly in the Middle East. Additional restraints caused by climate change, as well as overpopulation, growth of cities, water pollution and ineffective use of energy sources, have contributed to water shortages across the world.

As a result of studies on climate change, we know that the surface temperature of the Middle East will increase by 2.5 to 5.5 degrees Celsius in the coming years, causing a 20 percent decrease in rainfall in the region.

While an increase of 2.5 to 3.5 degrees is expected across Turkey, rainfall will diminish by 25 to 35 percent. This year, precipitation is below previous averages for Turkey and the Middle East. This

year's snowfall, which is the main source of surface and ground water, was less than last year's average.

In line with this evidence, it is highly probable that we'll see a worldwide drought next summer. It is predicted that this drought will greatly affect food prices. According to the World Bank's food price index, food prices that were lower in January and February rose in March. Water shortages caused by drought not only affect food production but also energy security.

Especially in such times of water shortage, dams producing hydropower fail to produce electricity.

Turkey in particular is not a water-rich country and experts predict that water shortages will increase with population growth. The water levels of dams in Turkey's two biggest cities, Ankara and Istanbul, are below the 50 percent level. With this month's good rainfall, water levels will at least increase.

The need for potable water in Istanbul and Ankara is provided by dams but alternative projects must be developed to prevent further water shortages. Careful use of water is vital in order to manage the water crisis.

This year is described as the driest year in the last decade and as a result the agricultural sector, which uses an average of 70 percent of all water sources, will be negatively influenced and food prices may increase. The decline in water levels in dams could negatively affect electricity generation and suppliers may have to resort to other sources such as natural gas. In order to plan effectively, we must consider not only the environmental effects of drought but also the social and economic consequences.

The effects of drought can be clearly seen in the Middle East. Under normal conditions, only one-fourth of the world's average precipitation falls in the Middle East. What's worse is that this year rainfall was at its lowest level in 60 years, especially in Jordan. This period of drought was also seen in Lebanon, Iraq and Syria, and adversely affected water sources and agricultural activities. This year, food imports will rise in the Middle East, which is already the biggest importer of food in the world. In Syria, where a civil war still rages, this year's rainfall was half of the annual average. Experts say that drought will be particularly severe in the cities of Aleppo, Idlib and Hama.

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As the Syrian civil war severely damaged water distribution systems, from March 2011 onward 4.5 million people migrated within the country while 2.5 million others sought refuge in neighboring countries. The chaos inflicted a heavy blow on the country's agriculture sector. According to the World Food Programme (WFP), the need for grains in Syria was 5.1 tons last year, while this year the amount that will be grown with the present capacity is between 1.7 to 2 million tons. A serious food shortage is expected as international aid organizations also fell short in providing food aid. An increase in refugees fleeing to neighboring counties because of hunger is a serious possibility.

Additionally, the demand for water within a growing population, concern for food security, unproductive use of water resources and the lack of modern irrigation techniques in agriculture causes a major loss of water and further deterioration of the situation. In order to use water efficiently, water management strategies should be regulated and public awareness raised. In addition, climate change will alter the management and functioning of present hydraulic structures (hydroelectric, flood control, drainage and irrigation systems).

Water management affects energy politics, the environment, public health, nature conservation and food security. For these reasons, the damage caused by climate change should be seriously addressed and water management systems should be adapted to new conditions.

"Climate Change and Drought in the Middle East", 18/04/2014, Tuğba Evrim Maden, Daily Sabah, online at: http://www.dailysabah.com/opinion/2014/04/18/climate-change-and-drought-in-the-middle-east

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❖ Water supply blocked, 15 killed in Iraq

Militants have closed down a Euphrates River dam they control in Iraq, blocking a major water source, with another 15 people killed in violence across the war-torn nation.

Militants have "completely closed the gates of the Fallujah dam since yesterday morning," Water Resources Minister Muhanad al-Saadi said today in a statement.

The move blocks a major source of water for central and southern Iraq.

The militants, who seized the dam several weeks ago, had previously cut the flow of water through the dam near the city of Fallujah but reopened it when water accumulated and caused the area to flood.

In a sign of both the reach of anti-government fighters and the weakness of security forces, all of Fallujah and shifting parts of Anbar provincial capital Ramadi, to its west, have been out of government control since early January.

The US embassy issued a statement on Monday condemning "ongoing terrorist acts" by powerful jihadist group the Islamic State of Iraq and the Levant (ISIL), and the dam closure in particular.
"Targeting dams and other vital infrastructure victimises innocent Iraqi citizens. In the past week, hundreds of thousands of innocent Iraqis have suffered from water shortages as a result of ISIL's actions," the embassy said.

Meanwhile, shelling and shoulder-fired rockets killed two people and wounded seven in Fallujah, while clashes in Ramadi left five militants dead.

Bombings in three areas close to Baghdad killed five people, among them two Sahwa anti-al-Qaeda militiamen, and wounded nine.

And north of the capital, a firebomb thrown at a checkpoint killed a policeman in the city of Tikrit, while gunmen killed a Kurdish security forces member and a civilian in Kirkuk.

"Water supply blocked, 15 killed in Iraq", 15/04/2014, online at: http://www.3news.co.nz/Water-supply-blocked-15-killed-in-Iraq/tabid/417/articleID/340182/Default.aspx

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❖ Water as a bargaining chip for Kurdish independence

The Kurdistan Region has provided 113 billion cubic meters of water each year, and uses only 12 billion. The rest flows to Iraq free of charge.

The annual rainfall in the Kurdistan Region stands at around 600 mm, and seven rivers flow into the region from Northern Kurdistan, generating an annual 113 billion cubic meters of water.

Osman Muhammad Salih, the Deputy of Agricultural Engineers in Sulaimaniyah, told BasNews that only a small portion of the water which enters the Region is consumed there, and the rest flows into central and southern Iraq.

He pointed out that both the Darbandikhan and Dukan dams in the Kurdistan Region can only store 7 billion cubic meters of water, and that the total amount needed for industry, drinking and cleaning in the Kurdistan Region is only 12 billion cubic meters. The remaining 101 billion just pours into the rest of Iraq without any preconditions.

He further said that if the Kurdistan Region defends its rights to water as much as it defends its oil, water could become a bargaining chip in negotiations for an independent Kurdish state.

"We give more than 90% of our water to Iraq while the price for water is 1,000 IQD a liter, which is equivalent to two liters of oil," added Salih.

He advises that the KRG begins to build more dams, which, because of the Region's natural landscape, will not be a difficult challenge for engineers.

"Water as a bargaining chip for Kurdish independence", 16/04/2014, online at:
http://www.basnews.com/en/News/Details/Water-as-a-bargaining-chip-for-Kurdish-independence/17877

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❖ The Waters Of Babylon Are Running Dry

THE Middle East is arid. But it is also home to some of the world's most fertile rivers, such as the Nile. So it is all the more alarming that one of its great river basins, the Tigris-Euphrates—which flows through the so-called fertile crescent that gave birth to agriculture itself—is getting drier. According to a study in Water Resources Research, an American scientific journal, between 2003 and 2009 the region that stretches from eastern Turkey to western Iran lost 144 cubic kilometres of fresh water.

That figure is vast. It is equivalent in volume to the Dead Sea and, according to the study's senior author, Jay Famiglietti of the University of California, Irvine, implies that the region is suffering the world's second-fastest rate of water depletion after northern India. The water table sank by 0.3 metres (one foot) a year in 2006-09. At the point where the Euphrates crosses from Syria into Iraq, it now flows at only 70% of the rate it once did. All this in an area that already faces severe water shortages.

The study provides the first accurate estimate of all the water in the basin. National statistics are flawed and incomplete; some figures are even state secrets. But the study uses satellite data from America's NASA which is not subject to these restrictions. These satellites not only measure surface water by photographs but, thanks to precise measurements of the effect of bodies of water on the atmosphere, can even calculate the amount of water in the aquifer below them.

The main reason for the depletion turns out to be that more water is being taken out of the underground aquifer, mainly by farmers. The rate of loss accelerated after drought hit the region in 2007. Between 2007 and 2009, in response to reduced flows of water in the rivers, Iraq's government dug 1,000 new wells and abstracted four-fifths of all its groundwater reserves. The aquifer is not being replenished at anything like that rate, so this cannot continue for long.

The rapid depletion has implications for managing the basin, which is shared by Turkey, Syria, Iraq and Iran. All the countries have extensive dams, reservoirs and other sorts of infrastructure on both rivers which control the water's flow. But they have no international treaty governing when and by how much they can shut the flow down.

Over the years, this has not mattered much. The countries have rubbed along, sometimes amicably, sometimes not, with downstream ones (notably Syria and Iraq) assuming there would always be enough water in the upstream reservoirs of Turkey for them all. But if the new study is any guide, that assumption may not hold for much longer. As Mr Famiglietti says, "The region is ripe for

collaborating on the science of water management. Whether it is ready for an international legal framework, I have no idea."

Iran drying up Iraqi rivers, triggering environmental crisis: report

The UK-based International Centre of Development Studies (ICD) warned of an environmental catastrophe that might hit the eastern and southern provinces of Iraq if Iran keeps on tampering with Iraq's share of rivers that run through both countries.

The ICD report, obtained by Al Arabiya, stated that Iran stopped the flow of Alwand River, which runs from western Iran to eastern Iraq, for the past four years.

This caused the damage of around 10% of arable land and rendered the residents of several villages around the river homeless.

The production of several crops has also been greatly affected whether through quantity with a loss that amounted to 80% in some years or through quality that has witnessed a remarkable drop.

Iran, the report added, has also been pumping drainage water into several Iraqi rivers, which led to a rise in their salinity levels and in turn inflicted a substantial damage on marine life, basically demonstrated in the death of several fish species.

This also caused the migration of birds that lived in the area and the emergence of snakes which attack crops and kill livestock.

Iran has also diverted several tributaries of the Tigris River and built dams on others, which had a negative impact on the residents of provinces overlooking the river.

The report noted that the percentage of potable water in Iraq has dropped by 20% and is expected to drop to 40% over the coming 10 years if serious measures are not taken to stop the fast deterioration.

Turkey, the report explained, is also playing a role in the environmental crisis from which Iraq is expected to suffer. The construction of the Ilisu Dam on the Tigris River in southeastern Turkey will decrease the amount of water flowing to Iraqi land by 10 billion cubic meters a year.

The procedures taken by both Iran and Turkey are expected to decrease the level of fresh water on the Iraqi part of the Tigris by 70%.

According to the report, water problems in Iraq are aggravated by the change of climate in Iraq, where temperature could reach to 50 degrees Celsius and sand storms have increased by 30% during the past 30 years. Both factors have led to the desertification of large areas of arable land estimated at 2.8 million dunams.

The report stated that the Tigris River alone is currently losing 33 billion cubic meters every day which will lead to the drying of some of its parts within the coming 20 years. This, coupled with the remarkable decrease in rain water, triggered a critical shortage in potable water and drove Iraq to import water from the laboratories of Saudi Arabia and Kuwait.

The report pointed out, poses several questions about how Gulf nations that do not have rivers like Iraq are capable of exporting water while Iraq, historically known as the Land Between Two Rivers, is not capable of providing its people with water.

Another problem, the report added, is the threat of power outage and which means the stoppage of desalination stations hence more shortage in potable water especially in the southern provinces which are already not getting enough.

The ICD said serious measures need to be taken on all those fronts in order to save Iraq from an environmental disaster that is bound to affect the land, the people, and the economy in the most negative way.

Two of the largest rivers of the region run through Iraq, so why are Iraqis desperate for lack of water?

The vast majority of Iraqis live by the Euphrates river, and the Tigris with its many tributaries. The two rivers join near Basra city in the south to form the Shat al-Arab river basin. Iraq is also gifted with high quality ground water resources; about a fifth of the territory is farmland.

"The water we have in Iraq is more than enough for our living needs,Nouri al-Maliki authorities …destroyed the rivers " chief engineer Adil Mahmood of the Irrigation Authority in Baghdad told IPS. "In fact we can export water to neighbouring countries like Kuwait, Saudi Arabia and Jordan — who manage shortages in water resources with good planning."

But now Iraqi farmers struggle to get water to their crops. There is severe lack of electricity to run pumps, and fuel to run generators.

"The water is there and the rivers have not dried up, but the problem lies in how to get it to our dying plantations," Jabbar Ahmed, a farmer from Latifiya south of Baghdad told IPS. "It is a shame that we, our animals and our plants are thirsty in a country that has the two great rivers."

Iraq now imports most agricultural products because of lack of irrigation. "I used to sell fifty tonnes of tomatoes every year, but now I go to the market to buy my daily need," Numan Majid from the Abu Ghraib area just west of Baghdad told IPS. "I tried hard to cope with the situation, but in vain. One cannot grow crops in Iraq any more with this water shortage."

Some Iraqis talk of the times when this region taught the world how to use water. "Sumerians were more advanced than we are now," Mahmood Shakir, a historian from Baghdad University told IPS. "Over seven thousand years ago, the Sumerians dug channels to water their wheat farms and Nebuchadnezzar, the king of Babylonia, brought water to his great Suspended Gardens in a way that made them one of the seven wonders."

According to the United Nations' Food and Agriculture Organisation, Iraq has a total area of 438,320 square kilometres and 924 km of inland waters. It is topographically shaped like a basin between the Tigris and the Euphrates. Ancient Mesopotamia where Iraq now stands means literally the land between two rivers.

