



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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❖ **Water Terrorism: How Militant Groups Are Taking Advantage of Climate Change Impacts**

The Intergovernmental Panel on Climate Change (IPCC) released a recent report, issuing the strongest warning yet on the devastating impact on climate change. According to the UN report, “even with adaptation, warming by the end of the 21st century will lead to high to very high risk of severe, widespread, and irreversible impacts globally.” One of the more salient concerns to emerge from the impact of a warming planet is water scarcity, as scientists have inextricably correlated these two concepts for decades. However, what we are seeing now are terrorist groups taking advantage of areas with water shortages and manipulating water resources as a coercive tactic. The militant group, the Islamic State (ISIS or ISL) has put the issue in focus as a significant security concern and humanitarian crisis. For many geographically-disadvantaged nations in the world that are already dealing with water concerns, the impact of climate change isn’t going to be felt 20, 30, or 40 years from now. The impacts are being felt today and will only worsen as time goes on. Furthermore, many of these nations that are already feeling the impact of unpredictable weather patterns leading to water scarcity, are also hotbeds of militant extremism. ISIS represents the first significant case of the results of climate change being used as a tool of terror.

The brutality carried out by ISIS has been well documented in the mainstream. From abhorrent images of beheadings of western journalists, to persecution of innocent religious minorities or women, ISIS has emerged as a symbol of immorality and nefariousness. However, for all the raw savagery exhibited by the militant group, their strategic calculus should not be understated. The group has acquired a significant portion of their power in the region through a troubling phenomenon: water terrorism. ISIS has the power to influence the lives of millions of people through their strategic acquisition of control over water resources.

ISIS has adopted strategic ideologies that contrast from those of other terrorist groups. The strategy of ISIS involves the seizing of territory and important infrastructure, particularly those involving water and energy resources. In the arid desert regions of Iraq and Syria, the control of water essentially correlates to control of the conflict. For all the conversation about ISIS taking control of oil refineries, one could argue that their control of water is even more significant, as it deprives the population of a resource necessary for daily sustenance and gives the militant group significant

leverage over local governments and populations. Water is a vital resource, used for electricity generation, agricultural production (and by result, economic sustainability), and proper sanitation. Additionally, water is critical during dry seasons and droughts, which will become increasingly prevalent as climate change continues to impact arid regions of the world.

The perturbing trend of water terrorism in Syria began in May, when rebels from the al-Qaeda splinter group, Jabhat Al-Nasura (who has now allegedly merged with ISIS), cut off water to the Shiite-dominated city of Aleppo, the largest in Syria. From this point forward, water became a premier strategy of ISIS for gaining dominance and spreading fear in the region. Earlier this summer, ISIS gained control of the Mosul Dam, a shoddy but key piece of infrastructure holding back 12 billion cubic feet of water and providing over 1,000 megawatts of electricity, for a brief period of time. Washington recognized the significance of the dam being in the wrong hands, deploying U.S. air power to help Kurdish forces recapture this key water resource. The Mosul Dam is the most important hydropower source in Iraq and the fourth largest in the Middle East, providing water and electricity to millions of citizens. Additionally, had ISIS chosen to destroy the dam, the resulting flood would have displaced and killed millions of Iraqis. ISIS militants feverishly attempted to seize the Haditha Dam, the second largest in Iraq, which would have been a disastrous development. Had the dam been seized, ISIS would have essentially controlled the Euphrates River, cutting off water and causing flooding, as the group had done with the Fallujah Dam. ISIS cut off water to certain districts containing Christian, Kurd, and Shiite minorities, while also using dams as an extortion tool for financing, offering to return water for money.

The way in which ISIS has controlled water in the region sets a dangerous precedent that other terrorist organizations will surely emulate, as a coercive tactic. In fact, this strategy has already been imitated. Al-Shabab, the terrorist group based in Somalia, has seized this basic necessity as its strategy against the Somali government. The group has restricted the flow of water to certain communities and they are fighting restlessly to keep their stranglehold on water infrastructure to demonstrate their presence and dominance in the country. Hafiz Saeed, chief of Pakistani terrorist group Lakshar-e-Taiba's Jamaat-ud-Dawah front, accused India of "water terrorism". The group, which was responsible for the deadly 2008 Mumbai attacks, has threatened to attack India again, in the form of a "water jihad", paving the way for a turbulent confrontation among these two nuclear armed rivals. Iraq, Syria, and Turkey have engaged in water disputes over the shared Euphrates River

in the past, which certainly does not bode well for future stability. Israel and Palestine have been locked in long-term disputes over water and electricity, as Israel controls the water resources of Palestine. With all of the acts of violence committed against one another, water-motivated terrorism is certainly a plausible outcome as Palestinian water becomes even scarcer.

ISIS has established a blueprint that can be used by other entities to take advantage of drought and water scarcity – especially in nations with poor governance – a common theme throughout the developing world. Whether taking advantage of droughts and water scarcity in a region, or purposefully depriving citizens of water out of malice, water terrorism has emerged as a significant security concern, and will only be accentuated moving forward. Although water scarcity is just one of many climate change impacts, it is a condition that can be exploited by those looking to foster violent conflicts and instability moving forward.

“Water Terrorism: How Militant Groups Are Taking Advantage of Climate Change Impacts”, 09/12/2014, online at: <http://breakingenergy.com/2014/12/09/water-terrorism-how-militant-groups-are-taking-advantage-of-climate-change-impacts/>

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❖ Turkey and the Kurds – Practical coexistence with Turkey

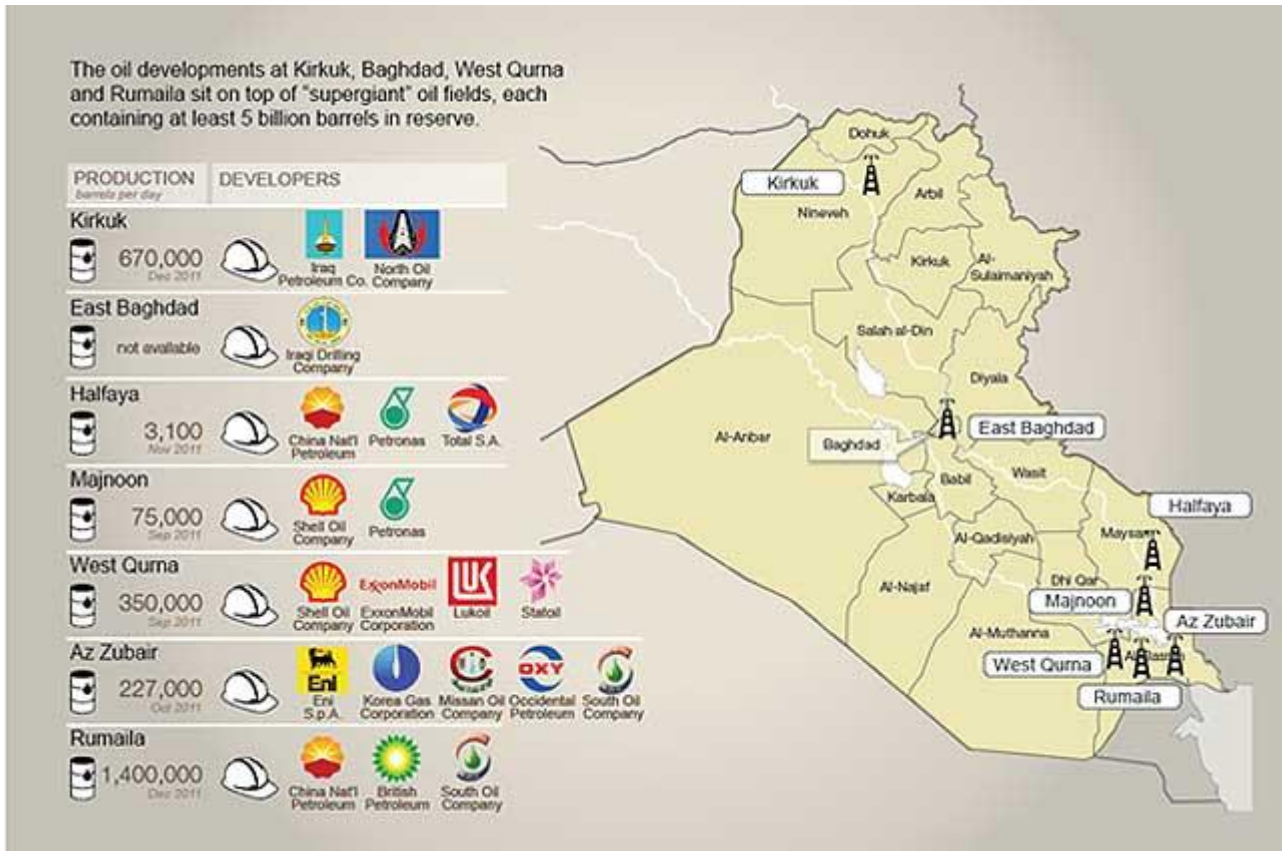
With the situation in Iraq and Syria changed, energy become key to the improving relationship between Ankara and the semi-autonomous Iraqi Kurdistan. Working together, they could also halt, or even defeat their common enemy - ISIS - from becoming a regional power.

With the situation in Iraq and Syria changed, energy became key to the carefully improving relationship between Ankara and the semi-autonomous Iraqi Kurdistan. Turkey needs the oil produced there, pumping around 120,000 barrels a day through a 600-mile long pipeline from Kirkuk to the southern Turkish port of Ceyhan.

