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- ***** Water shortages the real threat to Iran
- * Iran's Water Crisis: A Bigger Threat Than Israel?
- * Iran Involved in \$3.5 Billion of Hydro Water Works, Times Says
- * '100 million hectares of plains in Iran suffer from water crisis'
- ✤ Iran implementing water projects worth \$3.5b in foreign countries
- * Iran Becoming 'Uninhabitable,' Says Former Agriculture Minister
- * Iran: Cities in Isfahan province face water shortage
- * Rebuilding Iraq: Final report card on US efforts highlights massive waste
- Syrian refugees and the water problem in refugee camps
- * The real threat to our future is peak water'
- World Water Wars: In The West Bank, Water Is Just Another Conflict Issue For Israelis And Palestinians
- ✤ Johnston Gets Instructions on Israel-arab Waterdevelopment Plan
- City of Palestine to conduct second water system burnout in August
- * Action plan seeks to end random pumping from Azraq Basin
- * Israel: water is the gold of the new millennium, says Valori
- Slocum issues water restrictions, Palestine reviews drought plans
- Sudan backs Ethiopian dam project
- * Ancient Egyptian River Could be Revived for Farming
- * Egypt, Ethiopia and the diplomatic dam busters
- Ethiopian Renaissance Dam Expected to Yield Political and Economic Benefits for Sudan
- ✤ Uganda criticizes Britain over the Nile waters agreement
- * Ethiopia Continues Dam Construction



- * China Shifting Balance of Power in Nile River Basin
- ***** 26% of water samples in Mumbai unpotable
- China, Taiwan brace for typhoon as flood toll exceeds 200
- ***** The waters must run...
- * In Mekong Delta, Rice Boom Has Steep Environmental Cost



Water shortages the real threat to Iran

Kalantari underlined that all the sources of natural water in Iran were drying up, including Lake Urumieh, Bakhtegan, Tashak, Parishan and others, and that he anticipates a crisis.

The temperatures above 40 degrees celcius could be the reason for an upcoming water crisis in <u>Iran</u>. Former <u>Iran</u>ian Minister of Agriculture Issa Kalantari said if this situation was not reformed, <u>Iran</u> will become a desert in 30 years.

<u>Iran</u>ian officials asked the public to use water very carefully. The temperature in the <u>Iran</u>ian capital was about 43 degrees and the water volume used per day was about 3.500 million cubic meters. The load factor of the dam was announced as 25,700 billion cubic meter last week, but there were evaluations which draw a possible crisis in the region.

Kalantari says the water crisis is the "main problem that threatens us, what is more dangerous than Israel, America or political fighting, is the issue of living in <u>Iran</u>. It is that the <u>Iran</u>ian plateau is becoming uninhabitable (...) groundwater has decreased and a negative water balance is widespread, and no one is thinking about this."

Kalantari said, "If this situation is not reformed, in 30 years <u>Iran</u> will be a ghost land. Even if there is precipitation in the desert, there will be no yield, because the area for groundwater will dry out and water will remain at ground level and evaporate."

Kalantari underlined that all the sources of natural water in <u>Iran</u> were drying up, including Lake Urumieh, Bakhtegan, Tashak, Parishan and others, and that he anticipates a crisis.

Kalantari said that the "deserts in <u>Iran</u> are spreading, and I am warning you that South Alborz and East Zagros will be uninhabitable and people will have to migrate. But where? Easily I can say that of the 75 million people in <u>Iran</u>, 45 million will have uncertain circumstances."

"Water shortages the real threat to Iran",12/07/2013, online at: http://www.worldbulletin.net/?aType=haber&ArticleID=112983

BACK TO TOP



Iran's Water Crisis: A Bigger Threat Than Israel?

A former agriculture minister has said Iran's water shortage is a bigger threat to the country than either Israel or the United States, *Al-Monitor* reported this week citing local media.

<u>According to Al-Monitor</u>, Issa Kalantari, the minister of agricultural under president Hashemi Rafsanjani, told *Ghanoon* newspaper this week that the water crisis is the "main problem that threatens" Iran, adding that it is more dangerous "than Israel, America or political fighting" among the Iranian elite.

Kalatantari, who serves on president-elect Hassan Rouhani's transition team and heads research on agricultural at the think tank Rouhani has headed since 1992, went on to say that if the water issue is not addressed, Iran could become "inhabitable."

"If this situation is not reformed, in 30 years Iran will be a ghost town. Even if there is precipitation in the desert, there will be no yield, because the area for groundwater will be dried and water will remain at ground level and evaporate."

Kalatantari is not the only Iranian official who is concerned about the water shortages in the country. Mohammad Hossein Shariatmadari, a former Iranian trade minister, <u>said in April</u> that he believes the water issue is reaching an alarming level. The following month a deputy energy minister <u>similarly</u> <u>warned</u> that the country would soon face a water crisis.

Even the U.S. intelligence community sees water shortages as one of Iran's primary challenges in the coming decades. In its <u>Global Trends 2030</u> report, the National Intelligence Council said Iran "has no notable watersheds and is therefore heavily dependent on fossil and imported water, including 'virtual water' imports— such as agricultural goods like meat, fruit, and vegetables using high levels of water to produce."

And while the water crisis is set to worsen considerable in the coming years and decades, it has already resulted in notable unrest. After a drought earlier this year, hundreds of farmers in a town in Isfahan province clashed with police after <u>destroying a pipeline</u> that was carrying water from the Zayandeh Rood River in their town to the city of Yazd in a neighboring province. As a result, the city of Yazd <u>reportedly began</u> rationing water.

Iran has notorious tough terrain that has been both an enormous burden and huge asset to the country. On the one hand, it is difficult to govern let alone create prosperity in Iran given its immense size, semi-arid climate and defining topographical features—namely, its huge mountain ranges and two huge desert plateaus that already are largely inhabitable.

As *Stratfor*, a global intelligence firm, <u>has observed</u>:

"Iran's population is concentrated in its mountains, not in its lowlands, as with other countries. That's because its lowlands, with the exception of the southwest and the southeast (regions populated by non-Persians), are uninhabitable. Iran is a nation of 70 million mountain dwellers."



This geography does not bode well for maintaining sufficient water supplies. Indeed, Iran's <u>annual</u> <u>precipitation</u> rate is somewhere between one-third and one-fourth of the world's average, and around two-thirds of the country receives less than the global norm.

Furthermore, around 71 percent of this precipitation evaporates, and this number is likely to rise in the future. 50 percent of Iran's water comes from underground sources, <u>but in many parts</u> of the country underground water supplies are drying up. Mismanagement of water resources has exacerbated these issues, and climate change is likely to significantly worsen the problem in the future.

Although Iran's topography is already not conducive to bountiful farming, water shortages are going to be hardest felt in <u>the agricultural sector</u>, which accounts for about 13 percent of Iran's GDP, 23 percent of employment, and about 90 percent of the country's water supplies.

Agriculture in the country has already been suffering in recent years, but increased water shortages are likely to make the Islamic Republic's goal of self-sufficiency increasingly elusive. Lack of farming opportunities will also force more people to artificially migrate to the cities, where, among other things, the government will need to supply them with water. This will inevitably force the government to divert more of the already dwindling water supplies from rural agricultural communities to the cities, provoking anger and potential unrest from the impacted farmers.

Indeed, it does seem that water shortages could be causing Iranian policymakers more headaches than Israel or the U.S. in years ahead.

"Iran's Water Crisis: A Bigger Threat Than Israel?", 12/07/2013, online at: <u>http://thediplomat.com/the-editor/2013/07/12/irans-water-crisis-a-bigger-threat-than-israel/</u>

BACK TO TOP



***** Iran Involved in \$3.5 Billion of Hydro Water Works, Times Says

<u>Iran</u> is implementing hydropower project water works abroad valued at \$3.5 billion, Tehran Times reported, citing Iranian Deputy Energy Minister Alireza Daemi.

Iran is also in talks on \$2.7 billion of related deals, Daemi was cited as saying by the paper without giving details about the projects or location. Iranian companies have helped work on water and power projects in about 40 countries, mostly in Central Asia, the <u>Middle East</u>, Latin America and Africa, according to today's Times, which didn't give a timeline.

Sattar Mahmoudi, an advisor on water affairs to the energy minister, said Iran is taking part in water installations in Tajikistan, Turkmenistan, Venezuela, Afghanistan and Iraq. Iran "plays an important role among regional nations in the water sector, like the role <u>Germany</u> plays in Europe," Mahmoudi said July 2 in the Tehran-based Iran-Daily paper.

"Iran Involved in \$3.5 Billion of Hydro Water Works, Times Says", 08/07/2013, online at: http://www.bloomberg.com/news/2013-07-08/iran-involved-in-3-5-billion-of-hydro-water-works-times-says.html

BACK TO TOP



* '100 million hectares of plains in Iran suffer from water crisis'

TEHRAN – A member of the board of directors of the Institute for Forest and Pasture Research says underground water level has dropped 2 meters in 70 plains across Iran in recent years.

Mohammad Darvish, in an interview with the Persian service of the Mehr News Agency published recently, said the underground water level has dropped in 70 plains which equals approximately around 100 million hectares.

Darvish said underground water in 390,000 hectares of farmlands surrounding Urmia Lake has dropped up to 28-30 centimeters.

According to Darvish, about 110,000 water wells are operating in Iran without any license or prior permission.

In addition to Urmia Lake, other lakes like Hamoon and Bakhtegan, along with many greater underground water resources, have dried up, he lamented.

Darvish criticized the government's self-sufficiency policy in foodstuffs and said that the policy has only led to drastic shortage in water resources in Iran.

He cited the country of Japan as an example. "Japan has never achieved self-sufficiency in foodstuffs. But the Asian state has turned into one of the leading and powerful countries in the world by increasing its per capita income," he said.

He added, "It is expected that the new government of President-elect Rohani to put an end to all the current problems facing our domestic agriculture and to consult experts to resolve the current crises in all agricultural sectors."

According to ORSAM Water Research Program, Iran is located in one of the most arid areas of the world. The average annual precipitation rate is 252 mm. This figure constitutes one third of the



global precipitation rate. Under current climatic conditions; 179 mm (71 percent) of the rainfall evaporates. The average annual evaporation rate in Iran ranges between 1500 mm and 2000 mm. This figure is 1/3 of the world average. While this figure is 2000 mm/year in northern highlands of the country, it is 20 mm/year in desert area. Two thirds of Iran receives less rainfall than the average precipitation rate.

Massive droughts have hit different areas in Iran, and this has led to many problems. Currently, the Ministry of Energy is struggling to provide necessary water to the residents of several provinces in Iran.

Major cities such as Isfahan, Shiraz and Yazd are suffering from water shortage. Due to this problem, Iran's next administration will face an increase in costs to provide and transfer water to the provinces facing such problems.

The only way to tackle the problem is to come up with an international plan to cope with droughts in Middle Eastern countries.

Some international organizations have even predicted the outbreak of a war in the Middle East over water crisis. Governments in the Middle East must take strict measures with regard to water crisis.

The Iranian government has started projects to transfer water from seas into cities and dry lands. For example, the Ministry of Energy has launched a new project to transfer Persian Gulf water into Fars province.

"100 million hectares of plains in Iran suffer from water crisis", 08/07/2013, online at: <u>http://tehrantimes.com/component/content/article/109102</u>

BACK TO TOP



✤ Iran implementing water projects worth \$3.5b in foreign countries

Iran is implementing water projects worth \$3.5 billion in foreign countries, according to Iranian Deputy Energy Minister Alireza Daemi. The value of the water projects in foreign countries has risen by 282 percent since the start of President Mahmoud Ahmadinejad's administration in 2005, the Mehr News Agency quoted Daemi as saying on Sunday.

Some other projects, which would be worth about \$2.69 billion, are being negotiated and will most likely be implemented, he added.

In April, Esmaeil Mahsouli, another Iranian deputy energy minister, said that Iran has invested \$1.453 billion to complete 213 projects in the power sector in other countries. Some 45 Iranian companies have launched water and power projects in 40 countries, mainly in Central Asia, the Middle East, Latin America, and Africa.

Iran has attained self-sufficiency in the production of equipment for its power industry. In recent years, the Islamic Republic has signed technical and engineering contracts in the energy sector with several Asian and African countries.

Iran plans to export \$4.5 billion worth of technical and engineering services in the current Iranian calendar year, which began on March 21.

"Iran implementing water projects worth \$3.5b in foreign countries", 09/07/2013, online at: <u>http://www.payvand.com/news/13/jul/1071.html</u>

BACK TO TOP



* Iran Becoming 'Uninhabitable,' Says Former Agriculture Minister

A former agriculture minister under Ayatollah Hashemi Rafsanjani's presidency and current member of the advising committee to help form President-elect Hassan Rouhani's cabinet Issa Kalantari spoke to *Ghanoon* newspaper about a <u>variety of economic challenges</u> Iran is facing today and in the decades ahead, in particular the potential water crisis.

Kalantari, who heads research on agriculture for the Expediency Council's Center of Strategic Research, <u>said</u>, "Rouhani's administration will not have a simple task. This current administration did not fill the warehouses and did not forecast for the transfer of administrations. Unfortunately, the country will be handed over to Rouhani with empty warehouses, an empty treasury, empty ports and an empty Central Bank.