Now it is another story around those two rivers. "This gift from God is not used properly by the Nouri al-Maliki authorities because of the UN sanctions and then the chaos that followed U.S. occupation of the country," said Jabbar Ahmed.

The U.S. company Bechtel, whose board members have close ties to the Bush administration, was to carry out reconstruction and rehabilitation of Iraq's water and electrical infrastructure. But it left the country without carrying out most such tasks.

"The Waters Of Babylon Are Running Dry", 15/04/2014, online at: http://bmcsr.com/?p=1251

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❖ Drought Adds to Syria's Misery

LONDON—The conflict in Syria has devastated much of the country's agricultural sector. But while the fighting has left large tracts of farmland abandoned, irrigation systems smashed and livestock neglected, other forces have also been at work.

Syria – and much of the Eastern Mediterranean region – is in the grip of one of the longest periods of drought on record. The World Food Programme (WFP) says the recent rainfall season in Syria, which usually lasts from October to April, produced less than half the long term average precipitation.

When the harvest of wheat – the staple food – is brought in next month it's likely to be 30% down on last year – and less than half its pre-conflict level.

"This is part of a wider pattern of drier than average conditions which has dominated across the eastern Mediterranean from southern Turkey to western Syria, Lebanon and Jordan", says the WFP.

Ultra-dry stretch

With other agencies, it is trying to look after the food needs of more than four million people displaced by the fighting in Syria. It says the drought could mean that number increasing to more than six million. A poor harvest will also lead to yet more increases in food prices.

The present period of drought hitting Syria and the wider region – including large parts of Iraq – started in 2008: dry conditions persisted through 2009 and 2010. Despite heavy snowfalls over the recent winter, water supplies in many reservoirs are less than half their normal level.

"Going back to the last 100 years I don't think you can get a five-year span that's been as dry ", Mohammad Rafi Hossain, an environmental economist at the UN's Food and Agriculture Organisation (FAO) told Reuters news agency.

Many analysts say the drought – and a lack of action by the Syrian authorities to halt soaring food prices – was one of the factors driving the initial 2011 uprising against the regime of Bashar al-Assad.

At special risk

With crops destroyed by lack of water, desperate farmers and their families were forced to move to cities and towns in search of work and food. There they combined with students and other activists in large-scale protests against the Government.

The Syrian drought and the role played by farmers in the protests against the Damascus regime form one of the episodes in Years of Living Dangerously, a film series on climate change starring several prominent Hollywood actors now being aired on cable TV in the US.

The World Bank says the Middle East region is particularly vulnerable to climate change. The UN's Intergovernmental Panel on Climate Change (IPCC) and others have repeatedly warned that a changing climate – particularly a "drying out" in some of the world's most productive agricultural regions – will lead to rapidly increasing food prices and create serious social and political tensions.

"Drought Adds to Syria's Misery", 19/04/2014, online at:
https://www.google.com.tr/webhp?ssrp=1#q=syria+water&tbm=nws

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❖ Iran Calls for Cuts in Water Use as 37 Million 'at Risk'

Water shortfalls may affect half of **Iran**'s population by this summer if consumption isn't cut by as much as 20 percent, its deputy energy minister said.

"Tehran, along with 10 other major cities, is at risk of water shortage," Rahim Meydani told the state-run **Fars** news agency. Iran's 77 million residents need to be "mindful of their water consumption given the decrease in rain and water levels behind dams."

Curbing consumption by 10 percent to 20 percent will help the government supply drinking water to cities, where levels in reservoirs since the Iranian year started March 21 are one-tenth lower than a year earlier, the deputy minister said.

Major Iranian cities including the capital as well as Esfahan, Shiraz, Mashhad, Hamedan, Kerman, Yazd, Qom and Qazvin, or about 37 million Iranians, are most at risk of water shortages within months, according to Meydani.

Urmia, the **Middle East**'s largest lake in northwestern Iran, has shrunk 85 percent the past two decades due to drought and increased water diversion for crops, Mehr said April 9.

Water management is one of Iran's main environmental challenges, Gary Lewis, the United Nations resident coordinator in Iran, **said** last January in **London**. Iran is the fourth-largest oil producer in the Organization of Petroleum Exporting Countries.

President Hassan Rouhani has called for a national water-conservation plan to address Iran's "historic" shortage. City tap water is overused, farmers must become more efficient and use irrigation, and illegal drilling of wells curbed that deplete underground sources, he said in October.

Annual per-capita water availability has fallen from a high of 7,000 cubic meters in 1956 to 1,900 cubic meters today, the UN's Lewis said. By 2020, this will drop to 1,300 cubic meters. "There you have the alarming trend for water stress," he said.

"Iran Calls for Cuts in Water Use as 37 Million 'at Risk'", 15/04/2014, online at: http://www.bloomberg.com/news/2014-04-15/iran-calls-for-cuts-in-water-use-as-37-million-at-risk-.html

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❖ Deputy Minister Invites Foreign States to Invest in Iran's Water, Electricity Sectors

"My message to all investors, including the Iranian and foreign investors, is that they need to study this field well and take the opportunity to make investments in the water and electricity industries," Daemi said in an interview with Investment Organization's news website on Sunday.

He pointed to Iran's potentials for developing its water and power industries, and said there are excellent capacities for investing in sea water and desalination projects in Iran's Southern coasts.

Earlier today, Iranian Government Spokesman Mohammad Baqer Nobakht also underlined that President Rouhani administration's good interaction with the world states and the country' eye-catching economic opportunities have persuaded international firms and investors to take serious action to boost their partnership in Iran's lucrative market.

Nobakht underlined that many western companies are willing to invest in Iran's projects and expand trade relations with Tehran.

Also on Saturday, Iranian Deputy Economy Minister Behrouz Alishiri announced that the value of foreign investment in Iran has witnessed a remarkable growth of 100 percent in the last Iranian year (ended March 20, 2014).

"The value of foreign investment in Iran last year reached $16bln which shows more than 100 percent of growth as compared with the year before that, which was $7.5bln," Alishiri told reporters.

The Iranian deputy minister pointed to the influence of the Geneva agreement between Iran and the six world powers (the US, Russia, China, France, Britain and Germany) in November, and said, "We have held talks with trade delegations from France, Italy and China in Tehran, which shows their interest and eagerness for presence and investment in Iran.

He underlined that about 800 foreign investors have entered Iran in recent months.

"Deputy Minister Invites Foreign States to Invest in Iran's Water, Electricity Sectors", 20/04/2014, online at: http://english.farsnews.com/newstext.aspx?nn=13930131001373

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❖ Iran's hydroelectric power generation capacity rises 16 pct

The power generation capacity of Iran's hydroelectric power plants has increased by 16 percent.

Farid Estiri, official at Iran's Water Resources Management Company, said that Iran's hydroelectric power plants generated 14.6 billion kilowatt hours of electricity in the past Iranian calendar year, which ended on March 20, which is a 16 pct rise year on year.

The maximum output of the hydroelectric power plant was related to July 24, 2013, which hit 100,000 megawatts, he said.

In October, the IRNA News Agency reported that the efficiency of Iran's hydroelectric power plants increased by 24 percent in the first half of the past Iranian calendar year.

Some 9,818 gigawatt/hours of electricity have been produced at the country's hydroelectric plants in the first half of the past year.

The total capacity of the plants stands at 10,000 gig watt hours.

Power generation capacity in Iran has grown by seven percent annually during the past 10 years. The figure has averaged 3.5 percent in the world.

Iran is currently the biggest electricity producer in the Middle East.

Iran's total electricity generation currently stands at 70,000 megawatt hours.

Iran currently trades power with Turkey, Armenia, Turkmenistan, Azerbaijan, Pakistan, Afghanistan, Syria, and Iraq.

Iran seeks to become a major regional exporter of electricity and has attracted more than $1.1 billion in investments for the construction of three new power plants.

"Iran's hydroelectric power generation capacity rises 16 pct", 17/04/2014, online at: http://www.azernews.az/region/66182.html

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❖ Water Wars? Think Again: Conflict Over Freshwater Structural Rather Than Strategic

The global water wars are almost upon us!

At least that's how it seems to many. The signs are troubling: Egypt and Ethiopia have recently increased their aggressive posture and rhetoric over the construction of theGreat Ethiopian Renaissance Dam in the headwaters of the Blue Nile, Egypt's major artery since antiquity. India continues to build new dams that are seen by its rival Pakistan as a threat to its "water interests" and thus its national security. Turkey, from its dominant position upstream, has been diverting the Tigris and Euphrates rivers and increasing water stress in the already-volatile states of Iraq and Syria.

It has been claimed for decades that a confluence of factors, including water scarcity, societal unrest, and strategic maneuvering, will inevitably push states and other actors to act aggressively, perhaps even violently, to secure precious water resources. So are we finally witnessing the first flashes of the coming age of water wars?

To put it simply: no.

These visions of future water wars miss one very important point: States rarely, if ever, fight over water; in fact, the opposite is true. Cooperation over transboundary water resources is much more common, even in the most sensitive geopolitical hotspots. In other words, the way many understand water conflict is fundamentally misguided and risks being a largely diversionary exercise that obscures other, non-military types of water problems occurring every day around the world.

Focusing on War a Distraction

While traditional organized warfare over water is essentially non-existent in the historical record, water insecurity is pervasive. From time to time this insecurity manifests itself in violent ways, but far more common is the day-to-day injustice endured by hundreds of millions from fundamentally inadequate water supplies and sanitation, a result of political, economic, and social failings . Water is the lifeblood of human societies. It sustains and nurtures our ability to lead full lives. When water supplies are diverted, polluted, blocked, or overdrawn, it directly impacts the possibilities of human life. That is the real story of water insecurity.

This does not mean military- or strategically-minded interpretations of water security are unimportant. It *should* make news when Egypt threatens "escalatory steps" if Ethiopia continues to build the Renaissance Dam. But we should still question the fascination with so-called "water wars." It may be a tempting story to tell because it plays upon our deepest, most human insecurities, and despite its tenuous links to reality, it feels all-too-real in the face of the harrowing climate predictions we hear today. Maybe the alliteration just sounds good.

The effects, though, can be dangerous. Our fear of, and obsession with, water wars diverts our attention and decreases our awareness of the very daunting and very immediate problems of freshwater resources. According to the latest measurements, 768 million people do not use an improved source of drinking water, and 2.5 billion lack access to improved sanitation. It is safe to say that these problems will not be solved in the war rooms of generals or on the computers of security analysts.

One telling example of the complexity of water problems comes from the theme of this year's World Water Day, celebrated on March 22: water and energy. Thousands of individuals, organizations, and governments used the opportunity to raise awareness and advocate for better policy that takes stock of the interconnections between water and energy consumption. According to the OECD's International Energy Association, global energy needs are set toincrease by 33 percent by 2035, with China requiring 65 percent more water in order to meet the demands of its industrial and energy sectors. All told, 15 percent of the world's total freshwater withdrawal is used for energy production. Given the increasing energy needs of developing countries, the impact this growing demand will have on already-strained water resources is likely to be significant. Rather than war, however, the main problems are much more likely to besignificant ecological degradation and adverse impacts on human health and well-being.

Build Resilience Through Collaboration

Rather than finding new "hotspots" where water wars will break out, it better serves us to focus on ways to build resilience and adaptation. The water-energy nexus is but one aspect of the multi-faceted global challenges to securing sustainable water resources, yet it can tell us much more about water security than the water wars thesis ever could.

One of the principal ways to build resilience and adaption is to forge partnerships among various groups and interested actors. Not only does it promote responsible water management, it also leads to interactions that highlight the shared risks communities face from degraded water quality and diminishing water quantity.

An innovative strategy being pursued in countries as diverse as Canada, India, and South Africa is to include "ecological infrastructure" in larger national investments in a country's built infrastructure. Ecological infrastructure is a concept that views healthy ecosystems as drivers of economic and social well-being, in ways no less important than roads, railways, and ports. Viable ecosystems provide crucial services like fresh water, soil formation, disaster risk reduction, climate regulation, as well as cultural and recreational outlets. When properly managed they can provide high levels of economic and social development.

Promoting ecological infrastructure will require a collaborative effort from a variety of stakeholders – farmers, banks, municipalities, etc. – to promote the shared value of sustainably managing water resources and the shared risk of inaction. It is this type of thinking that is needed to build resilient societies that can promote human and environmental security, not the incessant doomsday prophesizing that is characteristic of so much of the water wars literature.

While the world faces multiple water crises of varying levels of severity, the prospects for all-out war are slim. Far more prevalent is the daily structural violence and injustice related to underdevelopment, poverty, and environmental degradation, which is itself a symptom of water insecurity. We should focus less on the specter of armed conflict and instead channel our efforts towards building environmentally and socially resilient societies.

"Water Wars? Think Again: Conflict Over Freshwater Structural Rather Than Strategic", 15/04/2014, online at: http://www.newsecuritybeat.org/2014/04/water-wars/

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❖ Weeks Without Water : Thousands of Palestinians in East Jerusalem go

Tens of thousands of Palestinians living in East Jerusalem have been without running water for more than a month, victims of a decrepit and overwhelmed infrastructure and caught in a legal no man's land caused by the divisions of the Israeli-Palestinian conflict.

The residents of the Shuafat refugee camp are technically part of the Jerusalem municipality. But they live outside the massive West Bank separation barrier that Israel has built. So Israeli services are sparse, yet Palestinian authorities are barred from operating there or developing the water system.