Historically, Turkish governments regarded Iraqi Kurds with deep suspicion, often intervening militarily to stop what they viewed as support for the bloody Kurdish insurgency inside Turkey. However, the latest boom in the Kurdish economy — and the subsequent success of Turkish companies there — has transformed relations between the two former enemies to thriving coexistence. Today, according to Turkish officials, there are already some 1,200 Turkish companies operating in Kurdistan, bringing in as many as a hundred thousand Turkish workers.

For the Kurds, the key to independence lies in exploiting and exporting their oil reserves, a trend that is just beginning. Since 2003, Kurdish leaders have opened their oil fields to Western companies, to explore, drill, and produce. It turns out that the Kurds are sitting on as many as 55 billion barrels of oil — a quarter of Iraq's total reserves. 29 companies, among them Exxon Mobil and Chevron, are working in Kurdistan; the region currently maintains a relatively modest production of about two hundred thousand barrels a day. If the Kurds are able to sell their own oil, it will have to flow through Turkey, their only neighbor with a pipeline leading into the Kurdish region.

Under the growing threat of ISIS, the Kurds appear, for the first time, remarkably united in their eagerness for an independent state. Still, beneath the surface is a deep current of frustration with Masoud Barzani and Jalal Talabani, the leader of the other major party, the Patriotic Union of Kurdistan (P.U.K.). The historic quarrel between the Kurdish ruling families is well known and has derailed efforts for unification in the past, presenting a major roadblock for their independence.



While oil could become a crucial driver for an eventual unification, water would provide the lifeline of such state. Water is a prime strategic element in the dry Middle East and strangely, the Kurds are sitting directly over the most important water resources in the eastern Mediterranean region. Euphrates and Tigris – the two famous rivers of the Ancient Mesopotamia have seen the rise of ancient civilizations. The control of regional water resources has been a continual source of tension between modern Turkey, Iraq and Syria, and may likely pose even greater problems in the near future.

The Rivers Tigris and Euphrates flow downstream from Turkey into Syria and Iraq, where they provide the principal water source for individual and community livelihoods. Given the importance of these resources, there has been a history of disputes over the construction of dams and other water regulation projects along the rivers. These regional interstate hydro-political dynamics are bound to affect the Kurdish population extensively, as the Iraqi Kurdistan plays a pivotal role in controlling the majority of the Tigris river flow into Iraq. Moreover, the geo-politics of water in the Euphrates-Tigris basin are bound to remain highly contentious due to their direct link to issues of the Kurdish national

independence and sovereignty. The Tigris-Euphrates basin, populated largely by the Kurds in all three riparian countries of Turkey, Syria and Iraq, has often been cited as the second most hydro-politically important region in the Middle East. The recognition of its significance for security of the region remains divided along the previously indicated lines of argument.

In the meantime, however more urgent matters seem to determine the regional political scene and that is the creation of the new Islamic State by ISIS. Following their dramatic success taking Mosul and, having full control of Anbar and parts of Syria, ISIS' fighters turned south, toward the city of Kirkuk. Situated only 160 miles north of Baghdad, Kirkuk has been an object of dispute between the Arab-dominated governments in Baghdad and the Kurdish population. Over the years, Kirkuk had been subjected to campaigns of ethnic cleansing, its Kurdish majority reduced by waves of expulsions and government encouraged Arab migration from the south. To many Kurds, Kirkuk is sacred ground, a vital component of an independent state. Kirkuk and the rest of the contested region contained as many as a million Kurds, as well as oil reserves thought to amount to at least ten billion barrels.

Meanwhile, the still very hesitant Turkish support will probably continue as long as the aspirations to nation-building are strictly confined to Iraqi Kurdistan but this could change, as Barzani's forces gain substantially in the war with ISIS. So far, the regional Kurdish government in the capital Irbil is playing its cards skilfully. It is all a matter of balancing those long-term political dreams against the practical diplomatic realities of the moment. For now, it feels as though Iraqi Kurdistan believes it can work on building a new nation-state as long as it keeps its real political aspirations carefully under the radar.

Strange as it may sound to western ears, from Turkey's new perspective, these days, Kurdish autonomy does not look so half bad, as it was before the ISIS crisis. The portions of northern Iraq and Syria that are under Kurdish control are stable and peaceful — a perfect bulwark against threats, such as the Islamic State of Iraq and al-Sham (ISIS) on Turkey itself. And that is why Turkey has been on relative good relations with the Iraqi Kurds, and could expand into other Kurdish territories, if the war with ISIS develops favorably for Ankara's regional aspirations.

ISIS' advances in Iraq — including a June 11 attack on the Turkish consulate in Mosul, during which the group took Turkish diplomats and security officials hostage — has added urgency to the drive to improve relations between Turkey and Iraqi Kurds. It now seems safe to say that if the Iraqi Kurdish regional government declared independence Ankara could perhaps become the first capital to recognize it. In today's Middle East, in other words, ISIS is a bigger threat to the Turks than a Kurdish independence in Iraq.

Whereas Turkey's ties with the Iraqi Kurds have improved in recent years, Ankara's relations with the Syrian Kurds have remained rather bitter. This is because, unlike in the Kurdish Regional Government (KRG) where Iraqi Kurdish groups hold more sway than the Turkish Workers Party (PKK), which has been for decades Turkey's mortal enemy,

the latter is very popular among the Syrian Kurds. With the emergence of ISIS, the Syrian Kurds' calculations might be changing. The Democratic Union Party (PYD) and PKK have strong secular tendencies and oppose ISIS and its austere version of Islam. The PYD now controls three Kurdish exclaves in northern Syria, all of which are flanked by Turkey to the north and ISIS to the south. And unlike the Assad regime, ISIS has shown no inclination to trade favors with the Kurds. The Syrian Kurds' future could now be in Turkey's hands, and if matters will heat up, full Turkish military and security cooperation could be forthcoming.

Turkey cannot grow closer to Iraqi and Syrian Kurds without making peace with its own Kurds, which virtually dominate eastern Turkey and much of its strategic assets there. After decades of battle, the PKK could still easily derail any rapprochement between Turkey and other Kurdish groups, especially the Syrian Kurds, by telling the PYD to reject Turkish offers. What is more, the PKK could launch attacks in Turkey if it feels that it is being left out of a potential deal between Ankara and the Iraqi Kurds.

When 'push comes to shove' in this region eventually, Ankara's only allies in the Middle East might just be the Kurds. Likewise, the Kurds' main ally could soon be Ankara. Working together, they will try to halt or even defeat their common enemy – ISIS – from becoming a regional power. Turkey's government is treading a delicate line – attempting to calm its core nationalist voters at home, while bowing to pressure from Washington to help the Kurds in Syria battle Islamic State. Under such

stringent conditions, a Turkish controlled Kurdish autonomy seems not to look as half bad to the Ankara leaders.

“Turkey and the Kurds – Practical coexistence with Turkey”, 08/12/2014, online at: http://defense-update.com/20141208_turkey_and_kurds.html#.VI6Q_iusVz8

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❖ Local activists call for review of Ilisu Dam construction amid Kurdish peace process

Local activists have called on the government to review a contentious, long-planned new dam project on the Tigris in southeastern Turkey, which will flood the ancient city of Hasankeyf.

The “Initiative to Keep Hasankeyf Alive” (Hasankeyf’ı Yaşatma Girişimi) association, founded to defend those whose livelihoods will be affected by the new Ilisu Dam, warned that the construction could also have a negative impact on the Kurdish peace process, at a time when the government is trying to give fresh impetus to negotiations. It also argued that the entire local administration is against the finalization of the construction.

“All the local administrations in the region that will be affected by the project are against it. But the government insists on continuing the project, despite all warnings and alternative proposal solutions conveyed through our association,” the NGO said in a statement.

Plans for the dam were first laid out in a regional development plan defined in the 1980s, under a broader development plan known as the Southeastern Anatolia Project (GAP). However, the initial project was drafted back in 1954 by the Directory of Water Affairs.

Set to become the fourth hydroelectric power plant if completed, the construction of the Ilisu Dam began in 2010 after years of debates, amid controversy over its ecological and cultural impact.

The construction continued despite tension rising after two of its workers were briefly abducted by outlawed Kurdistan Workers’ Party (PKK) militants in August. The incident prompted the dam’s workers to resign and led to a halt to the construction work, but the Water Affairs Directory announced last month that recruitments had restarted at the site and security measures would be enhanced.

The People’s Defense Forces (HPG), affiliated with the PKK, issued a statement after the announcement, expressing its opposition to the project.

“We call for the cancellation of the Ilisu Dam because it will damage the environment, nature and all the people who live in the region. We will not be held responsible for what could happen in the future,” the statement said.

The Initiative to Keep Hasankeyf Alive also stressed that the dam could put the Kurdish peace deal at risk.

“We know that this project will only benefit a few companies and a government that only thinks about centralized solutions. We know that it will be a very big loss for world heritage,” it stated.

The picturesque town of Hasankeyf, has long sought to be recognized as a UNESCO World Heritage site, with its unique caves and historic buildings. The town is part of the Tigris basin that will be flooded after the construction of the Ilisu Dam.

A new city has been built for Hasankeyf’s residents on a nearby hillside and the government promised to move the city’s most important monuments. However, Hasankeyf will by no means be the only affected part of the Tigris, as the Ilisu Dam will also considerably reduce the volume of water flowing to Iraq.

The Initiative to Keep Hasankeyf Alive statement said such a diversion of water resources “could fuel conflicts in the region.”