"I am saying this so that people know that they must wait," Kalantari continued. "When in the fall prices increase, they will not see it as Rouani's doing." He added, "To return from 2013 to 2005, it will take at least two years," in reference to undoing the eight years of President Mahmoud Ahmadinejad in power.

On Iran's water crisis, Kalatantari said, "Our main problem that threatens us, that is more dangerous than Israel, America or political fighting, is the issue of living in Iran. It is that the Iranian plateau is becoming uninhabitable ... groundwater has decreased and a negative water balance is widespread, and no one is thinking about this."

Kalantari continued, "I am deeply worried about the future generations. There has been livelihood in Iran for 7,000 years. We do not have a right with this lack of planning to confront the country with this great of a challenge." On whether others have noticed this issue, Kalantari said, "I have said it everywhere. If this situation is not reformed, in 30 years Iran will be a ghost town. Even if there is precipitation in the desert, there will be no yield, because the area for groundwater will be dried and water will remain at ground level and evaporate."

"All the bodies of natural water in Iran are drying up: Lake <u>Urumieh</u>, Bakhtegan, Tashak, Parishan and others," Kalantari said. "I am talking about the occurrence of a crisis. People's lives are being threatened."

Kalantari said that the "deserts in Iran are spreading, and I am warning you that South Alborz and East Zagros will be uninhabitable and people will have to migrate. But where? Easily I can say that



of the 75 million people in Iran, 45 million will have uncertain circumstances." Kalantari continued, "If we start this very day to address this, it will take 12 to 15 years to balance."

On the claim by Ahmadinejad's administration that Iran had produced 118 million tons of agricultural goods, Kalantari said, "If this statistic were true, we would be one of the happiest people in the world. Also, we could export \$20 billion worth of food, but agricultural production has a [specific] definition. 'Agricultural production' is a term used for goods that are consumed by individuals or given to warehouses. If we apply this criteria, then we see that agricultural production in Iran was not more than 68 million tons."

"Those who lie about statistics are working with foreign brokers," said Kalantari. "Based on these statistics offered by the administration, wheat was not imported on time." According to Kalantari, the four-month delay in the purchase of wheat "cost the country \$1 billion" more than if they had bought it on time.

"Now who is answerable for this \$1 billion damage in this field based on false statistics?" he asked. "Who has benefited? Naturally, the foreign brokers."

"Iran Becoming 'Uninhabitable,' Says Former Agriculture Minister", 09/07/2013, online at: <u>http://iranpulse.al-</u> monitor.com/index.php/2013/07/2353/iran-becoming-uninhabitable-says-former-agriculture-minister/

BACK TO TOP



* Iran: Cities in Isfahan province face water shortage

NCRI - A number of large cities in the central province of Isfahan are facing water shortages even though a water rationing plan has been in effect in the province.

Since July 9, cities of Nain, Najaf Abad, Khorasgan district, Bakhsh-ziyar, Khomeini Shahr and its surrounding areas are facing lack of water and continuous water outage.

In April, Alireza Daemi, Iranian regime's deputy for Ministry of Energy citing official figures said "Every year the situation in Iran will become more difficult."

According to Daemi, in 1960 six thousand cubic meters of water were available per person but in 1990 it was reduced to two thousand cubic meters per person.

Accordingly, the availability of water will reach one thousand cubic meters per person in 2025.

He predicted that in the next 20 years water availability will be reduced to one quarter.

In late February in province of Isfahan, over 400 protesters were injured as the State Security Forces attacked a peaceful gathering of farmers protesting water shortages in the area.

The former head of Iranian regime's Revolutionary Guard warned in his website in March that the farmers' protests over water shortages could trigger a massive social uprising that could threaten the stability of the regime

"Iran: Cities in Isfahan province face water shortage", 14/07/2013, online at: <u>http://www.ncr-iran.org/en/news/society/14169-iran-cities-of-isfahan-province-face-water-shortage.html</u>

BACK TO TOP



• Rebuilding Iraq: Final report card on US efforts highlights massive waste

Here are five of the most wasteful projects uncovered by the Inspector General for Iraq Reconstruction. Its final report paints a 'very grim picture' of America's ability to plan and carry out large-scale nation-building operations.

The US reconstruction operations in Iraq constituted the largest project of its kind ever undertaken by America, but it was plagued by a host of challenges, including corruption and waste, that cast a poor light on the US ability to undertake such projects, the author of the official report on the program told Congress this week.

"For all of the good intentions, it was a program replete with challenges, over-promises, setbacks, and shortcomings," the Republican chairman of the House Middle East subcommittee, Rep. Ileana Ros-Lehtinen of Florida, noted in the hearing Thursday.

These efforts have been plagued by waste, too, of much of the \$60 billion in US taxpayer money used to fund the rebuilding of Iraq, agreed Rep. Ted Deutch (D) of Florida in a rare moment of robust bipartisan unity.

At the same time, private defense contractors, which had some 170,000 employees on the ground, reaped some \$140 billion in profits in Iraq, he said. Some of these profits came from flagrant overcharging, such as the contractor that billed the US government \$900 for a switch that was valued at \$7.05, a 12,000 percent markup.

Here are five of the most wasteful projects uncovered in "Learning from Iraq: A Final Report from the Special Inspector General for Iraq Reconstruction," which summarized 220 audits and 170 inspection reports over nearly a decade and "painted a very grim picture of our ability to adequately plan, execute, and oversee large-scale stability and reconstruction operations."

Water treatment

Water projects resulted in "some of the costliest US-funded reconstruction efforts in the entire program," the report noted. Indeed, three treatment plants throughout the country cost the US government a total of \$545 million.

The goal of the Coalition Provincial Authority (CPA) goal was to increase access to drinkable water to 90 percent of Iraqis. The State Department later determined "these goals to be unrealistic, because there was no baseline data on Iraq's water and sanitation infrastructure," the special inspector general (SIGIR) found.

As a result, in Fallujah, for example, a \$30 million project tripled in cost to nearly \$100 million, and only reached one-third of the homes it was originally intended to serve.



In 2005, the US government partnered with the Iraqi government to improve a dam in the northern Iraq city of Mosul, funding 21 contracts worth \$27 million. When SIGIR inspectors visited the dam in 2007, they found that the project was poorly designed and that \$19 million worth of equipment bought to improve the dam wasn't being used.

Sons of Iraq

The widely hailed Sons of Iraq (SOI) program, which paid former Sunni insurgents to lay down their arms beginning in 2007, was one of the Pentagon's most widely funded programs. The US military used what were known as Commanders' Emergency Response Program (CERP) funds to pay chiefs to keep their people off the battlefields.

The CERP contracts amounted to 780 separate agreements calling for the stationing of 100,000 Sunnis across Iraq, for a total of \$370 million in CERP funds. The workers were supposed to take jobs "providing security for buildings, checkpoints and battlefield."

Yet the contracting process "was far from transparent," SIGIR noted. "Program managers could not tell whether SOI members received their US-funded salaries, and Defense was unable to provide any evaluations of the program's outcomes."

In short, it concluded, "Financial controls were weak."

Children's hospital

This was the largest individual health-care construction project, which USAID awarded to the defense contractor Bechtel in 2004 for \$50 million. The hospital was supposed to be a state-of-the-art pediatric cancer-treatment facility.

"Work moved slowly," however, according to the SIGIR report. "Deteriorating security, bad site conditions, and poor contractor performance pushed up costs and pushed out the completion date."

By 2008 the contract had been terminated. The hospital was completed with new funds in 2010 and opened for "limited treatment," with standards far below the original state-of-the-art visions for a project that would eventually cost the US government \$165 million.

First responder network

In March 2004, the US government decided to help contribute to an "advanced first responder network" in Iraq, and ultimately spent more than \$192 million to do it.

A 2006 SIGIR audit found, however, that the project had "failed to produce a reliable" system, largely because the "network's command and control system did not provide an effective means for dispatching and directing first responders."



The good news was that a SIGIR audit helped encourage the contractor to remedy many deficiencies of the system, and a 2012 whistle-blower lawsuit meant that the contractor reimbursed the US government \$4 million after it was found guilty of submitting false testing certifications designed to mislead the US Army about the effectiveness of the system.

Building Iraqi security forces

In examining contracts awarded to build the Iraqi Army, totaling \$628 million, SIGIR found that several of them had been modified 161 times, "which added \$420 million to the contracts' cost," the report noted.

SIGIR auditors also found that many contractors never provided documentation to support their reported costs, and that when they did, the "financial data on purchases did not reconcile."

Although some contracts provided logistics support to the Iraqi Army, "the effort fell well short of achieving the goal of training Iraqi Army personnel to maintain their equipment," SIGIR found. Today, it concludes, the culture of "Use it 'til it breaks' lives on."

"Rebuilding Iraq: Final report card on US efforts highlights massive waste", 12/07/2013, online at: http://www.csmonitor.com/USA/Military/2013/0712/Rebuilding-Iraq-Final-report-card-on-US-efforts-highlightsmassive-waste

BACK TO TOP



Syrian refugees and the water problem in refugee camps

The effects of the Arab Spring in Syria have been observed in the country since March 2011.

Due to the unstable environment in the country, Syrian citizens began to flee to neighboring countries from April 2011. According to statistics from the United Nations High Commissioner for Refugees (UNHCR), 1.2 million people have taken shelter in Turkey, Lebanon, Jordan and Iraq. There are approximately 230,000 people who are still waiting to register.

The problem of water in refugee camps in Jordan has been mentioned in the press and in UN reports. In addition to this, the problem of access to water in refugee camps in Iraq has been on the agenda for two months. A total of 160,149 Syrian refugees have taken shelter in Iraq, according to the UNHCR figures from July 7, 2013. Some 100,000 Syrian refugees settled in Dohuk and its surrounding area, 40,000 of them in Arbil and the surrounding area, 15,000 of them in Sulaimaniya and the surrounding area, 5,000 of them in al-Anbar and the surrounding area, and the rest of them in various cities across Iraq -- approximately 500 refugees.

The Domiz refugee camp, located 20 minutes away from central Dohuk in northern Iraq, is the largest Syrian refugee camp in Iraq (and the only camp, according to certain sources). The water in the camp is provided by UNICEF. The number of residents at the refugee camp has tripled since December 2012. In the camp, which was built to accommodate 2,000 families, there are currently some 8,000 families, namely 40,000 people. This situation, exceeding the capacity of the camp, leads to major problems in meeting food, water and sanitation needs. In other camps and settlements, water is supplied by the Ministry of Displacement and Migration, which was established in 2004, and by the Rebuild Iraq Reconstruction Program (RIRP) in al-Anbar, while it is supplied by Qandil, a Swedish humanitarian aid and development organization, in Arbil and the surrounding area.

According to the UNHCR data, throughout the upcoming three months, temperatures will range between 23 and 35 degrees Celsius in Dohuk. July is predicted to be the month with the highest temperatures. There is generally no rainfall during this period. Rainwater storage, which could be an alternative water source for meeting the need for water, will not be possible because of the climatic conditions during the summer, when water is needed most. Another problem in the refugee camps is the lack of facilities to deal with wastewater, which can lead to hygiene problems and waterborne



diseases. While solutions are sought through common toilets, kitchens and septic tanks installed within the camp, wastewater flows out in the open in the additional sections of the camp which were built without proper planning.

In Jordan, on the other hand, the majority of refugees have settled in the camps in Zarqa and Mafraq. While there is a serious problem of a lack of water in Mafraq province, there is no water at all in some parts of the province. Some 170,000 refugees are staying at the Zaatri camp, the largest refugee camp in Jordan, which is located in Mafraq province. It is likely that the problem will worsen due to rising temperatures and the further expected migration from Syria. Except for drinking water, the water consumption per capita is estimated to be 53 liters per day. It is predicted that refugees who are not staying in camps, but instead have dispersed to other locations, consume 20-50 liters of water per day.

In Turkey, however, official figures show that there are 402,000 registered Syrian refugees. There are some 200,000 refugees in camps. In Turkey, where there are 16 refugee camps, some 200,000 Syrian people reside in cities. In Turkey, the refugee camps are set up under the control of the Disaster and Emergency Management Directorate (AFAD). It can be observed that there is no problem related to water supply and sanitation in these refugee camps.

In Jordan and Iraq, the capacity of the camps has been exceeded due to the rising number of refugees, and there are problems in meeting basic needs such as water and sanitation and the institutions responsible in those countries are falling short. New regulations regarding water and sanitation need to be made, the capacity of camps should be increased and new refugee camps should be set up. When the flow of migrants will end cannot be foreseen. In this regard, permanent solutions must be sought rather than temporary ones.

"Syrian refugees and the water problem in refugee camps", Tuğba Evrim Maden, Todays Zaman, 14/07/2013, online at: <u>http://www.todayszaman.com/news-320669-syrian-refugees-and-the-water-problem-in-refugee-camps.html</u>

BACK TO TOP



* The real threat to our future is peak water'

As population rises, overpumping means some nations have reached peak water, which threatens food supply, says Lester Brown

Peak oil has generated headlines in recent years, but the real threat to our future is peak water. There are substitutes for oil, but not for water. We can produce <u>food</u> without oil, but not without water. We drink on average four litres of water per day, in one form or another, but the food we eat each day requires 2,000 litres of water to produce, or 500 times as much. Getting enough water to drink is relatively easy, but finding enough to produce the ever-growing quantities of grain the world consumes is another matter.