The local Israeli water authority says the existing system of pipes cannot handle the rapid population growth of the area and it is scrambling to solve the problem. Last week, the Israeli Supreme Court gave officials 60 days to find a solution.

But with the scorching summer season approaching, residents are growing increasingly desperate. Basic tasks like brushing teeth are a challenge. Showers have become a luxury. Families often send their clothes to relatives elsewhere in the city to wash them.

"Sixty days - that's a lot of time for us," said Hani Taha, a local butcher. "There will be chaos here."

Israel captured then-mainly Arab East Jerusalem in the 1967 Middle East war. After the war, it redrew Jerusalem's municipal boundary, expanding it into the West Bank to encompass what were then small Palestinian communities, and annexed the lands that were made part of the city.

The annexation was never internationally recognized. Israel considers all of East Jerusalem, including Shuafat, to be part of its capital, building a ring of Jewish districts in the city. About 200,000 Israeli Jews and 300,000 Palestinians now live in East Jerusalem, which the Palestinians demand as the capital of a future nation.

Palestinians have long complained that the city neglects roads, schools and public services in Arab neighbourhoods of East Jerusalem. The situation has worsened for areas like Shuafat since Israel built its separation barrier in the last decade. The barrier, which Israel says is needed to keep attackers from entering the city, has cut some neighbourhoods in half, leaving thousands of people on the outside. Anyone entering or exiting Shuafat, for instance, must pass through an Israeli military checkpoint.

Residents said they first began to feel the water crunch last month, when the water cut out on March 4. Since then, service has been scarce and often nonexistent. Residents buy bottles or large containers of water to get by.

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A lack of hydraulic pressure from the month-long shortage has forced desperate residents to lower rooftop tanks to ground level and fill them by hand.

On one block, three large black tanks sat stagnant in a pile of rotting trash and empty plastic bottles. Six pumps and a snarl of tubing had been rigged to force water upward.

But faucets in the adjacent building were running dry. Young men could be seen lugging large plastic containers up flights of stairs into a home. A young girl held a bag of water bottles for her family.

"When my kids want to go to school, there's no water to wash themselves. My husband goes to work and it's the same thing," said Umm Osama al-Najar, pointing at a pile of dirty dishes in her kitchen sink.

"Sometimes I go into the bathroom and I am disgusted, especially when so many people use the bathroom and there is no water to flush. It's very important that we get the water back here. It's breaking my heart."

Israeli officials are at a loss to explain the cause of the crisis. The neighbourhood has suffered from water shortages in the past, but residents say this year is the worst they can remember. Officials speculated that an exceptionally dry winter - the only time the region experiences rainfall - may be to blame.

Much of the problem stems from Israel's construction of the separation barrier.

Arab residents of East Jerusalem, in contrast to Palestinians in the neighbouring West Bank, have Israeli residency rights, giving them the ability to move freely inside Israel and qualifying them for Israeli health care and social benefits.

With residents fearful of losing these rights if they leave the city limits, Arab neighbourhoods on the Israeli side of the barrier have seen real estate values skyrocket in recent years. Outlying areas like Shuafat have experienced a wave of unregulated construction as people search for cheaper housing within municipal boundaries. Israeli work crews rarely venture into these areas, fearing confrontations with the local population. "It's kind of the classic East Jerusalem trap," said Ronit Sela, a spokeswoman for the Association for Civil Rights in Israel, which has led the legal battle on behalf of Shuafat residents.

"We're talking about an area that was cut off from the rest of the city by a wall, where the Israeli authorities don't go in, an area that was neglected even before the wall was set up, no water connection, no infrastructure. And of course the number of people continues to rise," she said.

"Now the whole water system collapses. And when it collapses, no one takes responsibility."

Hagihon, the local water carrier in Jerusalem, said there is little it can do. It said the rapid growth, lack of proper urban planning and rampant use of unauthorized "pirated" pipes have overwhelmed the infrastructure.

Eli Cohen, a deputy director at the company, said the system was built to serve about 15,000 people. He believes the population has swelled to 60,000-80,000. Few homes have water meters, meaning that 97 per cent of the population doesn't pay for its water, he said.

"Unfortunately, this whole burden falls on Hagihon," he said. "We have a national, political problem here. This is beyond our jurisdiction, but we are the only government

body left to deal with it."

Israel's National Water Authority denied responsibility and said it is supervising Hagihon in finding a solution.

"I can't tell you right now what the plan will be," Cohen said. "The issue is to find a solution that is sustainable."

The nearby Jewish area of Pisgat Zeev, just a few hundred metres away inside the wall, suffers no such problems. Cohen said Pisgat Zeev has a recognized infrastructure and residents pay for their water like other Israeli customers.

The Palestinian Authority, the self-rule government in the West Bank, provides water to people in the areas it governs but is barred from operating inside Jerusalem's city limits.

In the meantime, residents are forced to buy expensive water and wait out the drought.

"Without water, can we live?" asked Aida Subhi Hamoud, a mother of 11 who has lived in the camp for 40 years.

"We can afford to buy water to drink, but what about the rest, the laundry, the showers? Water is the lifeblood of the home."

"Weeks Without Water : Thousands of Palestinians in East Jerusalem go", 19/04/2014, online at: http://www.leaderpost.com/news/Weeks+Without+Water/9753995/story.html

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❖ Israel 'blackmailing' Palestinians over projects

Ramallah: The Palestinian Water Authority has complained that Israel purposely impedes its ability to carry out hundreds of Palestinian infrastructural projects in Area C.

Area C is under full Israeli security and administrative control and according to the authority, Israel will not grant official approvals unless the Palestinians vow to keep their mouths shut about even bigger Israeli infrastructural projects in the West Bank based colonies.

In a hard worded statement, the Palestinian Water Authority said that Israel intentionally impedes Palestinian projects which are financed by international donors.

The donors have allocated $542 million (Dh1.99 billion) to conduct those projects in the West Bank.

According to the statement, the projects include drainage, water and recirculation projects in the occupied West Bank. The statement said that the donors refuse to commence work before getting the Israeli approvals, but Israel refuses to grant the Palestinians the necessary approvals under the pretext that those projects would harm the Israeli colonies spreading in the West Bank.

According to the Oslo Accords, the Palestinians and the Israelis set up a joint committee to tackle Palestinian infrastructure projects but the last meeting of this joint committee was held in 2010.

The International Monetary Fund and World Bank have repeatedly announced that the Palestinians had not received the Israeli necessary approvals for many blocked projects. During this time Israel was not able to justify its categorical refusal to grant the necessary approval for the Palestinian projects despite the fact that tax payers in many donor countries had paid to achieve the dream of a two-state solution.

A senior official at the Palestinian Water Authority told *Gulf News* that the donors chose to start with projects involving water because it is vital and that the Palestinian National Authority (PNA) is shocked by the Israeli political blackmail. "The Palestinian territories stand in need for increasing quantities of water and had repeatedly urged Israel to provide more of water," he said.

"Israel has demanded its colonies benefit from the Palestinian projects but the PNA refused." The Palestinian Water Authority warned that Israel does not adhere in any way to the articles of the Oslo Accords after 20 years of signing the agreements. Israel fully controls the water sector in all areas of the Palestinian territories. Israeli forces have repeatedly raided Palestinian Area A and destroyed

Palestinian water projects including wells dug by Palestinian farmers on their own farms without obtaining Israeli approval, which the farmers could not secure.

The official said that Israel does not allow the PNA to handle even the water tankers, nor is the PNA allowed to repair the water pipes or import any materials needed for water projects via Israeli ports.

The Palestinian Water Authority stressed that Israel fully controls the PNA in terms of water and does not give the PNA a room for even a small move in this regard. The official of Palestinian Water Authority said that Israel had made it clear to the PNA that Israeli approval for 120 infrastructure projects will be directly connected to a Palestinian decision to not criticize the Israelis conducting infrastructure projects in West Bank based colonies.

The Palestinian Water Authority has urged the international community to press Israel to secure the needed official Israeli approvals and to spare Palestinians from blackmail.

"Israel 'blackmailing' Palestinians over projects", 16/04/2014, online at: http://gulfnews.com/news/region/palestinian-territories/israel-blackmailing-palestinians-over-projects-1.1320266

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❖ Agriculture Ministry moves to stem drought fears

BEIRUT: Agriculture Minister Akram Chehayeb stressed Monday the importance of developing agricultural infrastructure and solutions to deal with a decrease in rainfall, which is set to affect the quantity and quality of both surface water and groundwater in wells.The decline in rainfall this winter has sparked drought fears in Lebanon, as well as warnings of a water emergency and urgent calls for new solutions to combat scarcity and conserve water at home.

During a meeting with ministry Director-General Louis Lahoud, a delegation from the World Bank headed by Maurice Saade and representatives from the Food and Agricultural Organization, Chehayeb stressed the "united efforts between the different ministries and institutions and departments concerned with agriculture, infrastructure and donors."

Chehayeb also noted the importance of what has already been done in terms of establishing hill lakes and guiding farmers toward more advanced methods of irrigation.

The minister called for afforestation projects – planting trees where there were none before – to be expanded to include additional areas on both sides of Mount Lebanon, which would include municipality- and government-owned areas.

The meeting was called partly to congratulate Chehayeb on his new post and to brief him on the Sustainable Agricultural Livelihood in Marginal Areas project, which is funded with $20 million from the World Bank and $7 million from the Global Environment Facility.

The SALMA project includes three main components.

First, it outlines the creation of agricultural and rural infrastructure, including approximately 13 sand reservoirs and rural roads up to 40 kilometers long for farming and forestry purposes.

Second, it encourages afforestation, reforestation and forest management projects, conducted in close cooperation with municipalities, civil society and national non-profit organizations.

Third, training and developing technical expertise within the Agricultural Ministry, farmers and the Beirut Green Project, which aims to promote awareness and use of public parks in the capital.

Chehayeb expressed his satisfaction with "the World Bank's readiness to consider the participation of municipalities who express their desire to participate in afforestation operations according to the technical standards put in place by experts."

The delegation from the World Bank said the areas chosen as the launching point for the Sustainable Agricultural Livelihood in Marginal Areas project had been picked according to biological and

ecological standards, the willingness of municipalities to participate according to their previous experience in afforestation, and requests by civil society groups across Lebanon.

The participants in the meeting also stressed the importance of working to lessen the risk of forest fires, and it was agreed that the FAO would provide technical assistance in this respect, as well as taking into consideration the livelihoods of residents of rural areas and Syrian refugees staying there.

Also Monday, Parliament's Agricultural and Tourism Committee held a meeting headed by MPAyoub Humayed that was attended by Chehayeb, the committee's rapporteur Neamatallah Abi Nasr, and several other MPs.

The damage caused by climate change was discussed at the meeting, and the committee decided to issue two recommendations to the government: to hasten the commissioning of the Lebanese Army and the Higher Relief Committee to survey the damage so far and compensate farmers accordingly, and to allow the Agriculture Ministry to provide assistance in kind.

Humayed also said it was agreed, with the cooperation of Chehayeb, to hold another meeting next week.

Chehayeb said his ministry was working on organizing a conference with the Energy and Water Ministry to find ways to deal with this year's lack of rainfall and its consequences for agriculture.

He said he had surveyed the damage caused by the recent drought and last week informed Cabinet of the issue's gravity, adding that he hoped farmers would receive the necessary compensation.

"We have started to survey the damage and specify its proportion, and I hope the Cabinet will issue a decision," he said.

"Agriculture Ministry moves to stem drought fears", Daily Star, 14/04/2014, online at:
http://mideastenvironment.apps01.yorku.ca/2014/04/agriculture-ministry-moves-to-stem-drought-fears-daily-star/

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❖ Palestinian Water Shortages Intensify Due To Drought, Aging Infrastructure, Inaction

Bloomberg BNA — The current water shortage in Arab East Jerusalem is only the latest water crisis facing Arab areas of the West Bank and Gaza Strip, representatives from regional security, environmental and human rights organizations told Bloomberg BNA.

Its solution need not wait for progress in the currently stalled Middle East peace talks, they said. Nor should it.

Residents of East Jerusalem neighborhoods, though outside a security fence built by Israel to prevent terrorist infiltration, have had almost no water from the national grid since March 4.

In many parts of the neighborhoods, particularly their suburbs and elevated areas, there is no water at all. In other sections, pressure is very low, preventing pumping above ground level.

'Situation Unbearable.'

"There are elderly, babies and people with disabilities, and the situation has become unbearable," said Jamil Sanduka, chairman of the Ras Hamis Neighborhood Committee. "Anywhere else, if thousands of people were without running water, this problem would have been solved quickly. In our case, the problem is first and foremost that all the responsible parties simply do not care."

The East Jerusalem water shortage stems partly from a winter drought but mainly from crumbling infrastructure, an overwhelming number of illegal hookups to the remaining grid and a lack of coordination among Israeli government authorities. Some even call the neglect intentional, saying it reflects an Israeli desire to limit Arab population growth in the area where residency comes with a highly valued Israeli identity card and the right to freely cross into Israel.

Residents of the neighborhood are waiting to see how the Israeli government will respond to an April 2 order by the Supreme Court, giving it 60 days to propose solutions to the problem. Meanwhile, they

bring water from friends and family who still have it, and buy more in bottles and jerry cans from scalpers at rates far above its regulated cost.