“Don’t put Iraq in a difficult position by withholding a large amount of the water for irrigation. We experienced during the war in Iraq how [conflicts over] big water sources can fuel conflicts. We call on all the NGOs in Turkey, Iraq and the Middle East, as well as the representatives of political decision-makers, to stand against the Ilisu project,” it said.

The number of micro-plants producing a limited amount of energy while destroying natural habitats in often untouched natural environments across Turkey has also risen over the last years. Many projects are the subject of litigation, but companies that win bids to build the plants frequently start construction work before waiting for the conclusion of legal processes.

“Local activists call for review of Ilisu Dam construction amid Kurdish peace process”, 11/12/20134, online at:
<http://www.hurriyetdailynews.com/local-activists-call-for-review-of-ilisu-dam-construction-amid-kurdish-peace-process.aspx?pageID=238&nID=75489&NewsCatID=340>

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❖ Israel Cuts Water Prices by 10% From January 1

Israel will cut water prices by 10 percent at the start of 2015, the Infrastructure, Energy and Water Ministry said today.

The reduction will bring the total decline in water prices in the past year to more than 15 percent, the ministry said in an e-mailed statement.

The price cut is partly the result of better efficiency in the water companies, the ministry said. Infrastructure, Energy and Water Minister Silvan Shalom said it's "part of a wider decrease" expected in the coming year.

"Israel Cuts Water Prices by 10% From January 1", 11/12/2014, online at: <http://www.businessweek.com/news/2014-12-11/israel-cuts-water-prices-by-10-percent-from-january-1>

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❖ Israel offers to work with AP in agriculture, water management

Israel today said it is keen to work with Andhra Pradesh government in agriculture and water management sectors.

This was conveyed to Chief Minister N Chandrababu Naidu when Israeli Ambassador to India Daniel Carmon met him here.

"Given that Israel is a water-scarce region, we have excelled in using water efficiently and have pioneered water management systems," said Carmon, who called on Naidu at the Secretariat, according to a statement issued by the Chief Minister's Office (CMO).

Carmon said Israeli technology could help the state in waste management, recycling and desalination of water.

Stating that Andhra Pradesh is keen to use Israeli expertise and technology, the Chief Minister asked the Ambassador to also work with his Government in the area of skill upgradation.

"Identify areas that you are interested to work with AP Government and we will facilitate the process and begin working with you," Naidu added.

Carmon invited the Chief Minister to visit Israel and study efficient water management systems in the West Asian country.

Meanwhile, India's High Commissioner to Nigeria A R Ghanashyam also met Naidu and outlined the areas in which the State and the West African country could work together.

According to Ghanashyam, Nigeria believes there is good scope to work with AP in gas sector.

The Chief Minister explained the opportunities available in Andhra Pradesh and sought to know sectors in which Nigeria is willing to collaborate with the AP Government, the statement added.

"Israel offers to work with AP in agriculture, water management", 09/12/2014, online at: http://www.business-standard.com/article/pti-stories/israel-offers-to-work-with-ap-in-agriculture-water-management-114120901112_1.html

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❖ **Video: Forced drought hits Jordan Valley farmers as Israel steals their water**

This new short film, *Farming Without Water: Palestinian Agriculture in the Jordan Valley*, casts light on the forced drought affecting Palestinian farmers due to chronic shortages caused by Israeli occupation and settlement.

“They treat us as if we were a thorn in their side,” says Jordan Valley farmer Ismail Sharhan of the Israeli occupiers. Sharhan talks about the major land losses farmers like himself have faced due to Israeli confiscations and “security” fences.

Ninety-one percent of the fertile Jordan Valley is now off limits to Palestinians due to settlements and closures by the Israeli military.

“Sometimes when we have no drinking water, we cannot cook or do our house work,” says farmer and householder Anwar Ismail. She says that farmers often have to shorten their growing season due to the occupation-induced water shortages.

She also speaks about the lack of water for livestock.

“It hampers our existence in this area,” she says, “It even makes us think of leaving.”

“Video: Forced drought hits Jordan Valley farmers as Israel steals their water”, 14/12/2014, online at:
<http://electronicintifada.net/blogs/jimmy-johnson/video-forced-drought-hits-jordan-valley-farmers-israel-steals-their-water>

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❖ **Maybe it does take a rocket scientist? NASA helps Jordan uncover water theft**

Through using satellite remote sensing techniques in collaboration with the US National Aeronautics and Space Administration (NASA), authorities have uncovered a major case of water theft, Ministry of Water and Irrigation announced Monday.

The ministry has discovered an illegal 1.5km pipe linked to a major water conveyer in the Tneib region in south Amman, through which the main suspect had been allegedly diverting 1,200 cubic metres from public water supplies daily to his farm, a ministry statement said.

Teams from the ministry and Miyahuna, the firm handling the distribution in the capital, who rushed to the scene faced resistance from the suspect and a group of people “who circled the farm”, the statement said, adding that the farm was also guarded by fierce dogs.

Aided by Gendarmerie and Badia forces as well as the ministry's teams, the prosecutor general and members of the Higher Judicial Council moved to the spotted location and gave orders to carry out an inspection of the farm, which is located behind the Middle East University, the statement said.

Inspection unveiled a large pool to store the stolen water, which is then pumped to nearby and faraway farms using pipelines, the statement said, adding that owner of the pool allegedly installed gauges on the pipelines to sell water to other farmers.

The ministry's technical teams then documented the violations in detail, dismantled the pipelines and calculated the amount of water stolen. The farm's owner was detained for a week, pending further investigation upon directives of the prosecutor general, said the statement.

The Water Ministry has since August last year launched an aggressive campaign to stop water theft and illegal use, including unlicensed underground water wells, blaming the illegal acts for 70 per cent of water waste in the Kingdom, which is among the top world countries in terms of water shortage

“Maybe it does take a rocket scientist? NASA helps Jordan uncover water theft”, 10/12/2014, online at:
<http://www.albawaba.com/editorchoice/maybe-it-does-take-rocket-scientist-nasa-helps-jordan-uncover-water-theft-630717>

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❖ India, Israel FTA talks to resume soon

India-Israel are set to conclude a broader agreement on cooperation in the renewable energy sector between the two countries. This follows earlier agreements between the two countries to work on the renewable energy sector.

And the bilateral talks on Free Trade Agreement are likely to be back on track early next year, according to Daniel Carmon, Israeli ambassador to India.

He said the FTA talks slated to be held during November 2014 could not be held due to other engagements. But they are poised to be taken up again as both the Governments are committed to reaching a consensus on the agreement.

Speaking here after an interactive session on boosting the bilateral trade, he said that the India-Israel trade which had humble beginnings at \$ 200,000, a little over 20 years ago, has now topped the \$ 6 billion mark and this is poised to get a lot bigger as both countries get into more areas of mutual interest.

The \$ 6 billion bilateral trade is without the defence business, which is another big area.

Israel has developed strong and sound relationships in the defence sector and work is underway to identify few other clusters of common interest.

During his two-day visit to Hyderabad, and interactions with representatives of Andhra Pradesh and Telangana governments, the Ambassador sees potential to work in the areas of improving agriculture and horticulture crop productivity, irrigation and water supply management and homeland security.

There have been several rounds discussions with the State of Andhra Pradesh in particular and soon this will be narrowed down to some areas. These include development of clusters for mango and pomegranate.

A delegation led by Daniel Carmon met Andhra Pradesh Chief Minister N. Chandrababu Naidu today at Secretariat and invited him to visit Israel to study the water management systems there.

During the meeting, Carmon said they are keen to work with Andhra Pradesh Government in sectors like agriculture and water management. “Given that Israel is a water-scarce region, we have excelled in using water efficiently and have pioneered water management systems,” the Ambassador said.

“Identify areas that you are interested to work with AP government and we will facilitate the process and begin working with you,” Naidu said.

“India, Israel FTA talks to resume soon”,09/12/2014, online at: <http://www.thehindubusinessline.com/news/states/india-israel-fta-talks-to-resume-soon/article6676126.ece>

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❖ Al Ain summit probes role of water in Arabia

Beginnings of oasis life in north west Arabia and early water management techniques will be traced at a regional conference that opened in Al Ain, UAE yesterday (December 14).

Being held at the Qattara Art Centre, the three-day conference, which is open free-of-charge to the public, is organised by Abu Dhabi Tourism & Culture Authority (TCA Abu Dhabi).

Historic environment experts from eight countries across the Middle East, Canada and Europe are expected to take part in conference.

“Attendees will be able to trace the water engineering and management practices throughout Arabia from ancient to pre-modern times,” said Mohamed Al Neyadi, director of the Historic Environment, TCA Abu Dhabi.

“At the same time they will learn of the water sustainability opportunities inherent across the Arabian Peninsula, the challenges of water management in fast growing cities and water saving irrigation strategies for improving food security across the Peninsula.”

Delegates will hear of the water management lessons passed down by the Bedouin of Jordan’s south-eastern desert and the water irrigation systems in some historical cities in Saudi Arabia.

A special session will be dedicated to the ancient and unique Al Falaj irrigation system which characterised the oases of Oman and Al Ain.

“Water uses in a historical context will be widely explored,” said Al Neyadi. “From the use of resources in Bahrain’s Dilmun period to the old water wells implemented in north west Kuwait and the cultural memory of historic water resources in Abu Dhabi’s Al Dhafra region.”

Post conference activities include dinner at the Al Ain Palace Museum and visits to the Hili Iron Age falaj, Hili Archaeological Park and Oasis in Al Ain.