Grain consumed directly supplies nearly half of our calories. That consumed indirectly as meat, milk, and eggs supplies a large part of the remainder. Today roughly 40% of the world grain harvest comes from irrigated land. It thus comes as no surprise that irrigation expansion has played a central role in tripling the world grain harvest over the last six decades.

During the last half of the twentieth century, the world's irrigated area expanded from close to 250m acres (100m hectares) in 1950 to roughly 700m in 2000. This near tripling of world irrigation within 50 years was historically unique. But since then the growth in irrigation has come to a near standstill, expanding only 10% between 2000 and 2010.

In looking at water and our future, we face many questions and few answers. Could the world be facing peak water? Or has it already peaked?

Farmers get their irrigation water either from rivers or from underground aquifers. Historically, beginning with the Sumerians some 6,000 years ago, irrigation water came from building dams across rivers, creating reservoirs that then enabled them to divert the water on to the land through a network of gravity-fed canals. This method of irrigation prevailed until the second half of the 20th century, where with few sites remaining for building dams, the prospects for expanding surface irrigation faded. Farmers then turned to drilling wells to tap underground water resources.



In doing so, they learned that there are two types of aquifers: those that are replenishable through rainfall, which are in the majority, and those that consist of water laid down eons ago, and thus do not recharge. The latter, known as fossil aquifers, include two strategically important ones, the deep aquifer under the North <u>China</u> Plain and the Ogallala aquifer under the US Great Plains.

Tapping underground water resources helped expand world food production, but as the demand for grain continued climbing, so too did the amount of water pumped. Eventually the extraction of water began to exceed the recharge of aquifers from precipitation, and water tables began to fall. And then wells begin to go dry. In effect, overpumping creates a water-based food bubble, one that will burst when the aquifer is depleted and the rate of pumping is necessarily reduced to the rate of recharge.

Today some 18 countries, containing half the world's people, are overpumping their aquifers. Among these are the big three grain producers – China, <u>India</u> and the US – and several other populous countries, including Iran, Pakistan and Mexico.

During the last couple of decades, several of these countries have overpumped to the point that aquifers are being depleted and wells are going dry. They have passed not only peak water, but also peak grain production. Among the countries whose use of water has peaked and begun to decline are <u>Saudi Arabia</u>, Syria, Iraq and Yemen. In these countries peak grain has followed peak water.

Nowhere are falling water tables and the shrinkage of irrigated agriculture more dramatic than in Saudi Arabia, a country as water-poor as it is oil-rich. After the Arab oil export embargo in 1973, the Saudis realised they were vulnerable to a counter-embargo on grain. To become self-sufficient in wheat, they developed a heavily subsidized irrigated agriculture based heavily on pumping water from fossil aquifers.

After being self-sufficient in wheat for over 20 years, the Saudis announced in early 2008 that, with their aquifers largely depleted, they would reduce wheat planting by one-eighth each year until 2016, when production would end. By then Saudi Arabia projects it will be importing some 15m tonnes of wheat, rice, corn and barley to feed its 30 million people. It is the first country to publicly project how aquifer depletion will shrink its grain harvest.

Syria, a country of 22 million people riddled by civil war, is also overpumping its underground water. Its grain production peaked in 2001 and during the years since has dropped 32%. It, too, is becoming heavily dependent on imported grain.



In neighboring Iraq, grain production has plateaued over the last decade. In 2012 it was dependent on the world market for two-thirds of its consumption. In addition to aquifer depletion, both Syria and Iraq are also suffering from a reduced flow in the Tigris and Euphrates rivers as upstream Turkey claims more water for its own use.

In Yemen, a nation of 24 million people that shares a long border with Saudi Arabia, the water table is falling by roughly six feet a year as water use outstrips aquifer recharge. With one of the world's fastest-growing populations and with water tables falling throughout the country, Yemen is fast becoming a hydrological basket case. Grain production has fallen by nearly half over the last 40 years. By 2015, irrigated fields will be a rarity and the country will be importing virtually all of its grain. Living on borrowed water and borrowed time, Yemen could disintegrate into a group of tribal fieldoms warring over water.

Thus in the Arab Middle East the world is seeing the collision between population growth and water supply at the regional level. For the first time in history, grain production is dropping in a geographic region with nothing in sight to arrest the decline. Because of the failure of governments in the region to mesh population and water policies, each day now brings 9,000 more people to feed and less irrigation water with which to feed them.

Other countries with much larger populations are also near or beyond peak water. In Iran, a country with 77 million people, grain production dropped 10% between 2007 and 2012 as irrigation wells started to go dry. One-quarter of its current grain harvest is based on overpumping. With its population growing by a million people per year, it, too, faces a day of reckoning.

Pakistan, with a population of 182 million that is growing by 3 million per year, is also mining its underground water. Most of its irrigation water comes from the Indus river system, but in the Pakistani part of the fertile Punjab plain, the drop in water tables appears to be similar to the better-known fall that is occurring in India.

Observation wells near the twin cities of Islamabad and Rawalpindi showed a fall in the water table between 1982 and 2000 that ranged from three to six feet a year. In the Pakistani province of Balochistan, which borders Afghanistan, water tables around the capital, Quetta, are falling by 3.5 metres (11.5 feet) per year – pointing to the day when the city will run out of water. Sardar Riaz A



Khan, former director of Pakistan's Arid Zone Research Institute in Quetta, reports that six of Balochistan's seven basins have exhausted their groundwater supplies, leaving their irrigated lands barren.

In a World Bank study, water expert John Briscoe says: "Pakistan is already one of the most waterstressed countries in the world, a situation which is going to degrade into outright water scarcity due to high population growth." He then notes that "the survival of a modern and growing Pakistan is threatened by water."

In Mexico – home to a population of 122 million that is projected to reach 156 million by 2050 – the demand for water is outstripping supply. Mexico City's water problems are well known. Rural areas are also suffering. In the agricultural state of Guanajuato, the water table is falling by six feet or more a year. In the north-western wheat-growing state of Sonora, farmers once pumped water from the Hermosillo aquifer at a depth of 40 feet. Today they pump from over 400 feet. Mexico may be near peak water use. Peak grain may be imminent.

In addition to these small and midsize countries, aquifer depletion now also threatens harvests in the big three grain producers – China, India and the US – that together produce half of the world's grain. The question is not whether water shortages will affect future harvests in these countries, but rather when they will do so.

Among the big three, dependence on irrigation varies widely. Some four-fifths of China's grain harvest comes from irrigated land, most of it drawing on surface water, principally the Yellow and Yangtze rivers. For India, three-fifths of its grain is irrigated, mostly with groundwater. For the US, only one-fifth of the harvest is from irrigated land. The bulk of the grain crop is rain-fed, produced in the highly productive Midwestern Corn Belt where there is little or no irrigation.

Falling water tables are already adversely affecting harvest prospects in China, which rivals the US as the world's largest grain producer. A groundwater survey released in Beijing in 2001 indicated that the water table under the North China Plain, an area that produces half of the country's wheat and a third of its corn, was falling fast. Overpumping has largely depleted the shallow aquifer, forcing well-drillers to turn to the region's deep aquifer, which is not replenishable.



The survey reported that under Hebei Province in the heart of the North China Plain, the average level of the deep aquifer was dropping nearly 10 feet per year. Around some cities in the province, it was falling twice as fast. He Qingcheng, head of the groundwater monitoring team, notes that as the deep aquifer is depleted, the region is losing its last water reserve – its only safety cushion.

In 2010, He Qingcheng reported that Beijing was drilling down 1,000 feet to reach an aquifer, five times deeper than 20 years ago. His concerns are mirrored in the unusually strong language of a World Bank report on China's water situation that foresees "catastrophic consequences for future generations" unless water use and supply can quickly be brought back into balance.

As serious as water shortages are in China, they are even more alarming in India, where the margin between food consumption and survival is so precarious. In India, whose population is growing by 15 million per year, irrigation depends heavily on underground water. And since there are no restrictions on well drilling, farmers have drilled more than 21 million irrigation wells and are pumping vast amounts of underground water.

In this global epicenter of well drilling, pumps powered by heavily subsidised electricity are dropping water tables at an alarming rate. Among the states most affected are Punjab, Haryana, Rajasthan, and Gujarat in the north and Tamil Nadu in the south. In North Gujarat the water table is falling by 20 feet per year. In Tamil Nadu, a state of 72 million people, water tables are falling everywhere. Kuppannan Palanisami of Tamil Nadu Agricultural University noted in 2004 that 95% of the wells owned by small farmers have dried up, reducing the irrigated area in the state by half over the preceding decade.

India's grain harvest has been expanding rapidly in recent years, but in part for the wrong reason, namely massive overpumping. A World Bank study estimates that 15% of India's food supply is produced by mining groundwater. Stated otherwise, 175 million Indians are now fed with grain produced with the unsustainable use of water. As early as 2004, Fred Pearce reported in New Scientist that "half of India's traditional hand-dug wells and millions of shallower tube wells have already dried up, bringing a spate of suicides among those who rely on them. Electricity blackouts are reaching epidemic proportions in states where half of the electricity is used to pump water from depths of up to a kilometer."



As India's water tables fall, larger farmers are using modified oil-drilling technology to reach water, going as deep as 1,000 feet in some locations. In communities where underground water sources have dried up entirely, all agriculture is now rain-fed and drinking water must be trucked in. Tushaar Shah of the International Water Management Institute says of India's water situation: "When the balloon bursts, untold anarchy will be the lot of rural India."

In the US, farmers are over-pumping in the Great Plains, including in several leading grain-producing states such as Texas, Oklahoma, Kansas, and Nebraska. In these states, irrigation has not only raised wheat yields but it has also enabled a shift from wheat to corn, a much higher-yielding crop. Kansas, for example, long known as the leading wheat state, now produces more corn than wheat.

Irrigated agriculture has thrived in these states, but the water is drawn from the Ogallala aquifer, a huge underground water body that stretches from Nebraska southwards to the Texas Panhandle. It is, unfortunately, a fossil aquifer, one that does not recharge. Once it is depleted, the wells go dry and farmers either go back to dryland farming or abandon farming altogether, depending on local conditions.

In Texas, a large grain and cattle state, whose northern part overlies the shallow end of the Ogallala, irrigated grain area peaked in 1975. Since then it has shrunk by two-thirds, with the most precipitous drop in recent years. In Kansas the peak came in 1982 and irrigated grain area has since fallen 41%. Nebraska, now also a leading corn-producing state, saw its irrigated area peak most recently, in 2007. Even though aquifer depletion is reducing grain output in several key states, it is not yet sufficient to reduce the overall US grain harvest, the bulk of which is produced in the rain-fed Midwestern Corn Belt.

At the international level, water conflicts, such as the one in the Nile river basin between Egypt and the upstream countries, make the news. But within countries it is the competition for water between cities and farms that preoccupies political leaders. Indeed, in many countries farmers now face not only a shrinking water supply as aquifers are pumped dry, but also a shrinking share of that shrinking supply.

In large areas of the US, such as the southern Great Plains and the Southwest, virtually all water is now spoken for. The growing water needs of major cities and thousands of small towns often can be



satisfied only by taking water from agriculture. As the value of water rises, more farmers are selling their irrigation rights to cities, letting their land dry up. Hardly a day goes by without the announcement of a new sale. Half or more of all sales are by individual farmers or their irrigation districts to cities and municipalities.

In the largest farm-to-city water transfer in U.S. history, farmers in California's highly productive Imperial Valley agreed in 2003 to send San Diego County enough water to meet the household needs of close to one million people each year. The agreement spans 45 years. This could reduce food production in the Imperial Valley, a huge vegetable garden not only for California, but for countless other markets as well. Writing from the area in the *New York Times*, Felicity Barringer notes that many fear that "a century after Colorado River water allowed this land to be a cornucopia, unfettered urban water transfers could turn it back into a desert."

Colorado, with a fast-growing population, has one of the world's most active water markets. Cities and towns of all sizes are buying irrigation water rights from farmers and ranchers. In the Arkansas river basin, which occupies the southeastern quarter of the state, Colorado Springs and Aurora (a suburb of Denver) have already bought water rights to one third of the basin's farmland. Aurora has purchased rights to water that was once used to irrigate 19,000 acres of cropland in the Arkansas valley. The US Geological Survey estimates that 400,000 acres of farmland dried up statewide between 2000 and 2005.

Colorado is not alone in losing irrigation water. Farmers in rural India are also losing their irrigation water to cities. This is strikingly evident in Chennai (formerly Madras), a city of 9 million on the east coast. As a result of the city government's inability to supply water to many of its people, a thriving tank-truck industry has emerged that buys water from nearby farmers and hauls it to the city's thirsty residents.