Illegal Hookups, Poor Planning

Hagihon, Jerusalem's municipal water company, says there is little it can do. Rapid population growth, lack of urban planning and a proliferation of pirated pipes have overwhelmed the infrastructure, Hagihon Director-General Zohar Yinon told the Knesset (parliamentary) Public Petitions Committee on March 19.

Of the 60,000 to 80,000 residents in the area, barely 3 percent are legally connected to the municipal grid, he said. The rest get their water for free through illegal connections to the system, causing leaks and eliminating water pressure further down the line, he said.

The illegal tapping costs Hagihon about 10 million shekels ($2.9 million) a year, Yinon said, compared to the 100 million shekels ($29 million) needed to inspect, map and repair the system, and to install legal, metered hookups. And that does not factor in the cost of the police escorts needed for work crews to enter the area, he added.

“Unfortunately, this whole burden falls on Hagihon,” Yinon said, calling the situation a “national, political problem” that is “beyond our jurisdiction, even though we are the only government body left to deal with it.”

Israel's National Water Authority said the problem lies with Hagihon.

“Hagihon is Jerusalem's water supplier and also is responsible for collecting payment for this service,” Water Authority spokesman Uri Schor said.

Solution Will Require Funding

Ultimately, the buck will stop at the Finance Ministry, predicted Tamar Feldman, an attorney working with the Association for Civil Rights in Israel, which submitted the Supreme Court petition.

"Implementing any plan will require funding, and that's who has it," she told Bloomberg BNA April 9.

The East Jerusalem shortage will likely be solved in the short term, Feldman said, unlike the chronic shortage suffered by Palestinian residents of Gaza and the West Bank.

Several water officials estimate that Palestinians in Gaza and the West Bank use an average of 70 liters (18 gallons) of water a day, compared with Jewish use of "up to" 260 liters (69 gallons) per day.

Mekorot, Israel's National Water Company, puts the Israeli average at between 100 and 230 liters (26 gallons to 61 gallons) per day. The difference is mainly a result of large-scale Israeli industrial use and agriculture, which barely exist on the Palestinian side.

However, the Palestinian average can also vary widely according to whether a town or village is connected to the national grid. According to the Israel human rights organization B'Tselem, Palestinian water use in the West Bank ranges from 169 liters (45 gallons) per day in Jericho to 38 liters (10 gallons) per day in Jenin.

But while Palestinians largely rely on rainwater and wells drilled into underground aquifers, Israel has supplemented its own water supply in recent years through widespread recycling, sewage treatment and desalination that today account for about 80 percent of domestic consumption.

A 2012 report by Bar Ilan University on freshwater allocation put Israeli per-capita use at 170 cubic meters (44,880 gallons per year, 123 gallons per day) a year and Palestinian use at 129 cubic meters

(34,056 gallons a year, 93 gallons a day), which would be in line with the World Health Organization's recommended minimum of 100 liters (26 gallons) per day per person.

Lower per-capita estimates of Palestinian use, Israeli authorities said, come from the use of inflated population estimates, particularly in the West Bank.

Supply Based on International Accords

Under Article 40 of the 1994 Oslo Accords, Israel committed to provide the Palestinian Authority with at least 23.6 million cubic meters (mcm) of fresh water per year, including 5 mcm for Gaza.

The agreement also allowed Palestinians in the West Bank to drill for 28 mcm of water per year on top of the 118 mcm they produced at the time from drilling, agricultural wells, springs and precipitation.

But Oslo was intended to be temporary. Twenty years later, population growth, decreased drilling, aging infrastructure and dropping natural supply have left the area with a water deficit.

According to Water Authority statistics, Israel now supplies more than double the required amount to the Palestinian Authority, or 53 mcm, but even that does not meet the areas' needs.

Today, according to Naama Baumgarten-Sharon, a researcher at B'tselem, Palestinians in the West Bank procure only 100 mcm of water from drilling and buy the additional 53 mcm from Mekorot, the national water company. About 30 percent of the total, however, is lost to leakage from crumbling pipes, she said.

Those connected to the water grid—about 100,000 people are not—keep their water in rooftop tanks. The tanks are filled between once a week and once a month, depending on their location.

The West Bank water problem is threefold, Feldman said. First comes the "outdated and dysfunctional" Oslo framework. Second are the more than 100 "unrecognized" Arab villages in West Bank areas under full Israeli control, which have no access to the national water grid. And third is Israel's refusal to license new Palestinian wells. The military authority destroys wells drilled without a license as well as old water cisterns that have been repaired for use, she said.

Gaza Crisis Most Pressing

Gaza's water situation is more critical, most officials agree (2014 WLPM, 2/5/14). The area relies almost entirely on a coastal aquifer for its freshwater, but water from that aquifer is quickly becoming unpotable.

The 1.6 million Gazans living in the densely populated area currently draw water from the aquifer at almost triple its recharge rate, said Nader Khateeb, Palestinian director of Friends of the Earth Middle East (FoEME), a regional NGO that is spearheading a campaign to include a new water agreement in U.S.-backed peace talks.

As groundwater levels decline, seawater from the Mediterranean seeps into the aquifer along with untreated sewage and agricultural runoff. As a result, saline, chloride and nitrate levels in the aquifer have risen well beyond World Health Organization standards for drinking water, he said.

The situation is a "humanitarian crisis," Khateeb said.

"Gaza residents are drinking unhealthy water," he said in a March 21 statement released for World Water Day. "And if no alternative solutions are advanced, they are about to run out of potable water completely. No security fence will hold back people who do not have water for their children and families."

A large desalination plant, which is being built by UNICEF with a grant of 10 million euros ($13.7 million) from the European Union, is scheduled to come online in 2015. The international

community has also funded construction of three large regional sewage treatment plants. Yet they all require electricity on a scale still unavailable in Gaza, and so they function intermittently, if at all.

Israel Holds Key

Israel, which produces more desalinated water than it needs at a coastal plant just north of Gaza, could provide an interim solution, Gidon Bromberg, FoEME's Israel director, told Bloomberg BNA.

"This isn't far-fetched," he said. "Israel is already selling 4.7 mcm of water to Gaza annually and has committed to supply another 10 mcm."

He said the Israeli government also agreed to sell 20 mcm of purified water to the Palestinian Authority as part of a water-swapping deal signed in December with Jordan and the Palestinians.

"Surpluses of water that are sold or transferred to our neighbors can help strengthen relationships, serve as a gesture to prevent escalation, and a basis for creating mutual interests among Israel and its neighbors," Bromberg said.

Proposed Agreement Sent to Kerry

FoEME recently submitted a proposal to U.S. Secretary of State John Kerry and other representatives to the Middle East peace talks calling for a "final water agreement" to be achieved within three months of a framework peace agreement. The plan would replace the 1994 Oslo accord and its largely defunct management structure with a new management team, including a third-party representative.

The new body, according to the outline supplied to Bloomberg BNA, would "be based on all sources of shared natural water and be governed by principles of equity, efficiency, environmental sustainability and participatory structures."

The outline also calls for creation of an action plan to address "urgent issues including water supply and sanitation solutions for Gaza and the West Bank," and a trilateral committee of representatives from Israel, the Palestinian Authority and Jordan to rehabilitate the Jordan River and the Dead Sea.

"A final agreement on water between Palestinians and Israelis has been held hostage to the status quo for too long and can no longer wait," Bromberg said. "The current water arrangements are outdated and have been failing the interests of both sides. Palestinians are not receiving sufficient water to meet their basic needs, and sanitation solutions are urgently needed in the West Bank and Gaza to prevent the continuing contamination of shared ground and surface water that threatens the health of both peoples."

Some even say a solution to the region's water problems need not wait for a political agreement.

"We look at this issue from a strategic point of view," said Oded Eran, a senior research fellow at Israel's Institute for National Security Studies, and a former head of Israel's negotiating team with the Palestinians. "We see that water, energy and infrastructure can be a confidence-building measure, and also something that can precede the political peace."

Progress on water issues "can really enhance the negotiations and the process of normalization among Israel and its neighbors," he said.

"Palestinian Water Shortages Intensify Due To Drought, Aging Infrastructure, Inaction", 17/04/2014, online at: http://www.bloomberg.com/news/2014-04-17/palestinian-water-shortages-intensify-due-to-drought-aging-infrastructure-inaction.html

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❖ Egypt challenges Ethiopia's 'logic' the dam is 'Sovereign Affair'

Djibouti (HAN) April 21, 2014 – Editorial Note from the Editor of Geeska Afrika Online – Interim President Adly Mansour said that the security of the Middle East and North Africa zone are one of Egypt's national security priorities, and that Egypt was fighting the war on terror on behalf of the Middle East regions interests.

Answering a question about the Grand Renaissance Ethiopian Dam, currently under construction on the Blue Nile in Ethiopia, Mansour said the project was a **"great challenge."**

The Egyptian and Ethiopian leaders have met last year in Kuwait for the first time to discuss tensions over Ethiopia's construction of a huge hydropower dam on the river Nile but the meeting ended without any agreement, sources said. **"The problem of the Renaissance Dam is that some countries want to have big projects without consultation. This is a dangerous matter as they neglect the interest of other countries like Egypt,"** he said. Egyptian interim president Adly Mansour has promised the to the Egyptian People that he will **"spare no effort" i**n his attempts to secure their Great Assets -Nile water.

Official Opinion By, Ahmed Sayed El-Naggar chairman of state-owned media organisation Al-Ahram : *Ethiopia's 'logic' behind the construction of the Renaissance Dam is shocking, perhaps even more so than the issue of the dam itself.*

Addis Ababa is either unaware of such a thing as international law, in place to regulate water relations among countries sharing the same watercourse, or has no respect for it to begin with. Its absurd position regarding the Renaissance Dam encourages lawless handling of water relations beyond the rules of justice.

Several Ethiopian officials, including the country's ambassador to Cairo, said the construction of the dam is a sovereign affair and of no other country's business, arguing that Egypt built the Aswan High Dam without consulting them. These statements do not differentiate between the source country,

Ethiopia — whose actions regarding Nile water affect downstream countries — and the last downstream country on the river, Egypt, which is free to do what it wishes with its share of water because it does not affect any other state. Thus, Ethiopia does not have the right to take measures regarding the Nile without consulting other Nile Basin states.

Ethiopia's actions require Egypt to take immediate and firm measures to address the Renaissance Dam through exercising international law and former agreements on water from Ethiopian tributaries that reach the Nile River, most prominently the Blue Nile. It also draws attention to international laws governing global water relations among countries sharing the same watercourse basin.

International law, from theft to justice

Many phases and stormy exchanges characterised the formulation of the founding principles of the international law regulating joint watercourses between two or more states. They were primarily linked to troubles, or real conflicts, over joint watercourses, although these disputes only emerged after technology advances allowed the construction of huge water reservoirs, dams and the transportation of water from natural basins to waterways in areas of fertile agricultural land suffering the absence of water.

In the beginning, it appears that the regulation of water relations among countries sharing international watercourses was more akin to robbery, as will be evidenced later. The 19th century, especially its second half, saw the emergence of real disputes over water distribution triggered by attempts at controlling major shared watercourses. Before that, control over permanent major rivers was near impossible; only small seasonal rivers, some tributaries or minor branches of major rivers were subjected to such control.

Prior to the arrival of technology allowing humans to manage the storage and transportation of water from major permanent watercourses, main trans-border rivers naturally flowed downstream from source countries. Water usage was usually far below the river's renewable annual revenue of water which, for long periods in history, had allowed slow agricultural expansion, usually without causing disputes over water distribution of shared rivers.

However, the population explosion that accompanied the industrial revolution — as a result of great leaps in healthcare which resulted in a sharp drop in deaths and higher birth rates — escalated the demand for a rapid agricultural expansion to meet growing needs for food and agricultural raw materials used in industry. Thus was born the necessity to provide water for the large-scale horizontal expansion of agriculture as well as its vertical intensity. The need additionally arose to enhance the use of industrial fertilisers and pesticides while balancing between soil and climate on the one hand, and appropriate crops on the other. Meanwhile, rain-fed land also began to be switched to irrigated farms, since the latter yields far higher production than the former.

All of the above begs more water, creating the incentive to build mega irrigation projects to reserve, store or transport water from natural river basins to other regions. These projects are the cause of water distribution disputes for trans-border watercourses, because shifts in demographics and technology result in interference with the natural flow of the river.

Perverse "absolute sovereignty" — from the US and Turkey to Ethiopia

This "theory", if it can even be called that, basically states that any country has the right to exercise absolute sovereignty on the segment of any international watercourse that flows through its territories. Thus, if it is a source country then this "theory" gives it the absolute right for complete control over its waters and none to downstream states.

Known as the Harmon Doctrine, the "theory" is named after US Attorney General Judson Harmon who, in 1895, authored it to resolve the US-Mexican dispute over the Rio Grande River, which begins in the San Juan Mountains in southwest Colorado, with all its tributaries also beginning in the US. It is 3,040-km long and ends in the Gulf of Mexico.

In response to rising demands for water by US farmers to cultivate more land, water from the Rio Grande was diverted to the US states of Colorado and New Mexico in the last decades of the 19th century.