“This is a conference which probes history and will help take its lessons to impact and address the challenges of the future,” added Al Neyadi. – **TradeArabia News Service**

“Al Ain summit probes role of water in Arabia”, 14/12/2014, online at:
http://www.tradearabia.com/news/HEAL_271505.html

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❖ Rise in Middle East IWPs as Demand for Water Increases

The majority of the world's desalination plants are located in the Middle East and we are likely to see a further increase given the region's increasing water consumption and general water scarcity. GCC demand for desalinated water has increased at a rate of 9-11 percent in recent years according to Frost & Sullivan. By 2020, it is expected that the Middle East will add an additional 39 million cubic metres per day of desalination capacity since 2010, which indicates an approximate investment of US\$50 billion.

Desalination plants in the Middle East have to date been a relatively small bolt-on to a much larger scale power project forming what are commonly known as independent water and power projects (IWPPs) i.e., an integrated water and power plant developed by an independent producer, which is typically a global industry player.

However, given the increasing demand for water, it seems regional governments are increasingly adopting an independent water project (IWP) model to expedite supply and, given the introduction of solar and nuclear power projects in the region, IWPs are likely to become more prominent going forward.

Regional IWP Projects

One of the region's earliest and Oman's first IWP was the 80,000 m³/d Sur IWP commissioned in 2009. Five years into the 20 year operation period and the owners are reportedly planning to expand the plant's capacity by a further 48,000 m³/d (12.7 million imperial gallons per day (MIGD)) to meet projected demand for water in the Sharqiyah region of Oman. Oman has since launched the Al Ghubrah IWP –a 191,000 m³/d (42 MIGD) 20 year desalination project expected to be commissioned by the end of 2014– and the Qurayyat IWP – a 200,000 m³/d day (44 MIGD) 15 year desalination project which is targeting commissioning by H1 2016.

UTICO, a UAE based private power and water utility company, has this year launched the Al Hamra IWP, a 22 MIGD 20 year desalination project which is targeting commissioning by Q1 2016.

Bidding, Building and Licensing

The region's IWPs are largely being awarded, following a competitive bidding process, as long term concessions on a build-own-operate (BOO), build-own-operate-transfer (BOOT) or design-build-operate (DBO) basis to global industry players such as Abengoa, Acciona, Cadagua, Hitachi, Malakoff, Sembcorp, Sumitomo Corporation, Tedagua and Veolia. Each IWP is required by law to be licensed by the national regulator to carry out water desalination.

To a lesser extent some IWPs are being awarded as engineering, procurement and construction (EPC) contracts such as that awarded by the Iraq Ministry of Municipalities and Public Works to Hitachi and Veolia in 2014 for the construction of a 199,000 m³/d desalination plant in Basrah which will be Iraq's highest capacity single water purification plant. In addition Marafiq, a Saudi based private power and water utility company, awarded Acciona in 2012 the construction of a 100,000 m³ per day (22 MIGD) desalination plant in Al Jubail expected to come into operation by the end of 2014.

Desert Design

The Middle East has historically utilised thermal desalination technology such as multiple-effect distillation (MED) and multi-stage flash evaporation (MSF) although more recently has increasingly utilized membrane technologies such as reverse osmosis (RO), which often require their own supply and maintenance arrangements.

Environmental conditions in the Middle East such as red tide, high sea water temperatures and salinity, mean the pre-treatment facilities need to be designed or adapted to handle those conditions and/or the project documents need to address the occurrence of those risks as, for example, force majeure events with corresponding relief for the developer.

Whether awarded as a long term concession or EPC, there are increasing opportunities for global industry players in Middle East IWPs.

"Rise in Middle East IWPs as Demand for Water Increases", 11/12/2014, online at: http://www.al-mirsal.com/2014/12/11/rise-in-middle-east-iwps-as-demand-for-water-increase/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+Al-mirsal+%28Al-Mirsal%29&utm_content=Google+Feedfetcher

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❖ **Arcadis to develop Mecca's water management project in Saudi Arabia**

Built asset design and consultancy firm Arcadis would develop water, wastewater, treated sewage effluent and prepare an asset management master plan for Mecca in Saudi Arabia

Under the 18-month contract, Arcadis is expected to support national water company — Mecca and Taif Business Units (MCBU) — to expand and improve the city's water supply and service.

Arcadis would prepare a database study of region's water and wastewater infrastructure assets; develop an integrated water, wastewater and treated sewage effluent master plan, besides a capital investment plan for 2015 to 2050.

Arcadis water sector director-Middle East Philip Bourne said, "The city of Mecca is a focal point of Muslim pilgrims often swelling the population above its base of two million inhabitants to over six million during religious festivals placing significant demands on basic services.

"The water service coverage in Mecca is low — around 65 per cent of the populated area and the wastewater service coverage is less. There is currently not sufficient capacity in the treatment plants to treat the additional flow and load."

Once completed, the study would aid prepare a master plan to enable future planning of water and wastewater services for over seven million people in the region as well as industrial clients to the year 2050.

"Arcadis to develop Mecca's water management project in Saudi Arabia", 11/12/2014, online at:

http://www.technicalreviewmiddleeast.com/index.php?option=com_content&view=article&id=14003:arcadis-to-develop-water-management-project-in-saudi-arabian-city&catid=1091&Itemid=194

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❖ **ARCADIS wins contract to develop integrated water and asset management master plan for The Holy City of Makkah**

Saudi Arabia - ARCADIS (EURONEXT: ARCAD), the world's leading natural and built asset design and consultancy firm, today announced it has been awarded a contract in the Kingdom of Saudi Arabia to develop a water, wastewater, treated sewage effluent and an asset management master plan for the region of Makkah. Under the eighteen month contract, ARCADIS will support National Water Company (MCBU) by Royal Decree for Development of the Holy City of Makkah by expanding and improving the city's water supply and service.

"The city of Makkah is a focal point of Muslim pilgrims often swelling the population above its base of two million inhabitants to over six million during religious festivals placing significant demands on basic services", said Philip Bourne, Water Sector Director - Middle East at ARCADIS. "The water service coverage in Makkah is low - around 65 percent of the populated area and the wastewater service coverage is less. There is currently not sufficient capacity in the treatment plants to treat the additional flow and load".

From now to 2015, ARCADIS will bring its global expertise together from the Middle East, Europe and United States to prepare a database study of their water and wastewater infrastructure assets; develop an integrated water, wastewater and treated sewage effluent master plan; and prepare a capital investment plan for 2015 to 2050.

The team will work closely with National Water Company to develop the most progressive plan to fit His Highness King Abdullah's vision of 2050. Once completed, the study will provide a master plan to enable future planning of water and wastewater services for over seven million people in the

region as well as industrial clients to the year 2050. As part of the study, emergency works will also be contemplated.

ARCADIS' client focus, track record and ability to leverage global expertise help them win client confidence and iconic projects such as the Makkah Master Plan and the Kingdom Tower in Jeddah.

“ARCADIS wins contract to develop integrated water and asset management master plan for The Holy City of Makkah”, 09/12/2014, online at:

http://www.zawya.com/story/ARCADIS_wins_contract_to_develop_integrated_water_and_asset_management_master_plan_for_The_Holy_City_of_Makkah-ZAWYA20141209083348/

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❖ **Doha Bank provides US\$85mn to Kuwaiti project developer**

Qatar's Doha Bank has closed a project finance deal worth US\$85mn with Kharafi National of Kuwait

R Seetharaman, CEO of Doha Bank, said, “We are pleased to have the opportunity to finance Kharafi National. Doha Bank is committed to supporting the wider business community in Kuwait. For this reason, we see the potential to further grow our relationship with Kharafi National in terms of cross-selling our financial products and support their long term financial needs.”

Kharafi National is an infrastructure project water that specialises in water, wastewater treatment, reclamation, district cooling, solid waste management, enhanced oil recovery (EOR), facilities management for the petroleum, chemicals, power, water and commercial sectors in the MENA region.

Doha Bank, founded in 1979, is one of the largest commercial banks in Qatar. Doha Bank has won several awards for its sustained interest in funding industries and stakeholders.

“Doha Bank provides US\$85mn to Kuwaiti project developer”, 08/12/2014, online at:

http://www.technicalreviewmiddleeast.com/index.php?option=com_content&view=article&id=13963:doha-bank-provides-us-85mn-to-kuwaiti-project-developer&catid=1109&Itemid=120

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❖ Stealing Water in Times of Crisis

Hamed Najib's apartment, located in the Adhban neighborhood in Sana'a, has not received water from the government's public utilities network for more than five months. Although Yemen is known to suffer from water scarcity, according to Najib this is an unusually long period of time.

The cause of the shortage, he says, is not just government inadequacy, but also citizens themselves, and in particular one of his neighbors. "When I told my neighbor, Ala Abdu, about my problem, he couldn't believe it," says Najib. "He said he'd been receiving water for the last four months!" Abdu's admission revealed more than there just being an inequitable distribution of water throughout the neighborhood. It turned out that the reason for Najib being shortchanged had just as much to do with his neighbor as it did with government incompetency.

"The homes of Abdu, myself, and several of our neighbors are all located along a shared, local pipeline that transports water to all our homes, which is attached to a larger pipeline that transports water to the entire Adhban neighborhood from the city's regional water distribution center, located on 70th street," he explained. Nijab asserts that once a week, when water was being delivered from the main station, his neighbor Abdu had been dismantling the pipes leading into his house. "He would then attach a high powered water pump to the pipes leading into his home, which siphoned off and diverted all the water coming from the local pipeline that supplied all of our houses, into a water tank located in his home," he said.