For farmers near cities, the market price of water typically far exceeds the value of the crops they can produce with it. Unfortunately the 13,000 privately owned tank trucks hauling water to Chennai are mining the region's underground water resources. As water tables fall, eventually even the deeper wells will go dry, depriving rural communities of both their food supply and their livelihood.

In the competition for water between farmers on the one hand and cities and industries on the other, farmers always lose. The economics do not favour agriculture. In countries such as China, where



industrial development and the jobs associated with it are an overriding national economic goal, agriculture is becoming the residual claimant on the water supply.

Where virtually all water has been claimed, cities can typically get more water only by taking it from irrigation. Countries then import grain to offset the loss of irrigated grain production. Since it takes 1,000 tonnes of water to produce one tonne of grain, importing grain is the most efficient way to import water. Thus trading in grain futures is, in a sense, trading in water futures. To the extent that there is a world water market, it is embodied in the world grain market.

We can now see how overpumping, whether in the Middle East or the US Great Plains, can lead to aquifer depletion and shrinking grain harvests. In short, peak water can lead to peak grain. For some countries this is no longer merely a theoretical possibility. It is a reality.

Thus far, aquifer depletion has translated into shrinking harvests only in smaller countries in the Middle East. When we look at middle-sized countries such as Iran, Mexico and Pakistan, with tightening water supplies, we see that Iran is already in deep trouble. It is feeling the effects of shrinking water supplies from overpumping. Pakistan may also have reached peak water. If so, peak grain may not be far behind. In Mexico, the water supply may have already peaked. With less water for irrigation, Mexico may be on the verge of a downturn in its grain harvest.

In summarising prospects for the three big grain producers – the US, China and India – we see sharp contrasts. In the US, the irrigated grainland is starting to shrink largely as a result of depletion of the Ogallala aquifer, making it more difficult to rapidly increase overall grain production.

China, with four-fifths of its grain harvest coming from irrigated land, relies heavily on irrigation, but it is largely river water. A notable exception to this is the all-important North China Plain which relies heavily on underground water. With tight water supplies in northern China and with cities claiming more irrigation water, the shrinking water supply will likely reduce the harvest in some local situations. And before long it could more than offset production gains, leading to an absolute decline in China's grain harvest.

Of the big three countries, the one most vulnerable to overpumping is India. Three-fifths of its grain harvest comes from irrigated land. And since only a minor share of its irrigation water comes from rivers, India is overwhelmingly dependent on underground water. Its millions of wells, each powered



with a diesel engine or electric motor, are dropping water tables at an alarming rate. Accurate data are hard to come by, but India may have already passed peak water. The question is, will peak water be followed by peak grain or is there enough unrealised technological potential remaining to raise yields enough to offset any imminent losses from wells going dry?

The world has quietly transitioned into a situation where water, not land, has emerged as the principal constraint on expanding food supplies. There is a large area of land that could produce food if water were available.

Water scarcity is not our only challenge. Just as harvests are shrinking in some countries because of aquifer depletion, they are shrinking in other countries because of soil erosion. Among the more dramatic examples are Mongolia and Lesotho, which have each seen their grain area shrink as a result of soil erosion. And as a result of overplowing and overgrazing, two huge new dust bowls are forming in the world today, one in northwest China and the other in the Sahelian region of Africa. These giant dust bowls dwarf the US Dust Bowl of the 1930s.

The bottom line is that water constraints – augmented by soil erosion, the loss of cropland to nonfarm uses, a plateauing of yields in major producing areas, and climate change – are making it more difficult to expand world food production. The question raised is this: Is it conceivable that the negative influences on future food production could one day offset the positive ones, leading to a cessation in the world grain harvest?

Lester Brown is president of the Earth Policy Institute and author of <u>Full Planet, Empty Plates: The</u> <u>New Geopolitics of Food Scarcity</u> (WW Norton 2012)

"The real threat to our future is peak water", 06/07/2013, online at: <u>http://www.guardian.co.uk/global-development/2013/jul/06/water-supplies-shrinking-threat-to-food</u>

BACK TO TOP



World Water Wars: In The West Bank, Water Is Just Another Conflict Issue For Israelis And Palestinians

GHUWEIN AL FAUQA, West Bank -- Traveling along Road 60 as it winds south from Jerusalem into the heart of the West Bank, one sees the hurdles faced by Palestinians as they try to go about their daily lives.

One day in June, as traffic whizzed past Hebron, dozens of schoolchlidren were swarming the road's narrow shoulders on their afternoon walk home from school. It is dangerous to walk on the edges of this busy road, but the Israeli Civil Administration, which is in charge here as it has been since the 1995 Oslo accords of all land included in the so-called Area C of the West Bank, has never approved a school bus service on this route.

A few hundred meters ahead, firefighters were at work on a grove of recently burned olive trees. All that remained were ashes. Angry Palestinian bystanders claimed that Jewish settlers had set the field on fire.

Skirmishes between Palestinians and settlers, including stone throwing on settlers' cars, have become a daily routine along Road 60, whose section between the Palestinian municipalities of Bethlehem and Hebron serves at least 75,000 settlers living in an expanding cluster of communities, including Betar Illit, Efrat and Gush Etzion.

Difficult as it is for Jews and Palestinians to share land, it is even more difficult to share the area's water resources.

This became evident as we travelled a dirt track from the main road to Ghuwein Al Fauqa, a Palestinian village at the southernmost tip of the West Bank.

Sixty people are scattered among makeshift homes of bricks, tin sheets and tarpaulins. Until 2006, 40 households owned fields and grazing lands in the valley below. But that year their land was partially seized by the Israeli government to build the fence which separates the village from Israel.



Since then, military restrictions have made life so difficult that many farmers and herders left the village; now, only nine families remain. Electricity comes from a gasoline-powered generator subsidized by the nearby municipality of As Samu'a. There are no water pipes in the village. Instead, water must be bought from the Israeli national water company, Mekorot, and trucked from a filling station to the village.

According to a report published by the World Bank in 2009, this is the everyday reality for about 10 percent of the more than 2 million people living in the West Bank.

Yellow tankers parked outside the tents are the only source of water for domestic use in Ghuwein Al Fauqa. At a price of 200 shekels per 3.75 cubic meters (roughly \$55 per 1,000 gallons), boosted by transportation fees, water does not come cheap for the people of the village.

"We try to save it, by washing clothes every three days, for example, or by feeding the animals the rainwater collected in the cisterns during winter months. But it is never enough," said Abu Saqer, 51, a herder and father of 10.

With the help of an Italian NGO, Gruppo di Volontariato Civile, and funds from the European Union, five old cisterns have been rehabilitated and a few new ones dug to make the best out of the 20 days (or 200 mm) of rain falling yearly in this dry area bordering the Negev Desert.

For his family and himself, though, Saqer must rely solely on water tankered to the village every eight days. This amounts to 39 liters per day per person (l/d/p), far below the 100 l/d/p considered an optimal supply by the World Health Organization. It's also expensive for someone who earns an unstable income of 1,000 to 3,000 shekels per month; Saqer said he spends at least 10 percent of his monthly income on water, and up to 50 percent when things are bad.

"Of course we would need more water, and cheaper water, to expand the crops or to set up greenhouses. Unfortunately in summer the municipalities of As Samu'a, Yatta, Dura and Hebron get a bigger share of the water supplied by the Palestinian authorities. So, often I have to buy water from a filling point that is farther away and that costs more, 50 shekels instead of 5 per cubic meter," said Saqer, sitting on the bare concrete floor next to a dusty, broken TV set.



But his plight is not just the product of Israeli presence on the West Bank, which began with Israel's victory in the 1967 Six-Day War. "The main reasons for our situation are the Israeli occupation and the poor management of the existing resources by the Palestinian authorities," Saqer said.

Even Worse In Gaza

Water in the West Bank comes from the so-called Mountain Aquifer, which includes two basins shared with Israel proper, the Northern and the Western, and one entirely included in the West Bank, the Eastern basin. According to the 1995 Oslo II agreement, Palestinians would have the right to draw 118 million cubic meters (mcm) of water from the estimated 679 mcm of water that flow annually into those aquifers. Article 40 of the agreement also established an additional 28.6 mcm to be supplied every year by Israel to the West Bank and Gaza. It quantified as well the "future needs" of Palestinians at 70 to 80 mcm per year, to cope with population growth.

The agreement did not include other water sources the Palestinians would have been entitled to as downstream users, like the Coastal Aquifer or the Jordan River, to which they have no access today. And according to the World Bank, Palestinians in the West Bank have drawn between 117 to 138 mcm from 1995 to 2007, less than the water allocated to them by the Oslo agreements.

As for the Gaza Strip, the emergency has already entered a critical stage, with only 5 percent to 10 percent of the local aquifer now yielding drinking-quality water. Things are not so bad in the West Bank, at least on paper.

"In the West Bank there is no drought, as aquifers are replenished by rainfall. The amount of groundwater would be enough for personal and agricultural needs, if [it was] not controlled by Israel," said Ayman Daraghmeh, an independent water expert and consultant in Ramallah.

"The Oslo Agreements were supposed to be reviewed after five years within a permanent solution to the conflict, and so the water-sharing arrangement would have been reviewed. It never happened. On top of this, pursuant to the agreements, every water-related project has to be approved by the Joint Water Committee (JWC), and in the case of Area C, also by the Israeli Civil Administration. This mechanism has proved to be an additional constraint," he added.



The JWC has an equal number of Israeli and Palestinian members and makes decisions by consensus. A report published last year by the University of Sussex analyzed the working documents produced between 1995 and 2008 by the JWC.

According to the report's findings, the JWC approved no more than 66 percent of Palestinian applications for new wells and approximately 50 percent of those for supply pipes. Projects submitted by Israel for settlements in the West Bank enjoyed 100 percent approval.

While some Palestinian projects might have been rejected on the basis of feasibility or technical faults, the report revealed there may have been a political bias in the JWC's decisions. For example, whereas 85 percent of Palestinian applications for new productive wells in the Eastern Basin were approved, all similar applications for the Western Basin, which Israel considers critical to its own water security, were rejected.

Israel's control over water resources is even greater in Area C, which includes Ghuwein Al Fauqa and most of the West Bank. Every project in Area C approved by the JWC must obtain a final permit from the Israeli Civil Administration.

The Politics Of Sewage

According to Ewash, a group of 30 organizations working on water and sanitation in the Palestinian Territories, 59 water structures have been demolished in the West Bank since January 2009, due to a lack of building permits.

"This situation could be improved by treating sewage, but Israelis say they grant permits to new plants only if Palestinians agree also to treat the settlements' wastewater. But to us it would mean legitimization of the settlers' presence in the West Bank," said Jane Hilal, environment unit director at ARIJ, a Palestinian NGO in Bethlehem.

As a result, more than 50 percent of water used in the West Bank by Palestinians is purchased from Mekorot at great cost. Even so, Palestinians enjoy, on average, one-quarter of the water consumed by Jewish settlers and pumped from the same Western Aquifer that should be shared under the Oslo II Agreement.



"We do not expect any water shortage this summer or any problem in the supply, which amounts to 2 mcm per year," said Davidi Perl, mayor of the Gush Etzion regional council.

Each of the 20,000 residents of Gush Etzion has access to around 273 liters of water per day, seven times the amount available a few kilometers (miles) south to the residents of Ghuwein Al Fauqa.

"I think it is a shame that our Arab neighbors do not have enough water. Every person should have enough to live. But as far as I know they do not pay and so do not get water," said Mayor Perl.

Indeed, business mismanagement and poor bill collection by Palestinian authorities is acknowledged by several international studies as one of the reasons behind the current water crisis in the West Bank and Gaza.

According to Israel, this is the main, if not the only, reason for the crisis.

"We sit on the same aquifer and we do not want to see it being ruined as it has happened in Gaza because of thousands of illegal drillings. Instead of blaming Israel for everything, the Palestinian authority should treat sewage to obtain 40 mcm per year to use for agriculture. Most importantly, they should fix their water pipes in the urban areas, which have a leaking rate of 33 percent," said Colonel Grisha Yakubovich, head of the Civil Coordination Department at the Coordination of Government Activities in the Territories (COGAT).

"Many things could be done and should be done, including desalinating seawater, the best resource of all. But come on, Palestinians should take responsibility, that's all. We can do more, but they can do much more," Yakubovich said.

COGAT said that at the end of June, Israel would begin supplying an extra 8000 cubic meters of water per day to the Palestinian municipalities of Bethlehem, Hebron, Jenin and Ramallah.

Deemed as a gesture of good will, after lengthy negotiations, this move may actually make the Palestinians even more dependent on Israel's water supply, instead of expanding their own resources.



WATER RESEARCH PROGRAMME -Weekly Bulletin-

Yet, it seems everybody in the West Bank knew that this crisis might be coming, as a consequence of the Oslo peace accords. When faced with the risk of losing any political agreement with Israel because of the disagreement on water, the late Palestinian leader Yasser Arafat decided to give up on water.

He hoped to be able to successfully renegotiate the Oslo accords after five years, as agreed with Israel. It never happened. And almost 20 years later, Palestinians are left with little water and even fewer prospects for peace.