Mexican farmers suffered as a consequence and their agricultural land dried up after the Boulder Dam was built in New Mexico, depriving them of water they had previously relied on for farming and drinking. Mexico petitioned to the US, stating that diverting the river violated the interests and rights of Mexicans. The US State Department asked Attorney General Harmon to prepare a response. He wrote: "The fundamental principle of international law is the absolute sovereignty of every state, as against all others, within its own territory." Harmon argued that control of the water originating in any country is part of the state's absolute sovereignty over these territories, even if this control results in partial or complete deprivation for the other countries where the water naturally flowed *(reference to Dr Ali Ibrahim, Laws of International Rivers and Watercourses in Light of Recent Developments in the Final International Law Committee Project Draft, Dar Al-Nahda Al-Arabiya, Cairo, 1997).*

The US relied in part on Harmon's absolute sovereignty theory in resolving its Rio Grande water dispute with Mexico at the turn of the 20th century by signing a treaty in May, 1906. Although the preamble states the desire of the US and Mexico for fair and equitable distribution of the Rio Grande, the treaty requires Mexico to waive all former or future demands on its waters. The US asserts the principle of absolute territorial sovereignty, which means it falls under no obligation towards the downstream state, Mexico.

Absolute sovereignty theory in favour of the source country is based on power and the protection of its monopoly of river water. This is a perverse foundation not unlike the laws of the jungle, far from a means of safeguarding rights or justice in the context of international relations and distribution of shared natural resources.

Since the 1906 treaty rested on unfair terms, Mexico later demanded its amendment. In February 1944, a new treaty was signed on the basis that the two countries have rights to Rio Grande waters. Nonetheless, since the US pledged in the treaty to give Mexico an annual water quota at no cost, it made it appear as though the US was granting Mexico the water rather than recognising the latter's rights to it.

Also in the 1940s, Turkey diverted the course of the Queiq River — which begins there and irrigates the land in Syria's Aleppo region, whose inhabitants also relied on the river for drinking — damaging

large areas of Syrian farmland. In the 1980s, Turkey once again triggered a similar crisis with Syria and Iraq over the waters of the Euphrates River, based on Harmon's doctrine, even if it did not officially admit to that. Turkey unilaterally decided to obtain, at the source, what it determined to be its water rights. It paid no consideration to Iraq and Syria's historical claims to the river for human, livestock and agricultural life. While the water going to Iraq did indeed exceed the country's needs, the problem was not that Turkey wanted a share of the river water, but rather the unilateral action taken by Ankara.

The Ataturk Dam and chain of Anatolia dams constructed by Turkey at the source and tributaries of the Euphrates are used to store and transfer water to flat lands beyond the river basin for agriculture as well as to generate electricity.

Although Turkey has a legitimate right to a quota of Euphrates water, especially since it is wasted in the marshes at Shatt Al-Arab and eventually washes up into the Arabian Gulf, negotiations and understandings with Syria and Iraq to determine Turkey's share should have preceded the move so as to avoid harming the basic needs of the two other countries.

There are also examples of failed attempts to evoke absolute sovereignty by some countries to resolve disputes over shared international watercourses, such as the Ganges River between India and Bangladesh which ended in a settlement based on joint use of the water.

Absolute sovereignty or Harmon Doctrine is internationally unacceptable from a theoretical perspective, especially since it is not based on fair principles that are intellectually, conscientiously or morally acceptable. Yet, this does not prevent some countries from applying it.

While this perverse principle is unacceptable to the world, Ethiopia's stance is rooted in it when it behaves as though no other countries existed along the river. And although it maintains it will not touch Egypt's and Sudan's quotas, Ethiopia refuses to sign an agreement confirming this commitment, which reduces it to mere publicity.

Absolute river rights: the opposite extreme

The complete reverse of Harmon's Doctrine is the theory stating that all countries sharing a river basin possess the right to equal water quotas without interference or pollution. In other words, river water should follow historical flow patterns. Since this theory serves the interests of downstream states, these countries naturally champion it during water distribution negotiations with source countries.

This theory, however, is unjust to source and upstream countries because it does not allow them to use river water for agricultural or industrial purposes, which is both unreasonable and unacceptable. The only part of this theory that should be adopted is that upstream countries should not pollute the water.

Water sharing should be equitable and take into account historical quotas that are actually utilised and upon which rely the lives of people, livestock and agriculture. It should also consider the various needs of each river basin country, which this unjust theory does not. There are, however, some special cases where the river ends in an enclosed lake around which a community is founded on fishing and shore farming. In this case, the lives of the people, crops and livestock would be threatened by any reduction in water flow, which in this case would require a special review of the share of the downstream country. The absolute river rights theory, or absolute regional integration, actually becomes an extreme in the face of another, namely the "theory" of absolute sovereignty, or Harmon Doctrine, previously discussed.

Fair distribution of water

The theory of fair distribution of water, also known as limited territorial sovereignty, is based on reconciling the water interests of river basin countries in a fair manner, taking into consideration the needs and historical shares of each state when deciding water quotas.

Part of this theory states that the river cannot be diverted if this seriously violates the water rights of communities or countries across or alongside which the river flows – meaning source and upstream countries have no right to divert the watercourse because of the harm inflicted on downstream states. Meanwhile, any action by the latter does not affect the former. Accordingly, this theory, advocated by prominent Swiss jurist George Sauser-Hall, allows downstream states broader freedoms in river water and course within the limitations of their water quotas. This more realistic, humane and moral theory form the basis of modern international law on rivers and shared international watercourses.

Egypt in an inevitable showdown with Ethiopia

When considering irrigation projects, Egypt was always focused on fair water distribution, taking into account the historical use, rather than historical flow, of river water and its impact on the lives of people, crops and livestock and resulting agricultural, industrial and service projects.

Accordingly, when Egypt carried out joint water ventures with other Nile basin countries it invariably upheld the principle of fair distribution of revenue from these projects, although it often unilaterally forked all or most of their costs.

For example, Egypt was entirely responsible for the cost of the High Dam construction, although 60 percent of the saved water went to Sudan. Also, and although it did not benefit from it at all, Egypt footed the bill for the Owen Dam in Uganda because countries along Lake Victoria refused to reserve water there for Egypt since any rise in lake water levels would harm them.

Egypt had reservations about the Framework Convention on Non-Navigational Uses of International Watercourses endorsed by the UN in 1997 because it allowed the amendment of existing agreements and the drafting of new ones on the distribution of international watercourses.

Ethiopia, as a source country, has no right to unilaterally and deliberately impact life in Egypt. On 15 May 1902, Great Britain, which occupied Egypt at the time, signed an agreement with Ethiopia's King Menelik II who pledged Ethiopia would not build or allow the construction of works on the

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Blue Nile, Sobat River or Lake Tana that would restrict water flow to Egypt and Sudan without first reaching an agreement with the governments of Britain and Egypt.

France, Italy and Britain also signed an agreement in London on Abyssinia (Ethiopia) in which the fourth article states the three countries agreed to work together to protect the interests of Great Britain and Egypt in the Nile basin, especially guaranteeing that water from the Blue Nile and its tributaries reach Egypt.

Time is racing along without an agreement being reached with Ethiopia about the Renaissance Dam, safe practices, the size of its reservoir and its filling time. Taking advantage of the political situation in Egypt, Ethiopia is wasting time in endlessly evasive negotiations. Egypt has no option but immediately take the necessary steps to stop construction on the dam until an agreement is reached between Egypt, Sudan and Ethiopia. It is critical for Egypt to prepare a thorough portfolio about the dam, including all former agreements with Ethiopia, and Egypt's actual use of every drop of its Nile water quota on which the lives of people, crops and livestock entirely rely.

Cairo should present its case to all relevant regional and international agencies, or others who could galvanise a global or regional position on the matter. Egypt must also address the countries and companies participating in the construction of the dam, to convince them to stop work until an agreement is reached among Blue Nile countries.

All conscious measures must be instantly taken to compel Ethiopia to respect Egypt's rights. The legitimate defence of Egypt's life and its citizenry's rises above any other

"Egypt challenges Ethiopia's 'logic' the dam is 'Sovereign Affair' ", 21/04/2014, online at: http://geeskaafrika.com/egypt-challenges-ethiopias-logic-dam-sovereign-affair/2555/

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❖ No Room for Debate on Grand Ethiopian Renaissance Dam?

International Rivers has been caught in the crossfirebetween Ethiopia and Egypt as they struggle over a large dam being built on the Nile River by Ethiopia. Ethiopia's government turned its sights on International Rivers after we published a leaked report by the international panel of experts charged with reviewing project documents for the Grand Ethiopian Renaissance Dam (GERD). Oursummary of their report describes a number of outstanding concerns raised by the non-binding panel, including the inadequacy of the hydrological-impacts study (a key document for understanding how the dam will affect people and ecosystems downstream).

In response, Ethiopia's "national panel of experts" (which includes two of the 10 members of the Panel) issued a histrionic statement that claims our organization is backed by "Egyptian financiers," seeks to prevent Ethiopia from developing, and other provocative and groundless charges. Unhelpfully, their statement does not actually address the concerns raised by the International Panel of Experts (IPoE), nor our summary of them. You can read the IPoE reportand come to your own conclusions.

Ethiopia's wild allegations have been quite popular with a certain category of internet attack dogs, and these folks aren't likely to be swayed by what we say here. However, we can state unequivocally: **International Rivers does not take funding from any government institution**, including Egypt. We are not "taking sides" – we are impartial when it comes to critiquing destructive river projects and poor river management around the globe, including inEgypt and Sudan. The Nile is just one of many basins where conflicts are arising from engineering rivers for a narrow purpose with a limited group of beneficiaries, while a much larger group of people is left to suffer the consequences. These conflicts are exacerbated when transboundary rivers are "developed" for hydroelectricity in isolation and in secrecy. Readers can learn more about our cautions regarding the myriad of dams and diversions planned by many riparian nations along the Nile in our 2003 paper Can the Nile States Dam Their Way to Cooperation?, which presciently noted that poorly planned large dams could worsen tensions over the Nile.

We recognize Ethiopia's interest in updating the Nile Basin Treaty, support economic development that winnows Ethiopia's poverty rates, and acknowledge that the Ethiopian Government must chart its own course of development. **Our experience as an organization with expertise in hydropower**

and rivers, and as part of a global civil society movement of dam-affected peoples, leads us to conclude that maintaining healthy rivers and the ecosystems and communities they support is key to long-term prosperity. Our experience studying mega-dams in Africa reveals these projects have consistently failed to reduce poverty, and have been a costly and ineffective solution for increasing access for the millions of people on the continent without reliable access to electricity. We believe a greater focus ondecentralized energy solutions will more quickly, cheaply and effectively begin to close the yawning gap of Africa's energy poverty.

The GERD Panel concluded a year ago that more studies – some of them quite substantial, but also standard practice for a project of this magnitude – must be undertaken to fully assess GERD's impacts. Drawing upon this evaluation by an international team of technical experts, International Rivers has called for a halt to the hurried construction so that critical information on the project's impacts can be assessed and steps to reduce impacts agreed upon by all nations involved in the dispute.

To the government of Ethiopia, we respectfully submit that **the greatest threat to the GERD project is not International Rivers' publicizing the Panel's report, but rather the escalation of tensions resulting from the dam's poor planning process.** Such a monumental project should be accompanied by an equally monumental effort to gain acceptance from people who will be affected by it, and a commitment to adopt best practices for managing this important shared river. The next step is to begin the robust studies as called for by the Panel of Experts.

At this writing, Egypt and Ethiopia remain at an impasse while construction of the dam proceeds at a rapid pace. This serious conflict – borne of decades of mistrust between the two nations and controversial treaties over the use of Nile waters – is being enflamed by Ethiopia's rushed and secretive process. This is what threatens the viability and success of this project. **We urge the Nile states to find constructive ways to forge national and regional development strategies that ensure the long-term health of this critically important river, and build resilience to climatic uncertainty.**

"No Room for Debate on Grand Ethiopian Renaissance Dam?", 17/04/2014, online at: http://www.internationalrivers.org/blogs/229/no-room-for-debate-on-grand-ethiopian-renaissance-dam

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❖ Ethiopian dam to benefit Sudan: Official

ADDIS ABABA – A Sudanese governor has said that an Ethiopian dam project on the Nile River, which has been the source of tension with Egypt, will benefit Sudan.

"The dam will contribute share in efforts to extricate Ethiopia from poverty and will also benefit the people of Sudan," Hussein Yassin Hamad, the governor of the Blue Nile State, said at the opening of a joint border development commission meeting in Assosa, the capital of Ethiopia's Benshangul Gumuz region, according to a Sudanese diplomat.

"The people and administration of the Blue Nile State will provide the necessary support towards the completion of dam construction," he was quoted as saying by the diplomat.

Ethiopia is building a $6.4-billion dam on the Blue Nile, which represents Egypt's primary source of water.

The project has raised alarm bells in Egypt, the Arab world's most populous country, which fears a reduction of its historical share of Nile water.

Water distribution among Nile basin states has long been regulated by a colonial-era treaty giving Egypt and Sudan the lion's share of river water.

Ethiopia and Sudan have a joint border covering over 2000 kilometers.

"Ethiopian dam to benefit Sudan: Official", 19/04/2014, online at: http://www.turkishpress.com/news/402613/

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❖ Thai geologists warn Xayaburi dam is an earthquake risk

The huge barrage under construction on the Laotian section of Mekong River is located near active fault lines and is therefore vulnerable to seismic activity. There is a 30 per cent chance of a medium-sized earthquake in the next 30 years, and a 10 per cent chance of a magnitude 7 tremor. Builders claim instead that the project complies with all earthquake safety rules

Vientiane (AsiaNews/Agencies) - Thai geologists are warning that the Xayaburi dam, currently under construction in Laos, could have devastating consequences on the entire ecosystem of the Mekong Delta region because of the site's high seismic risk.