"He's been stealing water!" he exclaimed. "He didn't think it was a big deal because he said he assumed that I was doing the same, and that we had both been siphoning off and stealing water from the main pipeline leading into Adhban," he said. "I don't know what led him to believe that."

Worse yet, says Najib, Abdu has not been paying for the extra water he consumes. Every home in Sana'a has a water meter attached to its pipes that measure the amount of water consumed per month. "Every month people from the Sana'a local water corporation, which provides water for the government utility network, come by to measure the numbers on the meter and collect the money

owed for the bill based on those statistics,” explained Najib. “However, Abdu told me that he’s been removing the meter and replacing it with the pump. The meter originally connects two small pipes in his home, which lead into a water tank located in front of his house.”

Abdu told the Yemen Times that starting eight months ago, water from the public utility network has been arriving usually once a week for several hours at a time on Saturday afternoons. Prior to that he would receive water twice a week, he says, but increasing water shortages have forced the government to cut back on the amount of water they deliver to citizens.

Abdu says he begins dismantling the pipes in the mornings on Saturday. By nightfall, once water pumping has ceased, he then removes the water pump and replaces it with the original meter, which of course reads “zero,” for no consumption.

As Najib points out, in cases like this not only are neighbors stealing water from each other, but the government also gets shortchanged on the amount of payment it receives in exchange for pumping water into resident’s homes. Ala Abdu says he learned about this trick from his cousin, who has been doing this in his apartment in Sana’a’s Aser neighborhood for the last seven months.

Najib has since bought his own water pump and has also begun siphoning water away from his neighbors. “I have to do it, even if it’s illegal, otherwise I won’t have access to water at all,” he said. Najib says his neighbors had already been upset with Abdu, just as he had, when they found out about what he was doing. “They don’t know I’ve started as well, and I won’t tell them. I don’t want them to get upset with me as well.”

Anees Abdulhadi, an employee with the Public Corporation for Water and Sanitation in Sana’a, who is responsible for measuring consumption rates of water meters in residential buildings and handing out monthly bills, says he and others at the corporation know that illegal water siphoning is taking place using water pumps, but that not much can be done about it. “We’re understaffed, underfunded and don’t have enough capacity to catch people in the act,” he says. “There’s really no way to provide evidence proving that someone has stolen water.”

Abdulahdi is responsible for checking 350 water meters throughout Adhban, some of which are used to measure consumption for more than one home or apartment. “I have four or five days at the end of each month to check that many meters,” he says. “There’s no way for me to tell whether or not specific individuals have been stealing.”

However, the problem did begin roughly eight months ago, he added, when the local corporation began to reduce the amount of water being distributed through public utility networks due to shortages. Since then, although he has heard reports of water pumps being used to siphon off water, he is yet to catch anyone in the act, or hear of anyone being punished for doing so. In the event that residents are caught stealing, he says, they are to be fined. “According to Yemeni law, those caught stealing water pay anywhere from YR10,000 (\$46.45) to YR50,000 (\$232.28),” he said, a hefty fee in a country whose per capita monthly income is \$118. Abdulhadi would not elaborate on what determined the size of fines that people paid.

Aware of previous attempts by residents to open up water meters and adjust the numbers measuring their total level of consumption, the corporation equipped such meters with locks, Abdulhadi said. Once the corporation first learned of the practice of using water pumps to siphon off water from pipelines, they tried going into people’s homes and checking for water meter locks that looked as if they had been jimmied open. This proved ineffective, however, because residents were simply dismantling and removing the entire meter itself, rather than opening it, he said. There was no way for officials to tell whether or not a meter had been removed and then put back.

Most homes in Yemen have water tankers such as the one found in Abdu’s house that are connected to public pipelines and are used to store water that residents receive from public utilities or other sources. Since water scarcity has long been an issue in Sana’a, private suppliers have sprung up over the years to help citizens meet their basic needs. Oftentimes, these private suppliers are local businessmen who drill illegal ground wells and aquifers to extract water and distribute it throughout Sana’a and other cities via trucking networks.

Fuad Al-Hadi, the owner of one such truck in Sana’a, told the Yemen Times, “I sell [the contents of] small 1,000 liter water trucks for YR2,000 [\$9.3], mid-sized 2,000 liter tanks for YR3,500 [\$16], and large 3,000 liter ones for YR6,000[\$28].”

Al-Hadi says that his colleagues fill a small tank for YR700 (\$3), a medium tank for YR1,300 (\$6), and a large one for YR2,500 (\$12).

With an increasing number of citizens resorting to illegal siphoning, the issue of water scarcity in cities and the extent to which it affects specific residents becomes dependent on how close one lives to water distribution centers, such as that located on 70th Street. The problem becomes exponentially compounded for those living farthest away, as the amount of water being pumped through the main pipelines inevitably decreases after each house that the water passes through, due to the high number of residents who siphon off more than their supposed share.

Qaiz Abdulwali, another resident of the Abhdan neighborhood, lives in the farthest outskirts of Sana'a. His house is located atop one of the many mountains and hills surrounding the city, higher up than most other homes in his neighborhood. This makes it even more difficult for water to reach his house, as pumping water uphill requires more strength and pressure, something that Sana'a's pipelines are not equipped to provide. Once all is said and done, Abdulwali claims that, unlike Abdu, public utility water only makes it to his home once per month.

"Stealing water in times of crisis", 11/12/2014, online at: <http://www.yementimes.com/en/1841/report/4680/Stealing-water-in-times-of-crisis.htm>

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❖ KSA to stop wheat production by 2016

JEDDAH -- The newly appointed Minister of Agriculture Waleed Al-Kuraiji said Tuesday that the Kingdom will rely completely on imported wheat starting from 2016. He added that the Kingdom's wheat import has increased from 300,000 in 2008 to 3 million tons by the end of this year. This makes the Kingdom number six on the list of top countries importing wheat.

The minister was speaking on the sidelines of the two-day International Grains Forum that opened Tuesday at the Jeddah Hilton.

The Kingdom was able in 2008 to produce over 2 million tons of wheat however it soon rejected this self-sufficiency project due to its negative affect on its water resources. In this context, the minister said, "the Kingdom has been undergoing a strategic move for the past seven years to conserve water, therefore we head to international markets to import products that are water consuming, on top of which is wheat."

Starting from 2008 the Kingdom reduced its production of wheat by an annual rate of 12.5 percent, said Al-Kuraiji.

The global grain market is fluctuating he elaborated. However the world's production of wheat will hit 713 million tons this year. Further the corn production will be 980 million tons by this year. He noted that the unstable grain prices would reflect on the prices of milk products.

The minister added that both the private and public sectors are now working on preserving a stock of food to combat any challenges that might occur due to relying on international markets. The new plan is to make a year stock for wheat instead of the current plan that preserves wheat only for six months.

In this context, Alan Tracy, president of the US Wheat Association, called on the establishment of a Global Wheat Food Security Initiative. This initiative, she said, is crucial noting that wheat is the most planted and traded grain. This will provide "genuine food security to world's wheat importers,"

she added.

For the initiative to achieve its goals, there must be no export or import taxes, no state trade enterprises, and no embargoes. Further, there should be a limit to trade that distorts domestic subsidies, and the need to insure transparency.

Hans van der Beek, the Agricultural Counselor for GCC Ministry of Economic Affairs and the Netherlands Embassy, addressed in his speech the need to focus on Africa to provide food security to the world.

This approach, if achieved, will provide food security especially for countries that lack lands or water resources. Africa, he noted, can provide lands and yield improvement.

However, investors seeking Africa need to listen to farmers, insure that there will be no displacement and that farmers will benefit from the deals.

Among the top investing countries are the US, UK, UAE, KSA, Malaysia, Singapore, India, Netherlands, and Hong Kong. The top targeted African countries for agricultural investment are Sierra Leone, Liberia, Congo, Mozambique and South Sudan. Other targeted countries include Brazil, Indonesia, Papua New Guinea, and Ukraine.

“KSA to stop wheat production by 2016”, 11/12/2014, online at:

https://www.zawya.com/story/Saudi_Arabia_to_stop_wheat_production_by_2016-ZAWYA20141211061503/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=27c59b9528-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-27c59b9528-250657169

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❖ Ethiopia's Nile dam project nears halfway mark

December 10, 2014 (ADDIS ABABA) – Construction of Ethiopia's massive hydro- power plant project is almost halfway to completion, the Ethiopian Electric and Power Corporation (EEPCo) said on Thursday.

According to the state utility, construction of the dam project, known as the Great Ethiopian Renaissance Dam (GERD), is currently 42% complete, with the first stage of the dam due to be operational next year, with an electricity generation capacity of 700 megawatts.

Once complete, the \$4.1 billion dam project, which is being built along the Nile in Benishangul Gumuz region near the Sudanese border, will have a power-generation capacity of 6,000 megawatts.

Ethiopia aims to become a renewable energy hub for the region. It plans to export large amounts of clean and cheap hydro-power-processed electricity to its neighbours, and even to the Middle East.

The ambitious plan is part of efforts to propel Ethiopia to become a middle-income country by 2025.

Although construction of the GERD is seen by Ethiopians as having a vital role in transforming the economy of the country, Egyptians view the project as a potential threat to its water security.

The Nile River is a lifeline to some 80% of Egyptians and the desert North African nation fears Ethiopia's huge dam project will ultimately diminish its historic water rights.