"World Water Wars: In The West Bank, Water Is Just Another Conflict Issue For Israelis And Palestinians", 12/07/2013, online at: <u>http://www.ibtimes.com/world-water-wars-west-bank-water-just-another-conflict-issue-israelis-palestinians-1340783#</u>

BACK TO TOP



✤ Johnston Gets Instructions on Israel-arab Waterdevelopment Plan

Eric Johnston, President Eisenhower's special envoy to the Middle East, received today last minute instructions on the Israel-Arab water development plan from Secretary of State John Foster Dulles. Mr. Johnston is scheduled to leave for the Middle East on July 28. He will visit all the Arab states and Israel. He refused to elaborate on the details of his trip. This is his fifth visit to the Middle East in the capacity of special negotiator between the Israelis and the Arabs on the American plan to develop the waters of the Jordan River for the benefit of the countries involved.

An official of the International Cooperation Administration repeated the position of the Eisenhower Administration that the Johnston Plan for Jordan River water utilization is a key to settlement of the Arab-Israel dispute, it was revealed here today when his testimony on the Mutual Security appropriation bill was released.

Cedric H. Seager, Regional Director for Near East and African Operations, testified that during the past year the United States has maintained a sustained drive "to obtain an understanding for the division of the waters of the Jordan by the countries concerned on an agreed basis for their storage, their control along economic lines, and for arrangements to insure their equitable distribution."

Mr. Seager asserted that the conclusion of an agreement on the Jordan waters "will offer considerable prospect for the rehabilitation of refugee populations, and it would open up new areas for settlement in Jordan." In his testimony before the House Appropriations Committee Mr. Seager observed that the animosity between the Arab states and Israel has not yet abated. He explained that U.S. policy has been "to keep secret" the aid allocated to individual countries, "thus providing the United States Government the maximum amount of flexibility in the actual implementation of the program."

The ICA official testified that the economic situation in Israel "is much improved." He observed that German reparations are providing funds for part of Israel's economic development program, but that "United States aid is still required" to maintain this development effort.

"Johnston Gets Instructions on Israel-arab Waterdevelopment Plan", 12/07/2013, online at: http://www.jta.org/1955/07/12/archive/johnston-gets-instructions-on-israel-arab-waterdevelopment-plan

BACK TO TOP



City of Palestine to conduct second water system burnout in August

PALESTINE — The second of two water distribution burnouts is on the calendar, Palestine city officials reported this week.

City Utilities Director Robert Sedgwick told the Palestine City Council earlier this week, the water department's first water distribution burnout, implemented in January, was a success and he'd like to repeat the process again in August.

According to city officials, a distribution system burnout is accomplished by eliminating the ammonia from regular treatment. Turning the ammonia off produces a free chlorine residual which effectively kills any bacterial growth that could be living within the distribution system.

Such build up could cause taste, odor and discoloration in the city's drinking water. The process is also needed to remove lingering ammonia residue from the water.

"We normally use a chlorine-ammonia mix, which makes (the chemicals) more stable and lasts longer," Sedgwick said. "During a burnout, we only use chlorine, which is just as effective and not as long-lasting. The water will be still just as safe for consumption during a burnout as it is during regular treatment."

The procedure was recommended by Texas Commission on Environmental Quality to help the city achieve and maintain the state-mandated chemical and bacterial levels in its drinking water, which the city has historically had trouble with, despite utilizing a flushing program to help combat the problem.

Initial test results and reports indicate the first burnout process was successful.

Sedgwick said Thursday TCEQ officials have extended an invitation to Palestine's Utilities Department officials to discuss the process with other cities during an upcoming school.

"A lot of cities are afraid to try this for upsetting the customers," he said. "I was quite surprised we had so few complaints. We did have a few, but not nearly as many as anticipated. I don't anticipate a lot of problems this second time."

Sedgwick said most of the complaints his staff did receive pertained to a chlorine smell in the water.

Sedgwick told council members on Monday he'd like to see the city subscribe to a twice-a-year schedule.



The next burnout is scheduled to begin Friday, Aug. 8, and would conclude on Aug. 31. Residents may experience possible chlorine smell and red water – most likely during the first week of the process.

If any Palestine water customers experience red water, they may pick up a product called Red-Be-Gone for free at the Public Works Utilities office in the City Hall Complex, 310 Debard St.

According to the city's website, Palestine's Utilities Department is comprised of Water Treatment, Wastewater Treatment, Water Distribution, Wastewater Collection, Compliance Monitoring, and Engineering.

The Water Distribution Department services an estimated 275 miles of water lines. The Compliance Monitoring Department is responsible for the testing of drinking water for human consumption and the pretreatment of water from major contributors with guidelines for sampling, testing, and reporting criteria.

Monthly discharge reports show information for daily, weekly, and monthly testing and are generated from the department to satisfy requirements by the state of Texas and the Environmental Protection Agency (EPA).

"City of Palestine to conduct second water system burnout in August", 12/07/2013, online at: http://palestineherald.com/local/x1952120420/City-of-Palestine-to-conduct-second-water-system-burnout-in-August

BACK TO TOP



* Action plan seeks to end random pumping from Azraq Basin

AMMAN — The Ministry of Water and Irrigation on Monday finalised an action plan to manage usage of water from the Azraq Basin, where the annual pumping is currently more than double the aquifer's safe yield.

The action plan, which was finalised during the 11th meeting of the Highland Water Forum, entails several measures to end random pumping from the Azraq Basin, Ministry of Water and Irrigation Secretary General Bassem Tulfah said.

The first pillar of the action plan will reinforce government institutions' capacity to uncover illegal practices and activate related laws, and the second pillar will work on raising water-use efficiency at farms in Azraq to increase revenue, while reducing the amount of water consumed for irrigation, Tulfah underscored.

In addition, the action plan will secure new investment opportunities for farmers who wish to abandon agriculture, he said, noting that these opportunities will serve as alternative to cultivation and will not rely on water consumption.

"The fourth pillar is raising the awareness of the local community about Jordan's water problems, especially in the Azraq Basin, where annual pumping is 215 per cent above the aquifer's annual natural recharge capacity," Tulfah noted.

Launched in 2010, the Highland Water Forum seeks to achieve sustainable management of underground basins in highlands, from which 500 million cubic metres of water are being extracted annually, equalling double the amount of safe pumping limits.

The forum, which includes farmers, ecologists and lawmakers, started working on the Azraq Basin, which is located east of Amman. Spread over 15 per cent of the country's terrain, the basin provides the capital with a quarter of its drinking water needs.



More than 60mcm of water are currently being pumped from the basin on an annual basis for drinking and irrigation, while it produces only 20mcm annually.

The excessive extraction of water from the wetland has caused water levels to drop by 12-15 metres below ground level, according to environmentalists.

Official figures indicate that there are around 12 renewable and non-renewable aquifers in Jordan, such as Disi and Al Jafer, spread over an area of 633-1,856 square kilometres.

Several main underground aquifers have already dried up and others are on the way to complete depletion. Al Duleil aquifer is now completely dry, Al Jafer is almost dry after eight years of pumping, while the Azraq aquifer is expected to run out of water in 15 or 20 years if random pumping continues, according to water experts.

"Action plan seeks to end random pumping from Azraq Basin", 09/07/2013, online at: http://en.ammonnews.net/article.aspx?articleno=22162#.UeD3FdKe_PY

ВАСК ТО ТОР



State: water is the gold of the new millennium, says Valori

(ANSAmed) - TEL AVIV - Water is the gold of the new millennium and could lead to unrest and war just like oil does, Professor Giancarlo Elia Valori told a panel of experts at the launch of his new book titled 'The Geopolitics of Water' (Rizzoli) at the residence of Italian Ambassador Francesco Maria Talo'.

The international community must come up with "an efficient political regulation" of water on the global level, or risk having this precious resource become "the source of economic and political instability", the professor said.

"The world is getting more and more thirsty", while 12% of the world population uses 85% of "the planet's most precious good", said Valori, who discussed what is one of Israel's main assets with President Shimon Peres earlier today.

"A US citizen uses 425 liters of water a day, Italians use 237 and the French use 150 liters. In Madagascar, that figure is 10 liters a day", he pointed out. "This is a scenario of unprecedented wasted on the one hand and endless scarcity on the other". Studies show there will be 3.5 billion people without direct access to water by 2025: "an enormous water crisis" caused by ecological devastation, pollution, reduced rainfall, deforestation, desertification, privatizations and waste. There will be a new "gold rush", Valori said, that will further disenfranchise the poor and the southern regions of the world. "One of the ways out is to desalinize sea water", Valori explained. As Israel is doing, explained Booky Oren, president and CEO of Global Water Technologies, which supplies 70% of the country's water thanks 30 desalination to plants. Water is "a global challenge" and conflicts over it are already taking place between "the US and Mexico, Iran and Turkey, China and Russia". Israel has solved the problems of the past, Oren said. "The new conflicts will not be over water.

We have gone from water collection to producing it outright, thanks to avant-garde technology". Italy



WATER RESEARCH PROGRAMME -Weekly Bulletin-

being Israel's second trading partner, this technology could be leveraged to great advantage if Italy were willing to take on sector leadership in Europe. "Israel can support Italy in this field", he proposed. The Italian ambassador welcomed the idea, saying it should be put on the bilateral agenda. His next book, said Valori, will be about food and how its rising prices could lead to a global systemic collapse if left uncurbed. (ANSAmed).

"Israel: water is the gold of the new millennium, says Valori", 08/07/2013, online at: <u>http://www.ansamed.info/ansamed/en/news/sections/generalnews/2013/07/08/Israel-water-the-gold-the-new-millennium-says-Valori_8993694.html</u>

BACK TO TOP



Slocum issues water restrictions, Palestine reviews drought plans

PALESTINE — Water, water everywhere? Not lately for East Texas and unfortunately, that doesn't look to be changing anytime soon, causing some area water suppliers and city officials to start eyeing ways to save.

On Friday, Slocum Water Supply officials issued a Stage 1 Water Restriction, curtailing all outside watering between the hours of 3 p.m. and midnight, until further notice.

"What this means is that we have enough water resources, we are just asking that all Slocum WSC customers restrict their outside watering," corporation President Howard Calloway stated in the notice declaring the restriction. "These hours are what we consider the peak hours of the day when everyone is getting home and doing the daily chores indoors."

Not only does the restriction help conserve water, WSC officials said the restriction could help alleviate potential water pressure problems.

Corporation reports indicate it has continually maintained the mandatory water pressure required by the Texas Commission of Environmental Quality at each residence.

"We are just asking that everyone please conserve water to avoid going into a more restricted stage," Calloway continues in his statement.

During this restriction, WSC officials will be monitoring the system. Anyone caught watering during these hours could face up to a \$500 fine or even water service termination.

"We would like to thank everyone in advance for your cooperation in this matter," Calloway stated.

Palestine council members also discussed phase I of the city's drought management plan during the workshop portion of their regular meeting held July 8, but took no action at the time on implementing any part of phase I.

"I wanted to bring it to the Council's attention," Palestine Utilities Director Robert Sedgwick said Friday. "It's a good time to review it. We've never had to issue any water restrictions, and hopefully we never have to.



"We're very fortunate to have plenty of water, but as the city grows we'll have to plan for when our usage begins to exceed our capacity. And it's never a bad idea for all of us to start to conserve water anywhere and any time we can."

Sedgwick said earlier in June the city did experience a minor water shortage, due to some mechanical issues, but those problems have since been rectified.

"Slocum issues water restrictions, Palestine reviews drought plans", 13/07/2013, online at: <u>http://palestineherald.com/local/x1538941449/Slocum-issues-water-restrictions-Palestine-reviews-drought-plans</u>

BACK TO TOP



Sudan backs Ethiopian dam project

Sudan supports the construction of an Ethiopian dam on the River Nile, according to Sudanese Irrigation and Agriculture Minister Abdulhalim Al-Mutaafi on Sunday.

Mutaafi's remarks have been understood as confirmation of Sudan's earlier position on the Grand Renaissance Dam, located 40 kilometres inside Ethiopian territory from the Sudanese border. The dam is the largest built by Addis Ababa in the region.

"The tripartite dam investigative committee established by Ethiopia, Sudan and Egypt showed in its initial report that the dam's construction represents a positive development," the minister told English-speaking newspaper Sudan Vision.

Mutaafi said the dam presents a "model" of development for the region.

Addressing Egyptian concerns over the Renaissance dam project, the Sudanese minister claimed it was a political issue, not a technical one.

"Some Egyptian politicians have used the issue as a political tool to pressurize their opponents," he claimed

"It is known that the building of the dam will benefit downstream countries as it enables them to receive regulated free water."

In his first public endorsement of the project, Sudanese President Omar al-Bashir said last month that the Ethiopian dam will benefit Sudan and would not impinge on Egypt's share of Nile water.

In May Ethiopia made a surprise announcement that it planned to divert the course of the Blue Nile, marking the start of construction of the Grand Renaissance Dam.

Egypt says the dam will affect its share of Nile water and the ability of the Aswan High Dam, located in southern Egypt, to generate sufficient electricity.

A diplomatic stand-off between Egypt and Ethiopia ensued, although the issue has more recently attracted less attention following the overthrow of Egyptian President Mohamed Morsy and the formation of an interim administration brokered by the country's armed forces.