Experts note that the massive barrage is being built near active fault lines; however, dam builders claim that the project complies with all seismic design guidelines.

Last week, the Vietnam Rivers Network, a Vietnam-based group of NGOs, called for the immediate suspension of the Xayaburi dam project, citing risks to fisheries, food security and livelihood.

Geologist Dr Punya Charusiri of Chulalungkorn University in Bangkok has led the charge against the project, which "poses a potential danger" because of "active faults close to the dam site".

In his view, there is "a 30 per cent chance of a medium-sized earthquake hitting the dam site in the next 30 years, and a 10 per cent chance of a powerful earthquake of up to magnitude 7."

For the scientist, construction should "never have started" at such a site without further research into potential disasters. For their part, Cambodian authorities raised the alarm as early as 2011.

In recent years, the area has experienced significant seismic activity, including a 6.3-magnitude quake that hit the Xayaburi area in 2007. A 6.9 magnitude quake also hit neighbouring Myanmar on 24 March 2011, killing 151 people.

Dam builders Pöyry Energy's Swiss subsidiary and Thai company CH. Karnchang insist that the project meets the highest safety standards in accordance with seismic design guidelines prepared by the International Commission on Large Dams (ICOLD).

The US$ 3.5 billion, 1.26-megawatt hydropower project is in its early phase with less than 10 per cent complete. Although located in a remote area in northern Laos, the dam has already displaced more than 2,100 villagers.

Vietnam, Cambodia and the Mekong River Commission (MRC) have called for a ten-year moratorium without success. Meanwhile, there has been a 300,000 tonnes drop in fish catch.

The Mekong River starts in the Tibetan plateau, flows through China's Yunnan province until it reaches Myanmar, Thailand, Laos, Cambodia and Vietnam.

About 65 million people live along the river, relying on fish farms and the natural fishery, which is worth an estimated US$ 3 billion.

Considered the second most important river in the world in terms of biodiversity, the 4,880-km long Mekong is threatened by a number of projects involving dams and hydroelectric power plants.

"Thai geologists warn Xayaburi dam is an earthquake risk", 18/04/2014, online at: http://www.asianews.it/news-en/Thai-geologists-warn-Xayaburi-dam-is-an-earthquake-risk-30867.html

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❖ Water level in Mekong River drops significantly

CHIANG RAI, 18 April 2014 (NNT) – The water level in the Mekong River is constantly decreasing as drought continues, while 200 families in Maha Sarakham Province are in urgent need of assistance.

The water level in the Mekong River that passes through Chiang Rai Province has seen a significant drop, as rocks and dunes have resurfaced, causing problems to water transportation in the area. Cargo ships were unable to operate as a result, forcing several logistics companies to use small boats instead.

Elsewhere in Myanmar's Myawaddy District, over 100 workers were seen building an earthen embankment as an attempt to prevent coastal erosion, which normally happens during the rainy season. According to authorities, the erosion could change the flow of water into a different direction, which will effect cultivations in agricultural zones.

Back in Thailand, two hundred families in Maha Sarakham province battered by the severe drought have made complaints with the provincial governor. They requested that a canal be built as a long term drought prevention plan.

"Water level in Mekong River drops significantly", 18/04/2014, online at: http://thainews.prd.go.th/centerweb/newsen/NewsDetail?NT01_NewsID=WNDAT5704180010001

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❖ Ho Chi Minh Declaration dodges Mekong dams dispute: rivers group

International Rivers has blamed regional governments for failing to address the impacts of constructing dams along the Mekong River even as countries pledge to ensure the sustainable use and management of the water and related resources.

Non-profit group International Rivers has expressed disappointment over the unresolved dispute concerning the proposed dams on the Mekong River at the second Mekong River Commission (MRC) Summit held recently in Vietnam.

International Rivers, which works with an international network of organisations that aim to protect rivers and local communities against unsustainable management, said that the actions and statements of government leaders in the region did not clearly denounce the current rush of dams being built along the mainstream portion of the lower Mekong river.

This is despite the fact that the on-going construction of dams pursued by the Lao government poses a threat to local communities and their livelihood, explained Ame Trandem, the environmental group's Southeast Asia programme director.

At the summit which concluded on April 5, government leaders from Cambodia, Lao People's Democratic Republic (Lao PDR), Thailand and Vietnam presented the Ho Chi Minh Declaration, which set out new priorities for the MRC, an intergovernmental body between the four member countries that facilitates regional cooperation agreements relating to development projects around the river.

The MRC, while not a regulatory body, requires a consensus from all member states before any dam construction along the mainstream Mekong can proceed.

In the declaration, the actions proposed include expediting the implementation of MRC's basin-wide studies to reduce negative impacts of development projects in the river, including hydropower, as well as prioritising initiatives on battling the effects of natural disasters and the impact of climate change and rising sea level on the river basin.

Trandem, however, stressed that impact studies should be finalised first. "We expect all construction on the Xayaburi and Don Sahong dams to end immediately and that no further decisions or actions be taken until the Mekong River Commission Council Study, Vietnam's Delta Study, and transboundary impact assessments for each project have been completed and the results have been comprehensively reviewed," she said.

Xayaburi, the first hydropower plant being constructed on the lower stretch of the Mekong is now 23 per cent completed, stated recent media reports in Laos.

Energy-water-food security

The Mekong River Basin is a 4,909 kilometre-long river, which flows through six countries that include China, Myanmar, Thailand, Lao PDR, Cambodia, and Vietnam.

With increasing energy demand in these developing countries, building dams for large hydropower projects is seen as a necessary means to meet these needs, said the MRC. The four countries particularly situated at the lower Mekong are planning a total of 11 large hydropower dams along the river's mainstream.

China is reported to have already built four dams in Yunnan province on the upper Mekong mainstream. Laos' Xayaburi dam is a 1,285-megawatt hydropower project being developed by the Xayaburi Power Company on the lower Mekong side of Laos.

While hydropower is a renewable energy source, and therefore much cleaner than coal and other fossil fuels, the construction and maintenance of such large infrastructure projects have been controversial.

Other environmental groups such as the World Wildlife Fund (WWF) have echoed International Rivers' concern and indicated that such initiatives are not sustainable.

It would only bring short-term development, they emphasised. The eco-group said the dams will impact marine biodiversity and food security as the infrastructure could block migratory fish from going back to their spawning grounds, and therefore affect the already stressed fish population.

Similarly, the United Nations recently drew global attention on the interdependence of water and energy development projects in a comprehensive report released in March on World Water Day. It pushed for a reassessment on the forms of energy production employed by countries and its impact on water security.

While the UN report acknowledged that hydropower as a form of energy production remains underexploited in the region, it noted that prospects are better for small-scale hydropower projects particularly for countries with short, swift rivers as well as tributaries of big rivers that do not affect communities living downstream.

"The ability to make informed decisions, based on sound data and scientific study, should be a prerequisite for starting deliberations over whether to build dams on the Mekong River mainstream," added Trandem.

The Lao government claimed there are no risks in proceeding with the construction of the dam. Developers presented a report arguing that environmental concerns raised by various groups can be mitigated through afish-pass system designed large enough to accommodate the passage of all breeds of river fish.

WWF, one of the 40 environmental groups actively campaigning against the Mekong dams, disagreed with the report.

Marc Goichot, sustainable hydropower lead with WWF-Greater Mekong, previously said that there are no internationally accepted, technologically proven solutions that could lessen the impact of dam construction on fish migrations and the flow of nutrient-rich sediments. "Resting the future of the Mekong on flawed analysis could have dire consequences for the livelihoods of millions of people living in the Mekong Basin," commented Goichot.

Mekong's future: From Hua Hin to Ho Chi Minh

Leaders of the four countries have pledged to follow up and continue implementing the cooperation agreements upheld at the Hua Hin Declaration, which set the sustainable use and management of the water and related resources of the Mekong River Basin.

The Hua Hin Declaration was the outcome of the first MRC summit held in Thailand in 2010.

"

The ability to make informed decisions, based on sound data and scientific study, should be a prerequisite for starting deliberations over whether to build dams on the Mekong River mainstream

Ame Trandem, Southeast Asia programme director, International Rivers

Officials noted that the development of water resources along the Mekong River Basin has contributed largely to the socio-economic development of the region, in the areas of transportation, energy and food production. They also recognised that the negative environmental and social impacts in the basin should be fully and effectively addressed.

The new declaration, which focused on "Water, energy and food security in the context of climate change for the Mekong River Basin", promised to avoid, reduce and mitigate risks facing the river's ecosystem – which is a source of food, livelihood and water for over 60 million people. It also

identified these risks as coming from intensive agriculture, aquaculture and irrigation as well as hydropower and transportation along the river.

It also raised the need for further efforts to reduce the risks of natural disasters such as floods and droughts and the effects of the rising sea level in the basin.

In reference to hydropower projects, the declaration stated that the MRC should implement the results of the study conducted by the Commission's Council on Sustainable Management and Development of Mekong River Basin, including the results of studies on impacts of mainstream hydropower projects and the Mekong Delta Study initiated by Vietnam.

To achieve these plans, Vietnamese Prime Minister Nguyen Tan Dung, whose country hosted the second MRC Summit, emphasised the need for efforts beyond national borders. "We need to strengthen regional cooperation, particularly among the riparian countries, both upper and lower, through multilateral and sub-regional mechanisms such as the MRC."

However, these commitments inspired little confidence in International Rivers. Trandem remarked: "Words without actions are meaningless; the Lao government must stop its free reign of Mekong mainstream dam building."

"Ho Chi Minh Declaration dodges Mekong dams dispute: rivers group", 15/04/2014, online at: http://www.eco-business.com/news/ho-chi-minh-declaration-dodges-mekong-dams-dispute-rivers-group/

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❖ Alibaba Recruits Users to Identify China's Polluted Water

China's battle against pollution is getting some help from Jack Ma's 500 million-strong army.

Alibaba Group Holding Ltd., the e-commerce giant founded by Ma, is asking the public to participate in mapping water quality across China to raise environmental awareness. With **testing kits**sold through the company for as little as 65 yuan ($10), volunteers can measure pollutants in freshwater sources and upload the data to a digital map via smartphones.

The program, still in the startup stage, may prove to be a test of the government's resolve in cleaning up the environment. While harnessing the world's largest group of **Internet users** might help the cause, the data could also shine a critical light on the government's performance in particular regions or cities.

"The message that it gets out to the Chinese people is, 'Yes, you can measure this stuff, you have the right to find out what's in your water, what's in your air,' and that you have the right to ask your government to do something about it," said Judith Shapiro, author of "China's Environmental Challenges." "That's a very powerful message."

Alibaba's **Taobao Marketplace** boasts half a billion users, which has helped make Ma China's fourth-richest man. The 49-year-old said last year he wants to help make the nation's "water clearer, skies bluer, and food more secure." An environmental fund started by his company has raised at least 50 million **yuan** from donors, according to its website.

Threatening Growth

Environmental degradation and pollution are threatening growth in the world's second-largest economy. That prompted Premier Li Keqiang to promise greater efforts to tackle the problem in a speech at last month's National People's Congress.

Environmental damage cost China 1.5 trillion yuan, or 3.5 percent of the nation's gross domestic product, in 2010, according to April 2013 **data** from the Chinese Academy for Environmental Planning posted online by the Hong Kong Trade Development Council.

Concerns about the environment are the biggest source of unrest in China, Chen Jiping, a former leading member of the Communist Party's Committee of Political and Legislative Affairs, said last year. The nation has 16 of the 20 most-polluted cities on the planet, according to World Bank estimates.

Trial Run

About 10 percent of the water in China's biggest river basins was severely polluted, **according** to a report issued by the Ministry of Environmental Protection in 2012, the latest data available. The government, which has set a goal of providing safe drinking water to **298 million** rural residents by next year, plans to spend 2 trillion yuan fighting water contamination, the Securities Daily **said** Feb. 18.

Public concerns about water safety have increased and Xinhua reported April 12 that crude oil had leaked from a pipeline into the source of a water plant in Lanzhou, a city 1,700 kilometers (1,100 miles) northwest of **Shanghai**. Tests showed levels of benzene in Lanzhou's water supply surged to 20 times the national limit.

After a small trial run last year, Alibaba kicked off its water-testing initiative over the Lunar New Year holiday in January, when employees traveling to their hometowns across 28 provinces took company-provided testing kits with them.

Among the workers who measured water quality at a total of more than 420 locations was Yang Fangyi, a manager at the Alibaba Foundation, an arm of Alibaba Group that focuses on social issues including environmental protection. Yang recorded six different data measures at a lake in southwest China and uploaded them to a map.

In places where the data indicates pollution, the foundation's staff can consult with experts and cooperate with local environmental protection authorities and nongovernmental organizations on cleanup measures, Yang said in an interview.

Enlisting Participants

Yang spoke before Alibaba announced the commencement last month of an initial public offering in the U.S. The company may sell about a 12 percent stake in itself, one person with knowledge of the matter said at the time. That would make it an $18.4 billion offering, based on the $153 billion average valuation of analysts, according to data compiled by Bloomberg.