Long-standing disputes over Nile water between Ethiopia and Egypt reached boiling point last year after Egyptian politicians were caught on camera suggesting sabotage, including an air strike to halt the project.

However, relations between the two countries have improved in recent months after the two sides engaged in a number of positive discussions.

Ethiopia maintains the dam will not have any significant impact on the two lower riparian countries, Sudan and Egypt, and will in fact provide economic benefits.

BASHIR VISITS GERD

Meanwhile, Sudanese president Omer Hassan al-Bashir on Tuesday paid a visit to the GERD construction site.

According to the state-run Ethiopia broadcasting corporation (EBC), Bashir was accompanied by Ethiopia's foreign affairs minister, Tedros Adhanom, where he was briefed by the project manager on the current status and progress of the dam.

Following the visit, Bashir reiterated his county's full support for the project, which he says has regional benefits.

"I have all the information about the dam since its launch. We have also studied the effect the dam could have to Sudan," Bashir said.

"We believe that the dam benefits riparian countries and I hope it will be completed on schedule," he added.

Bashir was in Ethiopia to attend celebrations marking of the country's ninth Nation's and Nationalities Day held at the project site of the project in the Benishangul Gumuz region on Monday.

"Ethiopia's Nile dam project nears halfway mark", 10/12/2014, online at:

<http://www.sudantribune.com/spip.php?article53310>

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❖ RPT-UAE-Egypt alliance expands to desert wheat venture

- * Egypt wants to boost domestic wheat supply
- * UAE providing billions in cash, fuel, projects to Cairo
- * Companies say they consulted with Abu Dhabi on wheat investment

By Maha El Dahan and Maggie Fick

ABU DHABI/CAIRO, Dec 5 (Reuters) - Egypt and two companies from its strong backer United Arab Emirates have embarked on an ambitious plan to grow wheat in the desert that could boost the Cairo government's credibility if successful.

Egypt, the world's biggest wheat importer, has long aspired to become self-sufficient in its staple food through various schemes including reclaiming land in its desert wastelands.

Experts say growing wheat in the desert makes no economic sense given the logistical and environmental challenges.

That has not stopped UAE companies Al Dahra and Jenaan from turning to Egypt's southern desert, home to Toshka, a failed agriculture megaproject under former President Hosni Mubarak.

As Egypt recovers from turmoil following the 2011 revolt that toppled Mubarak, Gulf allies such as the UAE hope to ensure that Islamists who briefly held power can never do so again.

Abu Dhabi has put its weight behind President Abdel Fattah al-Sisi, who has promised to deliver everything past administrations could not, from reclaiming millions of acres of desert land to creating jobs.

Within a couple of years, the UAE companies plan to grow and sell several hundred thousand tonnes of wheat to the Cairo government -- equivalent to about 10 percent of the domestic crop bought annually from farmers.

Low yields, poor soil quality and uncertain water supplies make such a venture seem reckless.

For a wealthy nation like the UAE, which sees Sisi's Egypt as a bulwark against Islamists, the political value of the project outweighs the economic risks.

"They will eat the cost. It will not be profitable. It doesn't make sense economically," said Toby Jones, history professor at Rutgers University in the United States.

Al Dahra and Jenaan said the decision to grow wheat in the East Oweinat and Toshka regions was made in consultation with Emirati authorities. UAE officials were unavailable for comment.

Jenaan CEO Mohammed al-Falasi acknowledged challenges including a lack of labour and transport costs.

But he said Egypt had become more stable for investors and that growing wheat was the best option the company had for land it had leased in East Oweinat.

In the nearby Toshka area, the looming problem is mainly water supply.

Despite the UAE's commitment to back Sisi in a range of projects he has portrayed as a cure-all for the economy, reviving the Toshka project could be especially problematic.

Experts such as Cairo University agricultural economist Gamal Siam worry groundwater will run out before the investment could possibly pay off. That could explain why, of the half a million acres the Mubarak government hoped to reclaim, less than 10 percent has been cultivated.

Suleiman al-Nuaimi, who heads Al Dahra's Egypt projects, said his company produced 40,000 tonnes of wheat last year in the East Oweinat region but has yet to start work in nearby Toshka, where it hopes to grow 300,000 tonnes by 2016.

"We consider ourselves to be strategic partners for the Egyptian government in terms of food security," he said.

"RPT-UAE-Egypt alliance expands to desert wheat venture", 07/12/2014, online at:

http://www.reuters.com/article/2014/12/07/egypt-emirates-wheat-idUSL6N0TP32E20141207?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=78fbed349f-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-78fbed349f-250657169

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❖ Bleak Climate Report Bad News for Central Asia and Its Dams

If Central Asia's two poorest countries ever get around to building their massive but long-delayed hydropower dams, the facilities may be useful for a few decades. After that, they'll be rendered obsolete by a fast-warming climate that is melting the region's once-abundant glaciers and threatens to reduce precipitation sharply.

So suggests an alarming new World Bank report on the effects of climate change around the developing world.

“Turn Down the Heat: Confronting the New Climate Normal,” [released](#) in late November, offers just about everyone in Central Asia some bad news, especially the region's megalomaniacal dam builders. In landlocked Eurasia, the temperatures are expected to rise “above the global mean land warming,” bringing a slew of unpleasant consequences, from decreased crop yields to contentious water shortages.

Effects like these are difficult to assess and prepare for even in places with relatively responsible and capable governments. How will they be dealt with by dysfunctional, near-sighted and volatile governments in impoverished, corrupt countries like Central Asia's?

The 275-page report starts with the informed assumption that an increase in global average temperatures of 1.5 degrees Celsius by mid-century is unavoidable. It also looks at two more frightening, but plausible, scenarios: an increase of 2 degrees and 4 degrees. (Temperatures have already warmed by 0.8 degrees above pre-industrial levels.)

No matter which model they apply, forecasters predict a dramatic reduction in the size of Central Asia's glaciers and amount of precipitation. That translates into a sharp decrease in the water flows the largely arid region can expect for hydropower and agriculture.

Initially — until 2030, according to the authors — the rivers may swell due to glacial melt. But after

mid-century, the smaller glaciers will cause “melt water in the mountainous parts of the river basins ... to decline substantially.” By 2100, glaciers will shrink by about 50 percent in the 2-degree model and 67 percent with a 4-degree temperature increase.

Glacier melt will be accompanied by more frequent and longer droughts and the inevitable water shortages are expected to amplify the threat of conflict. Poorly managed, haphazardly shared water resources along contested borders have already been a major [source of friction](#) between Kyrgyz and Tajik communities.

Moreover, mountainous Kyrgyzstan and Tajikistan rely almost entirely on hydropower dams to produce their limited supplies of electricity—93 percent and 99 percent, respectively, according to World Bank data. Though the president of downstream Uzbekistan has [warned](#) of war over water resources, both his neighbors are trying to build more dams: [Kambarata-1](#) in Kyrgyzstan (which Russia has promised, somewhat obliquely, to help fund) and [Rogun](#) in Tajikistan, which would be the world’s tallest dam.

Of course, any change to water flows will affect agriculture, public health, and the overall economy. With warmer temperatures, the report’s authors expect increased runoff in winters, and less water available during the summer growing season. Fears about food security are compounded by the region’s rapidly growing population.

“Prolonged periods of above average temperatures will exacerbate heat stress of agricultural crops, leading to decreasing plant productivity. Droughts, meanwhile, are very likely to increase desertification in the Kyrgyz Republic and Kazakhstan,” the report says.

Some of the more worrying findings can be mitigated by modernized irrigation techniques, but implementation would require a major shift in policy from unimaginative governments that have shown themselves, over more than a generation of independence, to be largely resistant to change. Without urgent reform in the way it handles agrarian policy, Uzbekistan – Central Asia’s leading agricultural producer – can expect “yields for almost all crops...to drop by as much as 20–50 percent (in comparison to the 2000–2009 baseline) by 2050 in a 2°C world due to heat and water stress.”

The one thing that seems to excite policy makers in the upstream countries, Kyrgyzstan and Tajikistan, is building dams—indeed, Tajikistan’s president has turned the construction of dams into a national ideology. The report’s message to the region’s dam builders is quite clear: either hurry up or give up. Rogun, designed 36 years ago, is [expected](#) to take 14 years to build and 15 years to fill. By the time it is fully operational – in the mid-2030s – the Vakhsh River feeding it is unlikely to look anything like it did in 1978.

“Bleak Climate Report Bad News for Central Asia and Its Dams”, 08/12/2014, online at:
<http://www.eurasianet.org/node/71261>

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❖ **Asia Development Bank allocates loan for Georgia**

The Asian Development Bank (ADB) has approved \$108 million loan for Georgia to finance improvement of water supply system in Zugdidi and sewerage system in Poti, towns in Samegrelo region in western Georgia, ADB's Georgian office said Dec.12.

The loan is fourth tranche in \$500 million funding designed for upgrades to water and sanitation services in secondary towns in Georgia under ongoing Urban Services Improvement Investment Program ([USIIP](#)). ADB has previously approved three tranches of the program totaling \$218 million.

"Creating high-quality and reliable water supply in the face of increasing demand is one of the priorities of the government," said Kathie Julian, country director in ADB's Georgia resident mission. "USIIP supports the government of Georgia's long-term sector development plan to invest around \$1.6 billion to deliver safe water and sanitation services to all urban residents by 2020."

"Asia Development Bank allocates loan for Georgia", 12/12/2014, online at:
<http://en.trend.az/scaucasus/georgia/2343162.html>

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❖ **Activists slam Lao dam hearings**

Civil society groups on Thursday criticised the Lao government over delays to public hearings for the controversial 260-megawatt Don Sahong hydropower dam. The hearing, or "prior consultation meeting"...