"Sudan backs Ethiopian dam project", 14/07/2013, online at: <u>http://www.egyptindependent.com/news/sudan-backs-ethiopian-dam-project</u>

BACK TO TOP



Ancient Egyptian River Could be Revived for Farming

Researchers from Al-Azhar University, Boston University and the University of North Carolina have discovered an ancient river that may be revived, in theory, to <u>irrigate Egypt's farm lands</u>.

Before Egypt became swept up in what one of my friends dubbed a "coupvelution," ousted <u>President</u> <u>Morsi got testy with Ethiopian government representatives</u> over Nile River water rights – the sole source of water for Africa's burgeoning population.

Ethiopia is pushing an intense agenda to improve its energy infrastructure with hydroelectric plants, including a plan to build the controversial <u>Grand Millenium Dam</u> thought by critics to be an inevitable environmental and social disaster.

Of course, these ambitions threaten Egypt's longstanding monopoly of the Nile River, even though its headwaters are in Ethiopia.

New research published on *Geomorphology* last month might take the pressure off.

"The desert of the Sinai Peninsula receives the most rainfall of any part of Egypt — around 304 millimetres annually — but most of it is of no benefit to agriculture, instead flowing out into the <u>Mediterranean Sea</u> in flash floods," according to *SciDev.net*, which interviewed the authors. Using satellite radar images, the research team mapped out where an ancient river used to drain the Wadi El-Arish valley – back in towards the desert, and then proposed a method to revive it.

They recommend constructing a two kilometer long, six meter deep channel that can be used to irrigate thirsty farms.

"Accessing that depression would allow its stored water to be used for agriculture," Farouk El-Baz, an author of the paper and director of the Center for Remote Sensing, told the paper.

The runoff during flash floods is expected to create a 1,400 square kilometer tract of fertile land west of Gebel Halal, which is said to offer other ideal conditions for potential farmers.



At something of a political standstill, Egypt is unlikely to begin any new infrastructure projects just yet; *SciDev* reported on June 26th that the government is assessing the project, but it seems prudent to wonder who, if anyone, is currently calling the shots?

Meanwhile, one should keep an eye on Ethiopia, which could attempt to take advantage of its neighbors woes to push its own agenda throughout the Nile River basin.

"Ancient Egyptian River Could be Revived for Farming", 09/07/2013, online at: http://www.greenprophet.com/2013/07/ancient-egyptian-river-farming/

BACK TO TOP



* Egypt, Ethiopia and the diplomatic dam busters

As rhetorical battles raged last month, with analysts providing doomsday forecasts of an imminent water war, it was hightime someone poured a few gallons of realism on the Egypt-Ethiopia River Nile affair.

As pressure from local opposition mounted in June, Egypt's President Mohammed Morsi sought to hit on a useful nationalist diversion in defending the sacred Nile.

The now ousted Morsi's foreign minister, Mohamed Kamel Amr, said he would not surrender "a single drop" in negotiation over Ethiopia's \$4.2bn Grand Renaissance Dam.

But Ethiopia's energy minister, Alemayehu Tegenu, insisted it will take five to six years to fill the dam, stretching it out so that it will have minimal effects on Egypt and Sudan.

A negotiating team, including Egypt, Sudan and Ethiopia, commissioned an independent panel to assess the effects of the dam on the Nile.

After a year of research, it concluded that the dam would not significantly affect Egypt or Sudan.

Television viewers were left in no doubt in early June about Egyptian politicians' views.

A supposedly secret meeting in President Morsi's office with top politicians was broadcast live – by mistake according to Morsi's cabinet director.

Those in attendance quickly reached agreement on the need to stop Ethiopia's dam.

They discussed tactics ranging from backing rebel movements, sending the air force on flyovers or even a bombing campaign.

The Ethiopian government immediately issued a protest to the United Nations Security Council. It was the second alarm over the dam this year.

In February, a comment by Saudi Arabia's deputy defence minister, Prince Khalid bin Sultan, at the Arab Water Council in Cairo, had also sparked a row.

"There are fingers messing with water resources of Sudan and Egypt which are rooted in the mind and body of Ethiopia. They do not forsake any opportunity to harm Arabs," Khalid bin Sultan said.

That outburst prompted Ethiopia's foreign ministry to call in Riyadh's ambassador to Addis Ababa, who proffered a quick disavowal from King Abdullah.

In April, King Abdullah replaced Prince Khalid with Prince Fahd bin Abdullah.



The Saudi reaction might suggest the delicacy of the Nile waters issue at a time of otherwise strong African-Arab relations.

Even the oil-rich Middle East doesn't want to be squeezed out of Africa's rising economies.

It might also have helped that one of the biggest investors in Ethiopia is the multi-billionaire Mohammed Al Amoudi, who has joint Saudi-Ethiopian citizenship.

Or it may mean both sides are still shadow boxing in the great fight for the Nile. •

"Egypt, Ethiopia and the diplomatic dam busters", 11/07/2013, online at: <u>http://www.theafricareport.com/North-Africa/egypt-ethiopia-and-the-diplomatic-dam-busters.html</u>

BACK TO TOP



Ethiopian Renaissance Dam Expected to Yield Political and Economic Benefits for Sudan

The Grand Ethiopian Renaissance Dam, formerly known as the Millennium Dam, is an underconstruction gravity dam on the Blue Nile River in Ethiopia. It is in the Benishangul-Gumuz Region of Ethiopia, about 40 km (25 mi) east of the border with Sudan. At 6,000 MW, the dam will be the largest hydroelectric power plant in Africa when completed, as well as the 13th or 14th largest in the world sharing the spot with Krasnoyarskaya. The reservoir at 63 billion cubic meters will be one of the continent's largest. The potential impacts of the dam have been the source of regional controversy. The Government of Egypt, a country which relies heavily on the waters of the Nile, protests the dam and its political leaders have discussed methods to sabotage it.

Positive stance

Sudan's Minister of Information, spokesperson for the government, said that the dam will yield several benefits for Sudan, most importantly will increase the flow of water, which in turn will enrich the country farm lands during summer and winter seasons. According the spokesperson, when completed, the Renaissance Dam will contribute to increase Sudan's water reserves and reduce alluvium, which has a relative impact on the percentage of storing water in Sudanese reservoirs, especially in Ruseiris.

However, Egypt has serious concerns about the project therefore it requested inspection on the design and studies of the dam, in order to allay its fears, but Ethiopia denied the request unless Egypt relinquishes its veto on water allocation. After a meeting between the Ministers of Water of Egypt, Sudan and Ethiopia in March 2012, Sudan's President Bashir said that he supported the building of the dam.

The Egyptian Minister of Information called for the respect of Sudanese people because Sudan preserves the right to make its choices and defend its interests where they are. He called on the 11 members of The Nile Basin states to unite because the next war will be over waters. "Harmful contraversy will not serve interests," he continued.

Ethiopia's motives for constructing the Dam

The Ethiopian Ambassador in Khartoum Abade Zemo said during a symposium held at a Center for Future Studies "talking of the Renaissance Dam is talking about development in Ethiopia," focusing his speech on what he described as a "green economic strategy" aimed at addressing climate change and controlling immigration. Zemo said that Ethiopia seeks to improve living conditions for its



people.

Zemo, in an interview with Sudan News Agency, appreciated the real facts included in the address given by the President of the Republic, Field Marshal Omer Al-Bashir, at the recent meeting of the Shura Council of the National Congress concerning the establishment of the Ethiopian Renaissance Dam and its benefits for both Sudan and Ethiopia.

Interviewed by SUNA, the Ethiopian Ambassador also appreciated the genuine facts reflected by the Minister of Information, Dr. Ahmed Bilal, with regard to the establishment of Renaissance Dam.

He expressed his gratitude to the people of Sudan for their stand alongside the Ethiopian people regarding the construction of The Renaissance Dam and for their understanding to its importance for the development and combating poverty in the two countries. The Ethiopian Ambassador pointed out that neither Sudan nor Egypt will be affected by the establishment of the Renaissance Dam. He said that the establishment of the dam will enable Sudan to utilize its cultivable lands, enhance irrigation and obtain electricity from Ethiopia at a low and reasonable price, adding that the Renaissance Dam will lead to increasing the generated electricity power in Ethiopia.

Ambassador Zemo said that the establishment of the Renaissance Dam will make the Sudanese dams free from silt accumulation and floods, indicating that the establishment of the dam will guarantee regular and stable water flow throughout the year, providing larger quantities of water and reducing evaporation.

He said that the Renaissance Dam is being established through pure efforts of the government and people of Ethiopia without foreign assistance, adding that the studies for the construction of the dam were conducted by experienced international companies.

The Ethiopian Ambassador said that the Renaissance Dam is being established at an area which is free from volcanic activities, adding that it is located at an area which is 160 kilometers far from the Sudanese Ruseiris Dam.

He said that a committee composed of six experts, two from each of Egypt, Sudan and Ethiopia and



four independent experts, have carried out an assessment of the dam's project and submitted its final report on May 31, 2013 which affirmed the benefit of the Renaissance Dam to Ethiopia Sudan and Egypt.

Benefits

Benefits produced by the hydropower plant are to be sold in Ethiopia and to neighboring countries including Sudan and possibly Egypt. Selling the electricity from the dam would require the construction of massive transmission lines to major consumption centers such as Ethiopia's capital Addis Ababa and Sudan's capital Khartoum, which are both located more than 400 km away from the dam. These sales would come on top of electricity that is expected to be sold from other large hydropower plants that are under construction in Ethiopia, such as Gilgel Gibe III.

If the power plant is utilized permanently at full capacity the expected electricity production divided by the potential production - is only 33% compared to 45-60% for other, smaller hydropower plants in Ethiopia. Critics conclude that a smaller dam would be more cost-effective.

Egyptian Reaction and Condemnation

Angry Egyptian lawmakers accused the country's Prime Minister and government on Monday of doing nothing to prevent Ethiopia from completing a dam that threatens to leave Nile-dependent Egypt with a dangerous water shortage. The Former Egyptian Prime Minister Hisham Kandil was earlier reported to have called the dam's construction an "act of defiance" and stressed that Egypt will not give "a single drop of water," but then hurriedly left the chamber despite calls for clarification over how to handle the situation if Ethiopia rejects overtures.

"Egypt will turn into a graveyard" if the dam is completed, Geologist and Egyptian Lawmaker Khalid Ouda shouted to the parliament. "The prime minister didn't provide anything."

"We have to stop the construction of this dam first before entering negotiations," he said.

Egypt in the past has threatened to go to war over its "historic rights" to the waters of the Nile River. Last week, Egyptian political leaders caused uproar after proposing to aid rebels against the Ethiopian government or even sabotaging the dam itself. Ethiopia demanded an official explanation.

The Egyptian media outrage over the construction of the Dam has negatively affected the people who are accusing Ethiopia of seeking to destabilize their country. The ousted president Morsi had met



WATER RESEARCH PROGRAMME -Weekly Bulletin-

with political leaders for consultations to reach a common view. Shortly after the meeting, Mohamed Nour, a political figure, described Sudan's position on the controversial dam as "disgusting", remarks that evoked outrageous reaction by the Sudanese government and people, who categorically rejected the statement, saying such negative remarks will do no more than destroy historical relations between the two countries.

The deposed Egyptian government in a bid of apology said, Mr Nour's statement was personal and had nothing to do with the official position of the government. Many said the media's escalation regarding Ethiopia's dam is considered unjustifiable as the project will yield fruits in favor of the people of the three countries manifested in electricity as well as reducing alluvium, which cuts down the amount of water.

"Ethiopian Renaissance Dam Expected to Yield Political and Economic Benefits for Sudan",14/07/2013, online at: <u>http://news.sudanvisiondaily.com/details.html?rsnpid=224529</u>

BACK TO TOP



✤ Uganda criticizes Britain over the Nile waters agreement

The 1929 Nile Waters Agreement was signed between Egypt and Britain on behalf of Sudan and the East African countries who share the waters of Lake Victoria with the aim of increasing the volume of water flowing into Egypt. But analysts say this agreement was drawn in favor of Egypt and therefore neglecting the interests of other countries.

According to experts, the agreement has a clause that forbids any irrigation or power projects along the Nile without Egypt's consent since this could threaten the volume of water reaching Egypt.

The 1929 Nile Treaty spearheaded by Britain has now sparked controversy between Uganda, Egypt and Ethiopia.

The agreement for the construction of Uganda's Owen falls dam was also mediated by Britain through an exchange of notes with Egypt.

What is not clear is whether or not the agreements signed by Britain on behalf of Uganda and other littoral states who are using the Nile are still binding in international law, with Ugandan officials beginning to question Britain's interests in the affairs of Africa long after its colonization.

With the growing tension between Uganda, Egypt and Ethiopia over the use of the Nile, the question remains whether littoral states can use the river without necessarily taking into consideration the interests of other river users.

Despite the fact that States have the sovereign right to exploit their own resources, analysts say they also have a responsibility to ensure that activities within their jurisdiction do not cause damage to the environment of other States or areas beyond the limits of national jurisdiction.