In preparation for the IPO, Alibaba bought full control of AutoNavi Holdings Ltd. to bolster its mobile technology. The deal, announced April 11, gives Alibaba control of China's most popular mobile mapping service, helping it compete with Baidu Inc.'s Baidu Maps and with Tencent Holdings Ltd. for taxi and restaurant recommendation services.

Results Uploaded

Alibaba began working last month with 15 organizations to engage more participants in the water-testing program. It will also help nine villages purify their water sources through measures such as wetlands restoration, Yang said. By engaging the public, the mapping effort can help raise awareness about the need to protect clean water, he said.

The palm-sized kits used for water testing are sold by Greenovation, a non-governmental organization, for 65 yuan or 80 yuan on **Taobao Marketplace**. Participants can upload the test results using a mobile app created by Liu Chunlei, the founder of **Danger Maps**, a website that allows people to look up environmental hazards such as toxic-waste treatment facilities and oil refineries.

The Institute of Public & Environmental Affairs, a Beijing-based organization, also created**pollution maps** to encourage regulation and accountability among corporate and government agencies.

Greater involvement by private companies and nongovernmental organizations in environmental causes may pressure the government to step up its own efforts, said Shapiro, a professor at American University in **Washington**.

'A Little Risky'

"There are sectors of the Chinese government that very much want to implement the environmental regulations and laws that are in place, but these sectors in the government are not as strong as they need to be," she said.

At the same time, by collecting and publicizing information about local pollution, Alibaba could rankle officials who are responsible for those districts and threaten companies that are responsible. China has jailed environmental activists, including Wu Lihong, who campaigned against chemical companies he blamed for causing an algae bloom and choking a lake near Shanghai.

"It may be a little risky," Shapiro said of Alibaba's initiative. "They must have some kind of confidence from the central government that this is going to be OK for them to do."

The company declined to comment on what role the government plays in its effort. China's Ministry of Civil Affairs couldn't immediately comment, said a person at the ministry who identified herself only by her last name, Wei.

'Idealistic Generation'

For Alibaba, the program may help recruit and motivate workers, as well as appeal to customers.

"Tech companies are becoming political just by the sheer nature of their scale and their influence," said Duncan Clark, the Beijing-based chairman of BDA China Ltd., which advises technology companies. "This is an idealistic generation, and it's a generation that is very concerned about their future."

Alibaba can also tell its users they're more than just customers, said Ethan Zuckerman, director of the Center for Civic Media at the Massachusetts Institute of Technology.

"They can appeal to their users by saying, look you're going to be engaged in civic change, you're going to be engaged by making China a better place," Zuckerman said. "It's pretty brilliant."

"Alibaba Recruits Users to Identify China's Polluted Water", 14/04/2014, online at:
http://www.bloomberg.com/news/2014-04-13/alibaba-recruits-users-to-identify-china-s-polluted-waters-tech.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=b5ec096665-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-b5ec096665-250657169

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❖ Desalination Plant to Provide Third of Beijing's Water

One-third of the tap water used in Beijing in five years will be desalinated from the sea to make it potable and boost clean supplies, according to state media.

Beijing Enterprises (371) Water Group, the biggest publicly traded water-treatment company in China, is developing the reverse-osmosis project in the Caofeidian district of Tangshan in **Hebei province**, the Global Times **reported**. The city will get about 33 percent of its water daily from the treatment facility.

The company said it's planning to spend 7 billion **yuan** ($1.1 billion) on the plant and 10 billion yuan more on a pipeline to transport the water. Beijing Enterprises Water started desalinating seawater in 2012.

Beijing has been battling drought for 15 years as China works to clean its water and air of pollutants. Xinhua News Agency reported April 12 that investigators traced the source of an oil pipeline leak that contaminated the water supply of 2.4 million people in Lanzhou to a unit run by China National Petroleum Corp., the latest health- and safety-related mishap in the most-populous nation.

"WaterDesalination Plant to Provide Third of Beijing's Water", 15/04/2014, online at:
http://www.bloomberg.com/news/2014-04-15/desalination-plant-to-provide-third-of-beijing-s-water.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=f8e32b39ce-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-f8e32b39ce-250657169

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❖ China blames France's Veolia for tap water pollution

(Reuters) - China has blamed French utility Veolia Environnement for "supervision problems" in its water quality standards after authorities said a cancer-inducing chemical had been found in tap water supplied by the firm at 20 times above national safety levels, state media said on Wednesday.

The reading of benzene in the tap water in the northwestern city of Lanzhou was taken on Friday, forcing the city to turn off supplies in one district and warn other residents not to drink tap water for the next 24 hours.

Lanzhou, a heavily industrialized city of 3.6 million people in the northwestern province of Gansu, ranks among China's most polluted population centers.

Investigators looking into the incident found "there were supervision problems within Veolia Water Company related to water quality and safety", China National Radio said on its website, quoting a Lanzhou government spokesman speaking at a news conference. The spokesman did not elaborate.

The Lanzhou government and executives from Lanzhou Veolia Water Co, a local unit of Veolia, could not be reached for comment. Veolia France was not available for comment.

The Lanzhou government's complaints come on the back of rising scrutiny of foreign companies by Chinese state media. The government and state media have taken a series of firms to task on issues ranging from pricing to alleged poor quality products and shoddy customer service.

Lanzhou Veolia Water Company's deputy general manager, Yan Xiaotao, said there was no late reporting of the benzene spike or cover-up, Xinhua reported. Lanzhou Veolia Water Co is majority-owned by the city government, with Veolia China, a unit of Veolia Environnement, holding a 45 percent stake.

The government has already blamed a crude oil leak from a pipeline owned by a unit of China National Petroleum Corp. for the presence of benzene.

The Chinese government has not said whether it has opened an investigation into CNPC. PetroChina, the listed unit of CNPC, has denied media reports that it is to blame for the leak.

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A PetroChina official, who declined to be named due to the sensitivity of the matter, said the company had been cooperating with the investigations.

"The investigations showed that there is no PetroChina-operated pipelines that are close to the tap water production areas, no leaks were found, and no abnormal emissions," the official said. "All PetroChina facilities are operating normally."

"China blames France's Veolia for tap water pollution", 16/04/2014, online at: http://www.reuters.com/article/2014/04/16/us-china-water-veolia-idUSBREA3E05P20140416?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=ee81878d94-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-ee81878d94-250657169

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❖ Partnership to help distribute Veolia water/wastewater systems in Middle East

Veolia Water Solutions & Technologies has signed a partnership with Corys Environment, the environmental investments arm of Green Coast Enterprises, to promote water and **wastewater** systems developed in UAE and the Emirates of Dubai in particular.

The new partnership was announced at the 16^{tt} Water, Energy, Technology Exhibition (WETEX) being held from the 14th and 15th of April under the patronage of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai.

Emmanuel Gayan, executive vice president, Asia Pacific Middle East and Africa, Veolia Water Solutions & Technologies, said: "This is a strategically important partnership for both organizations, and means we are able to better serve our customers and increase our footprint with industry wide performance standards in the **Middle East**."

Mohammed Abdul Ghaffar Hussain, managing director of Green Coast Enterprises, said: "This strategic alliance will form the cornerstone of our own environmental activities here at CORYS

"Partnership to help distribute Veolia water/wastewater systems in Middle East", 14/04/2014, online at: http://www.waterworld.com/articles/2014/04/partnership-to-help-distribute-veolia-water-wastewater-systems-in-middle-east.html

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❖ Mainstreaming climate policy in the Gulf Cooperation Council states

A paper by Mari Luomi, published by the Oxford Institute for Energy Studies, examines current trends in domestic climate policy in the Gulf Cooperation Council (GCC) states.

Given the politicization of the topic at the international level, the paper takes a bottom-up approach that departs from the countries' national circumstances, capabilities and vulnerabilities. It emphasizes the opportunities inherent in integrating the goals of low-carbon, resource-efficient and climate-resilient development into these countries' sustainable development goals.

Following a review of the relevant international frameworks for action and support, and available domestic policies and measures, the study builds a comprehensive climate action profile for the GCC states, with analyses of national circumstances, capabilities and vulnerabilities, and greenhouse gas emissions. For the three most active GCC states in this area, the United Arab Emirates, Saudi Arabia and Qatar, the study presents a comprehensive, sector-based assessment of existing measures aimed at or with benefits for emission reductions and climate resilience.

The study demonstrates that there is large potential for enhanced mitigation and adaptation action in the GCC states. It also argues that climate policy mainstreaming and low-emission development strategies (LEDS) would help these states in aligning their climate change-related policy aims with existing economic development visions and development strategies in a way that creates positive synergies.

Download the Publication: http://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/02/MEP-7.pdf

"Mainstreaming climate policy in the Gulf Cooperation Council states", AFED, 14/04/2014, online at: http://mideastenvironment.apps01.yorku.ca/2014/04/mainstreaming-climate-policy-in-the-gulf-cooperation-council-states-afed/

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❖ Bailing out the world's fresh water bank

An Australian-based water scientist is testing a new technology to help save imperilled underground water resources in Australia and around the world as climate change tightens its grip on the global food supply.

Dr Margaret Shanafield of the National Centre for Groundwater Research and Training at Flinders University has developed a ground-breaking way to measure how much water is stored underground when big rivers are allowed to flood.

The technology is being put through its paces on the Colorado River, where it runs through Mexico, following initial trials in a canal flowing into the Coorong, at the mouth of the Murray-Darling system.

Overuse of groundwater to meet the demands of a burgeoning world population, is threatening landscapes, food production and even some cities around the world, Dr Shanafield says.

"Groundwater makes up 95 per cent of the available fresh water on the planet," she explains. "It provides water for drinking, for food production and industry – but it also waters forests and savannahs and keeps lakes and rivers filled. When it runs short, all of these suffer."

A key to avoiding future water crises is being able to predict how water in a big river soaks into underground aquifers – when, where and how much, she says. "Groundwater is the world's water bank – and we need to understand how much is being deposited and withdrawn if we are to manage it wisely."

Dr Shanafield has developed a complex mathematical model which describes what goes on when ephemeral rivers – those that flow only part of the year – flood. It uses complex calculations involving the speed of a flood-wave or advancing streamflow and the rate at which water can flow through the subsurface material. This can reveal which sections of a riverbed will allow water to seep through the ground and estimate how much water escapes downstream and how much soaks in to be stored underground.

Due to extensive water diversion the lower stretch of the Colorado river, which runs through Mexico, is bone dry and has not reached the sea since 1982. This month Dr Shanafield will be working with US scientists who plan to release 130 million cubic metres of water in an 'environmental flow' aimed

at reviving the river's dying landscape. Her model will be used to calculate how much of the released water is stored underground and where, so it is subsequently available both to the environment and to water users downstream.

Dr Shanafield wrote the model while completing her Doctor of Philosophy (PhD) and it has evolved since then. She carried out initial pilot testing using an irrigation canal on the Coorong. "Recent drought and flood events in parts of Australia highlight the importance of our highly variable river flows. They provide a perfect case test-bed for this model, especially in arid regions where river beds remain dry for much of the year and only flow during periods of high rainfall."

Dr Shanafield says her model could prove especially useful in the type of low-gradient rivers common to Australia, where surface or groundwater removal by industry, agriculture and local communities is endangering aquifers, ephemeral surface rivers and the ecosystems and human activities that they support.

"It means that instead of making generalisations about groundwater recharge volumes over long stretches of a surface water system, water managers, policy makers and users can acquire quite specific data which they can use to plan, and to fine-tune their management.

"It provides the sort of information we need to keep the world's water bank balance in the black, rather than in the red."

The director of NCGRT, Professor Craig Simmons says total global groundwater use is estimated by scientists at around 1000 cubic kilometres a year, with the largest users being India, China and the USA.

"UNESCO estimates that, since 1900, the world has drawn down its groundwater reserves by an estimated 4500 cubic kilometres – and demand is continuing to increase, especially in arid countries, which are rapidly running short of water that can be affordably extracted.

"A significant part of the world's food supply depends on groundwater – which is already starting to run short in critical regions such as the western USA, Mexico, northwestern Sahara, Indus Basin and North China Plain," Professor Simmons says.

"This is an issue every consumer should be concerned about, because it affects the price of food globally.

"In recent years we have seen large fluctuations in the world harvest and food prices, driven by a changing climate. This means the world food supply is likely to be increasingly dependent on groundwater – and if that starts to run out, we're all in trouble.

"Dr Shanafield and her colleagues are pioneering a vital technology to help us avoid that situation. It is a fresh example where Australian science can have a global as well as a local impact."

"Bailing out the world's fresh water bank", 14/04/2014, online at: http://phys.org/news/2014-04-bailing-world-fresh-bank.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=b5ec096665-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-b5ec096665-250657169

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❖ Afghanistan still opposed to Dasu Dam construction

ISLAMABAD: Afghanistan has insisted that it has not withdrawn objections to the Dasu Dam – a project Pakistan plans to build on the Indus River at an estimated cost of nearly $7.5 billion and expected to produce 4,300 megawatts of electricity.

Afghanistan's foreign ministry on Tuesday rejected the remarks made by Pakistani ministers that Kabul had withdrawn its opposition to the dam, which would have serious negative environmental repercussions for Afghanistan.