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link:<http://www.bangkokpost.com/news/asean/449139/activists-slam-lao-dam-hearings>. View our policies at <http://goo.gl/9HgTd> and <http://goo.gl/ou6Ip>. © Post Publishing PCL. All rights reserved.

“Activists slam Lao dam hearings”, 12/12/2014, online at: <http://www.bangkokpost.com/news/asean/449139/activists-slam-lao-dam-hearings>

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❖ Press Release: Water's role in the rise and fall of the Roman Empire

Smart agricultural practices and an extensive grain-trade network enabled the Romans to thrive in the water-limited environment of the Mediterranean, a new study shows. But the stable food supply brought about by these measures promoted population growth and urbanisation, pushing the Empire closer to the limits of its food resources. The research, by an international team of hydrologists and Roman historians, is published today in Hydrology and Earth System Sciences, an open access journal of the European Geosciences Union (EGU).

Stretching over three continents and persisting for many centuries, the Roman Empire was home to an estimated 70 million people. In such a vast area ensuring a stable food supply was no easy task, particularly given the variable and arid climate of the Mediterranean region. So how did the Romans maintain reliable food supplies to their cities for centuries under such challenging conditions?

To find out, Brian Dermody, an environmental scientist from Utrecht University, teamed up with hydrologists from the Netherlands and classicists at Stanford University in the US. The researchers wanted to know how the way Romans managed water for agriculture and traded crops contributed to the longevity of their civilisation. They were also curious to find out if these practices played a role in the eventual fall of the Empire.

"We can learn much from investigating how past societies dealt with changes in their environment," says Dermody. He draws parallels between the Roman civilisation and our own. "For example, the Romans were confronted with managing their water resources in the face of population growth and urbanisation. To ensure the continued growth and stability of their civilisation, they had to guarantee a stable food supply to their cities, many located in water-poor regions."

In the Hydrology and Earth System Sciences paper, the team focused on determining the water resources required to grow grain, the staple crop of the Roman civilisation, and how these resources were distributed within the Empire. It takes between 1000 and 2000 litres of water to grow one kilo of grain. As Romans traded this crop, they also traded the water needed to produce it – they exchanged virtual water.

The researchers created a virtual water network of the Roman world. "We simulated virtual water trade based on virtual-water-poor regions (urban centres, such as Rome) demanding grain from the nearest virtual-water-rich region (agricultural regions, such as the Nile basin) in the network," explains Dermody.

The team used a hydrological model to calculate grain yields, which vary depending on factors such as climate and soil type. The authors used reconstructed maps of the Roman landscape and population to estimate where agricultural production and food demand were greatest. They also simulated the trade in grain based on an interactive reconstruction of the Roman transport network, which takes into account the cost of transport depending on factors such as distance and means of transportation.

Their virtual water network indicates that the Romans' ability to link the different environments of the Mediterranean through trade allowed their civilisation to thrive. "If grain yields were low in a certain region, they could import grain from a different part of the Mediterranean that experienced a surplus. That made them highly resilient to short-term climate variability," says Dermody.

But the Romans' innovative water-management practices may also have contributed to their downfall. With trade and irrigation ensuring a stable food supply to cities, populations grew and urbanisation intensified. With more mouths to feed in urban centres, the Romans became even more dependent on trade whilst at the same time the Empire was pushed closer to the limits of their easily accessible food resources. In the long term, these factors eroded their resilience to poor grain yields arising from climate variability.

"We're confronted with a very similar scenario today. Virtual water trade has enabled rapid population growth and urbanisation since the beginning of the industrial revolution. However, as we move closer to the limits of the planet's resources, our vulnerability to poor yields arising from climate change increases," concludes Dermody.

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Please mention the name of the publication (Hydrology and Earth System Sciences) if reporting on this story and, if reporting online, include a link to the paper (<http://www.hydrol-earth-syst-sci.net/18/5025/2014/hess-18-5025-2014.html>) or to the journal website (<http://www.hydrology-and-earth-system-sciences.net/>).

More information

This research is presented in the paper 'A virtual water network of the Roman world' published in the EGU open access journal Hydrology and Earth System Sciences on 11 December 2014. The scientific article is available online, free of charge, at <http://www.hydrol-earth-syst-sci.net/18/5025/2014/hess-18-5025-2014.html>.

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The team is composed of B. J. Dermody (Department of Environmental Sciences, Utrecht University), R.P.H. van Beek (Department of Physical Geography, Utrecht University), E. Meeks (Stanford University Library), K. Klein Goldewijk (Department of Environmental Sciences, Utrecht University), W. Scheidel (Department of Classics, Stanford University), Y. van der Velde (Department of Soil, Geography and Landscape, Wageningen University), M. F. P. Bierkens (Department of Physical Geography, Utrecht University), M. J. Wassen (Department of Environmental Sciences, Utrecht University), and S. C. Dekker (Department of Environmental Sciences, Utrecht University).

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16 diverse scientific journals, which use an innovative open access format, and organises a number of topical meetings, and education and outreach activities. Its annual General Assembly is the largest and most prominent European geosciences event, attracting over 12,000 scientists from all over the world. The meeting's sessions cover a wide range of topics, including volcanology, planetary exploration, the Earth's internal structure and atmosphere, climate, energy, and resources. The EGU 2015 General Assembly is taking place in Vienna, Austria, from 12 to 17 April 2015. For information regarding the press centre at the meeting and media registration, please check <http://media.egu.eu>.

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“Press Release: Water’s role in the rise and fall of the Roman Empire”, 11/12/2014, online at:
http://www.egu.eu/news/133/waters-role-in-the-rise-and-fall-of-the-roman-empire/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=27c59b9528-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-27c59b9528-250657169

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❖ Water, Public Sector Get Largest Share of ADB Funds

The Asian Development Bank on Saturday released details of its five-year development plan for Cambodia, with the majority of the bank's \$800 million concessional loan going toward improving urban infrastructure and water supply, and public sector management.

In its "Country Partnership Strategy 2014 to 2018," the ADB allocates \$183 million, or 21.5 percent, of the total funds to ensuring all Cambodians have access to a safe water supply and good sanitation by 2025.

The second-largest part of the budget—\$159.1 million, or 18.7 percent—will go toward ensuring public sector finances are properly managed and transparent, and that the national budget is properly prepared.

The ADB has also allocated \$148 million for the facilitation of trade and transport, \$90 million for education, and the remainder of the funds for the development of agriculture and access to finance for private companies.

"Water, Public Sector Get Largest Share of ADB Funds", 08/12/2014, online at:
https://www.cambodiadaily.com/business/water-public-sector-get-largest-share-of-adb-funds-73776/?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=3c5a8c7a8a-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-3c5a8c7a8a-250657169

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❖ **Better policy, finance needed to balance forests and farming – experts**

LIMA, Dec 7 (Thomson Reuters Foundation) - Initiatives balancing protection for forests and other natural resources with the interests of farmers need more political and financial support if they are to advance the fight against climate change, experts said on Saturday.

A "landscapes approach" that aims to help people think more broadly about how they use ecosystems to boost food security and incomes without harming the planet has gained traction in recent years among researchers and development agencies.

But more effort is required to convince policymakers they need to put this approach into practice on a large scale, Andrew Steer, president of the World Resources Institute, told an international forum on the issue in Lima.

"It is very difficult to act in this integrated way," he said.

Rachel Kyte, the World Bank's special envoy for climate change, said the science is clear that the world will have to manage landscapes differently to reduce greenhouse gas emissions from deforestation and agriculture if global warming is to be limited to 2 degrees Celsius.

But "I don't think that we have yet fully made the case successfully... that this is economically and financially possible," she said.

Peter Holmgren, director general of the Center for International Forestry Research (CIFOR), said finance for sustainable land use must be increased, including from the private sector.

"We need to connect the large capital funds with the needs of small producers," he said. "We need to talk trillions, not billions (of dollars)."

INDIGENOUS RIGHTS

At the same time, the human rights and security of communities who are the stewards of forests and other natural resources have to be ensured, he emphasised.

More than 900 defenders of land rights and the environment are known to have died in 35 countries between 2002 and 2013, advocacy group Global Witness said in a report earlier this year.

In September, Edwin Chota, a well-known environmental activist and Ashaninka tribal leader, was shot and killed along with three of his companions in a remote rainforest region near Peru's border with Brazil.

Holmgren said there was no point in promoting landscape approaches if the local people involved "still die fighting for their rights to advance (their) priorities".

Victoria Tauli-Corpuz, U.N. special rapporteur on the rights of indigenous peoples, said the best-kept forests in her country, the Philippines, are in indigenous territories where local people have title to their land.

But globally, indigenous land rights have been significantly undermined, she added.

"Unless we reach a stage where serious government efforts are targeted towards respect, protection and fulfilment of the rights of indigenous peoples, there will be a very difficult path towards a landscapes approach" that provides benefits for all, she said.

The World Bank's Kyte said the challenge now was to take anecdotal evidence of successful agriculture and forestry initiatives that protect people and their ecosystems - as in Brazil and parts of Rwanda, for example - and make it happen in whole regions.

That would mean aligning agriculture and forest policy, land rights and land management, and giving small farmers access to credit, among other things, she said.

Countries will come under growing pressure to do this "as water resources start to become scarcer, and the need to produce nutritious food off less land becomes more intense, and as you start to see climate volatility", she added.