Ugandan officials maintain that Britain should correct its own mess created way back during the colonization era if the conflict over the usage of the Nile is to be resolved amicably.

"Uganda criticizes Britain over the Nile waters agreement", 14/07/2013, online at: http://www.presstv.ir/detail/2013/07/10/313106/uganda-criticizes-britain-over-the-nile-waters-agreement/

BACK TO TOP



* Ethiopia Continues Dam Construction

ADDIS ABABA — Ethiopia and Egypt have been in a diplomatic dispute for weeks over the construction of what will be Africa's largest hydro-electric dam - impacting the waters of the Nile River. But with Egypt facing political turmoil at home, attention has also been diverted from this controversial project.

The massive construction of the Great Ethiopian Renaissance Dam continues despite sometimes angry protests from Egypt.

At issue is - diverting part of the Blue Nile since May.

The recently ousted Egyptian government feared the diversion would impact the Nile River flow - on which it is heavily dependent.

All of this will be a reservoir with 74 billion cubic meters of Nile waters. Ethiopia said it will gradually fill the reservoir in the coming years, leaving Egypt questioning how the reservoir can be filled without affecting the water flow, especially during periods of drought.

Simegnew Bekele, one of the dam's project managers, said better water management by both Egypt and Ethiopia will be the key. "The water will flow through these culverts permanently. That culverts will be part of the dam, which will be embedded, which will have gates and during any low flow the water will pass through the culverts because it will be installed at the normal riverbed level. We cannot change the normal riverbed level," he explained.

Ethiopia is proceeding with construction even as environmental experts and diplomats continue to work out Nile River resource management among affected countries.

The Great Ethiopian Renaissance Dam will make Ethiopia Africa's biggest power exporter in the next four years - producing 6000 megawatts of hydroelectric power. The dam will be 1708 meters long, 145 meters high and will be equipped with two powerhouses. Potential buyers of the electricity include Somalia, Uganda and even possibly Egypt.

The dam will be competed in 2017 at a cost of close to \$5 billion.

"Ethiopia Continues Dam Construction", 11/07/2013, online at: <u>http://www.voanews.com/content/ethiopia-dam-construction-continues/1699491.html</u>

BACK TO TOP



* China Shifting Balance of Power in Nile River Basin

The growing intensification of economic, political and social ties between China and Africa in the last 15 years is often told as a story of copper, petrodollars, emerging Chinatowns, and bilateral visits by heads of state.

But perhaps the most significant way in which Chinese actors are contributing to an evolving African political-economic landscape is very seldom discussed: an unprecedented wave of hydro-infrastructure construction is taking place.

Beijing is a key partner for the construction of big dams, the expansion of irrigation systems, and the building of transportation canals. This is recalibrating the domestic political economies of major African states and altering how they relate to each other.

Toppling Egypt's Hydro-Hegemony

Nowhere has China's return to Africa been more consequential from a geopolitical water-angle than in the Nile Basin, <u>which covers 11 African states</u>. For decades, the geopolitics of the Nile have been violent yet predictable. Despite being downstream, Egypt has for generations been the "hydrohegemon": the country with the best economy; the largest population; the strongest military forces; the most international prestige; and the closest partnerships with global superpowers.

Cairo invaded Sudan and Ethiopia in the nineteenth century, and intervened heavily in Sudanese politics throughout the twentieth century, whilst also standing accused of interference in Uganda and Ethiopia. The reason was simple: given their profound dependence on Nile water (97% of domestic consumption comes from the river), Egyptian elites developed a mind-set that sought to maximise their control over water used throughout the basin.

Close relations with a succession of major powers — the UK (until the 1950s), the Soviet Union (until the mid-1970s) and the US ever since — provided the political and financial backing to entrench Cairo's pre-eminent position in the basin through political-legal treaties, behind the scenes influence and actual construction of infrastructure for power generation, storage and irrigation. The record-breaking Aswan Dam was built after the <u>1959 Nile Waters Agreement</u> reserved the bulk of the river's flow for Egypt.



WATER RESEARCH PROGRAMME -Weekly Bulletin-

Egypt's pre-eminence was disliked in the Nile Basin, but chronic domestic crises in Ethiopia, Uganda and Sudan meant that countries further upstream could not do much about Cairo's hydro-hegemony. It was inconceivable that the international financial institutions would ever fund any major hydroinfrastructure projects upstream without Egypt's explicit permission, particularly given the close alliance between Washington and Cairo.

Moreover, as dams were no longer considered very useful in the strategies of development economists (they came to be associated with mass displacement, corruption and environmental damage) there was even less of an incentive for Addis Ababa, Khartoum or Kampala to invest in such costly projects, which were only feasible with massive external support. This began to change in the 1990s when several forces internal to the region collided with China's intensified role in Africa.

China revives old ambitions

China's impact on the Nile Basin has been hugely consequential in two ways. The availability of Chinese technical skills, political support and capital has given African countries options that simply did not exist prior to the 1990s. While the World Bank had become reluctant to fund major hydroinfrastructure in the developing world, Chinese companies and banks, sensing profitable business opportunities, were very eager to help Sudan and Ethiopia harness their water resources and have since become major partners in the two most ambitious dam programmes in Africa.

Sinohydro, the world's leading dam builder, has been central to the construction of the Merowe dam and the heightening of the <u>Roseires dam</u> in Sudan; with the also state-owned China International Water and Electricity Corporation closely involved in these multibillion dollar projects as well. Chin has provided loans worth more than US\$1 billion for Merowe and for Uganda's biggest hydroinfrastructure project, <u>the Karuma dam</u>,construction of which is about to begin. Chinese public funds and enterprises have also been crucial to Ethiopia's dam-building. The Industrial and Commercial Bank of China is providing essential loans for the controversial <u>Gilgel Gibe III dam</u> after the World Bank, African Development Bank and European Investment Bank withdrew, citing ecological and social concerns.



Dams as "soft power"

But there has also been a second, more subtle form of influence exerted by Beijing. Big dams and hydro-engineering were crucial ingredients in China's own domestic transformation. The prominent role played by mega-infrastructure projects in Chinese industrialisation has not gone unnoticed and is a form of soft power: as African countries have become disillusioned with "good governance" conditionality by traditional donors, and as the West's fortunes have declined with the Great Recession, alternative models of development and political order have gained greater currency.

While the exact details of China's economic miracle remain relatively poorly understood in the Nile Basin, several regimes (which several of my colleagues and I have termed "<u>Africa's illiberal state-builders</u>") have embraced a vision of entrenching political hegemony in their respective countries not dissimilar to that that of the Chinese Communist Party.

The combination of political authoritarianism with strategic control of key sectors in the economy is seen as essential to the long-term survival of the ruling party; there is a consensus among elites that jobs need to be created and services provided to key constituencies so that significant portions of the population (though not necessarily a majority) consider continuing rule and economic stability provided by the dominant party in their interest. Big infrastructure projects are an important element in this long-term economic strategy

The grand strategy of Africa's most famous illiberal state-builder, the late Ethiopian prime minister Meles Zenawi, is a good illustration of Chinese influence. Ethiopia's ruling coalition has built a deep relationship with its counterparts in Beijing and has attempted to draw important lessons from the Chinese experience, in agricultural reform and political control as well as in instrumentalising the financial sector and, crucially, developing hydro-infrastructure.

Meles designed Ethiopia's dam programme as a nation-building project – tying peripheral regions to the political centre - and turned it into the central axis of Ethiopian foreign policy, to acquire greater autonomy from the outside world and to link with Ethiopia's neighbours through energy flows. The programme was ironically a result of the erosion of the West's dominance, despite the World Bank's role in co-writing much of the technical details of the planned hydro-infrastructure. Ethiopia's



ambitions are decades old, but were politically and financially unachievable until recently. China's huge new role in the Nile Basin has made all the difference in Ethiopia, Sudan and elsewhere.

Discontent at the grassroots

The story of China's most underestimated export, however, is not all rosy. While enthusiasm for dam-building is widespread among Nile Basin governments, large segments of the Ethiopian, Ugandan and Sudanese populations are deeply sceptical about these plans. The Merowe dam and the enlarged Roseires dam displaced more than 100,000 people, many of whom already had antagonistic relations with the Sudanese regime and who blame China for working with a violent, corrupt and exclusionary elite who does not provide adequate compensation or resettlement.

Similar anger – including mass arrests and deadly protests - has erupted in Southern Ethiopia over the Gibe dams, which threaten to ruin the livelihoods of tens of thousands of local communities, who will have to make way for capital-intensive sugar production, facilitated by irrigation waters released by the new hydro-infrastructure. If Chinese soft power in the economic realm is to be sustainable, far greater support from local populations for these mega-projects that are remaking East Africa is needed. While Chinese companies cannot assume tasks that a sovereign government should be responsible for, the increasingly ugly fall-out from hydro-development projects should encourage a reconsideration of how a more effective contribution can be made to sustainably develop Africa's water resources.

"China Shifting Balance of Power in Nile River Basin", 04/07/2013, online at: <u>http://www.chinadialogue.net/article/show/single/en/6178-China-shifts-power-balance-in-the-Nile-river-basin</u>

BACK TO TOP



* 26% of water samples in Mumbai unpotable

PUNE/MUMBAI: One in four samples of drinking water in the city was found contaminated in tests at the Pune-based State Public Health Laboratory (SPHL) last month. The problem has increased significantly this monsoon, with 26% of the samples found unfit for consumption as against 16% last year.

Water contamination exceeding 10% in city areas and 20% in rural areas calls for instant remedial measures, scientists from the lab said. SPHL tested 5,177 samples from Mumbaiâ€"as part of tests on samples from 35 districtsâ€" and 1,356 were found contaminated. Contaminants included e-coli, traces of sewage water and other foreign particles.

The BMC's own data for June showed that 20% of the 3,269 water samples tested were contaminated, as against 12% in May.

TOI had reported extensively on the contaminated water supply in its July 9 and 10 editions.

Smriti Raokar, a resident of Kohinoor Mill compound in Dadar, said they have been getting turbid water for a week and had been forced to buy packaged water. "The BMC should refund the money they take from us as water charges as they are unable to provide drinkable water," said Raokar.

Municipal commissioner Sitaram Kunte was unavailable for comments.

Civic officials attributed the contamination to dirty water seeping into leaking and cracked water pipelines. They say the long-term solution is to replace all the old pipelines in the city's complex water-supply network, as with every passing year, these pipelines are deteriorating further.

"The solution is to replace the pipelines, which is yet to begin and might take a long time as it is a cumbersome and time-consuming process," said a senior civic official.

In all, the Pune-based State Public Health Laboratory (SPHL) tested 96,000 water samples. Mumbai was second only to Jalna in the number of contaminated samples. Neighbouring Thane and Pune fared much better. Of the samples taken from Pune city, only 1% showed contamination.



In Mumbai, the heavy showers had led to complaints from areas such as Dadar, Naigaon, Ghatkopar, Kurla, Byculla and Mazgaon of muddy water being piped into houses by the BMC for more than two weeks.

The fallout from the contamination is becoming evident across the city. Incidences of water-borne diseases are increasing in proportion to complaints of contaminated water flowing through municipal pipes and taps. After 12 cholera cases were recorded in June, eight confirmed cases of the dreaded disease were reported in the first eight days of July. Cholera is an infectious disease that causes severe diarrhea, dehydration and, in rare cases, death.

BMC additional municipal commissioner Manisha Mhaiskar had told TOI on Monday that cholera was something new this year as it was not reported last year. Other diseases linked to contaminated drinking water, such as gastroenteritis and jaundice have also been reported.

"26% of water samples in Mumbai unpotable", 11/07/2013, online at: <u>http://articles.timesofindia.indiatimes.com/2013-07-11/mumbai/40513582_1_water-samples-water-pipelines-turbid-water</u>

BACK TO TOP



China, Taiwan brace for typhoon as flood toll exceeds 200

BEIJING/TAIPEI, July 12 (Reuters) - China and Taiwan braced on Friday for the impact of Typhoon Soulik as the toll of dead and missing from torrential rain across a broad swathe of China climbed beyond 200.

Soulik is expected to hit northern Taiwan later in the day, before crossing the narrow Taiwan Strait and slamming into China's provinces of Fujian and Zhejiang on Saturday.

"Government departments must place saving people's lives as their top priority," Chinese state media quoted Premier Li Keqiang as saying, as officials scrambled to tackle the floods.

The Taipei city government has ordered companies and schools to send staff and pupils home early, although the financial markets will operate normally.

Taiwan's China Airlines and Hong Kong-based Cathay Pacific Airways Ltd both warned of significant cancellations and disruption of flights to and from Taiwan on their websites.

The storm will also pass close to the far southern Japanese islands of Ishigaki and Miyako.

China has ordered fishing boats to return to port and suspended ferry links to Taiwan, official news agency Xinhua said.

The typhoon approaches as large parts of China are already being lashed by torrential rain.

At least 36 people have died in flooding in the southwestern province of Sichuan since the weekend, and 166 people are missing, the China News Service said.

State television has broadcast dramatic pictures of bridges and houses being washed away around Beichuan and Dujiangyan in Sichuan, a region that is still recovering from a massive earthquake in 2008 that killed nearly 70,000 people.