"I reject as completely baseless the statement made by Pakistan's Minister of Water and Power Khawaja Asif that Afghanistan has abandoned its opposition to the Dasu Dam," Afghan foreign ministry spokesman Ahmed Shakaib Mustaghni said in a weekly briefing in Kabul.

"We still have reservations about the dam and all institutions concerned in Afghanistan are studying its impact on the country," Mustaghni said, according to a statement available with*The Express Tribune*.

Last month, Afghanistan's National Security Council opposed the construction of Dasu hydropower project, saying it would be against the principles of joint rivers.

The council meeting, presided over by President Hamid Karzai, claimed that the dam was being built on the Kabul-Indus River.

Khawaja Asif and Finance Minister Ishaq Dar had earlier stated that Kabul had withdrawn its objection when Afghan officials were informed that the Dasu Dam would be built on the Indus River and had nothing to do with Afghanistan.

Afghanistan had also urged the World Bank and other international lenders to stop funding for the project unless its concerns were addressed. It claimed that Pakistan neither informed Afghanistan about the project through diplomatic channels nor was any agreement signed between the two countries.

Pakistan has already approached the World Bank, seeking the start of approval process for a $700 million loan for the 4,320MW project, according to sources in the Ministry of Finance. Construction work is expected to start this year.

Officials say the feasibility study and detailed engineering design of the project have already been completed. The government has cleared the project and the Central Development Working Party (CDWP) has constituted a committee to rationalise its cost.

Ground-breaking ceremony will be held on May 15, where Prime Minister Nawaz Sharif will kick off construction work.

"Afghanistan still opposed to Dasu Dam construction", 16/04/2014, online at: http://tribune.com.pk/story/696105/afghanistan-still-opposed-to-dasu-dam-construction/

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❖ The Future Is Evaporating: Climate Change Could Dry Out 30 Percent of the Earth

Sure, scientists expect the changing climate to bring on more drought. There's going to be less rainfall in already arid regions, that's fairly certain. And that alone would be bad news for denizens of the planet's dry zones—in some places in North Africa, the American Southwest, India, and the Middle East, water shortages could well become an existential threat to civilization. But new research shows that evaporation may be more of a problem than previously thought: Climate change could dry out up to a third of the planet.

The study, published in the journal Climate Dynamics last month, estimates that climate change will cause reduced rainfall alone to dessicate 12 percent of the Earth's land by 2100. But if evaporation is factored in, the study's authors say that it will "increase the percentage of global land area projected to experience at least moderate drying by the end of the 21st century from 12 to 30 percent."

“We know from basic physics that warmer temperatures will help to dry things out,” the study’s lead author, Benjamin Cook, a climate scientist with Columbia University and NASA's Goddard Institute for Space Studies, said in a statement. “Even if precipitation changes in the future are uncertain, there are good reasons to be concerned about water resources.”

Writing in a 2011 literature review in the science journal Nature, the physicist Joe Romm elaborates on how increased heat and evaporation can lead to a vicious cycle: "Precipitation patterns are expected to shift, expanding the dry subtropics. What precipitation there is will probably come in extreme deluges, resulting in runoff rather than drought alleviation. Warming causes greater evaporation and, once the ground is dry, the Sun’s energy goes into baking the soil, leading to a further increase in air temperature."

Disappearing soil moisture is likely to be a greater problem than previously thought, and the occasional downpour won't sate year-round crops. As Columbia University notes, "An increase in evaporative drying means that even regions expected to get more rain, including important wheat, corn, and rice belts in the western United States and southeastern China, will be at risk of drought."

If it becomes too dry to cultivate crops on one-third of the planet's surface, there's little doubt that crisis will follow. For millions of people who depend on food grown in vulnerable regions, the future is actually evaporating.

"The Future Is Evaporating: Climate Change Could Dry Out 30 Percent of the Earth", 15/04/2014, online at: http://motherboard.vice.com/read/the-future-is-evaporating-climate-change-will-dry-out-up-to-a-third-of-earth

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❖ Fish-Friendly Dams? Scientists Race to Reduce Turbine Trauma

A hydroelectric dam building boom in the Pacific Northwest in the past century drove dozens of salmon runs to extinction and has cost taxpayers billions of dollars to try to save the fish that remain. Today, scientists from the region are hard at work to prevent a repeat of history at a time when countries around the world race to wring more energy from rivers to fuel a power hungry and warming planet.

"We've made some pretty good progress here in the Pacific Northwest on determining criteria that can help keep fish safe," Richard Brown, a senior research scientist at the Department of Energy's Pacific Northwest National Laboratory in Richland, Wash., told NBC News.

Brown and his lab colleagues are collaborating with researchers from Laos, Brazil and Australia to apply what they've learned to reduce injury and death to fish passing through dam turbines on their way to the sea.

The change in pressure that fish experience while passing through turbines causes a rapid expansion of a swim bladder used to maintain buoyancy. In some cases, the organ can rupture. The pressure change can also cause pre-existing gas in the body to expand, eyeballs to bulge and stomachs to pop out of mouths. For some species and life stages, injuries from this so-called barotrauma may cause more deaths than lethal injuries sustained when fish are struck by spinning turbine blades, according to Brown.

Hydropower expansion

Research on reducing barotrauma is urgently needed, he and colleagues noted in a paper published in the March issue of the journal Fisheries. There's a push around the world to expand the use of dams to increase water storage and low-carbon energy generation on rivers in developing nations where people "rely heavily on freshwater fish for their livelihood, both as a source of income and food," the paper reads.

For example, the Lower Mekong River Basin, which includes Cambodia, Laos, Thailand and Vietnam, supports an inland fishery worth between $4.3 billion and $7.8 billion annually and

provides as much as 80 percent of the region's total animal protein. There are 11 dams in various stages of development on the main stem of the river, which could "lead to a major decline in fish populations, significantly compromising food security," according to the Fisheries paper.

And that's just one example, according to Jason Rainey, the executive director of International Rivers, a San Francisco-based advocacy group that opposes dam construction. "We are talking about hundreds and hundreds of large dams being proposed on rivers such as the Mekong, the Congo, the Nile, as well as the Amazon and rivers that drain the Himalaya mountains," he told NBC News.

Given the global rush to develop hydropower, "building new technologies — fish-friendly technologies, so to speak — into designs can be helpful," Rainey noted. He added that "slapping on some turbines that might reduce mortality and labeling that as fish-friendly is definitely sending the wrong signal to the public as to what these dams are doing."

Providing information

"We are just researchers; we are not in anybody's camp," Daniel Deng, a hydrologist at the Pacific Northwest National Laboratory and a co-author of the Fisheries paper, told NBC News. "Our focus," he added, "is to provide the information and criteria so that decision-makers can make the decision" on whether and how to build a dam.

For example, Deng is developing a sensor-laden capsule that resembles a fish — a so-called sensor fish — that is sent through turbines to measure the pressure conditions inside. The data, in turn, help the researchers determine whether those conditions would damage a live, migrating fish. This information is then shared with turbine designers, manufacturers and dam operators.

What's desperately needed, according to the researchers, is data on how pressure changes affect fish with different types of swim bladders, at different life stages, in different rivers around the world. Most information to date is from juvenile salmon impacted by dams in the Pacific Northwest.

One key lesson emerging from the salmon research is that modifications to turbine design to minimize large pressure drops — that is, trying to maintain a minimum pressure as the fish pass from

the intake, through the turbine and back out into the river — could help more fish pass safely through the dams.

"The way that we elevate those minimum pressures is through blade shape modifications," Martin Ahmann, a senior hydraulic engineer with the Walla Walla District of the U.S. Army Corps of Engineers, explained to NBC News. He has worked with the information from Brown's team on barotrauma in juvenile salmon for a planned replacement of turbines at the Ice Harbor Lock and Dam on the Lower Snake River in Washington.

He and colleagues use computer models of how water flows through dams to calculate the pressure of a given turbine design. They've found, for example, that the addition of an extra blade to the typical type of turbine in Pacific Northwest dams may maintain a higher pressure for the fish, but could also elevate the risk of blade strike. Other approaches include changing the shape of turbines and the location where they are placed in the dam.

Improved turbine designs

Advances in technology such as computer modeling and analysis have resulted in hydropower turbines that are about 2 percent to 3 percent more efficient today than those designed for dams built in the mid-20th century, according to Ahmann. These efficiency gains drop by about 1 percent when the designs include measures to reduce fish mortality.

The team will find out about the effectiveness of the fish-friendlier design when new turbines are tested at the Ice Harbor Lock and Dam, beginning in 2016. "And even then, we will not be able to necessarily break out any increases in survival that we may have gained (as) as result of improved turbine pressures or the result of reduced strike or just general hydraulic flow conditions through the turbine," he said.

What's more, the team's work for the Ice Harbor project is specific to the fish — salmon and lamprey — that pass through the dam with a specific type of turbine. The "results are not directly applicable to anything else," Marvin Shutters, a fisheries biologist with the Corps of Engineers, explained to NBC News.

In other words, a turbine design that allows more juvenile fish safe passage on the Lower Snake River may be irrelevant to passage of fish in proposed dams on the Mekong or Nile. The fish, for one, may have different biological characteristics. In addition, the hydraulics of the dams themselves will present unique sets of challenges. Identifying and modeling all these factors will be necessary if hydropower developers are to stand a chance of reducing harm to migrating fish, Brown noted.

"There are a lot of research gaps," he said.

Ultimately, other techniques may afford fish a greater chance of getting through, around or over dams, such as fish ladders, barges and spillways, which are how more than 90 percent of seaward salmon in the Pacific Northwest make the trek. But even those measures, noted Rainey with International Rivers, may be futile for charismatic creatures such as the Mekong giant catfish in Asia. They require access to much of the Mekong throughout various life stages for survival but are unlikely to successfully navigate any fish ladder.

"There might be some technologies that can mitigate or minimize kills," Rainey said, "but the notion that a dam will somehow be fish-friendly or will be supportive of native fish, I don't think that there is much evidence to support that that's the case."

"Fish-Friendly Dams? Scientists Race to Reduce Turbine Trauma", 15/04/2014, online at:
http://www.nbcnews.com/science/environment/fish-friendly-dams-scientists-race-reduce-turbine-trauma-n79936

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❖ Economics driving farms to make every drop of water count

Ronald Rayner has been fascinated with water since he was a boy on his father's farm in Goodyear. Now a partner on the family farm, A Tumbling-T Ranches, he has found a way to conserve water and double production since 1980.

Rayner does this by planting cotton over harvested wheat and barley plants, instead of clearing and plowing fields beforehand. This technique, called double-cropping, prevents soil erosion and helps trap moisture by creating a natural mulch.

"We use the same amount of water today that we did (since 1980) even though our efficiency has increased substantially," he said.

Water is a big part of a farm's budget, and Rayner said farmers have a bottom-line reason to be efficient.

"You're growing a crop, you have to make the commitment right up front," he said. "You have to give it all the water that it needs – not any more than that – because it costs you money."

With agriculture accounting for about two-thirds of the water used in Arizona, a state program encourages farmers to adopt water-saving practices and technologies. Through the Best Management Practices program, farmers receive incentives if they follow suggestions from the Arizona Department of Water Resources.

Jeff Tannler, the agency's director of Active Management Areas, said the state allocates farms certain amounts of water rights, but farmers are allowed to use as much as they need if they participate in Best Management Practices. The goal: ensuring that 80 percent of the water applied to crops is absorbed and not wasted.

Recommendations from state officials can include lining irrigation ditches with concrete, laser-leveling fields, rotating crops, using drip irrigation, using sprinklers, reusing water not absorbed by the soil, measuring flow rates, analyzing soil and water, and scheduling irrigation when crops need it rather than at set intervals.

Tannler said farms have made better use of their water since 1980 and that in some areas irrigation use is 90 percent efficient.

"A lot of farms have implemented a lot of these measures as time went on just because it made economic sense," he said.

In addition, the state offers farmers tax credits worth up to 75 percent of the cost of water-conservation systems.

Rick Sellers, owner of Waymon Farms in Yuma, a participant in the Best Management Practices program, uses sprinklers on his lettuce farm in the winter. He said he is very precise with how he operates his farm, from laser-leveling his fields to cutting rows precisely 42 inches apart.

"We don't waste anything here," he said. "The last thing we want to do is waste a resource such as water."

Sellers said he is considering using drip irrigation as his and other farms find ways to become even more precise and efficient with their water use, but he said those changes carry costs that will be passed on to the consumer.

"It's going to be a costly journey, and hopefully the public will be prepared for it," he said.

Glenn Schaible, an agricultural economist in the Conservation and Environment Branch of the U.S. Department of Agriculture's Resource and Rural Economics Division, said that while determining the exact efficiency rate is difficult, Arizona ranks high among the Western states when it comes to using efficient irrigation.

He said 75 percent of all gravity irrigation systems in Arizona use efficient systems such as lining irrigation ditches or laser-leveling fields to the exact angle needed for water flow. Overall, only 35 percent of gravity irrigation systems in the West are efficient, he said.

"Their gravity systems in Arizona are heavily oriented toward using the more efficient gravity systems," he said.

He said there's room for improvement in the use of efficient sprinkler and drip irrigation systems, with only 57 percent of farms in Arizona using systems considered effective. Schaible said continuing to find ways to conserve water is key to the future of agriculture in the West.

"Economics driving farms to make every drop of water count", 15/04/2014, online at:
http://azstarnet.com/business/local/6dda2b5e-1a3e-5a5e-8103-3e55ef41f237.html

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