“Better policy, finance needed to balance forests and farming – experts”, 07/12/2014, online at:
http://www.reuters.com/article/2014/12/07/climatechange-forests-idUSL6N0TR0EY20141207?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=78fbed349f-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-78fbed349f-250657169

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❖ California's 'Hot Drought' Ranks Worst in at Least 1,200 Years

Record rains fell in California this week. They're not enough to change the course of what scientists are now calling the region's worst drought in at least 1,200 years.

Just how bad has California's drought been? Modern measurements already showed it's been drier than the 1930s dustbowl, worse than the historic droughts of the 1970s and 1980s. That's not all. New research going back further than the Viking conquests in Europe still can't find a drought as bad as this one.

To go back that far, scientists consulted one of the longest records available: tree rings. Tighter rings mean drier years, and by working with California's exceptionally old trees, researchers from University of Minnesota and Woods Hole Oceanographic Institute were able to reconstruct a chronology of drought in southern and central California. They identified 37 droughts that lasted three years or more, going back to the year 800.

None were as extreme as the conditions we're seeing now.

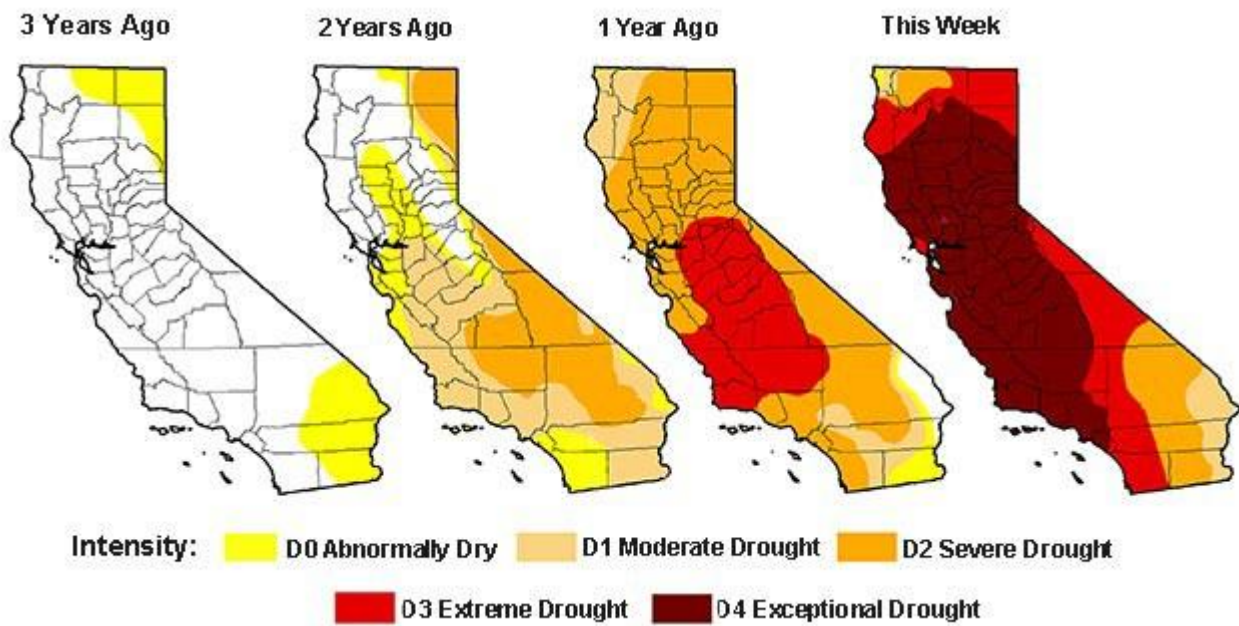
One of the oddities of this drought is that conditions aren't just driven by a lack of rainfall. There have been plenty of droughts in the past with less precipitation. (The drought of 1527 to 1529, for example, was killer.) What makes this drought exceptional is the heat. Extreme heat.

Higher temperatures increase evaporation and help deplete reservoirs and groundwater. The California heat this year is like nothing ever seen in modern temperature records. The chart above shows average year-to-date temperatures in the state from January through October for each year since 1895.

California's drought has withered pastures and forced farmers to **uproot orchards** and fallow farmland. It **may cost** the state \$2.2 billion this year, with 17,100 jobs lost and 428,000 acres of land left unplanted. Tensions are still running high between farmers and salmon fishers, who rely on the

same waters. Young salmon even qualified for migration assistance this year -- **via tanker truck** -- when river levels were too low to make the swim.

The effects of prolonged drought are cumulative. Maps from the U.S. Drought Monitor below show the worsening of conditions over the last three years.



More than half of the state remains in “exceptional drought” (crimson). It’s a distinction marked by crop and pasture losses and water shortages that fall within the top two percentiles. Record rainfalls recorded across the state this week -- including in San Francisco and Los Angeles -- did little to overcome the state’s moisture deficit, the National Drought Mitigation Center reported yesterday.

The tree-ring study, published by the American Geophysical Union, combined recent tree-ring samples with a [longer tree-ring database](#) developed by scientists at Columbia University. The study compares precipitation as well as [soil-moisture estimates](#). The accumulated severity of dry soil is worse than any period that's come before -- including dry spells lasting nine years.

California's "hot drought" is a bad sign of times to come, according to the study's authors. The role of man-made climate change in the current drought is difficult to tease out, they wrote, but as the planet continues to warm, more hot droughts "are assured."

There's no sign yet that this drought is coming to an end. The region's rainy season has started strong, but there's still a lot of catch-up to do. More than a year's supply of water has gone missing in the state's reservoirs, and it could take several unusually wet years to get things back to normal.

The tree-ring study found that roughly half of California's three-year droughts turn into four-year droughts.

"California's 'Hot Drought' Ranks Worst in at Least 1,200 Years", 05/12/2014, http://www.bloomberg.com/news/2014-12-05/california-s-drought-ranks-worst-in-at-least-1-200-years.html?utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=78fbcd349f-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-78fbcd349f-250657169

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❖ Sydney Water to Trial TaKaDu to Improve Water Network Management

Sydney Water and TaKaDu sign a 1-year contract to enhance water conservation efforts and manage the water network more efficiently

Sydney Water has signed a one year contract with TaKaDu to pilot and assess its Integrated Water Network Management product across part of its 21,000 kilometer water network. Sydney Water is Australia's largest water utility providing water services in Australia's most populated region. The trial aims to enhance Sydney Water's efforts to conserve water and manage its network more efficiently.

As an industry leader in Australia and worldwide, Sydney Water has a tradition of innovation in water distribution network management and superior customer service.

General Manager of Service Delivery at Sydney Water, Eric de Rooy, said that "The decision to engage TaKaDu is aligned with Sydney Water's long-term focus on customer service, water conservation and network efficiency. This partnership will support Sydney Water's decision-making from day-to-day operations to strategic planning".

TaKaDu uses statistical algorithms to integrate, aggregate, and analyse water network data through a web-based solution.

Amir Peleg, Founder and CEO of TaKaDu, noted "We are excited to be supporting Sydney Water, a leader in water network operations and management, in its effort to enhance customer service and improve network efficiency."

TaKaDu has a 40% market share for the top ten largest water networks in the country by population served. TaKaDu's service will be provided to Sydney Water through Jacobs, one of the world's largest and most diverse providers of technical professional and construction services, which represents TaKaDu in Australia and New Zealand.

Jacobs will provide the first line of support and service for project implementation and assessment.

Eric Skowron, Associate Water Engineer at Jacobs, said "Having rolled out TaKaDu for other Australian water utilities over the past two years, I am confident that Sydney Water will gain significant value from implementing TaKaDu's solution." Mr Strasser added "Sydney Water's decision further demonstrates its ongoing commitment to being at the forefront of water network technology and customer care."

About Sydney Water

Sydney Water is Australia's largest water utility. Our area of operations covers 12,700 km² and includes Sydney, the Illawarra and the Blue Mountains regions. We're a statutory State Owned Corporation, wholly owned by the New South Wales Government and we have three equal, principal objectives – to protect public health, to protect the environment and to be a successful business. Sydney Water supplies drinking water, provides industrial and commercial wastewater services, recycled water and some stormwater services to over 4.6 million people in Sydney, the Illawarra and the Blue Mountains. Every day, we supply about 1.4 billion litres of water to our customers and we collect and treat about 1.3 billion litres of wastewater.

We also work with the community to enhance the liveability of our cities by irrigating, protecting and restoring public areas like parks, rivers, playing grounds and wetlands.

About TaKaDu

TaKaDu is a leading provider of Integrated Water Network Management, enabling water utilities to improve efficiency and make smarter decisions. Using advanced statistical and mathematical algorithms, TaKaDu harnesses utility data, translating it into actionable insights and transforming the way water networks operate. The solution offers a comprehensive decision-making platform that can be integrated across the utility from the analyst monitoring the network to the executive team considering long-term strategic investments.

TaKaDu's solution is cloud-based, can be implemented within weeks, and can be integrated with various IT systems. It is currently deployed by water utilities in Europe, Australia, Latin America and the Middle East. TaKaDu's innovative approach has earned notable water industry commendations, including the World Economic Forum Technology Pioneer Award and the 2013 Sustainia Award. The company was also featured as a Harvard Business Case Study. TaKaDu is a founding member of SWAN, the Smart Water Networks Forum.

“Sydney Water to Trial TaKaDu to Improve Water Network Management”, 09/12/2014, online at:

<http://www.prweb.com/releases/2014/12/prweb12378004.htm>

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