China's Ministry of Civil Affairs said flooding had also hit Xinjiang in the far west as well as Tibet and Beijing, the capital. In Inner Mongolia at least five people have died, it added. (Reporting by Ben



Blanchard in BEIJING and Faith Hung in TAIPEI; Additional reporting by Elaine Lies in TOKYO; Editing by Clarence Fernandez)

"China, Taiwan brace for typhoon as flood toll exceeds 200", 12/07/2013, online at: <u>http://www.trust.org/item/20130712050845-</u> <u>w0zqm/?source=hptop&utm_source=Circle+of+Blue+WaterNews+%26+Alerts&utm_campaign=c01df77388-</u> <u>RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-c01df77388-250657169</u>

BACK TO TOP



***** The waters must run...

Know the word Potamology? Our familiarity with the term is as poor as our understanding of rivers as an ecosystem

This would have been a *crorepati* 'clincher' at the next season of *Kaun Banega Crorepati*. What is the common thread between Mesopotamia Hippopotamus and Potamon? The options are: Crab; Continent; River; Song.

While the person naming 'river' as the correct answer, would be a fitting*crorepati*, the question would have flummoxed most, not excluding the fabled life-lines. And herein lay the real tragedy facing our rivers.

Potamos is Greek for 'rivers' and as it can be easily made out that it is the root word of all the three mentioned above. Mesopotamia is the 'land between two rivers' (Euphrates and Tigris, in what is now Iraq); Hippopotamus is so named after 'horse of the river', while Potamon is the scientific name given to 'river crabs' found in southern Europe, west Asia through to north west India.

Potamology is 'the scientific study of Rivers'. But the fact is that our familiarity with the term Potamology (even the online dictionary of a Sony laptop is unaware of it) is as poor as our understanding of rivers as an ecosystem. This unfortunate situation, we believe is behind the step-motherly treatment received by 'rivers' at the hands of most stakeholders and sometimes even of those who ought to have known — based on their education, training or experience — much better.

It was way back in 1897, when Professor Albrecht Penck lamented in an article titled 'Potamology as a Branch of Physical Geography' published in the December issue of *The Geographical Journal* that: "Of the different departments of physical geography, treating of the hydrosphere, none has advanced more slowly then the science of rivers." He went on to write that "the science of rivers, which may be called Potamology, must be treated under five different heads. The physics of running water; the volume of water and its fluctuations; the action of water on its bed; the distribution of running water on earth; and rivers as a scene of organic life.

Prof. Penck then in the article went on to describe in great detail why the science of rivers (characterised by their running waters) deserved a special treatment and minute studies.

Unfortunately, saner voices like those of Prof. Penck were lost in the din of the 20 century grand march towards big dams; hydro-power and 'green' (sic) revolution, whence rivers were reduced to malleable pipes of water, and no more. Their sustained existence as a necessary ecosystem for a healthy earth and life on it was lost sight of until recently, when the ill effects of the devastated river ecosystems started to manifest themselves in ways more than one. Now there is a clamour to 'repair' the rivers, again in a very man's view of the world.



Even our founding fathers while drafting the nation's Constitution could not rise above the usual prejudices relating to rivers as mere source of utilisable water and the later planners and policy makers continued to follow suit by their inability to look, understand and safeguard our rivers beyond how much water could they provide or where a dam and their canals could be built or not. The fact that water in a river 'runs' and that this is its defining property seemed to remain no one's concern.

Later realising that all was not well, man started talking in terms of providing 'minimum flows' in rivers as if the rivers as ecosystem could do with doles handed out by humans. No wonder, our rivers are fast approaching a possible doomsday scenario. How and in what manner would such a situation impact our 'climate' already struggling against man-induced green house gases, and then ultimately our own selves is still in the realm of guesswork.

To set the record straight of how should a river be holistically viewed, we have tried to make a humble attempt, based on our own understanding from many years of research and working with river Yamuna: "Rivers are natural dynamic ecological system, marked by uni-directional flow down a gradient of water, sediments and energy, with key influences on associated geo-morphology, soils, micro-climate, ground and surface water sources and the aquatic and riparian biodiversity".

Clearly rivers are multi-hued and a promotion and practice of Potamology can thus in man's own interest no longer be delayed.

"The waters must run...", 07/07/2013, online at: <u>http://www.thehindu.com/news/cities/Delhi/the-waters-must-run/article4885450.ece</u>

BACK TO TOP



* In Mekong Delta, Rice Boom Has Steep Environmental Cost

Vietnam has become one of the world's leading rice producers, thanks to the construction of an elaborate network of dikes and irrigation canals. But these extensive infrastructure projects in the storied Mekong Delta have come at a high ecological price.

Phan Dinh Duc leans against yellow sacks of freshly harvested rice. It's a warm spring evening in Vietnam's Mekong Delta, and Duc, a local farmer, is waiting for traders to arrive by truck to purchase his produce and sell it on commodities markets. Beyond him lies a vast checkerboard of rice paddies, each filled with water and bordered by a network of canals and roughly 10-foot-high earthen dikes. They enable year-round rice cultivation in an area where, a half century ago, vast floodplains typically lay fallow for half the year and farmers planted one annual rice crop that grew in tandem with seasonal floods.

Here in the southern province of An Giang, a stronghold of Vietnam's booming rice industry, yields have increased fourfold in the last four decades. The initial surge occurred thanks to the development of high-yielding rice varieties and the construction of so-called "August dikes," which extended the end of the rice-growing season from June to August and enabled farmers to plant a second annual crop. Larger <u>dikes built in the 1990s and early 2000s</u> allowed farmers like Duc to plant a third crop on the same acreage. Within a generation, Vietnam has gone from a poor country where the government rationed rice and other staples, to a lower middle-income one that is now among the world's top rice producers.

But scientists say that the ongoing construction of dikes and irrigation infrastructure across the Mekong Delta and along the country's South China Sea coastline has disrupted the river delta's complex ecological systems. In upstream areas, for example, high dikes block the natural flood pulse and deprive downstream floodplain farms and fisheries of key nutrients. Agricultural chemicals also pollute irrigation canals and cause water and soil to acidify, which scientists say has contributed to a decline in fish populations and a general loss of biodiversity.



Along Vietnam's southern coast, sluice gates and dikes — built to enable freshwater rice farming and prevent the upstream movement of saline water during the dry season — have restricted the transfer of organic material between freshwater and saline aquatic environments. That has led to mass die-offs of nypa palm, an endemic palm species with a wide range of commercial uses. It also threatens large swaths of coastal mangroves as shoreline dikes interrupt a balanced flow of fresh- and saltwater-based nutrients. Scientists say if the mangroves die, Vietnam would be even more vulnerable to intensifying storms and <u>rising sea levels</u> linked to climate change.

These myriad environmental problems have prompted Vietnamese and international scientists to call on the government to enact measures that will benefit both the economy and the environment in the long term. Their recommendations include abandoning the third rice crop, implementing controlled flooding in the upstream delta to induce sedimentation, moving coastal sea dikes farther inland to allow mangroves to flourish, and creating "dynamic shorelines" that would allow for a better mix of saline and fresh water systems. Vietnam's ruling Communist Party now faces a difficult choice: continue promoting rice as a flagship export commodity and suffer the environmental and social consequences of degraded soils and ecosystems, or abolish the third rice crop and resist the urge to build even more water-control infrastructure.

The government is discussing the merits of its longstanding "rice first" policy, which has <u>encouraged</u> <u>steady intensification of rice production</u>, but incentives to maintain the status quo are high. Population growth and a stagnant economy put heavy pressures on provincial officials to boost exports and profits in the short term. And Vietnam's agricultural sector is dominated by politically connected state-owned companies that want to continue to reap big profits from export earnings.

"It's an economic analysis: Where do you put the damage?" says Martijn van de Groep, an economist from the Netherlands who manages a Dutch-Vietnamese project, <u>the Mekong Delta Plan</u>, to create a 100-year roadmap for the region's development. "The underlying question is if Vietnam wants to remain a major rice exporter... or focus on other issues."

The Mekong Delta, which spans Cambodia and Vietnam and is roughly the size of Switzerland, is an extremely complex tidal system. The Mekong River begins in the Tibetan plateau and flows hundreds



of miles through China and Laos before splitting into nine tributaries that empty into the South China Sea. Every autumn it overflows its banks and deposits sediment in the delta's nutrient-rich floodplains. During the December-to-April dry season, saline ocean water <u>travels as far as 18 miles</u> <u>upstream</u>.

In the late 1960s, the United States and the International Rice Research Institute helped the government of the former South Vietnam boost rice production by promoting hybrid seeds and building irrigation canals and dikes. The new seeds significantly increased yields, and the dikes allowed farmers to either keep some floodwaters out during rainy periods or pump water in during drier ones.

The campaign to control the delta's hydrology gained momentum in the 1990s, when the government built a network of higher dikes around farms and constructed sluice gates at the mouths of rivers and canals. Both upstream and downstream gates helped to regulate floodwaters traveling downriver from Cambodia. And throughout the delta, so-called "high dikes" were built above the mean flood level, which further minimized the impact of flooding and saline intrusion on agriculture and allowed for year-round cultivation despite a monsoonal climate.

Today, Vietnam produces more than enough rice to feed its 90 million people, a far cry from the post-war years of the late 1970s, when the Communist government feared famine. (Although the state technically owns all of Vietnam's land, much of the country's rice is produced by farmers who cultivate small plots under a 1993 land law that granted them conditional land-use rights.) But environmental costs are rising, says Jake Brunner, Mekong program coordinator at the International Union for Conservation of Nature. A long-term decline in water quality has contributed to the collapse of several native fish populations, he explains. And as less water flows downstream, more saline water flows upstream in the dry season.

Building high dikes in such a rich floodplain also prevents the flow of soil nutrients. The farther a rice paddy lies from where water enters a dike, the less organic matter the water contains when it arrives, explains Charles Howie, a Vietnam-based biologist affiliated with Royal Agricultural University in Britain. In addition to damaging soil quality, the lack of nutrients will eventually cause



land to sink because it does not receive enough sediment. The rise of triple-cropped rice across An Giang has increased annual yields from 2 or 3 tons per hectare in the 1970s to 22 tons per hectare today. But Howie, a faculty advisor at An Giang University, says it also has required steadily increasing chemical inputs. "Down the road, the soil may not give you what you want," he adds.

Along the coast, the construction of dikes has also enabled coastal farmers to switch from rice to shrimp farming, which requires a brackish environment. Now the two farming practices exist in an uneasy equilibrium: Shrimp farming is often conducted inside ring dikes, causing effluent to concentrate rather than flow out to sea. And<u>according to a study</u> led by Le Anh Tuan of Can Tho University and a team of international researchers, as brackish water is increasingly pumped inland, saline water travels upstream through a network of irrigation canals, polluting rice fields and wells and spurring deeper drilling to reach the delta's groundwater.

With mangroves dying on the delta's costal edges, the German and Australian governments — working with the Ministry of Agriculture and Rural Development — have committed up to 28 million euros (\$36.2 million) for climate-change-adaptation projects. One of the projects will support efforts to build coastal fencing made from trees, with the goal of reducing wave action along eroded coastlines and enabling young mangroves to take root despite stormy seas. But the government recently built a few concrete sea dikes in coastal areas where erosion had destroyed earthen dikes, and building more of them in the coming years will pose a serious threat to mangrove ecosystems, says Andrew Wyatt, a researcher at the Institute of Tropical Biology in Ho Chi Minh City.

The Mekong Delta is still relatively underdeveloped compared with the Mississippi and other river deltas where large-scale infrastructure has led to land subsidence and a range of other environmental problems. But scientists are concerned that the delta could begin to resemble the more developed deltas in the United States and the Netherlands, where planners are only now realizing the pitfalls of building heavily engineered flood control and irrigation systems. And although the environmental effects of triple-crop rice planting are increasingly apparent in the Mekong Delta's upper reaches, it is unclear whether scientists' calls for Vietnamese officials to abandon their longstanding "rice first" policy will gain political currency with an authoritarian government plagued by inefficiency and corruption. Observers say the Ministry of Agriculture and Rural Development typically pursues



policies that favor economic growth over ecological concerns.

The irony, experts say, is that the Mekong Delta's rice farmers don't see substantial economic benefits from the extra crop: Their rice is of low quality, currently selling to traders for as little as 16 cents per kilogram, and any extra income is usually offset by the need to buy more pesticides and fertilizers — even though their efficiency is reduced after a shift from double- to triple-cropping, according to the World Bank.

"You have a 'rice first' policy that sacrifices the interest of the poorest for the wealthy," says Brunner of the IUCN. "From an equity perspective, it makes no sense whatsoever. But this 'rice at all costs' approach is deeply ingrained, and there are strong commercial interests."

"In Mekong Delta, Rice Boom Has Steep Environmental Cost", 11/07/2013, online at: http://e360.yale.edu/feature/in_mekong_delta_rice_boom_has_steep_environmental_cost/2670/?utm_source=Circle+of+ Blue+WaterNews+%26+Alerts&utm_campaign=c01df77388-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_c1265b6ed7-c01df77388-250657169

BACK TO TOP